



# **DATA LINK GROUND SYSTEM STANDARD AND INTERFACE SPECIFICATION (DGSS/IS)**

**ARINC SPECIFICATION 620-4**

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DATA LINK GROUND SYSTEM STANDARD AND INTERFACE  
SPECIFICATION (DGSS/IS)

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Prepared by the Airlines Electronic Engineering Committee

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A description of the changes introduced by each supplement is included (on goldenrod paper) at the end of this document.

## FOREWORD

### Activities of AERONAUTICAL RADIO, INC. (ARINC) and the Purpose of ARINC Reports and Specifications

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- (1) To indicate to the prospective manufacturers of airline electronic equipment the considered opinion of the airline technical people coordinated on an industry basis concerning requisites of new equipment, and
- (2) To channel new equipment designed in a direction which can result in the maximum possible standardization of those physical and electrical characteristics which influence interchangeability of equipment without seriously hampering engineering initiative.

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## 1.0 INTRODUCTION

### 1.1 Purpose of this Document

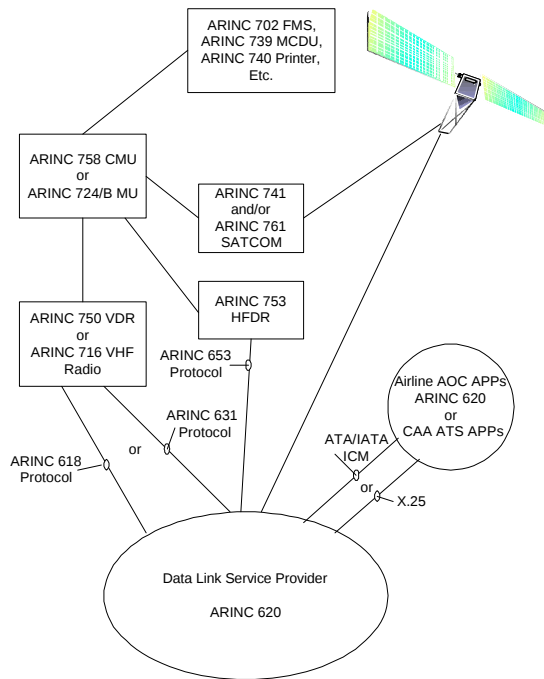
This document sets forth the desired interface characteristics of the data link service provider to the data link user. The intent of this document is to provide data link users the information needed to develop applications and to encourage uniformity and standardization, to the extent possible, among the various data link service providers. This document contains general and specific guidance concerning the interfaces between the data link service providers and both the airborne and ground user.

### 1.2 Scope

This document describes the inputs, functions and outputs of the data link service provider system from the perspective of the data link user. The functions are described in the detail necessary to provide a complete understanding of what the functions do while not restricting the data link service provider network internal implementation. Where there are differences in message formats or functions provided between the various service providers which affect the data link user interface, the differences are specifically described.

### 1.3 Relationship of the Specification to Other Standards

The documentation of the protocols to be exercised within the ACARS environment is shown pictorially in Figure 1-1, ACARS Documentation, below.



The protocols used onboard the aircraft by subsystems participating in ACARS are defined in ARINC Specification 619, "ACARS Protocols for Avionic End Systems".

The protocols and procedures to be used for ACARS communications between the airborne user and the data link service provider network are described in ARINC Specification 618, "Air/Ground Character-Oriented Protocol Specification".

The capabilities of the onboard equipment are defined in ARINC Characteristics 597, 724 or 724B as applicable. Provisions defined within from these Specifications and Characteristics are not duplicated in this document except as necessary to clarify the data link service provider to data link user interface.

The ACARS communications function may be provided by a Communications Management Unit (CMU) in lieu of an ACARS MU. The CMU is described in ARINC Characteristic 758. When acting as an ACARS MU, the CMU utilizes the protocols and procedures defined in ARINC Specification 618.

The CMU is designed to support bit-oriented message transfer utilizing the protocols and procedures for routing defined in ARINC Specification 637A. The CMU will interact with onboard systems that supply mobile air/ground communications over VHF, satellite and HF media. These subnetworks are described by AEEC standards:

|                                |                                                     |
|--------------------------------|-----------------------------------------------------|
| VHF Data Radio (VDR)           | ARINC Characteristic 750                            |
| Aviation Packet Communications | ARINC Specification 631A                            |
| Aviation Satellite System      | ARINC Characteristics 761 and 741 Part 1 and Part 2 |
| HF Data Link System            | ARINC Characteristic 753                            |
| HF Data Link Protocols         | ARINC Specification 635                             |

The CMU provides routing and transport services for the aircraft per ARINC Specification 637A.

The protocols and procedures to be administered by the data link service provider are contained herein.

The protocols used between the ground-based user and the data link service provider network are described in the ATA/IATA Interline Communications Manual (ICM).

### 1.4 System Description

The transport of ACARS Application data over the Air/Ground segment can be accomplished using services which are twofold:

- The ACARS 618 Communications Service defined in ARINC Specification 618, which specifies the use VHF, AMSS Data-2 and HF data links as candidate Air-Ground data links.
- The ICAO-compliant Communications Services defined in ARINC Specification 637A, which specifies means of interfacing to the ICAO-compliant Subnetworks.

This document specifies a common ACARS user interface to access both Communications Services over the Air/Ground segment.

#### 1.4.1 ACARS System Description

The character-oriented version of mobile communications is referred to as the Aircraft Communications Addressing and Reporting System (ACARS). This system enables

**1.0 INTRODUCTION (cont'd)****1.4.1 ACARS System Description (cont'd)**

aircraft to function as mobile communications terminals. With ACARS, aircraft operate as integral parts of an airline's command, control and management systems.

c-4 ACARS provides message transfer between airborne users and ACARS Ground Users via air/ground links and ACARS Ground Networks.

Attachment 1-1 shows a typical end-to-end communications environment and applicable Characteristics/manuals.

c-4 The protocols and formats used to transmit messages between the ACARS Ground User and the data link service provider network (Ground/Ground segment) differs from the protocols and formats used to exchange messages between airborne user and the data link service processor (Air/Ground segment). It is the responsibility of the data link service provider to provide translation between these protocols and formats as well as to provide proper message routing. The formats of messages exchanged between the ACARS Ground data link user and the data link service provider network are fully described in this document. The format for ACARS Application Text to be exchanged between the airborne user and the data link service provider network is also defined in this document.

The format used to transmit messages between the ACARS Ground User and the ACARS Ground Network is referred to as Standard Message Text (SMT), which uses Standard Message Identifiers (SMI) and Text Element Identifiers (TEI). See Appendix B for SMI/TEI descriptions. The data link service provider is responsible for putting messages received from aircraft (downlink ACARS messages) into SMT format for consumption by the Ground data link user, and sending them to their ultimate destination(s). Similarly, data link service providers reformat messages received in SMT from the data link ground based user into air-ground message formats having labels/sublabels/ACARS Text and then pass the reformatted messages on to the airborne user.

**1.4.2 ACARS Use of ICAO-Compliant Communication Services****1.4.2.1 ICAO Compliant Subnetworks**

The early ACARS 618-compliant subnetworks (VHF ACARS, HF ACARS, AMSS Data-2 ACARS) are being replaced by a new generation of air-ground communications.

c-4 These new air-ground subnetworks such as VDL (VHF Digital Link) and AMSS Data-3 offer bit-oriented air/ground data communication services based on the Open Systems Interconnect (OSI) architecture and provide the communication framework supporting the Aeronautical Telecommunication Network (ATN) over VHF and Satellite media. Other ICAO-compliant Subnetwork are being specified such as HFDL or Iridium systems which are also potential candidate for transfer of ACARS Application data over the Air/Ground segment.

In particular, the VHF ICAO-compliant air-ground subnetwork is termed Aviation VHF Packet Communications (AVPAC) in AEEC terminology and

VDL (VHF Digital Link) by ICAO. The two primary standardization organizations that have developed the VDL subnetwork are ICAO Aeronautical Mobile Communication Panel (AMCP) and Airlines Electronic Engineering Committee (AEEC). The AMCP specified and validated VHF Digital Link (VDL) Standard and Recommended Practices (SARPs) for the Air Traffic Services (ATS) community. In parallel to these efforts, the AEEC subcommittee 631 has also developed AVPAC (Aviation VHF Packet Communications) for the Aeronautical Operational Communications (AOC) community. Both the VDL and AVPAC specification documents outline a common design for this second-generation VHF data link system. In actual fact, the AVPAC specification 631, "Aviation VHF Packet Communications (AVPAC) Functional Description", makes direct reference to the ICAO VDL SARPs and is updated to accommodate specificities for ACARS to use of this new air-ground protocol.

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**1.4.2.2 ICAO ATN Communications Services**

A new architecture for the use in the Aeronautical Telecommunications Network (ATN) environment offers interoperability between various terrestrial, air/ground and avionics subnetworks through conformance with a single bit-oriented ATN Internetworking Protocol, ATN Addressing Plan, and ATN Routing Plan.

**1.4.2.3 ACARS Transition Aspects**

ARINC Specification 637Aspecifies the means for ACARS Applications to benefit from the ICAO-compliant Communications Service.

## 2.0 DATA LINK SYSTEM

### 2.1 Overview

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Data link is the generic term for air/ground communications which allow transfer of digital information between aircraft and ground based computers connected through a data link service provider's transport network. Possible ways of communicating between a point on the ground and an aircraft in flight are line-of-sight VHF, HF and satellite. As data link use increases, it becomes necessary to have data link channels constantly available. Data link service providers usually have both satellite systems as well as VHF facilities to present precisely the same interface to user's ground based computers.

Introduction of digital air/ground communications (data link) enables direct connection between equipment onboard an aircraft in flight and a service provider's transport network. For the flight crew, this means being able to generate and receive messages as if they had teletype facilities. Furthermore, text-editing capabilities of modern terminals reduce to a minimum the data entry workload on the crew. As well as message exchange capability between aircraft and any destination connected to a service provider's transport network, it is possible to offer interactive access to databases located on the ground. The direct, real-time data exchange allows information to be passed to the aircraft, only involving the crew when necessary for flight operation.

Direct connection of onboard equipment to a modern ground-based data transport network, gives air/ground communications (data link) the benefit of improved accuracy due to automatic error detection.

In addition to manual data entry and printer equipment interfacing with the crew, onboard data link avionics can be connected to other onboard computer-based systems. Some of these are Aircraft Integrated Monitoring System (AIMS), Flight Management System (FMS), and Centralized Maintenance Computer (CMC). These systems send and receive information via data link without requiring crew intervention. Onboard computer systems interface with user's ground based computers which themselves may be fully automatic or manually operated.

The concept of data link is that digital data are passed between an aircraft and a ground station. Equipment required onboard for data link is known as an ACARS Management Unit (MU). ACARS is an acronym for Aircraft Communication Addressing and Reporting System. This name comes from Airlines Electronic Engineering Committee (AEEC) documentation which defines equipment and protocols used on the air/ground channel. The MU is connected to a standard airborne transceiver for data link communication, and may be connected to other airborne equipment via an airborne communication bus defined in AEEC Characteristic 429.

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Equipment necessary on the ground side of data link has a function similar to the ACARS MU. It is generally known as a Remote Ground Station (RGS).

In a data link system, multiple users make use of the same RGS thus optimizing the sharing of resources among members. To achieve this sharing, all stations are connected to a central exchange system. All communications between a data link user and its aircraft pass through this data link processor. The data link

processor performs more than a concentration function. In order to avoid each user having to develop a system using ACARS protocol, it performs this service. It also performs a tracking function used to choose which RGS communicates with what aircraft. Communication between the data link user's ground based computers and the service provider's data link processor conforms to protocols and formats defined in the ATA/IATA Interline Communications Manual (ICM).

### 2.2 Message Transport

Message transport describes the mechanisms involved with the delivery of messages from source to sink. An aircraft or a ground user can either be a source or a sink. When an aircraft (source) initiates message traffic, a service provider will forward the contents of the message (downlink message) to the appropriate ground user (sink). When a ground user (source) initiates message traffic, a service provider will attempt to deliver the contents of the message (uplink message) to the appropriate aircraft (sink).

#### 2.2.1 Uplink Message Handling

Ground user generated uplink messages are sent to data link service providers as Type-B SMT messages (see Chapter 3.0 and ATA/IATA ICM for details).

If the uplink message is formatted properly and contains the information necessary for proper delivery to the aircraft (See Section 3.2.1.), the DSP will convert (reformat) the SMT Ground/Ground message into Air/Ground message. See Section 2.2.5 for handling of improperly formatted messages and unsuccessful delivery of messages.

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#### 2.2.2 Downlink Message Handling

Aircraft generated downlink Air/Ground messages are converted by the DSP (reformatted) into an SMT ground/ground message and forwarded to the proper address(es). Refer to Section 2.2.5 for air/ground messages that cannot be properly reformatted or addressed.

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#### 2.2.3 Accountability

The acknowledgment of a ground user uplink message by the DSP implies that the DSP will deliver the uplink message to the aircraft specified or return an intercept message to the message originator specifying the reason for non-delivery.

If an aircraft generated downlink message passes all validation criteria and data link service providers acknowledge (ACK) the message, then data link service providers accept responsibility to deliver that message to the ground user (airline or other host computer) identified in the downlink message. Data link service providers have the option not to acknowledge (ACK) an aircraft generated downlink message.

Data link messages are fully protected from source to sink, however, there is no end-to-end acknowledgment process. End-to-end acknowledgments are the responsibility of the end systems. Message originators receive positive acknowledgment (ACKs) from interim/final handlers only when error free transmissions have been logged to safe storage. These ACK processes are documented in both the ATA/IATA ICM for TYPE-B message switching traffic,

**2.0 DATA LINK SYSTEM (cont'd)****2.2.3 Accountability (cont'd)**

and in ARINC Specification 618 and Specification 637 for air/ground transmissions.

**2.2.3.1 Internetworking**

Data link service providers may offer internetworking as a service option. Using internetworking capabilities, a data link service provider transfers to another data link service provider uplink messages destined for aircraft not currently listed in the initial data link service provider's aircraft location information. Similarly, a data link service provider accepts uplink messages from another data link service provider unable to deliver the messages.

Data link service providers that initially accept (ACK) uplink messages are responsible either to ensure that messages are delivered, or to intercept unformattable/undeliverable uplink messages to ground users (airline or other host computers).

**2.2.4 Prioritization**

Data link service providers use a prioritization scheme which emphasizes minimum end-to-end delay to ensure prompt and safe delivery of uplink messages from ground users (airline or other host computers) to aircraft, and downlink messages from aircraft to ground users.

Network management functions take highest precedence in the prioritization scheme to ensure proper link operations.

Acknowledgments to downlink messages from an aircraft are sent upon successful receipt by data link service providers with a priority higher than that of uplink messages to that aircraft.

All voice channel requests are processed prior to any other service related messages scheduled to be delivered to any particular aircraft.

Uplink and downlink message processing are independent processes having no prioritization scheme between them.

NOTE: In addition, message prioritization is handled by the DSP in such a manner to ensure that no individual ground user is favored over another.

**2.2.5 Intercept Message Handling**

Messages which cannot be transmitted, reformatted or successfully delivered by the DSP will be intercepted by the DSP and forwarded to the appropriate ground user. See Section 3.3 for detailed format information for intercepted messages.

**2.2.5.1 Untransmittable Uplink Messages**

Uplink SMT messages which cannot be properly reformatted into air/ground message blocks will be intercepted by the DSP and returned to the message originator with the reason for message interception.

**2.2.5.2 Undeliverable Uplink Messages**

Uplink SMT messages which were properly reformatted but not successfully delivered to the aircraft will be intercepted

by the DSP and returned to the message originator with the reason for message interception. The simplest case is when an aircraft is out of range of a DSP's coverage area, and the DSP receives no acknowledgment from the aircraft.

**2.2.5.3 Unformattable Downlink Messages**

Downlink messages that cannot be properly reformatted by the DSP will be intercepted and delivered to the ground user address associated with the label/sublabel combination specified in the downlink air/ground message.

Downlink messages that cannot be properly addressed by the DSP will also be intercepted and delivered to a central ground user address designated to handle intercepted messages.

Finally, downlink messages which cannot be identified by agency will be intercepted and delivered to a DSP intercept handling site and then manually interpreted.

**2.3 Flight Following**

Data link service providers maintain information on the last known transmission path of all aircraft in their area of coverage. Aircraft transmission path information for enroute aircraft is kept for a period of at least "x" minutes (see Appendix D). Information concerning on-ground aircraft is maintained based on each DSP's requirements.

**2.3.1 Aircraft Tracking**

Aircraft transmission path information enables data link service providers to identify the last known approximate location of all aircraft kept in the data link system for the interval of time that aircraft transmission paths are maintained.

**2.3.2 Optional Geographic Locator (GL) or Airport Locator (AP)**

Data link service providers accept uplink messages with or without the geographic locator (GL) or the airport locator (AP) text element identifier TEI, and deliver uplink messages using the best available aircraft location information.

**2.3.3 Aircraft Identification**

Data link service providers accept uplink messages addressed by Flight-ID (FI) or by Aircraft-Number (AN). For this reason, they maintain a correspondence table that is updated by each downlink message in order to locate the uplink path for the message based on the addressing format used.

Even though the aircraft tracking table can be updated with every downlink, the updating of the Flight-ID table should obey the following rules:

Do not update the table for a Flight-ID that does not correspond to the definition of the field contained in Sections 2.3.3 of ARINC Specification 618.

Do not update the table for values that are known to be wrong (e.g., all NULs).

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**2.0 DATA LINK SYSTEM (cont'd)**

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Do not update the table when the downlink message is a "H1" message.

**COMMENTARY**

"H1" downlink messages contain a Flight-ID value that is generated by a peripheral device which may not have been initialized properly.

**2.4 Network Management**

Station advisory messages are used to inform the ground user (airline or other host computer) of the current status of a data link service provider ground station.

**2.4.1 Data Link Station Outage Status (AOS)**

Station advisory outage messages provide a current list of inoperable data link stations whenever a station becomes inactive.

**2.4.2 Data Link Station Restoral (ARA)**

Station restoral advisory messages provide the ground user (airline or other host computer) with a list of data link stations which were recently restored to service.

**2.4.3 Data Link Station Addition (ASA)**

Station addition advisory messages inform the ground user (airline or other host computer) of the existence of new data link stations available for data link traffic.

**2.4.4 Data Link Station Deletion (ASD)**

Station deletion advisory messages inform the ground user (airline or other host computer) of the permanent removal of data link stations from the network.

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**2.5 DSP Connectivity Offering**

As a service option, data link service providers may provide connectivity to other data link service providers, agencies, and networks.

An outside agency (e.g., ATC) is one who has direct access to aircraft to provide services usually accomplished by ground users (airline or other host computers). Authority for this access must be obtained from both the ground user and from the data link service provider(s).

The DSP interaction with the Data Link Service User concerning error handling is "reporting by exception", that is, the user may assume the message has been delivered unless a reject message is returned.

**2.5.1 Data Link Service Provider Exchanges**

A ground user (airline or other host computer) may contract with a single (primary) data link service provider. If so, this data link service provider has established, or will establish, message handling agreements with other data link service providers to assure that messages are forwarded to/received from specified aircraft addresses.

Aircraft location information of ground users (airline or other host computers) that contract for internetworking services

with multiple data link service providers is exchanged between the contracted data link service providers so that ground user (airline or other host computer) uplink messages are efficiently delivered.

**2.5.2 Data Link Station Restoral (ARA)**

Station restoral advisory messages provide the ground user (airline or other host computer) with a list of data link stations which were recently restored to service.

**2.5.3 Data Link Station Addition (ASA)**

Station addition advisory messages inform the ground user (airline or other host computer) of the existence of new data link stations available for data link traffic.

**2.5.4 Data Link Station Deletion (ASD)**

Station deletion advisory messages inform the ground user (airline or other host computer) of the permanent removal of data link stations from the network.

**2.6 Function Summary**

A summary of data link system functions provided by each data link service provider is presented in Appendix F.

**3.0 MESSAGE HANDLING**

AEEC STAFF NOTE: Due to the extensive use of tables, this section is presented in single column format rather than the usual two-column format of ARINC documents.

**3.1 Introduction**

This chapter describes the handling of messages by the Datalink Service Provider. The messages are identified in two categories of traffic flow :

Downlink: from the aircraft to the ground user.

Uplink: from the ground user to the aircraft.

The path of the ACARS data link messages is broken into two segments as illustrated in the figure in Section 1.3, Ground/Ground and Air/Ground.

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This chapter provides information on the format of messages in each direction of traffic flow. This chapter also includes a description of the Service messages and Network Advisory messages sent to the ground user by the DSP to indicate the status of the ground station network.

**3.1.1 Chapter Outline**

This Chapter is broken down into several sections as follows:

**Section 3.1** provides basic definitions and a brief an outline of this chapter.

**Section 3.2** describes the handling of Ground/Ground messages by the Data link Service Provider and the conversion rules that are applied by the DSP to forward message to and from the Air/Ground and Ground segment. It specifies the use on the DSP interface to ground systems of the IATA Standard Message Text (SMT) format. The function of ACARS messages is indicated on the interface to the ground systems by a three-character Standard Message Identifier (SMI) and on the interface to the aircraft by a two-character "ACARS label".

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**Sub-section 3.2.1** specifies Ground/Ground message formats and content in each direction of traffic flow in the form of characters encoded as 7-bit binary codes using the ASCII or ISO No. 5 alphabet, limiting the content of the user data to the codes which represent printable characters.

**Sub-section 3.2.2** describes the Downlink Conversion Function that generates Ground/Ground data elements from Air/Ground data elements.

**Sub-section 3.2.3** describes the Uplink Conversion Function that generates Air/Ground data elements from Ground/Ground data elements.

**Section 3.3** includes a description of the Service messages sent to the Ground users by the DSP on the Ground/Ground segment.

**Section 3.4** includes the Network Advisory messages sent to the Ground users by the DSP indicating the status of the ground station network.

**Section 3.5** specifies a generic User Interface by a set of primitives used between the 620 ACARS Messaging Function of the Air/Ground segment and either the "618 ACARS Communications Service" defined in ARINC Specification 618 or the emulation of the 618 ACARS service.

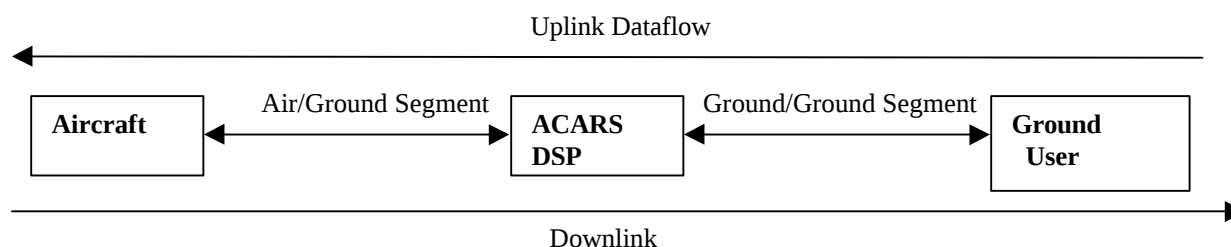
**Section 3.6** introduces some of the constraints that are imposed on the application and the ground/ground connection because of the need for these messages to transit the air-ground link.

**3.0 MESSAGE HANDLING (cont'd)****3.1.2 Definitions**

The messages are identified in two categories of traffic flow:

- Downlink : from the aircraft to the ground user.  
 Uplink : from the ground user to the aircraft.

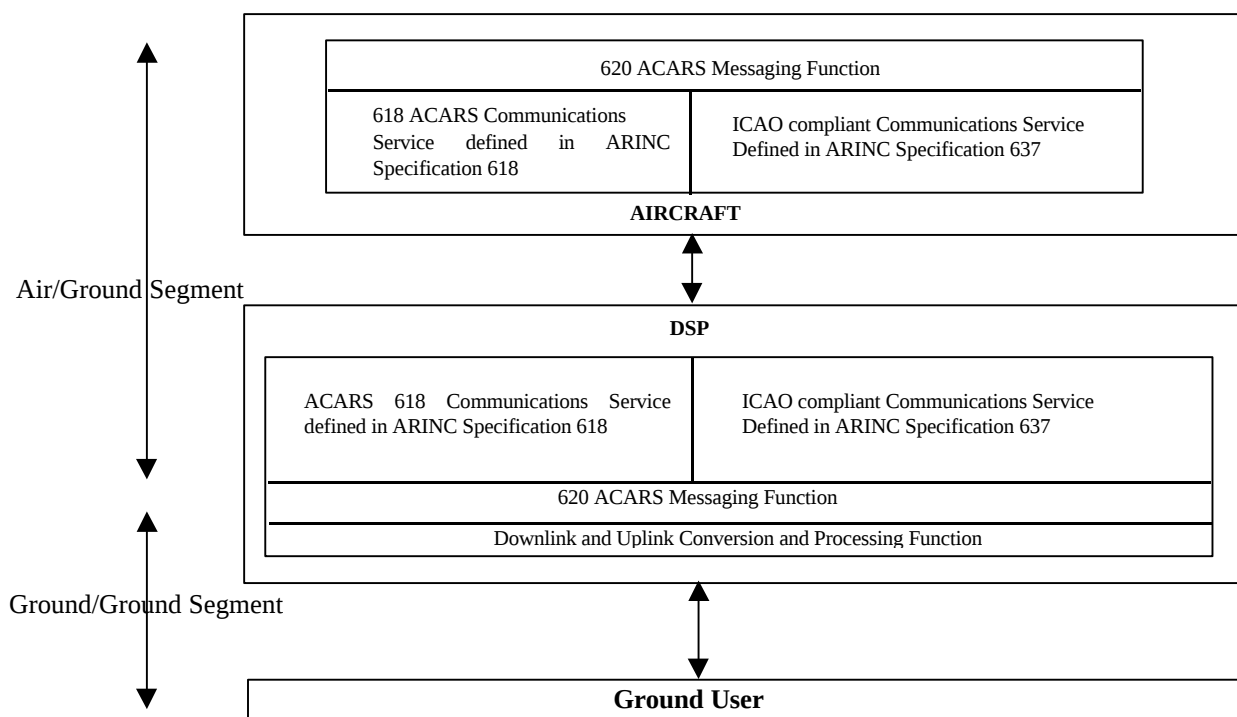
The path of the ACARS data link messages is broken into two segments as illustrated in the figure in Section 1.3 below, the Ground/Ground and Air/Ground segments.



This chapter fully specifies the handling of uplink and downlink traffic flows as far as message format and protocol used on the DSP to Ground User interface (Ground/Ground segment), as well as the conversion rules the DSP applies between the Air/Ground and Ground/Ground segment (e.g., SMI/Label conversion). The Air/Ground segment starts with the 620 ACARS Messaging Function which accepts and forwards ACARS Application data from Upper layer to the lower layer of the Communications services, and vice versa. The transport of ACARS Application data over the Air/Ground segment can be accomplished using services which are twofold:

- a. The ACARS 618 Communications Service defined in ARINC Specification 618.
- b. The ICAO-compliant Communications Service defined in ARINC Specification 637.

A common interface of access to both services from the 620 ACARS Messaging Function is specified in Section 3.5 of this chapter. It should be noted that DSP should stand for Data link Service Provider in a broad sense and not restricted to Data link Service Processor. The figure below summarizes the architectural concept presented in this chapter.



**3.0 MESSAGE HANDLING (cont'd)****3.2 Ground/Ground Segment Specification (DSP to Ground User Interface)****3.2.1 General Ground/Ground Message Format**

The format of the Ground/Ground messages is governed by the ATA/IATA Interline Communication Manual (ICM).

**Table 3.2.1-1 General Format of Ground/Ground Messages**

| LINE | CONTENTS                          | EXAMPLE              |
|------|-----------------------------------|----------------------|
| 1    | Priority/Destination Address      | QU ADRDPAL           |
| 2    | Signature/Transmission time       | .DSPXXXX 121212      |
| 3    | Standard Message Identifier (SMI) | AGM                  |
| 4-m  | Text Elements                     | FI XX0001/AN N123XX  |
| m-n  | Free Text                         | - UPLINK OR DOWNLINK |

This section describes how each part of the Ground/Ground message is formed.

**Line 1** of the Ground/Ground message is the Priority/Destination Address line (also known as simply the Address line). The Destination Address line is composed of the priority of the ground message and the address list of the intended recipients. The two-character Priority identifier is used to indicate the priority of the message. There is only one priority code in use, thus all messages are encoded with the characters 'QU'. This is followed by a SPACE and then the Destination Address list. Each address is 7 characters long. If more than one address is included, they are separated by a SPACE. This line ends with a [CARRIAGE RETURN/LINE FEED] <CR/LF>. The maximum number of addresses is 16.

**Line 2**, the Signature line begins with the PERIOD character <.> and is followed by the address of the sender. After the sender's address it is possible to add a timestamp in the format ddhmm (day/hour/minute). It is possible to enter further signature information after the timestamp. This line ends with [CARRIAGE RETURN/LINE FEED] <CR/LF>.

**Line 3**, the Standard Message Identifier (SMI) line contains a three character code. The line terminator for the SMI line is a [CARRIAGE RETURN/LINE FEED] <CR/LF> sequence. Further information concerning the use of SMIs is provided in Appendix B and Appendix C. Section B.1 of Appendix B contains a list of assigned SMI codes. Section B.3 lists the rules for SMI and TEI use. Table C-1 and C-2 of Appendix C lists the SMIs and their respective Label/Sublabel assignments.

**Line 4**, the Text Element field of the message, is a series of Text Elements. Each Text Elements is composed of 3 parts: Text Element Identifier (TEI), Data, and a Text Element Terminator (TET). Text Element syntax is provided in Table 3.2.2-2.

**Table 3.2.1-2 Text Element Structure**

| FIELD                         | LENGTH                    | CODING                                                                               |
|-------------------------------|---------------------------|--------------------------------------------------------------------------------------|
| Text Element Identifier (TEI) | 2 characters              | Alpha/Numeric                                                                        |
| Text Element delimiter        | 1 character               | space                                                                                |
| Text Element Data field       | Variable (depends on TEI) |                                                                                      |
| Text Element Terminator       | 1 character               | "/" if another Text Element follows<br>or<br>CR/LF if this is the final Text Element |

The first Text Element is usually the Flight Identifier (FI). The Flight Identifier is composed of a two character Airline Identifier and a four character Flight Number. Refer to ARINC Specification 618 for definition of Flight ID.

Further information concerning the use of TEIs is provided in Appendix B. Section B.2 contains a list of assigned TEI codes and the composition of the respective data elements. Section B.3 lists the rules for TEI use.

**3.0 MESSAGE HANDLING (cont'd)**

**Line 5**, the final segment of the Ground/Ground message is “Free Text”. “Free Text” is optional. “Free Text” is not part of a message’s structured text. If “Free Text” is included in the message, it immediately follows the last line of the structured text portion of the Text Element field. A unique TEI is used to indicate the start of the Free Text portion of message. This TEI is the DASH <-> character followed by a SPACE <sp> character; i.e. <-sp>. This TEI appears only at the beginning of the first line of Free Text. The TEI is itself followed by a SPACE character to separate it from the first character of the Free Text; therefore the complete message structure is [DASH SPACE SPACE] <-spsp> Free Text.

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**3.2.2 Downlink Conversion and Processing Function**

This section specifies the conversion rules that are applied on the receipt of a downlink ACARS message to generate a downlink Ground/Ground message to the target Ground Users.

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Airborne generated ACARS messages are received by the Data link Service Provider (DSP) through a ground station. When the DSP receives a downlink ACARS message from an aircraft, the Label within the ACARS message indicates whether a Ground/Ground message should be generated and sent by the DSP to the user. The DSP transmits these messages to the ground user as ATA/IATA standard messages (Type B). Ground/Ground messages should have the following structure:

**Table 3.2.2-1 General Format of Ground/Ground Downlink Messages**

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| LINE | CONTENTS                     | EXAMPLE [1]               |
|------|------------------------------|---------------------------|
| 1    | Priority/Destination Address | QU ADRDPAL                |
| 2    | Signature/Transmission Time  | .DSPXXXX 121212           |
| 3    | Standard Message Identifier  | AGM                       |
| 4    | Text Elements                | FI XX0001/AN N123XX       |
| 5    | Communication Service Line   | DT DSP RGS 121212<br>M01A |
| 6-n  | “Free Text”                  | - DOWNLINK                |

Note:

[1] The specification of the contents of this table are entered in an abbreviated and symbolic format. The conventions used to describe the contents are shown in Table 3.2.2-2.

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**Table 3.2.2-2 Notes to ACARS Messages**

| ENTRY                                   | INTERPRETATION                                                                       | RANGE OF VALUES               |
|-----------------------------------------|--------------------------------------------------------------------------------------|-------------------------------|
| <u>underlined</u> UPPER CASE characters | Fixed Text for display/printing                                                      | (A..Z) + (0..9) + Punctuation |
| lower case characters                   | Description of fixed text for display/ printing or display/printer control character |                               |
| <lower case characters>                 | Description of variable text for display/printing                                    |                               |
| N                                       | Numeric character only for display/printing                                          | 0..9                          |
| A                                       | Alpha character only for display/printing                                            | A..Z                          |
| H                                       | Hexadecimal                                                                          | (0..9) + (A..F)               |
| X                                       | Alphanumeric character for display/printing                                          | (A..Z) + (0..9)               |

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**3.0 MESSAGE HANDLING (cont'd)**

- c-4 | 3.2.2 Downlink Conversion and Processing Function (cont'd)
- Lines 1, 2, 3, 4 and 6-n are constructed the same as their corollary lines in the General format described in Section 3.2.1. The descriptions below expand on the use of these fields for downlink messages.
- c-1 | **Destination Address line: QU ADRDPAL**  
In Line 1, the Destination Address line, the list of addresses to be used when sending the message is defined by: (1) the Airline and Label/Sublabel, (2) the Airline and Label/Sublabel/MFI combination and Supplemental Addresses in the ACARS downlink.
- Signature line: .DSPXXXX 121212**  
Line 2, the Signature line, contains the IATA address of the Data Link Service Provider (DSP), followed by the date and time at which the message is sent into the Ground network by the DSP.
- c-4 | **SMI Line: AGM**  
Line 3, the Standard Message Identifier (SMI) line, is dependent on the label and sub-label of the ACARS message. See ARINC Specification 618 for an explanation of how the SMI is associated with the label and sub-label. Appendix C gives a full list of the conversion between message label and SMI and between Sublabel and SMI.
- c-3 | As an example, the SMI of 'ETA' is always assigned as the SMI for a Label Q2 (estimated time of arrival) downlink message. However, DSPs may assign any one (of many) SMIs to a Label Q1 downlink message [e.g., DEP (departure report), ARR (arrival report), or AGM (miscellaneous air-ground message)], depending on what data is presented in the Text field.
- c-2 | **TE Line: FI XX0001/AN N123XX**  
Line 4, the Text Element line(s), consists of a sequence of text elements beginning with the Flight Identifier and the aircraft Registration Number. The presence of other text elements depends on whether there is a fixed part included in the Application Text portion of the downlink ACARS message. All TEIs and their associated data are contained on the TE line, except the "Free Text" TEI (see "Free Text" below).
- c-3 | Filling a field with NULs will result in the corresponding TEI being omitted from the TE line. Filling a field with spaces will result in the corresponding TEI being included on the TE line with a data field filled with spaces.
- ARINC strips leading periods from the Registration Number (AN field) and leading zeros from the FI field. SITA does not strip either periods or zeros.
- c-1 | **DT Line: DT DSP RGS 121212 M01A**  
Line 5, the Communication Service line, contains the Text Element Identifier 'DT'. The Communication Service line contains the last Text Element. It consists of four fields:
- a. DSP Identifier (e.g., DDL - see below)
- b. Ground Station of reception of the downlink ACARS message.  
Specifically when using ACARS 618 Communications Service, the Ground station that should be retained is the one having received the first 618 block of the downlink ACARS message
- c-3 |       for VHF, the Remote Ground Station (RGS) Identifier  
         for SAT, the Ground Earth Station (GES) Identifier  
         for HF, the HF Ground Station Identifier
- c. Message Reception time stamp (UTC in the form: date, hours, minutes)
- d. Message Sequence Number as provided in the downlink ACARS message. Specifically when using ACARS 618 Communications Service, the Message Sequence Number that should be retained is the one assigned to the first 618 block of the downlink ACARS message.

**3.0 MESSAGE HANDLING (cont'd)****Table 3.2.2-3 Three Letter DSP Identifier Codes**

| SERVICE PROVIDER                | CODE |     |
|---------------------------------|------|-----|
| Air Canada                      | AGC  | XC  |
| Allied Signal                   | ASA  | AS  |
| ARINC                           | DDL  | XA  |
| AVICOM Japan                    | JDL  | JD  |
| Brazil                          | DPV  | XB  |
| Brazil/SITA Internetworking     | QXB  | --- |
| China                           | BJS  | CA  |
| Satellite AIRCOM                | QXT  |     |
| SITA/Air Canada Internetworking | QXC  | --- |
| SITA AIRCOM                     | QXS  | XS  |
| SITA/AVICOM Internetworking     | QXJ  | --- |
| Thailand                        | BKK  | XA  |

c-4

**“Free Text”: - DOWNLINK**

Many messages contain free text. The “Free Text” field follows any fixed text elements (see Chapter 5). When the Application Text field contains fixed text elements, then the fixed text elements and the associated TEIs are added to the TE line. The free text portion of the Application Text downlink field is contained in the “Free Text” section of the Ground/Ground message. The “Free Text” section of the ACARS ground/ground message consists of the TEI (DASH SPACE) <-sp> followed by a SPACE <sp> as a separator, then the non-structured text part of the ACARS message.

c-2

For some message types it is possible to include Supplementary Addresses in the message text. See ARINC Specification 618 for further details.

c-4

Example of downlink label Q1 message application text:

c-2

QU <USER ADDRESS>  
 .DSPXXX  
 <AGM>  
 FI XX300/AN N1003XX/AD SEA/OT 1259/OF  
 1305/ON 2134/IN 2145/FB 0123/DS DFW  
 DT DSP RGS 182111 M01A  
 - “FREE TEXT”.

c-4

c-2

**3.0 MESSAGE HANDLING (cont'd)****3.2.2 Downlink Conversion and Processing Function (cont'd)**

c-2 | While processing a downlink Label Q1 message, DSPs may identify the following Text Element Identifiers (TEIs):

c-4 | **Table 3.2.2-4 Example TEI List**

| TEI   | DESCRIPTION         | CODING                                        |
|-------|---------------------|-----------------------------------------------|
| FI    | Flight Identifier   | 2 Alpha/Numeric plus<br>1-4 Alpha/Numeric     |
| AD    | Destination Airport | 3 Alpha Characters<br>(IATA format)           |
| AN    | Aircraft Identifier | 1-7 Alpha/Numeric                             |
| OT    | OUT Time            | 4 Numeric Characters                          |
| OF    | OFF Time            | 4 Numeric Characters                          |
| ON    | ON Time             | 4 Numeric Characters                          |
| IN    | IN Time             | 4 Numeric Characters                          |
| FB    | Fuel On Board       | 4 Numeric Characters                          |
| DS    | Destination Station | 3 Alpha Characters<br>(IATA format)           |
| <-sp> | “Free Text”         | not to exceed 184<br>Alpha/Numeric characters |

See Appendix B.1 for a full listing of TEIs.

Data link service providers assign an SMI for the Label Q1 message as follows:

- a. DEP (departure report) SMI...Assigned if either the Out-time or the Off-time fields or both fields contain data
- b. ARR (arrival report) SMI...Assigned if either the On-time or the In-time fields or both fields contain data
- c. AGM (miscellaneous air-ground message) SMI...Assigned if:
  - Out-time, Off-time, On-time and In-time fields all contain data
  - Illogical data is contained in text (e.g., Out-time and On-time fields contain data, but Off-time and In-time fields do not).

c-4 | **3.2.2.1 Downlink Addressing**

The DSP uses several elements of a downlink ACARS message in order to determine where to sent it. The label, sublabel, MFI and supplementary address fields are used by the DSP to determine where to send copies of the downlink message. Some downlinks contain all four fields and some downlink message definitions include only one of these fields. Some fields are optional depending on the message content and originator. The following subsections clarify the allowable configurations. Chapter 5, which defines the downlink message formats, explicitly identifies which fields are available for addressing purposes in each downlink.

The destination address(es) is placed in the Priority/Destination line, Line 1, of the ground/ground message per Section 3.2.1.

The address(es) of a downlink message is determined by the DSP. The DSP uses the label and either the Airline Identifier or Aircraft Registration Number to determine where to forward the downlink message. The DSP translates the label into an SMI. See Table C-2 of Appendix C. The DSP maintains a table for each customer that is used to correlate the downlink address with the proper ground address for routing.

Extensions of the basic addressing scheme are described in Sections 3.2.2.1.1 and 3.2.2.1.2.

**3.0 MESSAGE HANDLING (cont'd)****3.2.2.1.1 Downlink Addresses of Messages From an ACARS Peripheral**

When the message originator is an ACARS peripheral then the downlink addressing scheme is augmented by the addition of a Sublabel field. Each ACARS peripheral is assigned a unique sublabel. Thus the combination of label (H1 for ACARS peripherals) and sublabel unambiguously identifies the message originator and thus permits the DSP to deliver an AOC message to the address(es) in its look up table. See Table D-1 of Appendix D to Specification 622 for a listing of ACARS peripheral sublabels.

Recently, a second addressing mechanism was defined in order to augment the routing of ATS messages originating from ACARS peripherals. A field called Message Function Identifier (MFI) was created in order to identify ATS functions from an ACARS peripheral. By including the MFI as the first element of the Supplementary Address field, it is now possible for the DSP to route messages from ATS functions (applications) in an ACARS peripheral to peer ATS functions on the ground. The DSP uses the MFI as an additional index into its lookup table in order to determine the ground address(es) of the ATS message. The coding and use of the downlink MFI is defined in Sections 5.3.38 through 5.3.51.

**COMMENTARY**

The MFI field was created because it is needed for ATS messages. Subsequently some AOC messages have been defined that contain the MFI as well. See Table C-2B of Appendix C for a listing of MFI assignments.

**3.2.2.1.2 Downlink Supplementary Addresses**

For some downlink message types it is possible to include Supplementary Addresses in the message text. These messages are:

| <u>Description</u>                            | <u>Label</u>          |
|-----------------------------------------------|-----------------------|
| Aircrew addressed                             | 80 to 8~              |
| ATA/IATA Aircraft generated movement messages | M1/M2/M3/M4           |
| Optional Auxiliary Terminal                   | H1                    |
| Command Response Downlink                     | RB (special handling) |
| Air Traffic Service Messages                  | Bx                    |

A Supplementary Address is normally either 7, 4, or 3 characters in length. If an MFI is included as the first entry of the Supplementary Address field, it is 2 characters in length. All other Supplemental Addresses in a single message must be of the same length.

**COMMENTARY**

The 3 character codes are from the International Air Transport Association (IATA) table and the 4 character codes are from the International Civil Aviation Organization (ICAO) table of addresses. ARINC does not currently support the use of 3 character optional addressing. Each message type has the potential to be delivered to a different address at the same airport or ATC facility.

In the case of a 7-character Supplementary Address, the address information is moved, without any translation, from the ACARS downlink block to the address line of ACARS ground/ground message. In case of 3 (or 4) character code Supplementary Addresses, a conversion table maintained by the DSP is used to derive an associated 7-character address to be entered in the Destination Address line, Line 1, of the ground/ground message in place of the 3 or 4 character code. One 3 (or 4) character code can generate several Supplementary Addresses. Agencies should inform DSPs as the need for 3 and 4 character codes arise so that the DSP tables can be properly configured.

**COMMENTARY**

The translation of 3 or 4 character addresses into a 7 character address by the service provider should be both label-sensitive and airline-sensitive. Each message type has the potential to be delivered to a different address at the same airport or ATC facility.

3.0 MESSAGE HANDLING (cont'd)

c-4 | 3.2.2.1.3 Supplementary Address Field

c-1 | When Supplementary addresses are included in the downlink, the Supplementary Address field begins with the Slash character </> and is immediately followed by the first character of the first address. If the downlink is a message from  
c-4 | an ACARS peripheral, the first entry in this field may be a 2-character MFI. Subsequent addresses in the  
c-1 | Supplementary Address field are separated by a space <sp> character. The last address in the list is followed by a period <.> character. The maximum number of Supplementary Addresses is 16.

The Supplementary Address field for an AOC or an ATS message that does not contain an MFI is constructed as follows:

| Character No. | Description                                   | Notes |
|---------------|-----------------------------------------------|-------|
| 1             | Slash                                         |       |
| 2-n           | Supplementary Address                         |       |
| 1             |                                               |       |
| n-m           | Optional Additional Supplementary Address(es) | 1, 2  |
| m+1           | Period                                        |       |

c-4 | Notes:  
[1] Length can be 3, 4 or 7 characters; all addresses are the same length.  
[2] Quantity variable; each address is separated by a space.

AOC Message Examples:

/CHIVUUA . (to Chicago)  
/CHIVUUA <sp> SANKLUA . (to Chicago and San Diego)

ATS Message Examples:

c-4 | /LAX0501. (to Los Angeles)  
/LAX0501 <sp> ORDONY1 <sp> PITK123. (to Los Angeles, Chicago and Pittsburgh)

The Supplementary Address field for an AOC or an ATS message that does contain an MFI is constructed as follows:

| Character No. | Description                                   | Notes |
|---------------|-----------------------------------------------|-------|
| 1             | Slash                                         |       |
| 2-3           | MFI                                           |       |
| 4             | Space                                         |       |
| 5-n           | Supplementary Address                         |       |
| 1             |                                               |       |
| n-m           | Optional Additional Supplementary Address(es) | 1, 2  |
| m+1           | Period                                        |       |

c-4 | Notes:  
[1] Length can be 3, 4, or 7 characters; all addresses are the same length.  
[2] Quantity variable; each address is separated by a space.

AOC Message Examples:

c-4 | /H2 <sp> CHIVUUA . (to Chicago)  
/H2 <sp> CHIVUUA <sp> SANKLUA . (to Chicago and San Diego)

**3.0 MESSAGE HANDLING (cont'd)****3.2.2.1.4 Downlink Address Conversion**

The Table below summarizes the conversion rules applied by the DSP to convert a downlink ACARS message parameters into downlink Ground/Ground message parameters. The first column entails the Air/Ground input parameters extracted out of the downlink ACARS message to generate the Ground/Ground output parameters found in the last column. The output parameters are needed to format the downlink Ground/Ground message sent to the user. The center column lists the processing functions involved in the conversion.

**Table 3.2.1.4-1 Downlink Conversion and Processing Function**

| ACARS<br>Messaging<br>Function → | Air/Ground input parameters                                                                                                   | DSP Processing                | Ground/Ground<br>output parameters         |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------|
|                                  | Airline Code<br>Label/Sublabel<br>MFI<br>7-character Supplemental Address(es)<br>3-character IATA or 4-character<br>ICAO code | QU Address Line<br>generation | 7-character<br>destination address<br>list |
|                                  |                                                                                                                               | Originator generation         | 7-character address<br>of the DSP          |
|                                  | Label/Sublabel                                                                                                                | SMI generation                | SMI                                        |
|                                  | Aircraft Tail Number<br>Flight Identifier                                                                                     | AN/FI TEI generation          | /FI /AN                                    |
|                                  | Label/Sublabel<br>ACARS Text                                                                                                  | Additional TEI<br>generation  | TEI list                                   |
|                                  | MSN<br>Label/Sublabel/ACARS Text                                                                                              | DT line generation            | 3-character DSP ID                         |
|                                  |                                                                                                                               |                               | Ground Station-ID                          |
|                                  |                                                                                                                               |                               | UTC Time                                   |
|                                  |                                                                                                                               |                               | MSN                                        |
|                                  |                                                                                                                               | Free Text generation          | Free Text                                  |

**3.0 MESSAGE HANDLING (cont'd)****3.2.3 Uplink Conversion and Processing Functions**

- c-4 | Uplink Ground/Ground messages received by the DSP for transmission to an aircraft are accepted if the following conditions are fulfilled:
- a. The timestamp of the message indicates a ground transit time less than the stale message rejection limit.
  - b. The SMI is valid and is approved for use by the ACARS user.
  - c. The SMT contains either an Aircraft Registration Number (AN) text element or a Flight Identifier (FI) text element and the corresponding text element is valid. Refer to Appendix B2. If the DSP does not have tracking information for the aircraft addressed, the following supplementary condition applies:
  - d. If the SMT contains either a GL text element (approximate geographic location of aircraft) or an AP text element (airport location of aircraft) and that text element identifies an airport or city known to the DSP, the DSP uses this information to determine the ground station for transmission to the aircraft.
  - c-4 | e. The Application Text is preceded by the special TEI “- “ also referred to as “dash space” <-<sub>sp</sub>> . Note that an additional space is used as a separation. The Application Text may consist of entirely free text, entirely fixed text or a combination of fixed text followed by free text. See Appendix B2.
  - c-2 | f. The address of the DSP is contained in the Priority/Destination line, Line 1, of the ground/ground message as described in Section 3.2.
  - c-4 |

If the incoming ground message fails to meet these criteria the data link service provider will intercept the uplink message (see Section 3.3).

The text elements defined for use in the Text Element line of uplink Ground/Ground messages are listed in Table 3.2.3-1.

**Table 3.2.3-1 Uplink Message Text Element Set**

| TEI | DESCRIPTION       | TEXT ELEMENT SYNTAX                                | NOTES |
|-----|-------------------|----------------------------------------------------|-------|
| FI  | Flight Identifier | 2 Alphanumeric characters + 1-4 Numeric characters | 1     |
| AN  | Aircraft Number   | 1-7 Alpha/Numeric characters                       | 2     |
| GL  | Ground station    | 3-4 Alpha characters                               |       |
| AP  | Airport station   | 3-4 Alpha characters                               |       |
| TP  | Transmission path | 3 Alpha Characters                                 | 3     |
| MA  | Message Assurance | 3 Numeric followed by an Alpha Character           |       |

Notes:

- [1] Some users may provide a 3-character Airline Identifier.
- [2] The Aircraft Registration Number may be padded with leading periods.
- [3] Codes are VHF, SAT, HFD

c-4 | Only some combinations of the TEIs listed in Table 3.2.3-1 are valid. The valid combinations are listed in Table 3.2.3-2.

**3.0 MESSAGE HANDLING (cont'd)****Table 3.2.3-2 Valid FI, AN, GL and AP TEI Sequences**

| SEQUENCE | ALTERNATE          | COMMENT |
|----------|--------------------|---------|
| FI       | FI/GL; FI/AP       |         |
| AN       | AN/GL; AN/AP       |         |
| AN/FI    | AN/FI/GL; AN/FI/AP |         |

**3.2.3.1 TEI Processing of Uplink Ground/Ground Message****3.2.3.1.1 AN (Aircraft Tail Number) and FI (Flight Identifier) TEI Processing**

To forward incoming uplink messages, the DSP will need the address of the aircraft. This information is contained in the first part of the TE line, Line 4, of the ground/ground message.

c-4

For uplink messages, the address of the aircraft (to which the message is to be delivered) is provided in the Aircraft Address field. The value in the Aircraft Address field may take two forms, as defined in Sections 2.3.3 and 3.3 of ARINC Specification 618. The aircraft may be identified by: (1) its Registration Number, or (2) its current Flight Identifier. See ARINC Specification 618 for details.

The aircraft address is constructed using information from the Text Element (TE) line. The Flight Identifier and the Aircraft Number in this line indicate the aircraft to which the message is to be sent. The Aircraft Number is preferred, but the user may specify either or both of these values when addressing a message.

c-2

The DSP records the flight identifier for each aircraft from the aircraft's downlink messages. If the TEI FI is used subsequently in addressing an uplink message, the message is sent to the aircraft with the AN or FI address depending on the input TEI. If the DSP cannot perform this conversion but the user has included GL or AP TEIs, the uplink ACARS message will be sent through the station specified with the flight identifier in the address field.

Ground users address an airframe by Aircraft-Number (AN) and/or by Flight ID (FI). The DSP will forward the uplink to the aircraft without providing AN or FI address conversion, in the following manner:

c-3

If the user provides the Airline Identifier as a 3-letter code (as defined by ICAO) the DSP has the responsibility to translate the Airline Identifier to the appropriate 2-character IATA equivalent. See Section 2.3.3.2 ARINC Specification 618 for a detailed description of these elements.

c-4

**AN Address:**

If only the Aircraft-Number (AN) element (e.g., N1003X) is provided in the TEI line of the ground/ground user uplink message, then the Aircraft-Number is used in the "Aircraft Address" field of the uplink ground-air message.

**FI Address:**

If only the Flight-Id (FI) element (e.g., ZZ0300) is provided in the TEI line of the ground/ground uplink message, then the Flight-Id is used in the "Aircraft Address" field of the uplink ground-air message.

c-3

**AN + FI Addresses:** xxxx SITA specific xxxx

If the originator of the uplink message provides both the Aircraft-Number (AN) and the Flight-Id (FI) elements in the TEI line of the ground/ground message, SITA will verify that they match the information maintained in its FI/AN correspondence table and will take one of the two following actions:

- If the AN and FI elements correspond exactly to the information contained in the FI/AN correspondence table, the uplink is attempted with the first parameter named in the TEI line of the ground/ground user uplink message and it will be included in the "Aircraft Address" field of the ground/air uplink block.
- If the AN and FI elements DO NOT correspond exactly to the information contained in the FI/AN correspondence table, the uplink is NOT attempted and the message is rejected back to the originator with the service message code 240.

**3.0 MESSAGE HANDLING (cont'd)****c-4 | 3.2.3.1.1 AN (Aircraft Tail Number) and FI (Flight Identifier) TEI Processing (cont'd)**

AN + FI Addresses: xxxx ARINC Specific xxxx

If the originator provides both the Aircraft-Number (AN) and the Flight-Id (FI) elements on the TEI line of the ground/ground uplink message, ARINC will give preference to the Aircraft-Number (AN) element and it will be used in the "Aircraft Address" field of the ground/air uplink block.

**COMMENTARY**

c-4 | The ground user should address ATS messages to the aircraft by its Aircraft Registration Number (AN). Although the AN is preferred, AOC messages may use the aircraft's Flight Identifier (FI). Owners and operators of business and most commercial aircraft employ the aircraft address (AN), rather than a light number (FI), to identify the aircraft in uplink messages. For those operators, the Flight ID field may be used for other purposes. Often a fixed value (e.g., UV0000) is used.

AN + FI Addresses: xxxx Air Canada and AVICOM specific xxxx.

c-3 | If the originator of the uplink provides both the Aircraft Number (AN) and the Flight Identifier (FI) elements in the  
c-4 | TEI line of the ground/ground message, then AVICOM will reject the uplink.

**3.2.3.1.2 GL (Ground Locator) /AP (Airport Locator) and TP (Transmission Path) TEIs Processing**

c-4 | If supported by the DSP, the user may insert an additional TEI in the text element line of the ground/ground message to specify which transmission path (TP) is preferred for delivery of the message. Depending on which media code is associated with the TP TEI, delivery attempts will only be made on this media. If a GL TEI is also specified, the media of the ground station must match that of the TP TEI otherwise the message will be intercepted. Use of the TP TEI is optional and when used, message delivery will only be attempted over the specified media.

For an uplink message that requires delivery to an aircraft not active in the system, DSPs start with the Geographic Locator (GL) or Airport Locator (AP) specified by the ground user (airline or other host computer). Delivery through each possible locator is attempted a configurable number of times.

The GL and AP text element identifiers (TEIs) are used to indicate to the DSP through which ground station the aircraft can be reached; they cannot be used together.

c-2 | Use of GL is optional. If GL is used in conjunction with the TP TEI, the media of the ground station must match that specified by the TP TEI.

In the SITA network the Transmission Path 'TP' Text Element indicates to the DSP which service providers network or which media in the case of internetworking should be used in order to uplink the message.

ARINC has implemented the TP TEI in order to enable users to specify which media is used for delivery of the uplink. The appropriate code is used along with the TEI to tell the DSP to only attempt delivery of the message using the specified media.

See Appendix B for values of TP TEI.

Undeliverable uplink messages are intercepted and processed as described in Section 3.3.

**3.2.3.1.3 MA (Message Assurance) TEI Processing**

c-4 | Normally uplink messages are generated by the user and delivered to the aircraft by the DSP without confirmation to the sender. Delivery is assumed. If the message cannot be delivered, the DSP will provide a notice to the user by sending the appropriate reject messages of Section 3.3.

If supported by the DSP, the user may have the option of obtaining a confirmation of message delivery, i.e., a positive indication of the delivery of the message to the aircraft, from the DSP. This is accomplished by including an additional Text Element, including the Text Element Identifier 'MA' as the final Text Element (preceding the Free Text" portion) of the uplink message. The details of the uplink message construction are described below. See Sections 3.3, 3.3.1, 3.3.2, 3.3.3 and 3.3.4 for the definition of DSP responses.

**3.0 MESSAGE HANDLING (cont'd)****Table 3.2.3.1.3-1 Format of Ground/Ground Uplink Message With Message Assurance**

| LINE | CONTENTS                      | EXAMPLE         | NOTES |
|------|-------------------------------|-----------------|-------|
| 1    | Priority / DSP Address        | QU CTYDPAL      |       |
| 2    | Signature / Transmission time | .QXSXMXS        |       |
| 3    | Standard Message Identifier   | AGM             |       |
| 4    | Text Elements                 | AN N123/MA 123A | 1     |
| 5-n  | Free Text                     | - UPLINK        |       |

Note:

[1] In Line 4, the Text Element line, the format of the Data field of the Text Element MA is: 'MA NNNC'. where:

- a. NNN is the Serial Number of the message
- b. C is the Function Indicator with two possible values, A or I where
  - A = Request delivery indication only (coded, e.g., MA 123A)
  - I = Request delivery indication and link acknowledgment (coded, e.g., MA 123I)

The sender of the uplink message is responsible for managing the serial numbers sent to the DSP. On initialization, the user should send the Serial Number 000 and for each subsequent message should increment the number. After using 999, the sender should increment to 001. The DSP will simply copy the serial number supplied by the sender in all replies. This serial number will not be used to detect duplicate uplink messages unless specifically negotiated with the DSP.

### 3.2.3.2 Uplink Addressing

The address of the uplink message is always the aircraft address. When the message is to be processed by the ACARS MU, this address is adequate. When the final destination onboard the aircraft is a peripheral to the ACARS, the Label H1 is used and additional addressing is included in a Sublabel field.

Uplink messages also contain address information that can be used by the end system on the aircraft for sending a response.

#### 3.2.3.2.1 Uplink Addresses for Messages Delivered to an ACARS Peripheral

As with messages delivered to the ACARS MU, the Aircraft Address is the same as described in Section 3.2.3.2. When the uplink message is sent to a peripheral to the MU, such as the FMC, the value 'H1' will be used in the Label field.

Messages to be delivered to an ACARS peripheral will carry the intended destination information in the Sublabel field. See Table D-1 of Appendix D to Specification 622 for listings of the Sublabels applicable to ATS messages delivered to an ACARS peripheral. Thus, the addressing consists of the (1) Aircraft Address, (2) the Label and the Sublabel.

Example: .N12345 H1 M1 (for a message to be delivered to the Left FMC)

#### 3.2.3.3 Uplink Supplementary Address(es)

Some uplink messages permit the inclusion of a Supplementary Address field. The Supplementary Address field of the uplink message, if present, will contain the address of the source to which the downlink response should be routed. For AOC messages, this will typically be the airlines' host computer. In the case of ATS messages, the Supplementary Address will typically be that of the ATC facility that is responsible for the airspace in which the aircraft is located, or into which the aircraft is expected to travel.

The information in the Supplementary Address field is used to address the response, to the message, if any. The Supplementary Address field may contain additional addresses, designating secondary recipients of any subsequent downlink generated by the aircraft avionics in response to the uplink message.

For ATS uplink messages to be delivered to a peripheral of the ACARS MU, the Supplementary Address field has been expanded to include a 2 character Message Function Identifier (MFI) as the first entry followed by a space character < > as a separator. The coding and use of the uplink MFI is defined in Section 4.3.5. The remainder of the Supplementary Address field will contain the address of the End System that is providing the uplink message and any Supplemental Addresses.

**3.0 MESSAGE HANDLING (cont'd)****3.2.3.3 Uplink Supplementary Address(es) (cont'd)**

DSPs should perform a Supplementary Address validity check before forwarding an uplink message to an aircraft. As a minimum, the DSP should verify that the address is either 3, 4 or 7 characters. Uplink messages with improperly formatted addresses will be rejected by the DSP. The DSP may also compare the address with a list of known valid addresses within its tables.

The Table below summarizes the conversion rules applied by the DSP to convert uplink Ground/Ground message parameters into uplink ACARS message parameters. The first column entails the Ground/Ground input parameters extracted out of the uplink Ground/Ground message to generate the Air/Ground output parameters found in the last column. These output parameters are needed to format the uplink Air/Ground message sent to the aircraft. The center column lists the processing functions involved in the conversion.

c-4

**Table 3.2.3-2 Uplink Conversion and Processing Function**

| Ground/Ground input parameters             | DSP Processing                 | Air/Ground output parameters |
|--------------------------------------------|--------------------------------|------------------------------|
| 7-character DSP Destination Address        | Destination Address Validation |                              |
| 7 character Ground User Originator Address | Originator Address Validation  |                              |
| UTC Originator Time                        | Message Too Old processing     |                              |
| SMI                                        | Label/Sublabel generation      | Label/Sublabel               |
| AN and/or FI TEIs                          | AN/FI Processing               | Aircraft Address             |
| GL/AP/TP TEIs                              | Uplink Route processing        |                              |
| MA TEI                                     | Message Assurance Processing   |                              |
| ACARS Text                                 | ACARS Text generation          | ACARS Text                   |

ACARS  
Messaging  
Function

**3.3 Service Messages**

Service messages are messages provided by the DSP to the ground user carrying information concerning the delivery status of uplink messages.

**Table 3.3-1 General Format of Ground/Ground Service Message**

| LINE | CONTENTS                      | EXAMPLE                    | NOTES |
|------|-------------------------------|----------------------------|-------|
| 1    | Priority / Destination        | QU CTYZZZZ CPYXXXX CTYXXXX | 1     |
| 2    | Signature / Transmission time | .DSPXXXX (ddhhmm)          | 1     |
| 3    | Standard Message Identifier   | SVC (obligatory)           | 1     |
| 4    | Intercept Information         | - UP UNKNOWN SMI           | 2     |
| 5    | Carriage Return Line Feed     | <cr/lf>                    | 1     |
| 6-n  | Text of message               |                            | 1     |

Notes:

- [1] Lines 1, 2, 3, and 5-n are constructed the same as their corollary lines in the General format described in Section 3.2.
- [2] Line 4, the Intercept Information line, contains the Type/Reason/Code. The contents of these fields is described in the following sections.

The 3 digit Service message code is placed in the sixtieth column of the intercept line. It can be interpreted as follows:

Digit 1 indicates the category of the service message:

- c-1 | Category 1 - Downlink messages that cannot be reformatted  
 Category 2 - Uplink messages that cannot be transmitted  
 Category 3 - Undelivered on-board messages

**3.0 MESSAGE HANDLING (cont'd)**

Digit 2 indicates the class of the service message

For Categories 1 and 2, the following classes exist:

- Class 1 - Identification error
- Class 2 - Formatting error
- Class 3 - Addressing error
- Class 4 - Other error

For Category 3 the classes are:

- Class 1 - No contact with aircraft
- Class 2 - Message rejected after contact - printer
- Class 3 - Message rejected after contact - others

Digit 3 indicates the service message within the category and class

**3.3.1 Uplink Message Receipt Confirmation**

If an uplink sent to the DSP contained a request for Message Assurance service with Link Acknowledgment (see Section 3.2.3.1.3) i.e., containing an 'MA' Text Element with the Function code set to 'I', the DSP should acknowledge receipt of the ground/ground uplink message. If the Message Assurance function can be supported for the message, the DSP will immediately send the following message to the originator as a ground/ground link acknowledgment.

**Table 3.3.1-1 Format of Ground/Ground Link Acknowledgment Message**

| LINE | CONTENTS                      | EXAMPLE                   | NOTES |
|------|-------------------------------|---------------------------|-------|
| 1    | Priority / Destination        | QU CTYDPAL                |       |
| 2    | Signature / Transmission time | .QXSXMXS                  |       |
| 3    | Standard Message Identifier   | MAS (obligatory)          |       |
| 4    | Text Elements                 | AN N123/FI XX1234/MA 123L |       |

If the Message Assurance function is not supported by the DSP, the DSP should return the following message to inform the user that a confirmation will not be provided.

**Table 3.3.1-2 Format of Ground/Ground Message With Acknowledgment Not Supported Response**

| LINE | CONTENTS                      | EXAMPLE                   | NOTES |
|------|-------------------------------|---------------------------|-------|
| 1    | Priority / Destination        | QU CTYDPAL                |       |
| 2    | Signature / Transmission time | .QXSXMXS                  |       |
| 3    | Standard Message Identifier   | MAS                       |       |
| 4    | Text Elements                 | AN N123/FI XX1234/MA 123X |       |

**COMMENTARY**

SITA and ARINC support the Message Assurance functions. For SITA, the Function Indicator code of "X" will be used in the case of certain messages sent through internetworking. In this case, successful delivery assurance may not be possible. Some DSPs will simply not respond at all.

c-1

c-3

**3.0 MESSAGE HANDLING (cont'd)****3.3.2 Uplink Message Delivery Confirmation**

In the event of successful uplink message delivery, the following delivery confirmation report will be sent by the DSP to the sender.

Successful delivery is interpreted to mean that all the ACARS blocks resulting from the uplink message sent to the DSP were positively acknowledged by the aircraft. The delivery confirmation simply indicates that the uplink message was received by the ACARS Management Unit. Receipt of Uplink Message Delivery Confirmation does not provide an indication of receipt or acknowledgment by the flight crew or any avionics subsystem.

**Table 3.3.2-1 Format of Ground/Ground Message Delivery Confirmation**

| LINE | CONTENTS                      | EXAMPLE                   | NOTES |
|------|-------------------------------|---------------------------|-------|
| 1    | Priority / Destination        | QU CTYDPAL                |       |
| 2    | Signature / Transmission time | .QXSXMXS                  |       |
| 3    | Standard Message Identifier   | MAS                       | 1     |
| 4-m  | Text Elements                 | AN N123/FI XX1234/MA 123S | 2     |
| m+1  | DT Text Element               | DT QXS RGS 312355 5524    | 3     |

Notes:

- [1] Line 3, the Standard Message Identifier line, will contain the SMI 'MAS'.
- [2] Line 4, the Text Element line, will contain the 'AN' and 'FI' Text Elements, filled with the values from the downlink block sent by the ACARS MU acknowledging the final uplink block of the uplink message followed by the MA Text Element.
- [3] Line m+1, the DT Text Element line, is used to report the time and identify the Remote Ground Station that accepted the air/ground acknowledgment for the message; or the final block if an ACARS multiblock message is involved.

**3.3.3 Untransmittable Uplink Service Messages**

Untransmittable uplink messages are those messages that cannot be sent on from the DSP to the aircraft either:

- a. because there is a format error in the message,
- b. the message does not contain enough information for the DSP to identify either the aircraft or the aircraft's location,  
or
- c. in the case of routing as defined in Specification 622,
  - the message was sent from an unauthorized ground ATS facility,
  - with an invalid SMI or
  - with an invalid MFI.

For example, in the SATCOM environment, an aircraft is reachable by the SATCOM DSP only after the aircraft has "logged on" (and initiated a downlink to the DSP) to establish the link. In the event that an unsolicited uplink is sent by the user to be delivered to an aircraft which is not logged on, the DSP will be unable to identify any connection to the aircraft.

If an uplink message is found to be untransmittable, a Service message is sent to the origin address indicating why the message is untransmittable and including a copy of the untransmittable message. The general format of the ground/ground service message generated to report an untransmittable uplink message is:

**3.0 MESSAGE HANDLING (cont'd)****Table 3.3.3-1 Format of Message to Report an Untransmittable Uplink**

| LINE | CONTENTS                        | EXAMPLE [1]                                                                                                   | NOTES |
|------|---------------------------------|---------------------------------------------------------------------------------------------------------------|-------|
| 1    | Priority and Destination        | QU CTYZZZZ CPYXXXX CTYXXXX                                                                                    |       |
| 2    | Signature and Transmission Time | .XXXXXXXX (ddhhmm)                                                                                            |       |
| 3    | Standard Message Identifier     | SVC                                                                                                           | 2     |
| 4    | Intercept Information           | - UP INTERCEPT reason 2XY                                                                                     | 3     |
| 5    | Carriage Return Line Feed       | <cr/lf>                                                                                                       |       |
| 6-n  | Text of Uplink Message          | QU DSPXXXX<br>.HDQCMUA<br>CMD<br>AN N123XX/MA 123A<br>- AMEND RLS IFR PER RLS 03...<br>(up to 220 characters) |       |

Notes:

- [1] The specification of the contents of this table are entered in an abbreviated and symbolic format. The conventions used to describe the contents are show in Table 3.2.2-2.
- [2] The SMI of 'SVC' is obligatory.
- [3] Reason code is located in columns 60-62. Two spaces follow the dash <-> character.

**3.3.3.1 Message Assurance Report - Untransmittable Uplink**

When an End System on the ground generates an uplink message, it may request confirmation that the message was sent as an uplink to the aircraft by inserting 'MA' in the Text Element field of the message. If the message cannot be transmitted, the DSP should advise the End System by sending a (ground/ground) message to report the problem. Since this function is redundant to the already existing function defined in Section 3.3.3, the message may carry an SMI of 'SVC' or 'MAS'.

**COMMENTARY**

Some Service Providers may use the SMI code of SVC for intercepting a message which contains an MA and is untransmittable because of format or other errors (e.g., message too old). In this case, the SVC intercept message would include the MA TEI within the text contained in the intercept message.

**3.0 MESSAGE HANDLING (cont'd)****3.3.3.1 Message Assurance Report - Untransmittable Uplink (cont'd)**

The general format of the ground/ground service message generated to report an Untransmittable Uplink Message with Message Assurance is:

**Table 3.3.3.1-1 Format of Message Assurance Report**

| LINE | CONTENTS                        | EXAMPLE [1]                                                                                                   | NOTES |
|------|---------------------------------|---------------------------------------------------------------------------------------------------------------|-------|
| 1    | Priority and Destination        | QU CTYZZZZ CPYXXXX CTYXXXX                                                                                    | 2     |
| 2    | Signature and Transmission Time | .XXXXXXXX (ddhhmm)                                                                                            | 2     |
| 3    | Standard Message Identifier     | MAS or SVC                                                                                                    | 3     |
| 4    | Text Elements                   | AN N123XX/MA 123F                                                                                             | 4     |
| 5    | Intercept Information           | - UP INTERCEPT reason 2XY                                                                                     | 6     |
| 6    | Carriage Return Line Feed       | <cr/lf>                                                                                                       |       |
| 7-n  | Text of Uplink Message          | QU DSPXXXX<br>.HDQCMUA<br>CMD<br>AN N123XX/MA 123A<br>- AMEND RLS IFR PER RLS 03...<br>(up to 220 characters) | 5     |

Notes:

- [1] The specification of the contents of this table are entered in an abbreviated and symbolic format. The conventions used to describe the contents are shown in Table 3.2.2-2.
- [2] Lines 1 and 2 are constructed the same as their corollary lines in the General format described in Section 3.2.
- [3] Line 3, the SMI line, will contain 'MAS'.
- [4] Line 4, the Text Element line, will contain a copy of the Text Element line from the uplink message with the Function Indicator in the MA Text Element set to 'F'. If both the FI and the AN were included in the ground/ground uplink message, the Service Provider may report both the FI and AN of the designated recipient.
- [5] Line 7-n should be the same as in the Table above.
- [6] Reason code is located in columns 60-62. Two spaces follow the dash <-> character.

Service Providers may report both the AN and FI of the designated recipient.

**3.3.3.4 Undeliverable Uplink Service Messages**

Undeliverable uplink messages are those messages that are sent on to the aircraft from the DSP but which do not reach their final destination.

The simplest case is that where no acknowledgment is received for the message because the aircraft is not within range of any of the ground stations through which the message is sent.

The second case is that where the aircraft does reply to the message but with a label or technical acknowledgment field which indicates that the message could not be delivered to its destination within the aircraft's avionics. When the DSP receives one of these labels in response to an uplink message, it returns a copy of the uplink message to the originator inside a Service message with an indication of the reason for rejection.

The downlink rejection labels are generated by the airborne avionics in case of an abnormal situation when receiving an uplink message. This situation can be a printer fault or that a peripheral is not ready to accept a block, in which case a Q5 or CA-CF label is sent. If the DSP receives a Q5 or CA-CF in response to an uplink message, it retries the transmission of the uplink message after a delay. Only after receiving the Q5 or CA-CF a configurable number of times (see Appendix D) is the uplink message returned to the originator. The DSP may also receive a QX downlink. In this case, the DSP generates an Undeliverable Uplink (ground/ground) report to the originating host.

If a message cannot be delivered by the DSP, a Service message is sent to the origin address of the undeliverable ground/ground message. The general format of the ground/ground Service message generated to report for an undeliverable uplink message is:

**3.0 MESSAGE HANDLING (cont'd)****3.3.4 Undeliverable Uplink Service Messages (cont'd)****Table 3.3.4-1 Format of Message For Reporting an Undeliverable Uplink Message**

| LINE | CONTENTS                        | EXAMPLE [1]                                                                                           | NOTES |
|------|---------------------------------|-------------------------------------------------------------------------------------------------------|-------|
| 1    | Priority and Destination        | QU CTYZZZZ CPYXXXX CTYXXXX                                                                            | 2     |
| 2    | Signature and Transmission Time | .XXXXXXXX (ddhhmm)                                                                                    | 2     |
| 3    | Standard Message Identifier     | SVC                                                                                                   | 2,3   |
| 4    | Intercept Information           | - reason 3Xy                                                                                          | 4     |
| 5    | Aircraft Registration Number    | ADDRESSEE:N123XX                                                                                      | 5     |
| 6    | carriage return-line feed       | <cr/lf>                                                                                               |       |
| 7-n  | Text of Uplink Message          | QU DSPXXXX<br>.HDQCMUA<br>CMD<br>AN N123XX<br>- AMEND RLS IFR PER RLS 03...<br>(up to 220 characters) | 6     |

Notes:

- [1] The specification of the contents of this table are entered in an abbreviated and symbolic format. The conventions used to describe the contents are shown in Table 3.2.2-2.
- [2] Lines 1, 2, 3, and 6-n are constructed the same as their corollary lines in the General format described in Section 3.2.
- [3] The SMI of 'SVC' is obligatory.
- [4] Line 4, the Intercept Information line, contains the reason the uplink message cannot be transmitted. A list of reasons and their associated codes is listed in Table 2-3 of Attachment 2. The reason code is listed in columns 60-62.
- [5] Line 5, the Aircraft Registration Number line, usually contains only the aircraft registration number, a subset of the information included in a Text Element. Refer to ARINC Specification 618 for coding of the aircraft registration number.
- [6] Line 7-n contains the original uplink message that could not be transmitted. If the message is long, it should be limited (truncated) such that the overall length of the message returned to the user does not exceed 220 characters.

If the user has requested Message Assurance by including the 'MA' Text Element and the DSP fails to deliver the message to the aircraft, the message will be returned to the originator as a reject message, modified as shown in Table 3.3.4-1.

**3.3.4.1 Message Assurance Reports**

When an End System on the ground generates an uplink message, it may request confirmation that the message was delivered to the MU onboard the aircraft by inserting 'MA' in the Text Element field of the message. If the message cannot be delivered (aircraft out of coverage, congestion problems, etc.) or the aircraft fails to acknowledge receipt of the uplink, the DSP must assume that the message was not delivered and should send a (ground/ground) message reporting the negative results to the End System. The message will carry the SMI of 'MAS'. The general format of the ground/ground service message generated to report an undeliverable uplink message with Message Assurance is:

**3.0 MESSAGE HANDLING (cont'd)**3.3.4.1 Message Assurance Reports (cont'd)**Table 3.3.4.1-1 Format of Message For Reporting an Undeliverable Uplink Message With Message Assurance Requested**

| LINE | CONTENTS                        | EXAMPLE [1]                                                                                                          | NOTES |
|------|---------------------------------|----------------------------------------------------------------------------------------------------------------------|-------|
| 1    | Priority and Destination        | QU CTYZZZZ CPYXXXX CTYXXXX                                                                                           | 2     |
| 2    | Signature and Transmission Time | .XXXXXXXX (ddhhmm)                                                                                                   | 2     |
| 3    | Standard Message Identifier     | MAS                                                                                                                  | 3     |
| 4-m  | Text Elements                   | AN N123XX/FI XX1234/MA 123F                                                                                          | 4     |
| m+1  | Intercept Information           | - reason xyz                                                                                                         | 6     |
| m+2  | Aircraft Identification         | ADDRESSEE: .N123XX                                                                                                   |       |
| m+3  | carriage return line feed       | <cr/lf>                                                                                                              |       |
| n    | Text of Uplink Message          | QU DSPXXXX<br>.HDQCMUA<br>CMD<br>AN N123XX/FI XX1234/MA 123A<br>- AMEND RLS IFR PER RLS 03<br>(up to 220 characters) | 5     |

Notes:

[1] The specification of the contents of this table are entered in an abbreviated and symbolic format. The conventions used to describe the contents are shown in Table 3.2.2-2.

[2] Lines 1 and 2 are the same as the table above.

[3] Line 3, the SMI line, will contain 'MAS'. The SMI of 'MAS' is obligatory.

[4] Line 4, the Text Element line, will contain a copy of the Text element line from the uplink message with the appropriate function indicator in the MA Text Element set to 'F'.

[5] Line n is the same as the table above.

[6] Reason code is located in columns 60-62.

**3.0 MESSAGE HANDLING (cont'd)****3.3.5 Unformattable Downlink Service Messages**

Unformattable downlink messages are Air/Ground messages that the DSP cannot convert into a Ground/Ground message because there is a format error in the message. In this case, a Service message is sent to the airline address configured for service messages, indicating why the message is unformattable.

**Table 3.3.5-1 Format of Ground/Ground Message to Report Unformattable Downlink**

| LINE | CONTENTS                             | EXAMPLE [1]                                                                                           | NOTES |
|------|--------------------------------------|-------------------------------------------------------------------------------------------------------|-------|
| 1    | Priority / Destination               | QU XXXXXXXX                                                                                           | 2     |
| 2    | Signature / Transmission time        | .DSPXXXX (ddhhmm)                                                                                     | 2     |
| 3    | Standard Message Identifier          | SVC (obligatory)                                                                                      | 2     |
| 4    | Intercept Information                | - DN INTERCEPT reason 1XY                                                                             | 3     |
| 5    | carriage return line feed            | <cr/lf>                                                                                               |       |
| 6-n  | Copy of Intercepted Downlink Message | QU DSPXXXX<br>.HDQCMUA<br>CMD<br>AN N123XX<br>- AMEND RLS IFR PER RLS 03...<br>(up to 220 characters) | 2     |

Notes:

- [1] The specification of the contents of this table are entered in an abbreviated and symbolic format. The conventions used to describe the contents are shown in Table 3.2.2-2.
- [2] Lines 1, 2, 3, and 6-n are constructed the same as their corollary lines in the General format described in Section 3.2.
- [3] Line 4, the Reason/Code line, contains the reason the downlink message cannot be delivered. A list of reasons and their associated codes is listed in Table 2-1 of Attachment 2. The reason code is displayed in columns 60-62.

c-3

**3.3.5.1 Incomplete Downlink Service Message Intercept**

Specifically when using the 618 ACARS Communications service, for multiblock messages all ACARS blocks of the same message are reassembled by the DSP before transmission in a single Ground/Ground message to the ground user. A reassembly session is closed by one of the following events:

- The last ACARS block of the message is received.
- The Incomplete Downlink Message Delivery timer, VGT4, expires. See Section 5.4.1 of ARINC Specification 618 for a list and description of ground based timers. If timer VGT4 expires, the DSP will act in the following manner:
 

xxxx SITA specific xxxx

The string 'QTB' is appended to the Ground/Ground message built with the ACARS blocks received. An Incomplete message report is also generated if the message is missing one or more blocks.

xxxx ARINC Specific xxxx

An Incomplete Downlink message report is sent with the SMI of 'SVC' and the Reason Code of 143 (No QTB). An incomplete message report is also generated if the message is missing one or more blocks.
- The maximum number of blocks allowed in a multiblock message (see Appendix D) is reached. In this case, the string 'QTB' is appended to the Ground/Ground message built with the ACARS blocks received.

c-4

3.0 MESSAGE HANDLING (cont'd)

3.4 Network Advisory Messages

Network advisory messages are used to notify users of additions, deletions, outages and return to service of ACARS ground stations. These messages are designed to be processed by a computer. They follow the ATA/IATA ICM format. The SMIs for Network advisory messages are included in Appendix C to this Specification.

c-1 | ACARS Station Advisory messages use the SMI of 'AAM'. Each part of a Station Advisory Message begins with a Message Text Delimiter (MTD). These are not TEIs. The valid delimiters are:

Table 3.4-1 ACARS Station Advisory Messages

| MTD  | DEFINITION                                 |
|------|--------------------------------------------|
| AOS/ | ACARS Station Status section within AAM    |
| ARA/ | ACARS Restoral Advisory section within AAM |
| ASA/ | ACARS Station Addition section within AAM  |
| ASD/ | ACARS Station Deletion section within AAM  |
| REM/ | Optional Remarks section                   |

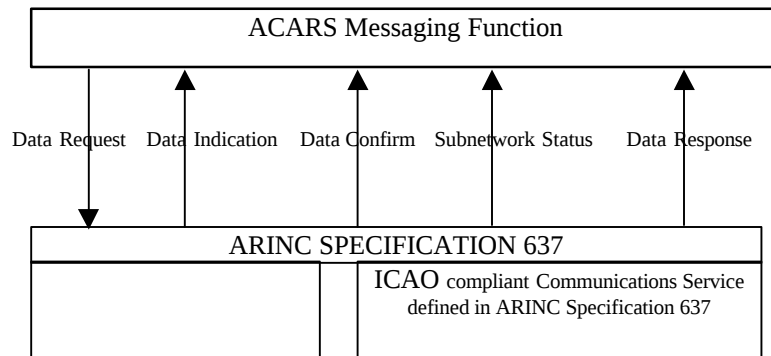
Each section except the optional Remarks section, may contain the following subsections:

| EFFECTIVE: (ddhhmm). | DAY/HOUR/MINUTE OF OCCURRENCE                                                         |
|----------------------|---------------------------------------------------------------------------------------|
| STNS: (LAX SIN).     | Precedes the list of stations.<br>If no stations names are included, contains 'NONE'. |

| NETWORK ADVISORY MESSAGE                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QU ADRDPAL<br>.DSPXXXX DDHHMM<br>AAM<br>AOS/ACARS OUTAGE STATUS.STNS:<br>(SIN).<br>ARA/ACARS RESTORAL ADVISORY EFFECTIVE (DDHHMM).STNS:<br>(YYZ).<br>ASA/ACARS STATION ADDITION.STNS:<br>(LAX).<br>ASD/ACARS STATION DELETION.STNS:<br>(PAR).<br>REM/REMARKS: (DEMONSTRATION MESSAGE). |

**3.0 MESSAGE HANDLING (cont'd)****3.5 ACARS Messaging Function Primitives**

A service is formally specified by a set of primitives (or operations) available to the user of those services. The basic primitives that will be used are the Request, Indication, Response and the Confirm primitives. A service can be confirmed, whereby an explicit response is required or unconfirmed. A service relates to an interface between two layers, and it should be noted that the present specification does not tell how these primitives are implemented.



c-4

This diagram is general in nature. See ARINC Specification 637 for more detail. Generic primitives have been defined to be used between the ACARS Messaging Function and ARINC 637 protocol stack. See ARINC Specification 637 for the definition of these primitives.

**3.6 Air/Ground Messages**

Character-oriented messages (uplink/downlink) can be delivered over any of the air/ground links defined in ARINC Specification 618. Each link and service provider combination have specific characteristics concerning the length of the message that can transit the link.

Length limitations need to be observed in preparing the messages defined herein unless other arrangements have been made with the service provider. Some new air-ground media may support larger messages than defined for the original ACARS network. Where a maximum size of the Application Text is specified, this value should be observed. Where no length maximum is specified, the length should be considered media dependent. Refer to ARINC Specification 618 for this data.

**COMMENTARY**

Many messages were defined for an ACARS VHF environment wherein the length of the Application Text was constrained to a single block consisting of a maximum of 220 characters of text. Where the Application Text format specifies this 220 character maximum, it may be necessary to comply with this constraint even though the medium (e.g., SATCOM) may allow greater length across the air/ground link.

4.0 UPLINK MESSAGE TEXT FORMATS

4.1 Introduction

This chapter contains a listing of the Message Texts of uplink messages to be passed from an originating End System at an airline host or at an ATC agency to the Data Link Service Provider (DSP) and then to the designated End System on the aircraft. Sections 4.2 through 4.4 list the uplink texts: System Control, Service Related and User Defined.

- c-4
- c-1
- Each Application Text definition contains a description of the message, a listing of the fields of the message and a graphic layout of the message construction. The figures in the following subsections illustrate the format of messages which are exchanged between an airborne end system and a ground based end system. The illustrations cover two legs of the total path: between the aircraft and the DSP on the ground and between the DSP and the ATC facility. Where appropriate, timing diagrams showing the sequence of message exchanges are also provided. The sequence and direction of message travel are illustrated in the figure below depicting both direction (downlink and uplink) and source/sink (aircraft, DSP or user Host). As many as four separate messages may be needed to complete an exchange.

Note:

The form of the messages depicted in the examples do not necessarily typify the format in which these same messages will be presented in an actual implementation.

The whole message should be transmitted. Any of the fixed format fields for which no data has been entered should be filled with <NUL>s.

c-3

4.2 Uplink Message Formats, System Control

The system control uplink messages are included in Tables C1 and C2 of Appendix C.

4.2.1 General Response - Label \_DEL

- c-2
- When the only reason for the DSP to uplink a response is the need for a technical acknowledgment to the previous downlink, this message should contain Label characters <\_DEL>.

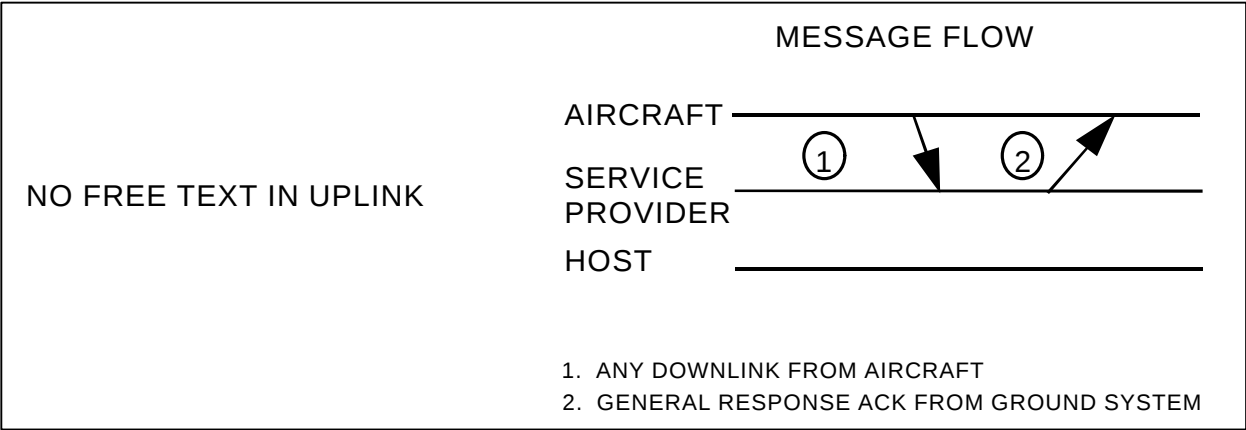


Figure 4.2.1-1 General Response Uplink

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.2.2 General Response, Polled Mode - Label \_j**

This mode is not used. Label characters \_j are reserved.

**4.2.3 ACARS Frequency Uplink - Label 54  
or Voice Go-Ahead - Label 54**

The range of authorized VHF channel names is from 118.000 MHz through 136.975 MHz. A list of channel names is maintained in ARINC Characteristic 716. ICAO Annex 10 has precedence over ARINC Characteristic 716.

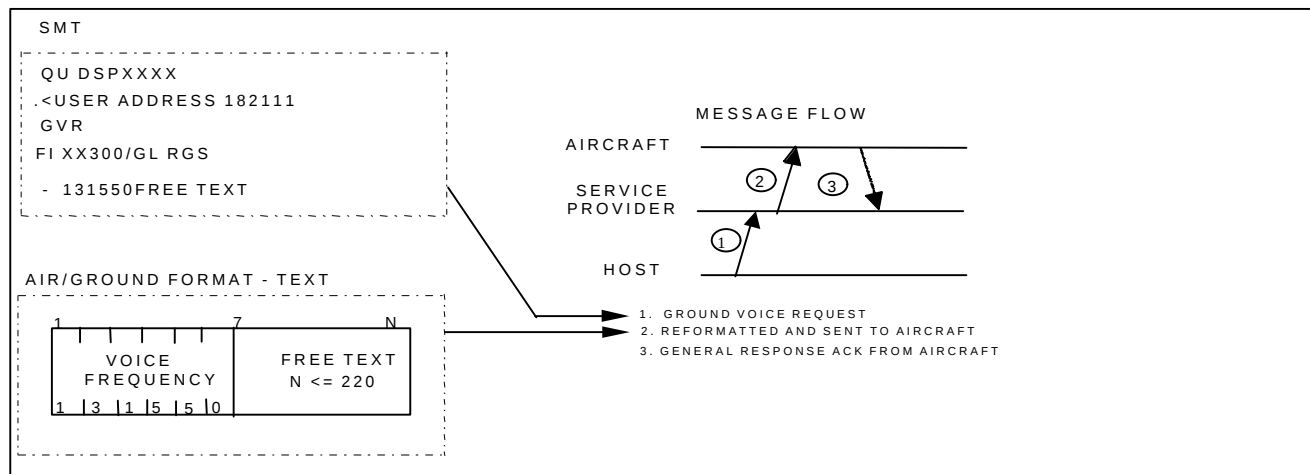
The following fixed format text field will be used in uplinked Label 54 messages containing VHF channel names:

| <u>Character No.</u> | <u>Character Content</u>                                                     |
|----------------------|------------------------------------------------------------------------------|
| 1                    | Frequency in Mhz (Hundreds)                                                  |
| 2                    | Frequency in Mhz (Tens)                                                      |
| 3                    | Frequency in Mhz (Units)                                                     |
| 4                    | Frequency in Mhz (Tenths)                                                    |
| 5                    | Frequency in Mhz (Hundredths)                                                |
| 6                    | Frequency in Mhz (Thousandths)                                               |
| 7-n                  | "Free Text" (n ≤ 220): Text be may present depending on the service provider |

The decimal point between the units and tenths Mhz characters will not be included in the ground-to-air message. It should, however, be generated in the airborne sub-system, i.e., the MU, and included in the information displayed.

**COMMENTARY**

While the format of the Voice Go-Ahead uplink provides for free text, the displaying of free text by the avionics was not originally required, and may not be supported in some avionics. Users who desire to utilize the free text field should first confer with their avionics suppliers. Some Label 54 uplinks may contain only the first 5 digits for 25 kHz channel naming to be consistent with radio control panels.



**Figure 4.2.3-1 Voice Frequency Uplink or Voice Go-Ahead**

4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

c-3 | 4.2.4 Voice Circuit Busy – Label Q4  
This message is not supported.

4.2.5 Uplink Squitter - Label SQ

c-4 | Three versions of uplink squitter messages are defined. Version 0 is the basic message. Version 1 contains Remote Ground Station (RGS) identification. Version 2 expands the content to include the RGS geographic location and VDL ground station capability. The fixed fields will be preserved in future versions for backward interoperability. The avionics should not check fields so that future extensions will be accepted.

The format of Version 0 is as follows:

|     | <u>Character No.</u> | <u>Character Content</u>            | <u>Note</u> |
|-----|----------------------|-------------------------------------|-------------|
| c-4 | 1-2                  | Version Number (00)                 | 1           |
|     | 3-4                  | Service Provider (XA, XS, XC, etc.) |             |
| c-2 | 5-n                  | Free Text (n≤ 220)                  |             |

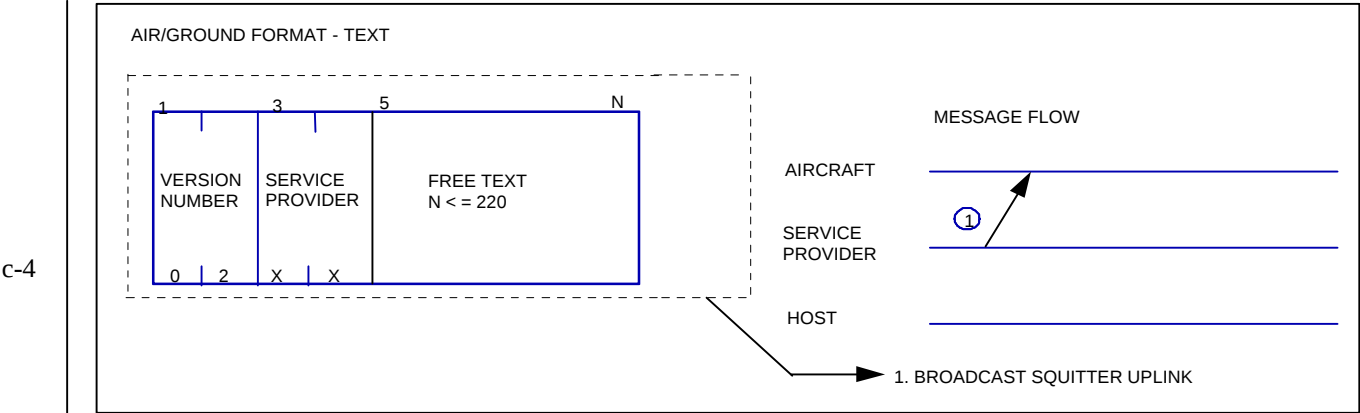


Figure 4.2.5-1 Squitter Message, Version 0

c-2 | The format of Version 1 is as follows:

|     | <u>Character No.</u> | <u>Character Content</u>            | <u>Notes</u> |
|-----|----------------------|-------------------------------------|--------------|
| c-1 | 1-2                  | Version Number (01)                 | 1            |
|     | 3-4                  | Service Provider (XA, XS, XC, etc.) |              |
|     | 5-7                  | IATA Station ID (e.g. CID)          |              |
|     | 8-11                 | ICAO Station ID (e.g. KCID)         |              |
|     | 12                   | Station Number ID (e.g. 2)          |              |
| c-2 | 13-n                 | Free Text (n≤ 220)                  |              |

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**

The format of Version 2 is as follows:

| <u>Character No.</u> | <u>Character Content</u>               | <u>Notes</u> |     |
|----------------------|----------------------------------------|--------------|-----|
| 1-2                  | Version Number (02)                    |              |     |
| 3-4                  | Service Provider (XA, XS, XC, etc.)    | 1            |     |
| 5-7                  | IATA Station ID (e.g. CID)             |              | c-2 |
| 8-11                 | ICAO Station ID (e.g. KCID)            |              |     |
| 12                   | Station Number ID (e.g. 1)             |              |     |
| 13-17                | Latitude                               | 2            |     |
| 18-23                | Longitude                              | 2            |     |
| 24-30                | Alternate Service Availability         | 3, 4         |     |
| 31-n (if used)       | Possible additional alternate services | 3, 4         |     |
| 31 or (n+1)          | Slash Delimiter </>                    | 3, 5         |     |
| 32-n or [(n+2) – m]  | Free Text (n< 220)                     |              | c-4 |

**COMMENTARY**

The original Version 2 message defined only characters one through 23. Characters 24 through 30 were introduced later to enable the avionics to identify VDL Mode 2 capable ground stations. If multiple VDL services are available, there will be multiple entries of VDL Flag and associated frequency.

**Notes**

[1]: Refer to Table 3.2.2-3 for a listing of Data Link Service Provider (DSP) designations.

[2] Position of RGS:

latitude in 4 numeric for degrees (2) and minutes (2) followed by N or S (e.g. 4620N)  
longitude in 5 numeric for degrees (3) and minutes (2) followed by E or W (e.g. 12005W)

[3] Since the definition of characters 24 and higher was added by Supplement 4, the content of characters 1 through 23 were retained without change to permit backhand compatibility.

[4] Alternate service capability will be announced by one or more 7-character strings of the format:  
ANNNNNN  
where “A” is a flag identifying the service and “NNNNNN” identifying the frequency of the service in kHz.

The following identifying flag and service characters have been defined:

| Flag | Service    |
|------|------------|
| V    | VDL Mode 2 |
|      |            |
|      |            |

[5] The end of the Alternate Service list is indicated by the slash character </> as a delimiter.

4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

4.2.5 Uplink Squitter - Label SQ (cont'd)

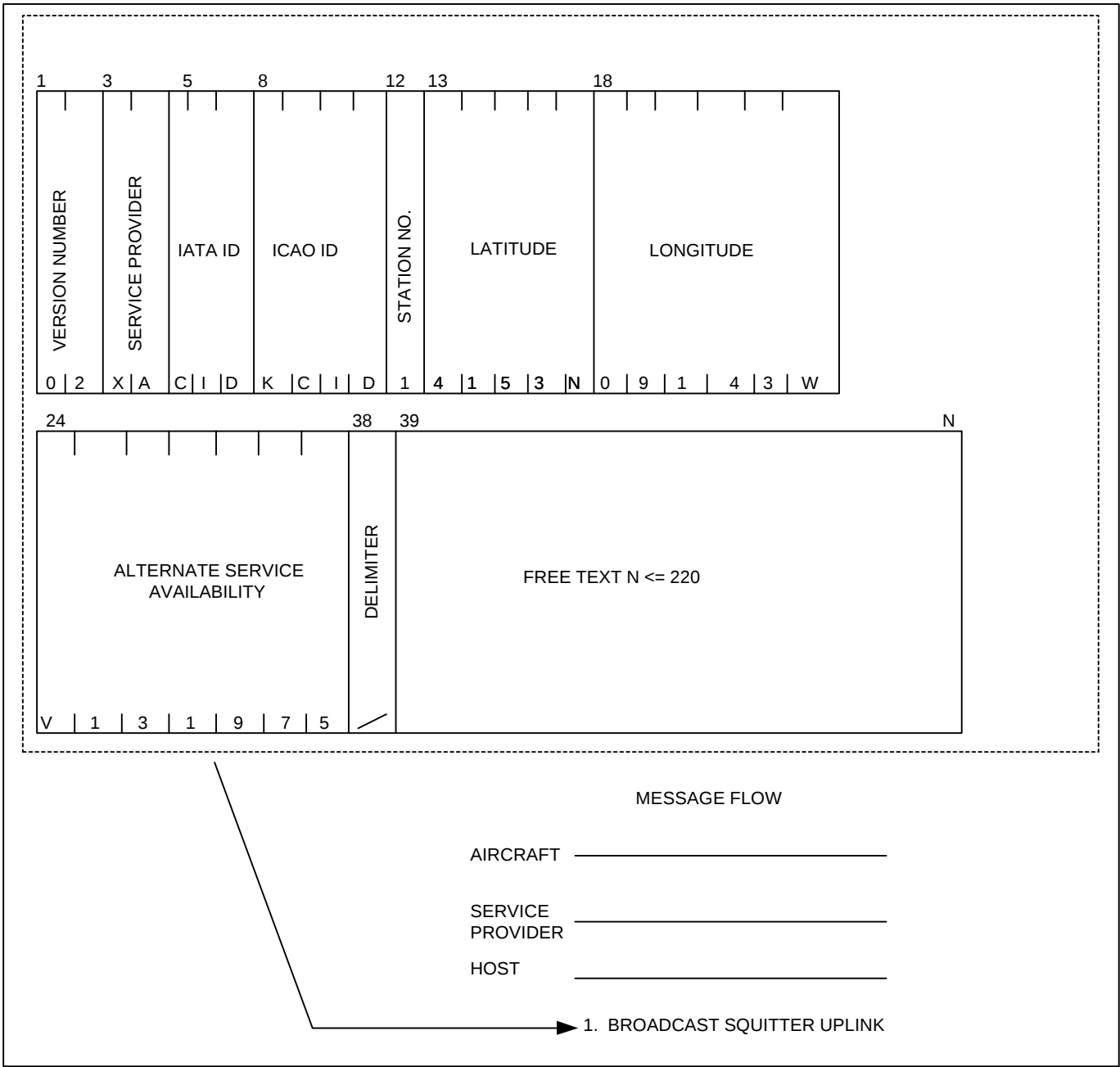


Figure 4.2.5-2 Squitter Message, Version 2

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.2.6 Data Transceiver Autotune - Label ::**

When the MU receives a Data Transceiver Autotune uplink containing Label characters ::, , it should respond on the old frequency with any traffic in queue or a technical acknowledgment message containing Label characters \_DEL as appropriate. Only one transmission should be made.

| <u>Character No.</u> | <u>Character Content</u>       |
|----------------------|--------------------------------|
| 1                    | Frequency in Mhz (Hundreds)    |
| 2                    | Frequency in Mhz (Tens)        |
| 3                    | Frequency in Mhz (Units)       |
| 4                    | Frequency in Mhz (Tenths)      |
| 5                    | Frequency in Mhz (Hundredths)  |
| 6                    | Frequency in Mhz (Thousandths) |

The description of the proper response to be followed by the MU is described in ARINC Specification 618.

**4.2.7 DSP Autotune Broadcast Uplink Label – Label ::**

The Service Provider will use the DSP Autotune Broadcast uplink during recovery from an interruption of service and is intended to result in rapid redistribution of ACARS avionics from the base frequency to a group of alternate frequencies with a single transmission. The message will use the Squitter address of all NULS. The text of the message includes a list of candidate alternate frequencies that the aircraft, on the base, can tune to based on the aircraft flight phase (Onground, Terminal, or Enroute). The remaining free text, if provided would contain a message from the DSP for possible display to the crew.

The format for this message is as follows:

| <u>Character No.</u> | <u>Character Content</u>                           | <u>Notes</u> |
|----------------------|----------------------------------------------------|--------------|
| 1-2                  | Version Number (01)                                |              |
| 3-4                  | Service Provider (XA, XS, SC, etc.)                |              |
| 5                    | Delay Link Establishment: 0 = Off, 1 = Enabled     |              |
| 6-8                  | Delay Time in Seconds Range: 0 to 999              |              |
| 9                    | Number of Alternate Ground Frequencies to Follow   |              |
| 10                   | Number of Alternate Terminal Frequencies to Follow |              |
| 11                   | Number of Alternate Enroute Frequencies to Follow  |              |
| 12                   | First Ground Frequency in Mhz (Hundreds)           |              |
| 13                   | First Ground Frequency in Mhz (Tens)               |              |
| 14                   | First Ground Frequency in Mhz (Units)              |              |
| 15                   | First Ground Frequency in Mhz (Tenths)             |              |
| 16                   | First Ground Frequency in Mhz (Hundredths)         |              |
| 17                   | First Ground Frequency in Mhz (Thousandths)        |              |
| 18                   | Second Ground Frequency in Mhz (Hundreds)          |              |
| ...                  |                                                    |              |
| Varies               | First Terminal Frequency in Mhz (Hundreds)         |              |
| Varies               | First Terminal Frequency in Mhz (Tens)             |              |
| ...                  |                                                    |              |
| Varies               | Last Terminal Frequency in Mhz (Hundreds)          |              |
| Varies               | Last Terminal Frequency in Mhz (Tens)              |              |
| Varies               | Last Terminal Frequency in Mhz (Units)             |              |
| Varies               | Last Terminal Frequency in Mhz (Tenths)            |              |
| Varies               | Last Terminal Frequency in Mhz (Hundredths)        |              |
| Varies               | Last Terminal Frequency in Mhz (Thousandths)       |              |
| Varies               | First Enroute Frequency in Mhz (Hundreds)          |              |
| Varies               | First Enroute Frequency in Mhz (Tens)              |              |
| Varies               |                                                    |              |
| Varies               | Last Enroute Frequency in Mhz (Hundreds)           |              |
| Varies               | Last Enroute Frequency in Mhz (Tens)               |              |
| Varies               | Last Enroute Frequency in Mhz (Units)              |              |
| Varies               | Last Enroute Frequency in Mhz (Tenths)             |              |
| Varies               | Last Enroute Frequency in Mhz (Hundredths)         |              |
| Varies               | Last Enroute Frequency in Mhz (Thousandths)        |              |
| n-220                | Optional Free text.                                |              |

Refer to ARINC Specification 618 for the ACARS MU use of this message.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**

**4.3 Uplink Message Formats, Service Related**

c-3 | Service messages are used by the aircraft to facilitate operations. Air Traffic Service (ATS) messages are also classed as Service Related uplinks. See Section 4.5 for ATS message formats.

c-4 | Two different formats are defined in the subsections which follow: those with Headers and those with no Header. The [DASH SPACE] <- > character sequence is used to terminate the Header, if present, and announce the beginning of the Application Text field. If no Header is used, the Text field simply begins with the [DASH SPACE] <- > character sequence. For messages that contain a Sublabel, the [DASH SPACE POUNDSIGN] <- #> character sequence is used to indicate that the Application Text field begins with a Sublabel.

**Ground/Ground Messages:**

The form of the ground/ground messages destined for processing by the ACARS Management Unit (MU) as an End System should have the format defined in Chapter 3. The overall form is repeated diagrammatically here for reference.

c-3 | Refer to Table C1 and C2 of Appendix C for a listing of Messages, their associated label, SMI and section reference.

**Table 4.3-1A Ground/Ground Message Format for Uplink Messages sent to the MU**

c-1 | 

|                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------|
| Standard format:<br>QU CTYDPAL<br>.QXSXMSX ddhhmm<br><u>SMI</u><br>AN N1002x/GL MAN or FI xx1234/GL MAN<br>- <u>Application text</u> |
|--------------------------------------------------------------------------------------------------------------------------------------|

**Air/Ground Messages:**

The form of air/ground uplink messages destined for processing by the ACARS Management Unit (MU) as an end system should have the following format.

**Table 4.3-1B Air/Ground Message Format for Uplink Messages sent to the MU**

|     |  |                          |  |              |  |                                       |                         |
|-----|--|--------------------------|--|--------------|--|---------------------------------------|-------------------------|
|     |  | <b>AIRCRAFT ADDRESS</b>  |  | <b>LABEL</b> |  | <b>OPTIONAL SUPPLEMENTARY ADDRESS</b> | <b>MESSAGE TEXT</b>     |
| c-3 |  | .N1234x<br>or<br>.xx1234 |  | <u>xx</u>    |  | /PIKCLXS.                             | <u>Application text</u> |

**Aircraft Address:**

Refer to ARINC Specification 618.

**Message Label:**

The air/ground uplink message contains a 2-character Label. In most cases, the Label is used by the ACARS Management Unit (MU) to identify the content and format of the message.

Uplink messages may also be delivered to other onboard systems for processing. Label H1 is used to identify messages exchanged across the air-ground medium that are to be delivered to a peripheral of the MU. See Section 4.3.5 for the format of messages delivered to a peripheral of the MU.

**Optional Supplementary Address:**

c-3 | The Supplementary Address field will contain the address of the source (End System) that is providing the uplink message. In most cases this will be the airline host. Refer to Section 4.5 for a description of the Supplementary Address for ATC messages.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**

If the message is sent to a peripheral of the MU, such as the FMC, the Label 'H1' will be used. In this case, the Supplementary Address field will be expanded with a 2-character MFI. See Section 4.4 of this Specification for a more detailed description.

**Message Text:**

In general, the message text of uplink messages should be constructed in the format: '-----Application Text-----'.

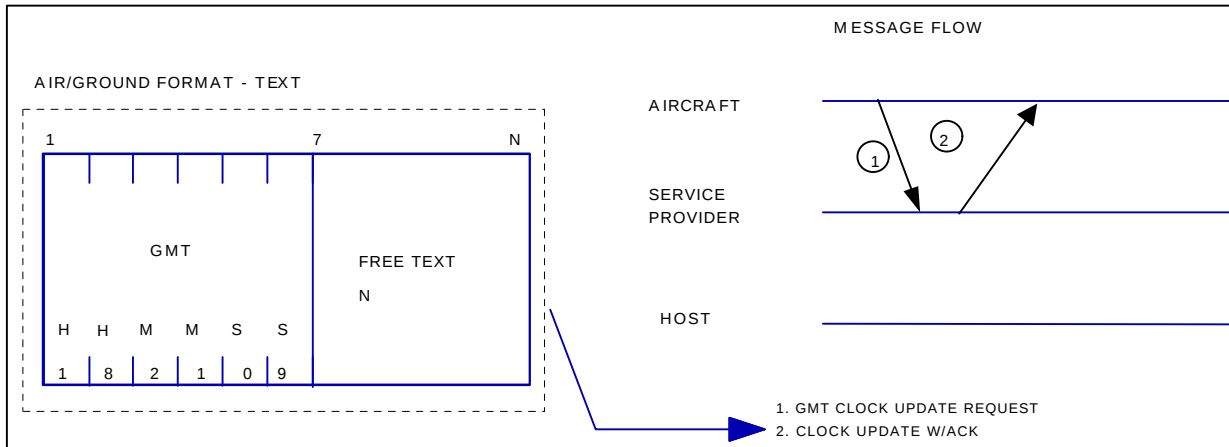
**4.3.1 Ground GMT Update - Label 51**

The message should be transmitted whenever the pilot signifies his desire for clock update action from the ground.

| <u>Character No.</u> | <u>Character Content</u>   |
|----------------------|----------------------------|
| 1                    | [GMT Hours (Tens)] (MSC)   |
| 2                    | [GMT Hours (Units)]        |
| 3                    | [GMT Minutes (Tens)] (MSC) |
| 4                    | [GMT Minutes (Units)]      |
| 5                    | [GMT Seconds (Tens)] (MSC) |
| 6                    | [GMT Seconds (Units)]      |

c-3

c-3

**Figure 4.3.1-1 GMT Report**

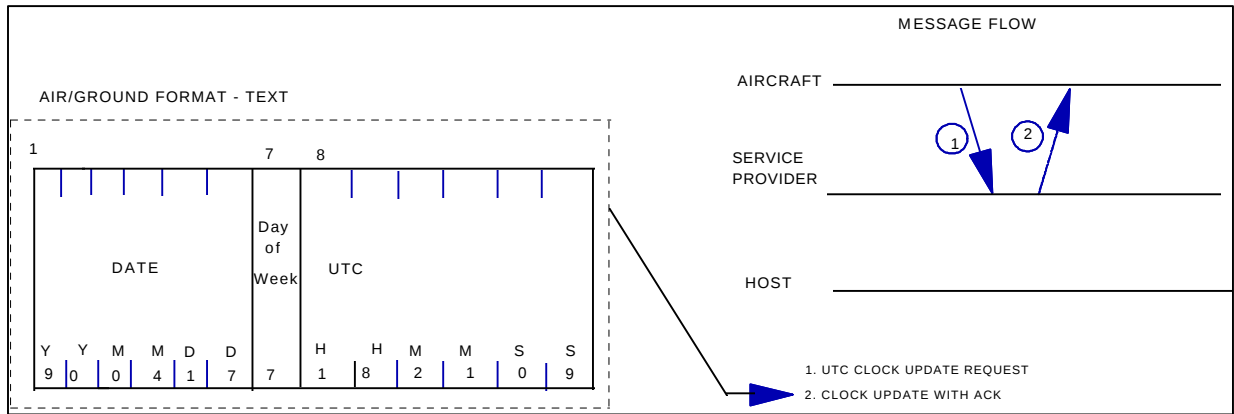
c-4

4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

4.3.2 Ground UTC Update - Label 52

Uplink label 52 presents an alternative format for delivering UTC information. The new format includes the date and the day of the week as well as the information already present in label 51. The format of the message is as follows:

| Character No. | Character Content               |
|---------------|---------------------------------|
| 1-6           | Year (yy,mm,dd)                 |
| 7             | Day-of-Week (e.g. 1=MON, 7=SUN) |
| 8-13          | UTC (hh,mm,ss)                  |



c-1 | Figure 4.3.2-1 Ground UTC Update

4.3.3 Reserved Spare - Label 53

Not assigned.

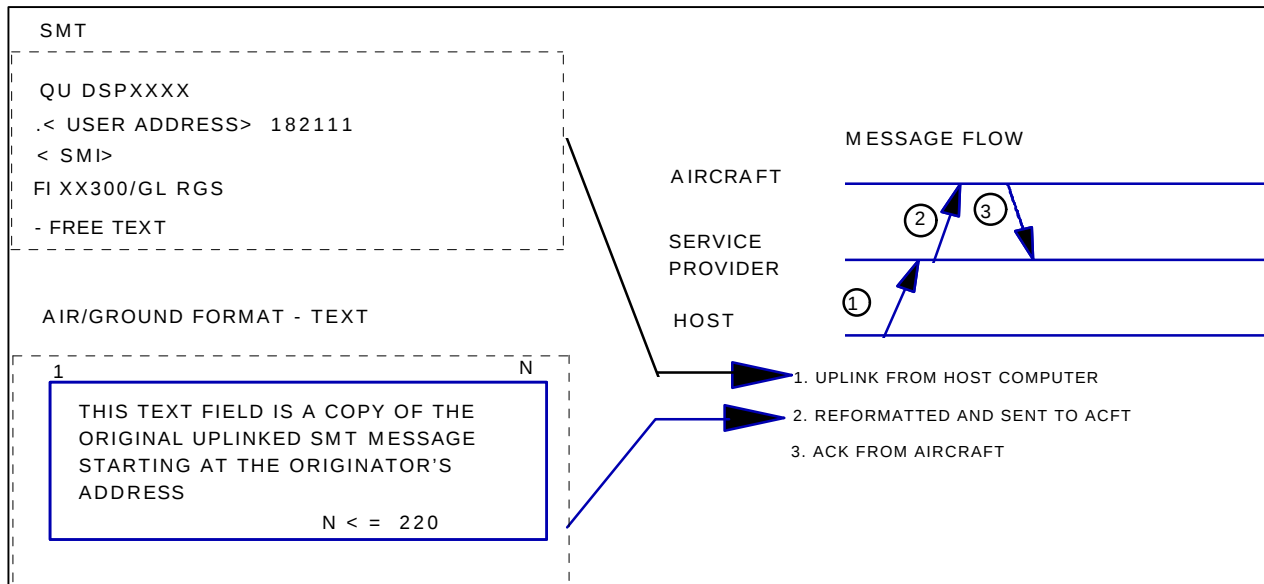
**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.3.4 Cockpit/Cabin Printer Messages - Labels C0-C9**

The uplink labels C0 through C9 are used to address different cockpit or cabin printers onboard the aircraft. Label C1 addresses Printer #1, C2 addresses Printer #2, etc. Label C0 is for an undesignated printer or an “All Call” printer as determined by the airborne system.

c-1

| <u>Character No.</u> | <u>Character Content</u>                       |
|----------------------|------------------------------------------------|
| 1                    | Period Character <.>                           |
| 2-8                  | ATA/IATA address of message originator         |
| 9                    | Space Character < >                            |
| 10-15                | Date/Time group                                |
| 16                   | Carriage Return Character <CR>                 |
| 17                   | Line Feed Character <LF>                       |
| 18-20                | SMI from originator's message                  |
| 21                   | Carriage Return Character <CR>                 |
| 22                   | Line Feed Character <LF>                       |
| 23-24                | TEI of 'AN' or 'FI' from originator's message  |
| 25                   | Space Character < >                            |
| 26-32                | Aircraft registration number or flight number  |
| 33                   | Slash Character </>                            |
| 34-35                | TEI of "GL" or "AP" from originator's message  |
| 36                   | Space Character < >                            |
| 37-39                | Ground station identifier - 3 Alpha characters |
| 40                   | Carriage Return Character <CR>                 |
| 41                   | Line Feed Character <LF>                       |
| 42                   | Hyphen Character <->                           |
| 43                   | Space Character < >                            |
| 44-n                 | "Free Text" where $n \leq 220$                 |

Only single-block uplinks and the first block of an ACARS multi-block uplink messages will contain the complete text field described above. The text fields of second and subsequent blocks of multi-block uplinks will only contain text.



**Figure 4.3.4-1 Uplink Messages with SMT Header**

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4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

4.3.5 Command/Response Uplink - Label RA

The Command/Response application is user-defined. The communications exchange is initiated by the ground host.

| Character No. | Character Content      |
|---------------|------------------------|
| 1 - n         | Free Text (See Note 1) |

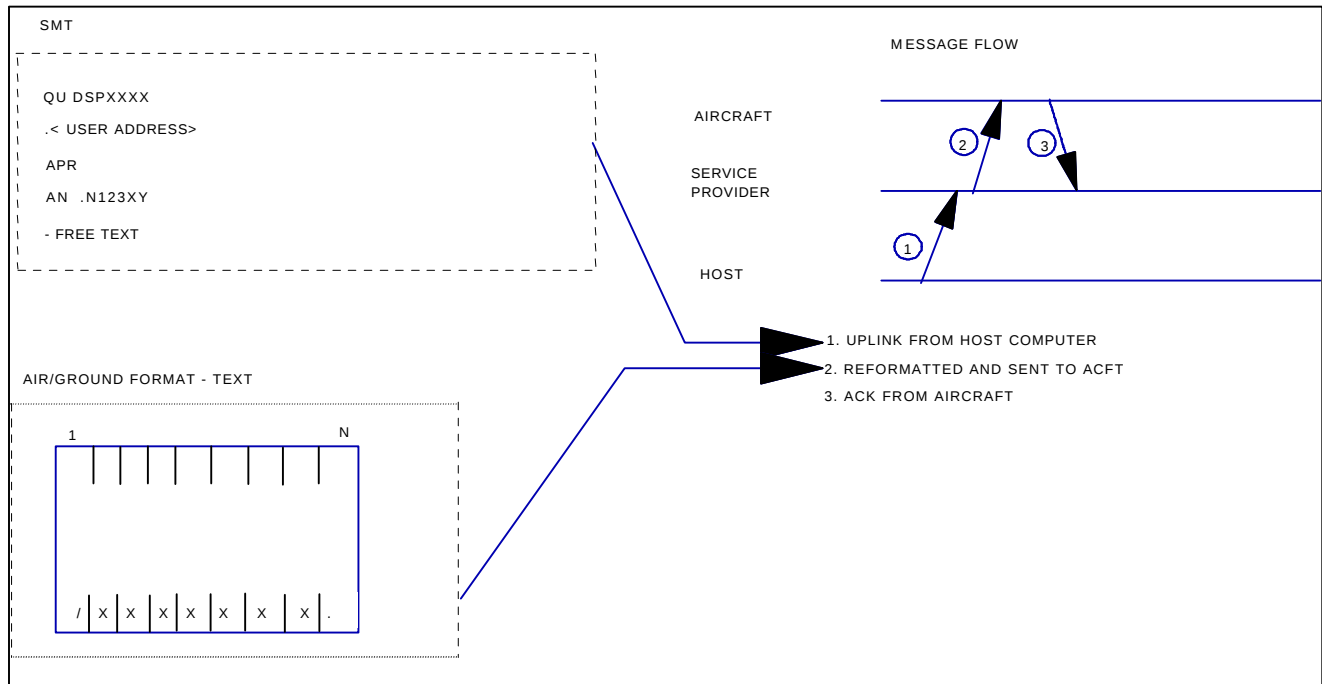


Figure 4.3.5-1 Command/Response Uplink

While the free text of this message is user defined, many ACARS MUs have implemented a common format that is defined by:

| Character No. | Character Content                    |
|---------------|--------------------------------------|
| 1-2           | Message Priority                     |
| 3-9           | Ground Address                       |
| 10            | Tilde <~> Character. See note below. |
| 11            | RA Function Indicator (1,2,3,4)      |
| 12-n          | "Free text" where $n \leq 220$       |

Note:

[1] Since some user network interfaces with their service provider are limited to the baudot subset of ASCII, which excludes the tilde <~>, character 10 of incoming RA messages is frequently ignored by the avionics while others accept a range of characters. Consult your service provider. ACARS multiblock messages are permitted. When used, the fixed format shown above for characters 1 thru 11 applies only to the first block.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.3.6 Network Statistics Report Request - Label S1**

The Network Statistics Report Request uplink message is used to request network statistics from the aircraft. Multiple reports (up to four possible report types) can be requested by including additional report type codes. The MU will retain only the most recent request if multiple requests are received. Uplink Network Statistics Report Request messages will be delivered to the DSP with the SMI of NSR.

The uplink Network Statistics Report Request (Label S1) uplink message provides the user with the option to request a report immediately or upon the occurrence of the IN event. Also, the user may arrange with the MU manufacturer to generate Label S1 downlinks at specific times or events. See Section 5.3.52 for the description of the Network Statistics downlink message.

**Table 4.3.6-1 Network Statistics Report Request Format**

| SIZE | FORMAT        | DESCRIPTION               | EXAMPLE | NOTES |
|------|---------------|---------------------------|---------|-------|
| 1    | slash </>     | Delimiter                 | /       | 2,3   |
| 7-n  | XXXXXXX       | TTY Address               | CIDRICR |       |
| 1    | period <.>    | Delimiter                 | .       |       |
| 2    | XX            | Report Type Identifier    | DA      | 1     |
| 0-6  | Same as above | Additional requests (0-3) |         | 1,4   |

Notes:

- |     |                                            |                                                                                                                                                                                                                                                                                                                  |
|-----|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | <u>Report Type</u><br>SA<br>SC<br>DA<br>DC | <u>Description</u><br>Enable generation of Summary report to be downlinked subsequent to the IN event.<br>Downlink the Summary report with current data now.<br>Downlink all accumulated Detailed Statistics records subsequent to the IN event.<br>Downlink a Detailed Statistics report with current data now. |
|-----|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
- [2] This data is optional.
- [3] Multiple addresses can be specified : separated by spaces and terminated with a period <.>. See Section 3.8 for rules of encoding addresses.
- [4] If additional requests are included in the uplink request message, each additional request will follow the format defined in this table for the first request.

**4.3.7 Network Performance Report Request - Label S2**

The Network Performance Request is generated by an entity on the ground (user or DSP). The format enables the user to specify the reporting period or interval.

**Table 4.3.7-1 Statistics Report Request Format - Label S2**

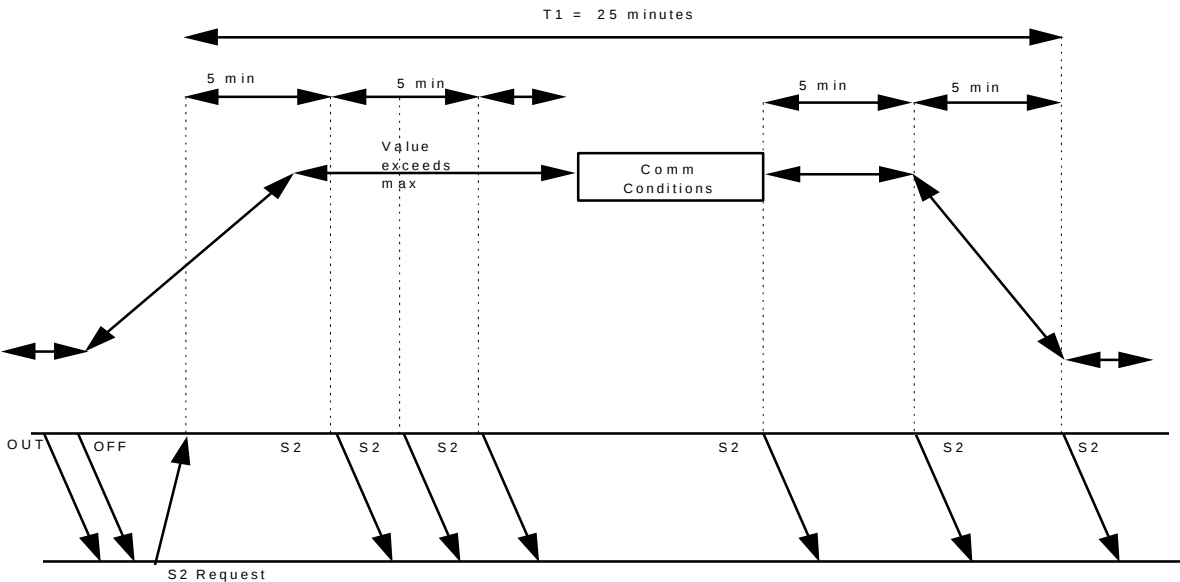
| DATA FIELD                                   | VARIABLE | SIZE | RANGE     | NOTE                      |
|----------------------------------------------|----------|------|-----------|---------------------------|
| Enable/Disable Data Collection and Reporting | E/D      | 1    | 0-1       | 0 = Disable<br>1 = Enable |
| Data collection interval (in minutes)        | T1       | 4    | 0000-1440 |                           |
| Periodicity (in minutes)                     | T2       | 4    | 0000-1440 | T2 < T1                   |

4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

4.3.7 Network Performance Report Request - Label S2 (cont'd)

Example:

A VHF Network Performance Report Request message is sent after the OFF downlink message is received by the DSP or user. In the example diagram below, the S2 Request fields are set as follows: E/D = 1, T1 = 25, T2 = 5.



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#### **4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**

#### 4.3.8 LRU Configuration Profile Report Request – MFI or Label S3

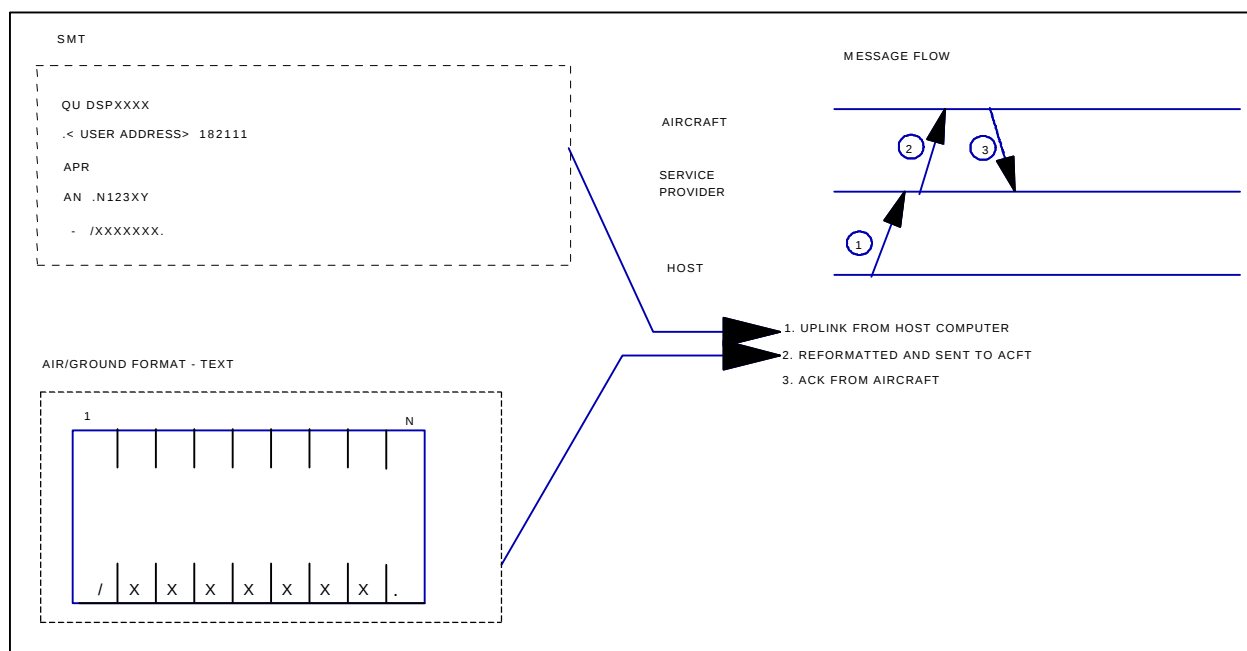
The LRU Configuration Profile Report Request is generated by an entity on the ground (user or DSP).

| SIZE | FORMAT     | DESCRIPTION | NOTES |
|------|------------|-------------|-------|
| 1    | slash </>  | Delimiter   | 1     |
| Var  | XXXXXXXX   | TTY Address | 1     |
| 1    | period <.> | Delimiter   | 1     |

Note:

[1] This field is optional.

See Section 5.3.50 for the definition of the downlink Aircraft Profile Report message.



### Figure 4.3.8-1 LRU Configuration Report Request

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.3.9 Meteorological Report Command Uplink –MFI or Label H2**

Automatic Weather Report (AWR) algorithm (see Section 5.2.13.2 and 5.2.13.3) limits can be changed via an ACARS uplink command using the following format:

| CHAR  | DATA    | DESCRIPTION                    | UNITS                                                               |
|-------|---------|--------------------------------|---------------------------------------------------------------------|
| 1     | A       | IMI                            |                                                                     |
| 2     | W       | IMI                            |                                                                     |
| 3     | R       | IMI                            |                                                                     |
| 4-5   | '0'-'9' | Ascent Series 1 intervals      | Number of seconds, 03 to 20                                         |
| 6-8   | '0'-'9' | Ascent Series 1 duration       | Number of seconds, 030 to 200                                       |
| 9-10  | '0'-'9' | Ascent Series 2 intervals      | Number of seconds, 20 to 60                                         |
| 11-13 | '0'-'9' | Top of Ascent                  | Hundreds of feet PALT, 180 to 300<br>or tens of seconds, 051 to 111 |
| 14-15 | '0'-'9' | Enroute intervals              | Number of minutes, 01 to 60                                         |
| 16-18 | '0'-'9' | Top of a Descent               | Hundreds of feet PALT, 180 to 300                                   |
| 19-21 | '0'-'9' | Descent intervals              | Number of seconds, 020 to 300                                       |
| 22    | '0'-'1' | Ascent Enable(1) / Disable(0)  |                                                                     |
| 23    | '0'-'1' | Enroute Enable(1) / Disable(0) |                                                                     |
| 24    | '0'-'1' | Descent Enable(1) / Disable(0) |                                                                     |

**4.4 Uplink Message Formats, ACARS Peripherals - Label H1**

Provisions have been made for avionic subsystems (peripherals) to operate as End Systems and to accept messages from the AOC users' host systems or ATC facility on the ground. These messages will be routed through the ACARS Management Unit (MU) for delivery. Uplink messages to these avionics subsystems will contain Label characters H1.

Label H1 messages may contain additional addressing information to facilitate delivery of the message. Sublabels are used to enable the MU to identify the specific avionics subsystem (e.g. FMC) to which uplink message is to be passed.

A general format example is shown below. The following subsections define, in greater detail, the format of messages exchanged across the air-ground medium that are to be delivered to an avionics subsystem by the ACARS Management Unit (MU).

A listing of Sublabels, their associated SMI and Section References are found in Table C2-A of Appendix C.

**Table 4.4-1A Ground/Ground format of an Uplink Message for Delivery to an Avionics Subsystem**

Standard format:

QU DSPXXXX

.LAX05xx/ddhhmm

SMI

AN N1003x/GL or RGS FI xx1234/GL RGS

- /LAX05xx.Application text

The message will be delivered to the avionics system identified by the SMI. The actual SMI entry should be taken from Table C-2A of Appendix C, cross referenced to the avionics systems sublabel from Appendix D of ARINC Specification 622.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****Message Text:**

See the description provided in Section 4.3 under Table 4.3-1A, Ground/Ground format of Uplink Message sent to the MU.

**Table 4.4-1B General Air/Ground Format of Uplink Message to be delivered to an Avionics Subsystem.**

|  | AIRCRAFT ADDRESS         |  | LABEL |  | SUB LABEL | OPTIONAL SUPPLEMENTARY ADDRESS | MESSAGE TEXT            |
|--|--------------------------|--|-------|--|-----------|--------------------------------|-------------------------|
|  | .N1234x<br>or<br>.xx1234 |  | H1    |  | MD        | /LAX05xx.                      | <u>Application text</u> |

c-1

The specific messages supported by the ACARS network are defined in Sections 4.3.7 through 4.3.17.

**Aircraft Address:**

See ARINC Specification 618 for a description of the aircraft address.

**Label:**

Uplink messages to be delivered to a peripheral of the MU, such as the FMC, utilize the Label H1.

**Sublabel:**

When uplink messages are to be delivered to avionics subsystems by the ACARS MU for processing, these messages use Label H1 and a 2 character Sublabel to identify the intended recipient avionics subsystem. Note that, as discussed in Section 4.3, the Sublabel field is preceded by the POUNDSIGN <#> character to designate the presence of a Sublabel field. The above example assumes that the message will be delivered to the active FMC; thus the Sublabel MD is shown. See Table C-2A of Appendix C and ARINC Specification 622, Appendix D for a full listing of Sublabel assignments for ACARS peripherals.

**Table 4.4-1C Example Sublabels**

| DESTINATION    | SUBLABEL |
|----------------|----------|
| CMC            | CF       |
| Cabin Terminal | T1       |
| DMU            | DF       |
| FMC selected   | MD       |

c-3

**Optional Supplementary Address:**

For messages to a peripheral to the MU, the Supplementary Address is optional. The Supplementary Address field will contain the address of the End System to which the responding downlink should be sent. See Section 3.8.

**Message Text:**

See the description provided in Section 4.3 under Table 4.3-1A, Ground/Ground format of Uplink Message sent to the MU.

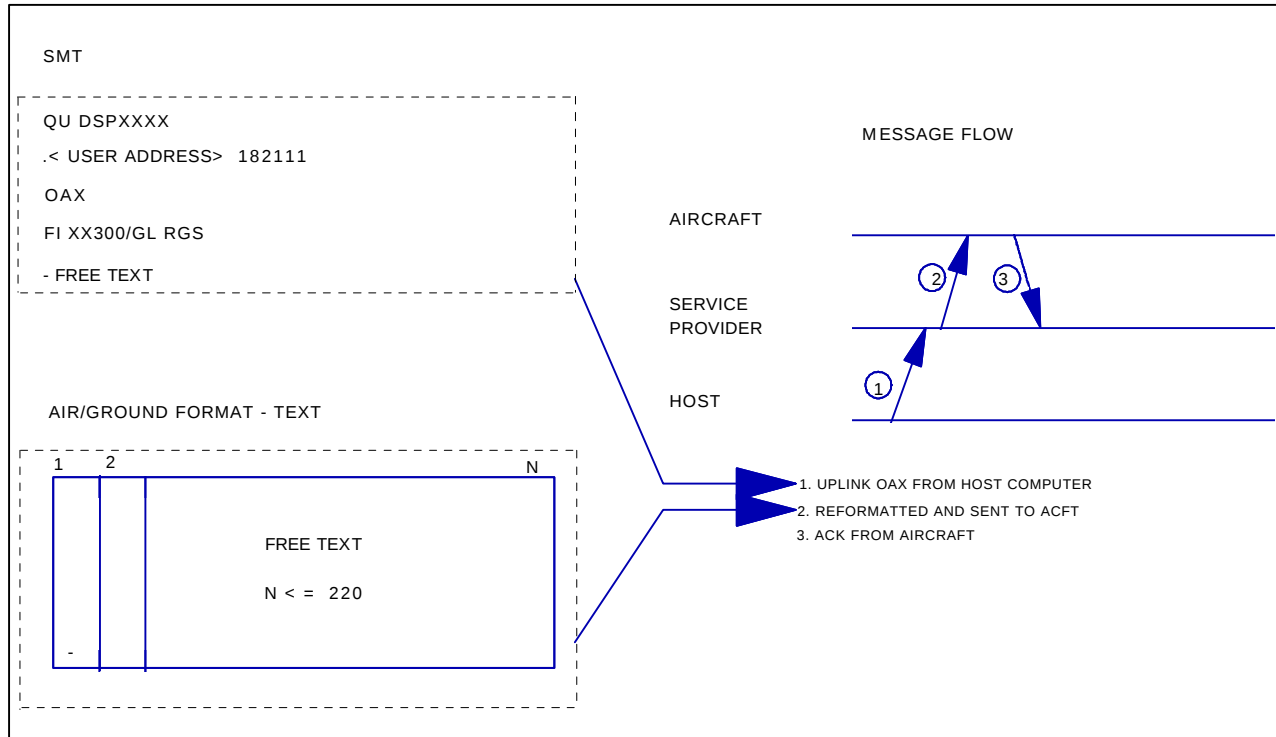
**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**4.4.1 OAT - Label H1

| <u>Character No.</u> | <u>Character Content</u>                       |
|----------------------|------------------------------------------------|
| 1                    | Period Character <.>                           |
| 2-8                  | ATA/IATA address of message originator         |
| 9                    | Space Character < >                            |
| 10-15                | Date/Time group                                |
| 16                   | Carriage Return Character <CR>                 |
| 17                   | Line Feed Character <LF>                       |
| 18-20                | SMI from originator's message                  |
| 21                   | Carriage Return Character <CR>                 |
| 22                   | Line Feed Character <LF>                       |
| 23-24                | TEI of 'AN' or 'FI' from originator's message  |
| 25                   | Space Character < >                            |
| 26-32                | Aircraft registration number or flight number  |
| 33                   | Slash Character </>                            |
| 34-35                | TEI of "GL" or "AP" from originator's message  |
| 36                   | Space Character < >                            |
| 37-39                | Ground station identifier - 3 Alpha characters |
| 40                   | Carriage Return Character <CR>                 |
| 41                   | Line Feed Character <LF>                       |
| 42                   | Hyphen Character "<->"                         |
| 43                   | Space Character " "                            |
| 44-n                 | "Free Text" where $n \leq 220$                 |

- c-1 | Note: For ATS uplink messages to an OAT, the beginning of the "Free Text" field is encoded with a SLASH </>, a two-character MFI, and a space, followed by one or more seven-character ATS return addresses, separated by spaces. This series is terminated with a period. (See Section 3.8.1.3, "Uplink Supplementary Address(es)" for a definition of the MFI field.)
- c-3 | For OAT messages, SITA, as a DSP, examines the beginning of the text part of the Type B message to test whether the message contains a sublabel. If the text begins with the [DASH SPACE POUNDSIGN] <- #> character sequence, the
- c-4 | two characters following the POUNDSIGN <#> are taken to be the sublabel. If the message is an ACARS multiblock, this sublabel will be placed at the beginning of any subsequent ACARS blocks. If the DSP finds any character other
- c-1 | than POUNDSIGN <#> at the position described, the message is treated as containing no sublabel.
- c-4 | Only single-block uplinks and the first block of ACARS multi-block uplink messages will contain the complete text field described above. The Text fields of second and subsequent blocks of multi-block uplinks will only contain text. See Figure below.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.4.2 OAX - Label H1**

| <u>Character No.</u> | <u>Character Content</u>       |
|----------------------|--------------------------------|
| 1                    | Dash Character <->             |
| 2                    | Space Character < >            |
| 3-4                  | "Free Text" where $n \leq 220$ |

**Figure 4.4.2-1 OAX - Label H1**

Note: For ATS uplink messages to an Optional Auxiliary Terminal (OAX), the beginning of the "Free Text" field is encoded with a SLASH </>, a two-character MFI, and a space, followed by one or more seven-character ATS return addresses, separated by spaces. This series is terminated with a period. (See Section 3.8.1.3, "Uplink Supplementary Address(es)" for a definition of the MFI field.)

c-1

For OAX messages, SITA, as the DSP, examines the beginning of the text part of the Type B message to test whether the message contains a sublabel. If the text begins with the [DASH SPACE POUNDSIGN] <- #> character sequence, the two characters following the POUNDSIGN <- #> are taken to be the sublabel. If the message is an ACARS multiblock, this sublabel will be placed at the beginning of any subsequent ACARS blocks. If the DSP finds any character other than POUNDSIGN <- #> at the position described, the message is treated as containing no sublabel.

**4.4.3 Uplinks (with Headers) to Peripherals - Label H1**

c-3

This section describes the message format for uplink messages containing a sublabel and with SMT header information imbedded in the uplink air/ground message block.

c-1

Peripherals may receive messages with the following SMIs:

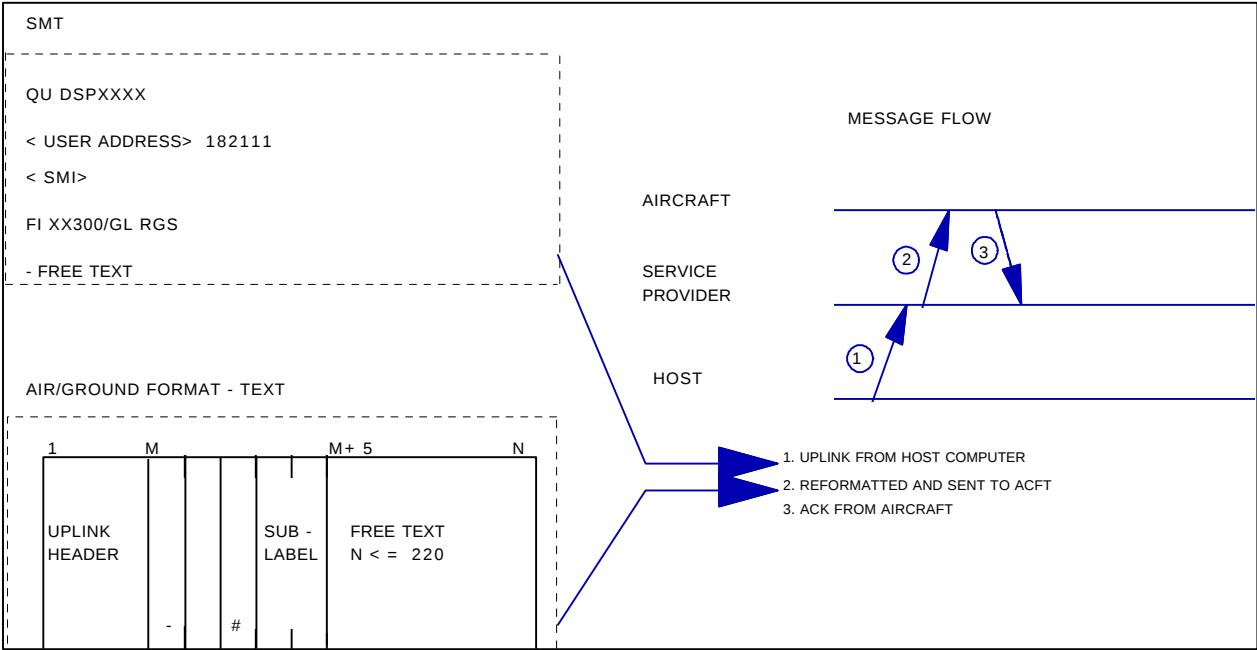
|     |     |     |     |
|-----|-----|-----|-----|
| CFD | DFD | FCD | TX1 |
|     |     | FCL | TX2 |
|     |     | FCR | TX3 |
|     |     | FC3 | TX4 |

c-3

4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

c-3 | 4.4.3 Uplinks (with Headers) to Peripherals - Label H1 (cont'd)

| Character No. | Character Content                                   |
|---------------|-----------------------------------------------------|
| 1             | Period Character <.>                                |
| 2-8           | ATA/IATA address of message originator              |
| 9             | Space Character < >                                 |
| 10-15         | Date/Time group                                     |
| 16            | Carriage Return Character <CR>                      |
| 17            | Line Feed Character <LF>                            |
| 18-20         | SMI from originator's message                       |
| 21            | Carriage Return Character <CR>                      |
| 22            | Line Feed Character <LF>                            |
| 23-24         | TEI of 'AN' or 'FI' from originator's message       |
| 25            | Space Character < >                                 |
| 26-32         | Aircraft registration number or flight number       |
| 33            | Slash Character </>                                 |
| 34-35         | TEI of "GL" or "AP" from originator's message       |
| 36            | Space Character < >                                 |
| 37-39         | Ground station identifier (3 Alpha characters)      |
| 40            | Carriage Return Character <CR>                      |
| 41            | Line Feed Character <LF>                            |
| 42            | Dash Character <->                                  |
| 43            | Space Character < >                                 |
| 44            | Poundsign Character <#>                             |
| 45-46         | Sublabel Characters (See Table C-2A of Appendix C.) |
| 47-n          | "Free Text" where n ≤ 220                           |



c-3 | Figure 4.4.3-1 Uplink Messages with SMT Header to Peripherals

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.4.4 Uplinks (With No Header) to Peripherals - Label H1**

c-3

This section describes the message format for uplink messages with a sublabel, but without SMT Header information imbedded in the uplink air/ground message block.

Peripherals may receive messages with the following SMIs:

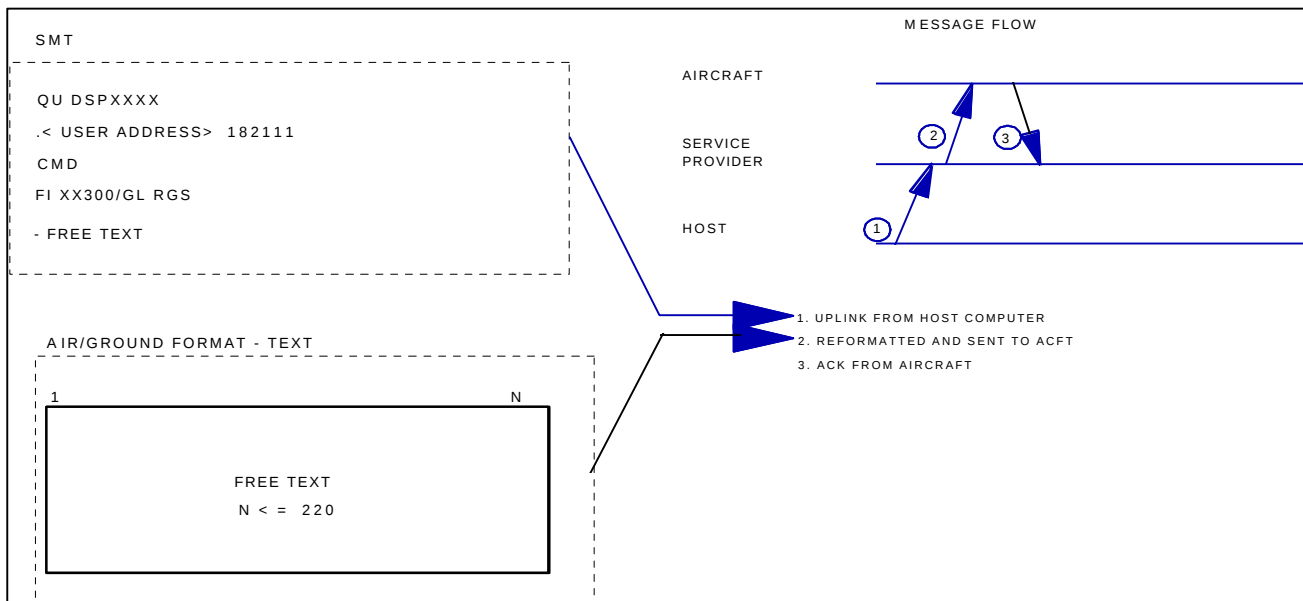
|     |     |     |     |     |     |         |     |
|-----|-----|-----|-----|-----|-----|---------|-----|
| AUD | CFX | DFX | FMD | Nxx | SDD | TT1-TT8 | HDR |
| AUL |     |     | FML |     | SDL |         | HDL |
| AUR |     |     | FMR |     | SDR |         | HDD |
|     |     |     | FM3 |     |     |         |     |

c-3

Note: For ATS uplink messages to an ACARS peripheral, the beginning of the “Free Text” field is encoded with a SLASH </>, a two-character MFI, and a space, followed by one or more seven-character ATS return addresses, separated by spaces. This series is terminated with a period. (See Section 3.8.1.3, “Uplink Supplementary Address(es)” for a definition of the MFI field.)

c-1

| <u>Character No.</u> | <u>Character Content</u>                            |
|----------------------|-----------------------------------------------------|
| 1                    | Dash Character <->                                  |
| 2                    | Space Character < >                                 |
| 3                    | Poundsign Character <#>                             |
| 4-5                  | Sublabel Characters (See Table C-2A of Appendix C.) |
| 6-n                  | “Free Text” where $n \leq 220$                      |



**Figure 4.4.4-1 Uplink Messages Without SMT Header to Peripherals**

c-3

4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

4.5 Uplink Message Formats, ATS Messages - MFI or Label Ax

The following subsections define the handling to be provided for Air Traffic Service (ATS) messages. For character-oriented messages, the format of these messages is found in Specification 623. For bit-oriented messages, the format is defined in RTCA and ICAO documentation.

COMMENTARY

The airlines have expressed a desire that both bit and character-oriented ATS messages be processed using the provisions of Specification 622. This will minimize the number of airborne software permutations. CAAs are encouraged to take note of the expected aircraft capability and plan their implementations accordingly.

| ATS Uplinks                       | MFI or Label | SMI | Section |
|-----------------------------------|--------------|-----|---------|
| Oceanic Clearance                 | A1           | CLX | 4.5.1   |
| Unassigned                        | A2           | --- | 4.5.2   |
| Departure Clearance               | A3           | CLD | 4.5.3   |
| Flight Systems Message            | A4           | FSM | 4.5.4   |
| Unassigned                        | A5           | --- | 4.5.5   |
| Request ADS Reports               | A6           | RAR | 4.5.6   |
| ATC "Free Text"                   | A7           | FTU | 4.5.7   |
| Deliver Departure Slot            | A8           | DDS | 4.5.8   |
| ATIS Report                       | A9           | DAI | 4.5.9   |
| ATS Facilities Notification (AFN) | A0           | AFN | 4.5.10  |
| ATC Communications                | AA           | ATC | 4.5.11  |
| Terminal Weather Information      | AB           | TWI | 4.5.12  |
| Pushback Clearance                | AC           | PBC | 4.5.13  |
| Expected Taxi Clearance           | AD           | ETC | 4.5.14  |
| Unassigned                        | AE           | --- | 4.5.15  |
| CPC Command Response              | AF           | CPR | 4.5.16  |
| Unassigned                        | AG           | --- | 4.5.17  |

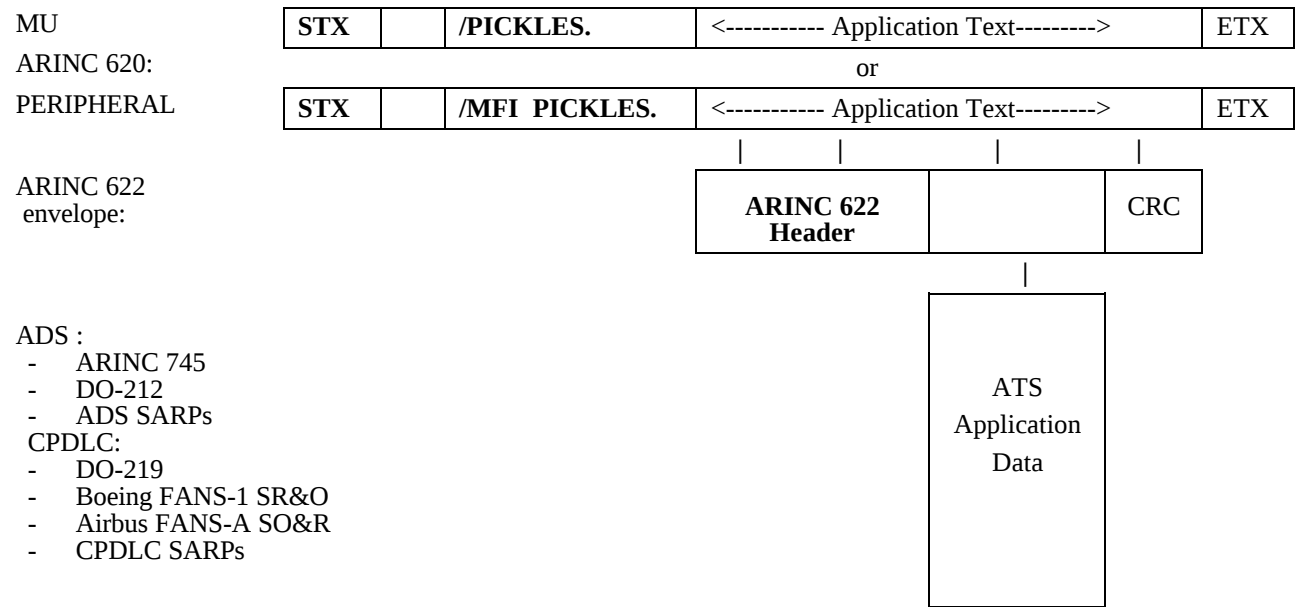


Figure 4.5-1 ATS Message Encapsulation

Note:

[1] Boeing and Airbus Industries have produced aircraft that were programmed to generate a subset of RTCA's DO-219 bit-oriented CPDLC message. These systems were designated "FANS-1" by Boeing and "FANS-A" by Airbus. Subsequently, an expanded (and slightly different) set of controller/pilot phrases were developed by ICAO. Any of these bit-oriented applications [ADS: ARINC 745, DO-212 or ATN SARPs] and [CPDLC: DO-219, FANS-1/A or ATN SARPs] can constitute the ATS Application Data.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****Table 4.5-1 Ground/Ground Format of an Uplink ATS Message**

ATS format:

QU DSPXXX

.LAX05xx ddhhmm

SMI

AN N1003x/GL MAN or FI xx1234/GL MAN

- /PIKCLXS.Application text

c-4

**Application Text:**

See ARINC Specification 623 for definition of ATS Application Data . Messages that may have an impact on the movement of the aircraft, such as Air Traffic Service (ATS) messages, may have additional content in the Application Text field to insure delivery and integrity. See ARINC Specification 622 for definition of ATS Application Text (definition has precedence). In general, the format of the Message Text field of an ATS message is '-----Application Text-----' with the expanded form being 'IMI/-----Application data-----CRC' for character-oriented messages and 'IMI/-----Application data-----CRC' for bit-oriented messages.

c-4

**Imbedded Message Identifier:**

The 3 character Imbedded Message Identifier (IMI) field is used to indicate the format of the generated message. Some uplink messages encode the IMI field with a variation that uses the third character to identify the version number of the format of the message.

c-1

**Delimiter:**

A slash </> character is used in character-oriented messages to separate the IMI from the Application Data. The characters 'AN' are used in bit-oriented messages to separate the IMI from the Application Data per ARINC Specification 622.

c-4

**Application Data:**

In the case of ATS messages, the contents of the Application Data field are defined in ARINC Specification 623 or included by reference to ARINC Specification 622.

c-3

**CRC:**

Many ATS messages have been deemed to need additional assurance that the message is accurately reconstructed at the receiving equipment. This is achieved by including a cyclical redundancy check (CRC) value as the final element of the message content. The CRC is used by the receiving equipment to perform an end-to-end check on the message content. The CRC may be any binary number. Since the ACARS air/ground network can only support the transfer of the character-based message set defined in ARINC Specification 618, the 16-bit CRC must be translated to pass reliably across the ACARS network. The conversion process defined in Section 2.3.1.1 of ARINC Specification 622 should be used to process the CRC. The CRC consumes 4 characters in the message text.

c-1

**Supplementary Address:**

When the uplink message is sent to a peripheral to the MU, such as the FMC, the Label 'H1' will be used. For ATS uplink messages, the Optional Supplementary Address field will be expanded to include the 2 character Message Function Identifier (MFI) as the first entry followed by a space character < > as a separator. The MFI serves the purpose that the Label would serve in a message delivered to the MU; i.e., identify the content and format of the uplink message.

c-3

The MFI is coded the same as the associated Label. For example, an ATIS message sent to the MU uses Label A9; the MFI of an ATIS uplink message sent to an avionics subsystem is also A9. The remainder of the Supplementary Address field will contain the address of the End System that is providing the uplink message. In most cases this will be the airline host. In the case of ATS messages, the Supplementary Address will be the address of the ATC facility that is responsible for the airspace in which the aircraft is located, or into which the aircraft will fly.

**4.5.1 Oceanic Clearance - MFI or Label A1**

The Oceanic Clearance uplink is a message prepared by the ATC facility and sent to the ground DSP who then forwards the message to the aircraft End System that issued the initial request. See Section 5.5.1 for the definition of the Oceanic Clearance Request downlink message.

c-1

c-3

c-1

4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)

4.5.1 Oceanic Clearance - MFI or Label A1 (cont'd)

c-2 | Upon receipt of a ground/ground Oceanic Clearance uplink message destined for the ACARS MU, carrying an SMI of 'CLX', from the ATC facility, the DSP will uplink the air/ground Oceanic Clearance message with the Label of A1 (See Section 4.3). Alternatively, if the ground/ground message is an uplink to an ACARS peripheral, the SMI will be FMD, DFX, OAT, etc. Refer to Appendix D of Specification 622 for a listing of possible SMIs. In this case, the DSP will uplink the air/ground Oceanic Clearance message with the Label H1, the appropriate Sublabel for that peripheral and the MFI of A1 (See Section 4.3.5). The MFI 'A1' is included at the beginning of the Supplementary Address field.

c-2 | The expected Oceanic Clearance Readback downlink response by the aircraft is presented in Section 5.3.40 of this Specification.

The following examples show the treatment of SMIs, Labels/Sub-labels, MFIs and Supplementary Addresses, when the DSP converts ATS uplink messages from ground/ground to air/ground format.

The Application Data and procedures for character-oriented ATS messages are given in ARINC Specification 623. ARINC Specification 622 provides additional processes to support both bit and character-oriented ATS applications.

For ATS uplink messages to an ACARS MU:

- a. The SMI is converted to a label, in this case, the SMI label combination identifies the ATS application
- b. The Supplementary Address (if used) is copied directly from the ground/ground to the air/ground message as shown.

c-2 | Although the following tables illustrate the content of the Oceanic Clearance uplink message, the structure applies to other ATS uplink messages. Therefore this one set of illustrations serve as representative of the other cases as well. Those Sections having similar uplinks contain a reference the tables below.

c-3 | Table 4.5.1-1A Oceanic Clearance Uplink to an MU - Ground/Ground Format

|     |                                      |
|-----|--------------------------------------|
| c-1 | QU DSPxxxx                           |
|     | .PIKCLXS ddhhmm                      |
|     | <u>CLX</u>                           |
| c-4 | AN N1003x/GL MAN or FI xx1234/GL MAN |
|     | - /LAX05xx. <u>Application text</u>  |

c-4 | The Application Text field is defined in Chapter 5 of ARINC Specification 622. The Application Data is given in ARINC Specification 623.

Table 4.5.1-1B Oceanic Clearance Uplink to an MU - Air/Ground Format

|     |  |                          |           |  |                       |                         |
|-----|--|--------------------------|-----------|--|-----------------------|-------------------------|
| c-1 |  | AIRCRAFT ADDRESS         | LABEL     |  | SUPPLEMENTARY ADDRESS | MESSAGE TEXT            |
| c-4 |  | .N1003x<br>or<br>.xx1234 | <u>A1</u> |  | /LAX05xx.             | <u>Application text</u> |
| c-3 |  |                          |           |  |                       |                         |

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**

For ATS uplink messages to an ACARS peripheral:

- a. The SMI is converted to a Label/Sub-label combination, in this case the Label/Sub-label combination identifies the aircraft end-system
- b. The MFI and Supplementary Address are copied directly from the ground/ground to air/ground message as shown, in this case the MFI identifies the ATS application.

c-2

**Table 4.5.1-2A Oceanic Clearance Uplink to an Avionics Subsystem - Ground/Ground Format**

c-3

QU DSPXXXX  
 .PIKCLXS ddhhmm  
DEX  
 AN N1003x/GL MAN or FI xx1234/GL MAN  
 - /A1 LAX05xx. Application text

c-4

**Table 4.5.1-2B Oceanic Clearance Uplink to an Avionics Subsystem - Air/Ground Format**

c-3

|  | AIRCRAFT<br>ADDRESS      | LABEL |  | SUB<br>LABEL | SUPPLEMENTARY<br>ADDRESS | MESSAGE TEXT            |
|--|--------------------------|-------|--|--------------|--------------------------|-------------------------|
|  | .N1003x<br>or<br>.xx1234 | H1    |  | DF           | /A1 LAX05xx.             | <u>Application text</u> |

c-4

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**

4.5.2 Unassigned - MFI or Label A2

4.5.3 Departure Clearance - MFI or Label A3

The Departure Clearance uplink message is generated as a character-oriented message. The Departure Clearance message can be received by the service provider from the airline or directly from the ATC agency depending on the arrangements that have been negotiated.

The format of the Departure Clearance uplink message is consistent with the general form described in Section 4.3.5 of this Specification. ARINC Specification 623 contains the application data of the Departure Clearance uplink message.

c-2 | If the character-oriented Departure Clearance uplink message is destined for the ACARS MU, it is received by the service provider as a ground/ground message with the SMI of 'CLD'. The DSP translates this SMI to Label A3 in the air/ground uplink.

If the Departure Clearance message is for a peripheral, the appropriate SMI, Label (H1) and Sublabel are used. The MFI 'A3' is included at the beginning of the Supplemental Address field. Refer to Appendix D of Specification 622 for a listing.

Refer to the tables in Section 4.5.1 for an illustration of the message structure.

4.5.4 Flight Systems Message - MFI or Label A4

c-2 | By necessity, the list of responses available to controllers using the clearance message uplinks defined in Specification 623 are limited. The Flight Systems Message constitutes an expanded list of responses that can be used to augment the clearance messages in a codified manner. The format of the Flight Systems uplink message is consistent with the general form described in Section 4.3.5 of this Specification. See Chapter 5 of ARINC Specification 623 for the character-oriented Flight Systems uplink Application Data format. Generally, Flight System messages are expected to be sent by the ATS application after a request for clearance has been received or after a clearance readback has been received.

**COMMENTARY**

If the contents of Flight Systems uplink messages are not adequate, the controller may choose to use a ATC Free Text message (see Section 4.5.1).

c-2 | To minimize complexity of the data link procedures, there is no equivalent to the Flight System message set in the aircraft. If the pilot needs to respond in a manner outside the defined downlink message set, s/he will revert to voice procedures.

If the message is to be delivered to the ACARS MU, the character-oriented Flight Systems message is received by the service provider with the SMI of 'FSM'. The DSP translates the SMI to Label A4 in the air/ground uplink.

If the Flight Systems message is for a peripheral, the appropriate SMI, Label (H1) and Sublabel are used. The MFI 'A4' is included at the beginning of the Supplementary Address field. Refer to Appendix D of Specification 622 for a listing of SMIs, Sublabels and MFIs.

c-3 | Refer to the tables in Section 4.5.1 for an illustration of the message structure.

4.5.5 Unassigned - MFI or Label A5

c-1 | 4.5.6 Request ADS Reports - MFI or Label A6

c-2 | If the ground/ground Request for Automatic Dependent Surveillance (ADS) Reports uplink message is destined for the MU, it is received by the service provider with the SMI of 'RAR'. The DSP translates this SMI to the Label A6 in the air/ground uplink if the message is for the MU.

c-1 | If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used. The MFI 'A6' is included at the beginning of the Supplementary Address field. Refer to Appendix D of Specification 622 for a listing of SMIs and Sublabels. See ARINC Characteristic 745 for the format of the ADS application text. See ARINC Specification 622 for information on processing of the bit-oriented Request ADS Reports message for transfer across the ACARS network.

c-3 | Refer to the tables in Section 4.5.1 for an illustration of the message structure.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.5.7 “Free Text” from ATC - MFI or Label A7**

This message is meant to provide an ATC agency with the ability to communicate information that is not codified in any of the ATS uplink messages defined herein to an aircraft without the necessity of reverting to voice communications.

c-2

The ground/ground ATC Free Text message is received by the service provider with the SMI of ‘FTU’ if it is destined for the ACARS MU. The DSP translates the SMI to Label A7 in the air/ground uplink.

c-3

If the message is for a peripheral, the appropriate SMI, Label (H1) and Sublabel are used. Refer to Appendix D of Specification 622 for a listing of SMIs and sublabels. The MFI ‘A7’ is included at the beginning of the Supplementary Address Field.

c-1

Refer to the tables in Section 4.5.1 for an illustration of the message structure.

**4.5.8 Deliver Departure Slot - MFI or Label A8**

This message is received by the service provider with the SMI of ‘DDS’ and is translated to Label A8 when the message is to be delivered to the MU. If the message is for a peripheral, the appropriate SMI, label and sub-label are used and the MFI A8 is included at the beginning of the Supplementary Address Field.

c-2

**COMMENTARY**

It has been recognized that this could have been a simple message to the printer but it was felt that the functionality of the proposed scheme could be used in a negotiation exercise with the issuing authority.

Refer to the tables in Section 4.5.1 for an illustration of the message structure.

c-3

**4.5.9 ATIS Report - MFI or Label A9**

If the ATIS Report uplink is destined for the ACARS MU, the ground/ground ATIS Report message is received by the service provider with the SMI of ‘DAI’. The DSP translates the SMI to Label A9 in the air/ground uplink.

c-2

If the ATIS Report uplink message is for a peripheral, the appropriate SMI, Label (H1) and Sublabel are used. The MFI ‘A9’ is included at the beginning of the Supplementary Address Field. Refer to Appendix D of Specification 622 for a listing of SMIs and Sublabels.

c-3

In some cases, the service provider will be the originator of ATIS information and, although no SMI is involved, Label A9 should still be used in the air/ground uplink. See ARINC Specification 623 for the ATIS application text.

c-2

**COMMENTARY**

Lengthy ATIS uplinks have demonstrated an associated reduction in delivery success rate. The DLK Users Forum recommends that Notice to Airmen (NOTAM) information NOT be appended to digital ATIS uplink messages. Concise text and reasoned content is encouraged. Specifically, the message will be delivered most efficiently and effectively when its length is held to one block. In no case should the message exceed four blocks in length.

c-3

Refer to the tables in Section 4.5.1 for an illustration of the message structure.

**4.5.10 ATS Facilities Notification (AFN) - MFI or Label A0**

If the AFN uplink message is destined for the ACARS MU, the ground/ground AFN message is received by the service provider with the SMI of ‘AFU’. The DSP translates the SMI to the Label A0 in the air/ground uplink.

c-2

If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used. The MFI ‘A0’ is included at the beginning of the Supplementary Address Field. Refer to Appendix D of Specification 622 for a listing of SMIs and sublabels. See Chapter 3 of ARINC Specification 622 for the format of the ATS Facilities Notification (AFN) application text.

c-3

AFN messages have three purposes: (1) they notify the ATC agency that the aircraft is ready to begin data communications (to support applications such as ADS), (2) they pass all relevant application information that is needed by the ATC agency to begin the data communications, and (3) they advise the aircraft to contact another ATC agency.

c-1

Refer to the tables in Section 4.5.1 for an illustration of the message structure.

c-3

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)****4.5.11 ATCCommunications** - MFI or Label AA

- c-4 | If the ATCComm uplink (formerly known as Two Way Data Link and now referred to as Controller Pilot Data Link Communications (CPDLC)) message is destined for the MU, the ground/ground ATCComm message is received by the service provider with the SMI of 'ATC'. The DSP translates the SMI to the Label AA in the air/ground uplink.
- c-2 |
- c-3 | If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used. The MFI 'AA' is included at the beginning of the Supplementary Address Field. Refer to Appendix D of Specification 622 for a listing of SMIs and sublabels. See Section 4.4 of ARINC Specification 622 for the format of the ATCComm application interface and for the definition of how to transfer the bit-oriented ATCComm application text onto the ACARS network. See RTCA DO-219 for the format of early ATCComm application text. Current text for FANS-1 is defined by Boeing. Future text for CPDLC is defined by ICAO.
- c-2 |
- c-4 |

**4.5.12 Terminal Weather Information for Pilots** - MFI or Label AB

The Terminal Weather Information for Pilots (TWIP) report is generated in response to a TWIP Request downlink (Label BB) from the aircraft. If the TWIP Report is destined for the ACARS MU, the ground/ground TWIP is received by the service provider with the SMI of 'TWI'. The service provider translates the SMI to label AB in the air/ground uplink.

If the TWIP Report uplink message is destined for a peripheral, the appropriate SMI, label (H1) and Sublabel are used. The MFI 'AB' is included at the beginning of the Supplementary Address field. Refer to Appendix D of Specification 622 for a listing of SMIs and Sublabels.

**4.5.13 Pushback Clearance** - MFI or Label AC

The Pushback Clearance is generated in response to a DDTC Pushback Clearance Request downlink (Label BC) from the aircraft. If the Pushback Clearance is destined for the ACARS MU, the ground/ground Pushback Clearance uplink message is received by the DSP with the SMI of 'PBC'. The DSP translates the SMI to Label AC in the air/ground uplink.

If the Pushback Clearance uplink message is destined for a peripheral, the appropriate SMI, label (H1), and Sublabel are used. The MFI of "AC" is included in the beginning of the Supplemental Address field. Refer to Appendix D of Specification 622 for a listing of SMIs and Sublabels. See Specification 623 for the DDTC Pushback Clearance application and message text.

**4.5.14 Expected Taxi Clearance** - MFI or Label AD

- c-3 | The Expected Taxi Clearance is generated in response to a DDTC Expected Taxi Clearance Request downlink (Label BD) from the aircraft. If the Expected Taxi Clearance is destined for the ACARS MU, the ground/ground Expected Taxi Clearance uplink message is received by the DSP with the SMI of "ETR." The DSP translates the SMI to Label AD in the air/ground uplink.

If the Expected Taxi Clearance uplink message is destined for a peripheral, the appropriate SMI, label (H1) and Sublabel are used. The MFI of 'AD' is included in the beginning of the Supplemental Address field. Refer to Appendix D of Specification 622 for a listing of SMIs and Sublabels. See Specification 623 for the DDTC Expected Taxi Clearance message application text.

**4.5.15 Unassigned** - MFI or Label AE**4.5.16 CPC Command/Response** - MFI or Label AF

Upon receipt of a CPC Command/Response, Label (or MFI) AF uplink, the avionics end system will deposit the uplink message into a buffer for subsequent processing, display of applications text, and aircrew assessment.

This CPC Command/Response message provides a CPC uplink command for display and acknowledgment (WILCO or UNABLE ) by the crew and also other processing depending on the specific CPC application message type (Refer to AEEC Specification 623).

If the ground/ground CPC Command uplink message is destined for the MU, it is received by the DSP with the SMI of "CPR" (CPC Command/Response). The DSP translates the SMI to Label AF in the air/ground uplink.

If the message is destined for a peripheral, it is sent by the originator with the appropriate SMI for the intended peripheral. The DSP translates the SMI to the appropriate Label and Sublabel. The MFI of "AF" is included at the beginning of the Supplementary Address field. Refer to Appendix D of Specification 622 for a listing of SMIs and Sublabels. See ARINC Specification 623 for the CPC Command/Response applications and message text.

**4.0 UPLINK MESSAGE TEXT FORMATS (cont'd)**

In all cases, the address of the originator is included in the uplink as defined in ARINC Specification 622. Refer to the tables in Section 4.5 for an illustration of the message structure.

c-3

4.5.17 Unassigned - MFI or Label AG

4.6 Uplink Message Formats, User Defined

User defined messages may be sent using the label characters <10> through <4~>. The Text field format should be as follows:

| <u>Character No.</u> | <u>Character Content</u>       |
|----------------------|--------------------------------|
| 1-n                  | "Free Text" where $n \leq 220$ |

5.0 DOWNLINK MESSAGE TEXT FORMATS

5.1 Introduction

This chapter contains a listing of the Application Text of downlink messages to be passed from an originating End System on an aircraft to the Data Link Service Provider (DSP) and then to the designated End System at an airline host or at an ATC agency. Sections 5.2 through 5.4 list the downlink texts: System Control, Service Related and User Defined.

Each Application Text definition contains a description of the message, a listing of the fields of the message and a graphic layout of the message construction. The figures in the following subsections illustrate the format of messages which are exchanged between an airborne end system and a ground based end system. The illustrations cover two legs of the total path: between the aircraft and the DSP on the ground and between the DSP and the ATC facility. Where appropriate, timing diagrams showing the sequence of message exchanges are also provided. The sequence and direction of message travel are illustrated in the figure at the right, depicting both direction (downlink and uplink) and source/sink (aircraft, DSP or user Host). As many as four separate messages may be needed to complete an exchange.

Note: The form of the messages depicted in the examples do not necessarily typify the format in which these same messages will be presented in an actual implementation.

The whole message should be transmitted. Any of the fixed format fields for which no data has been entered should be filled with nulls <NUL>.

5.2 Downlink Message Formats, System Control

There are two groups of ACARS functions, the first of these, the “System Control” group, is associated with maintaining system operation, and the second, the “Service-related” group, with providing communications services. The MU should be capable of generating all downlinks identified as system-essential in the following table.

Refer to Table C1 and C2 of Appendix C for a listing of Messages, their associated label, SMI and section reference.

5.2.1 General Response - Label \_DEL

When the only reason for the aircraft sub-system to downlink a response is the need for a technical acknowledgment to the previous uplink, this message should contain Label characters <\_DEL>.

| Character No. | Character Content                                | Notes                                                               |
|---------------|--------------------------------------------------|---------------------------------------------------------------------|
| 1             | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618                     |
| 2-3           | Sequence [Message Number]                        |                                                                     |
| 4             | Number [Block Sequence Character]                |                                                                     |
| 5             | Airline Identifier - Alpha/Numeric Character #1  | Flight Identifier<br>See Section 2.3.3.2 of ARINC Specification 618 |
| 6             | Airline Identifier - Alpha Character #2          |                                                                     |
| 7             | Flight Number - Alpha/Numeric Character #1 (MSC) |                                                                     |
| 8             | Flight Number - Alpha/Numeric Character #2       |                                                                     |
| 9             | Flight Number - Alpha/Numeric Character #3       |                                                                     |
| 10            | Flight Number - Alpha/Numeric Character #4 (LSC) |                                                                     |

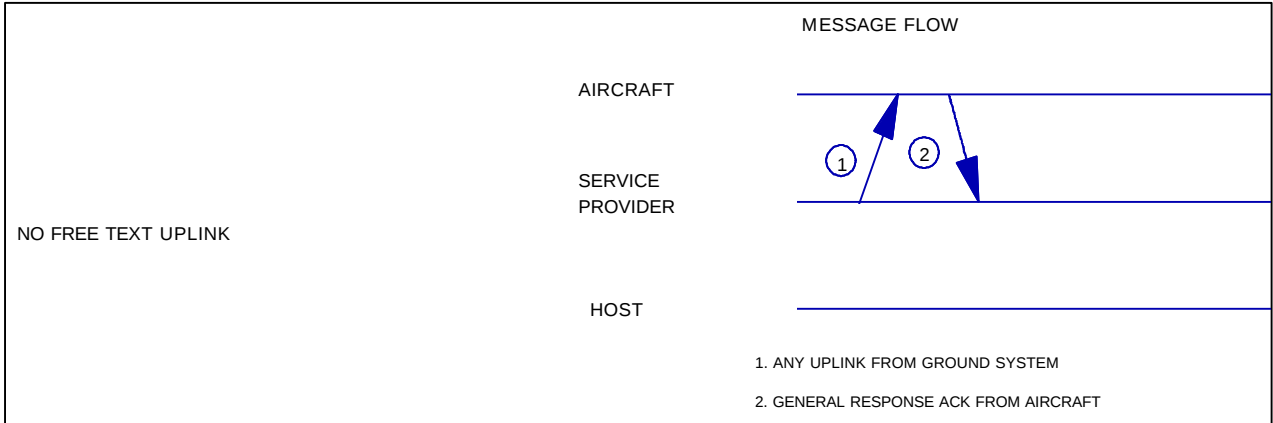


Figure 5.2.1-1 General Response Downlinks

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.2.2 Voice Contact Request - Label 54

Aircrew requests for voice contact with a specified party on the ground should contain Label characters 54. The text should consist of the 22-character fixed format sequence shown below.

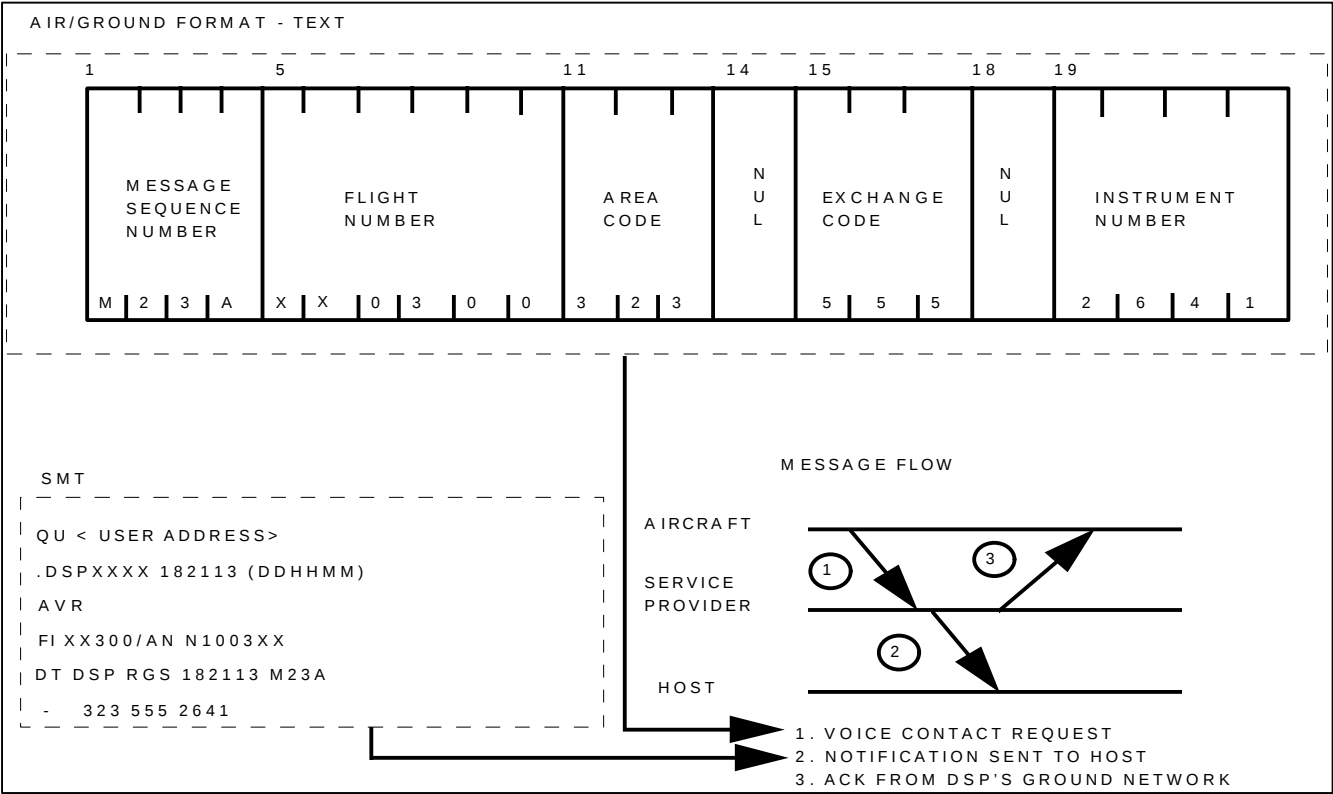
| Character No.     | Character Content                 | Notes                                                             |
|-------------------|-----------------------------------|-------------------------------------------------------------------|
| 1                 | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3               | Sequence [Message Number]         |                                                                   |
| 4                 | Number [Block Sequence Character] |                                                                   |
| 5-10              | Flight Identifier;                |                                                                   |
| 11 -----          |                                   |                                                                   |
| 12                |                                   |                                                                   |
| 13                |                                   |                                                                   |
| 14                |                                   |                                                                   |
| 15                |                                   |                                                                   |
| 16 Communications |                                   |                                                                   |
| 17 Address of     |                                   |                                                                   |
| 18 Ground Party   |                                   |                                                                   |
| 19                |                                   |                                                                   |
| 20                |                                   |                                                                   |
| 21                |                                   |                                                                   |
| 22 -----          |                                   |                                                                   |

c-1

The airborne equipment, i.e., the MU, should automatically fill character positions 14 and 18 of the 22-character message with “NULs”, leaving ten character positions of the communications address field to convey pilot-entered address information. Any dialing scheme involving one through ten characters may be implemented. When fewer than ten characters are employed, however, the airborne equipment should automatically fill the field with leading zeros in order to preserve the fixed format of the message.

COMMENTARY

The ten-character Ground Party Communications Address field permits a complete area code and telephone number to be downlinked if desired.



5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

Figure 5.2.2-1 Voice Contact Request

5.2.3 Reserved Characters

The Label character sequence \_ j is reserved.

5.2.4 Temporary Suspension - Label 5P

A message containing Label characters 5P may be downlinked by the ACARS MU in accordance with ARINC Specification 618 to indicate the non-availability of the RF link because the VHF radio will be temporarily used for voice communications.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier                 |                                                                   |

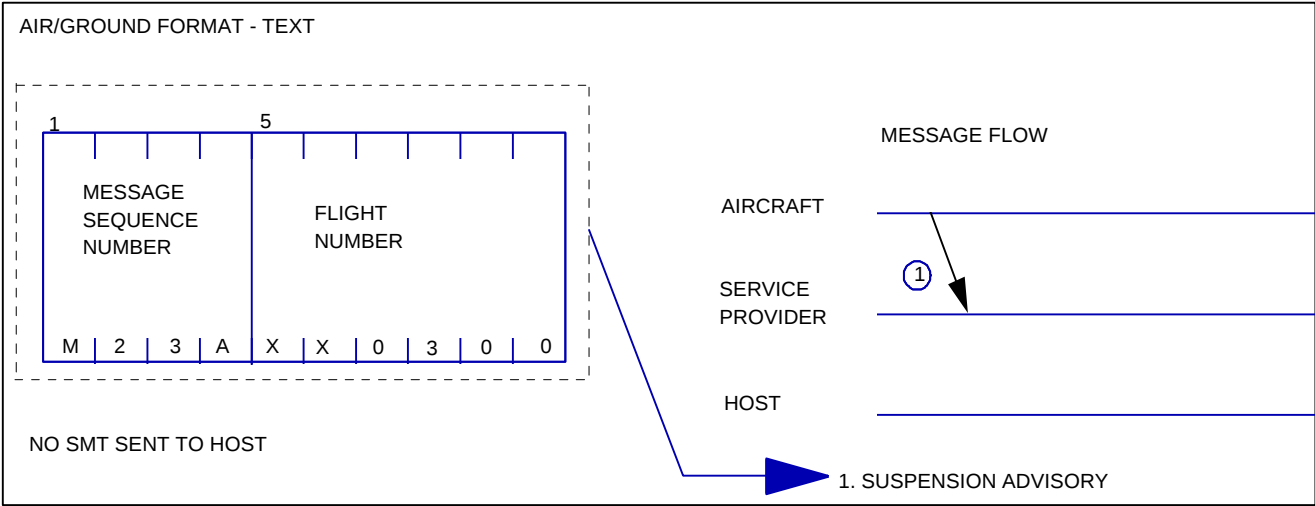


Figure 5.2.4-1 Temporary Suspension

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.2.5 Unable to Deliver Uplink Message - Label Q5

When the airborne sub-system cannot accept an uplinked message it should respond with a downlink containing Label Q5. Such messages should be transmitted immediately, taking precedence over any other planned use of the downlink except Label 5P or Label F3 messages.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier                 |                                                                   |

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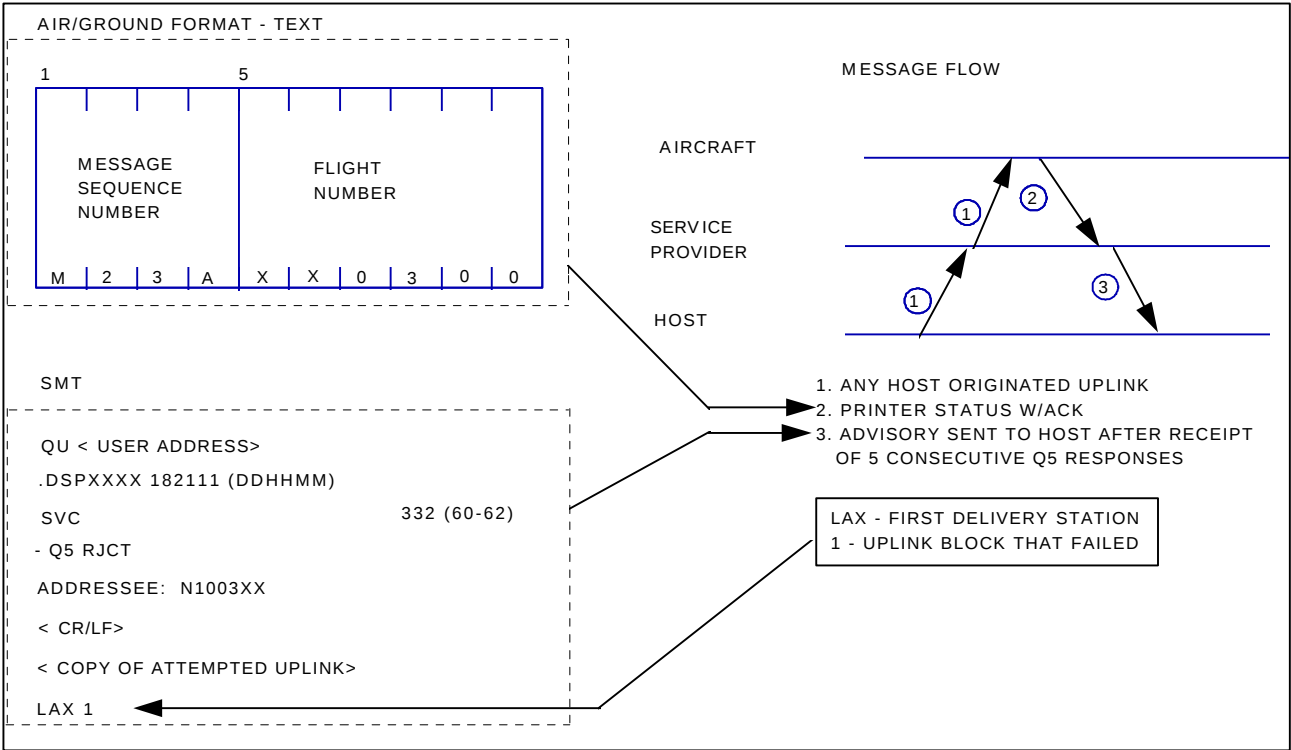


Figure 5.2.5-1 Unable to Deliver Uplink Message

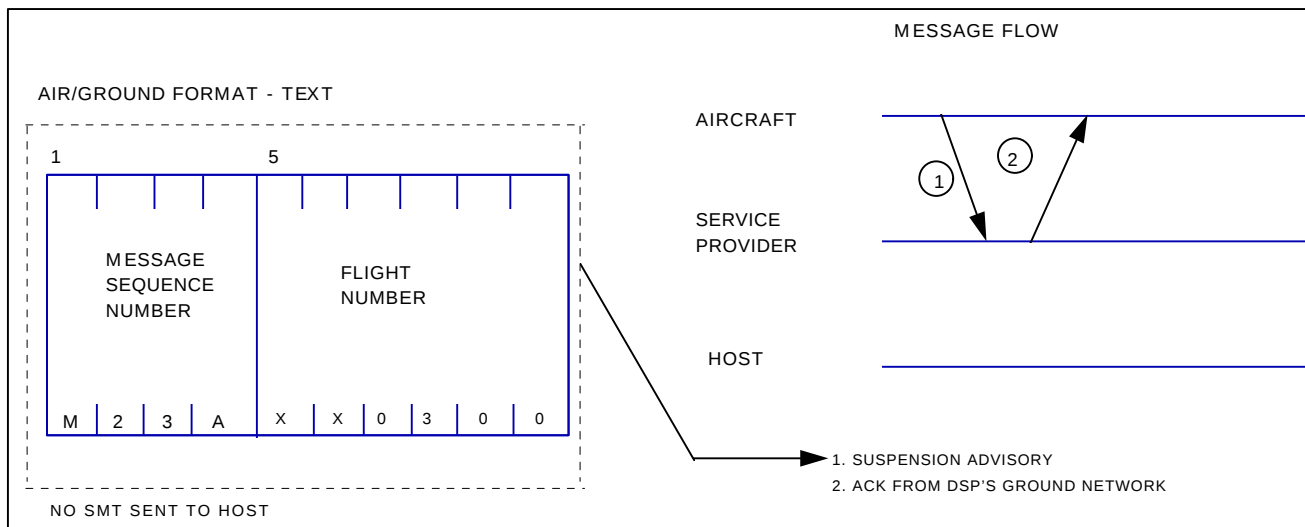
**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.2.6 Voice to Data Channel Changeover Advisory - Label Q6**

Label Q6 downlink messages will be transmitted in accordance with ARINC Specification 618 to indicate that the VHF radio associated with the ACARS MU has been returned from Voice to Data Service.

The format of the message should be as follows:

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| <u>Character No.</u> | <u>Character Content</u>          | <u>Notes</u>                                                         |
|----------------------|-----------------------------------|----------------------------------------------------------------------|
| 1                    | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618<br>See Section 5.2.1 |
| 2-3                  | Sequence [Message Number]         |                                                                      |
| 4                    | Number [Block Sequence Character] |                                                                      |
| 5-10                 | Flight Identifier                 |                                                                      |



**Figure 5.2.6-1 Channel Changeover Advisory**

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.2.7 Intercept/Unable to Process - Label QX**

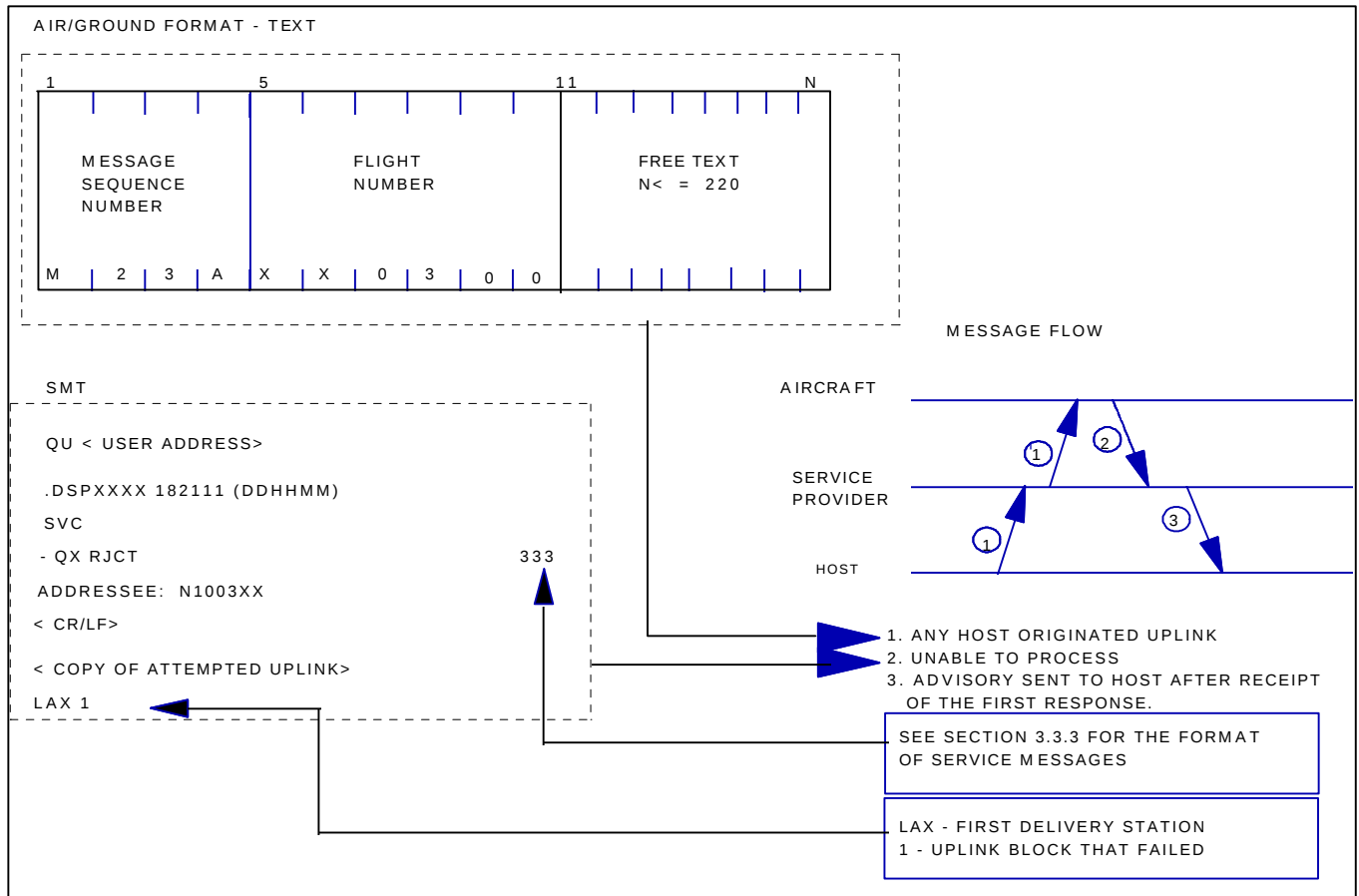
When the airborne sub-system wants to Intercept and terminate an uplink transmission (all blocks), it may respond with a downlink containing Label characters QX. Label QX may also be used to report that the MU is unable to process an uplink message. The message will be discarded by the MU.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier;                |                                                                   |
| 11 thru n     | "Free Text" where $n \leq 220$    |                                                                   |

c-1

The "Free Text" area may contain a user defined intercept message or error code. The received uplink is discarded by the MU. The service provider interprets this message as an air initiated INTERCEPT. The message is deemed undeliverable and no reattempts of the uplink or any subsequent blocks of that message will be transmitted from the ground. Such messages should be transmitted immediately, taking precedence over any other planned use of the downlink except label 5P messages. The Label QX is transmitted only once and never contains a NAK.

Example Message Triggers include Undefined Uplink Label Received, Undefined Sublabel Received (RA or H1 or user defined) and Destination (DFDAU, CFDIU, PRINTER, etc.) not available.



**Figure 5.2.7-1 Unable to Deliver Uplink Message**

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.2.8 Dedicated Transceiver Advisory - Label F3

Label F3 messages may be downlinked by the airborne subsystem in response to Voice Go-Ahead (Label 54) uplinks. See ARINC Specification 618 for protocol details.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier                 |                                                                   |

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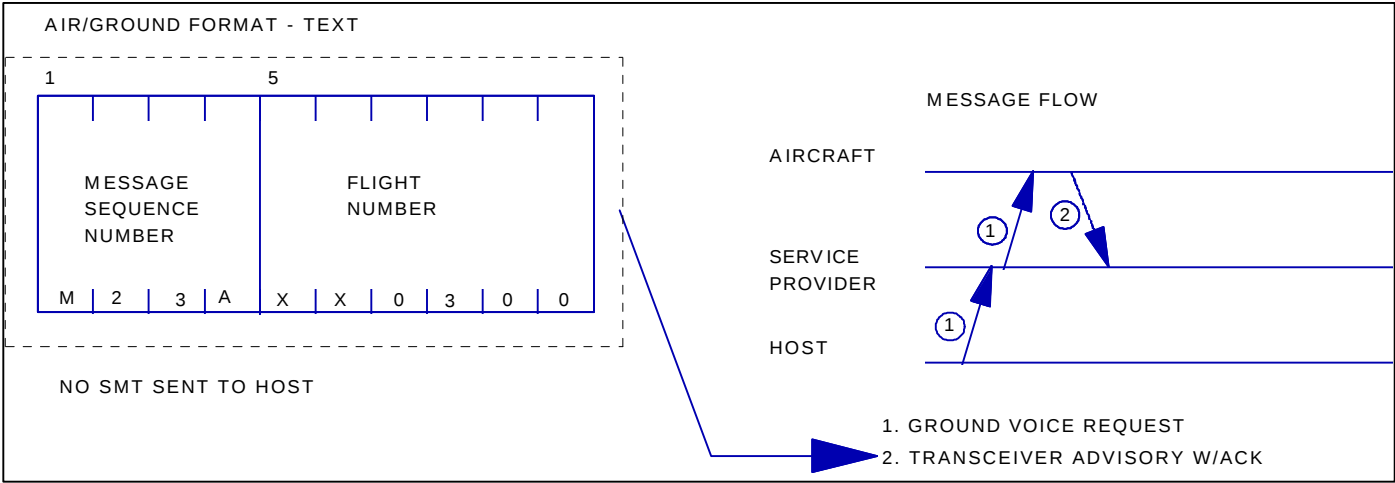


Figure 5.2.8-1 Dedicated Transceiver Advisory

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.2.9 Cockpit Printer Status - Label CA-CF**

On recognition of the status code signifying that the printer is not installed, not powered or inoperative, the MU should respond to uplinks directed to the printer with a downlink message having the label indicated in Section 3.3.3.

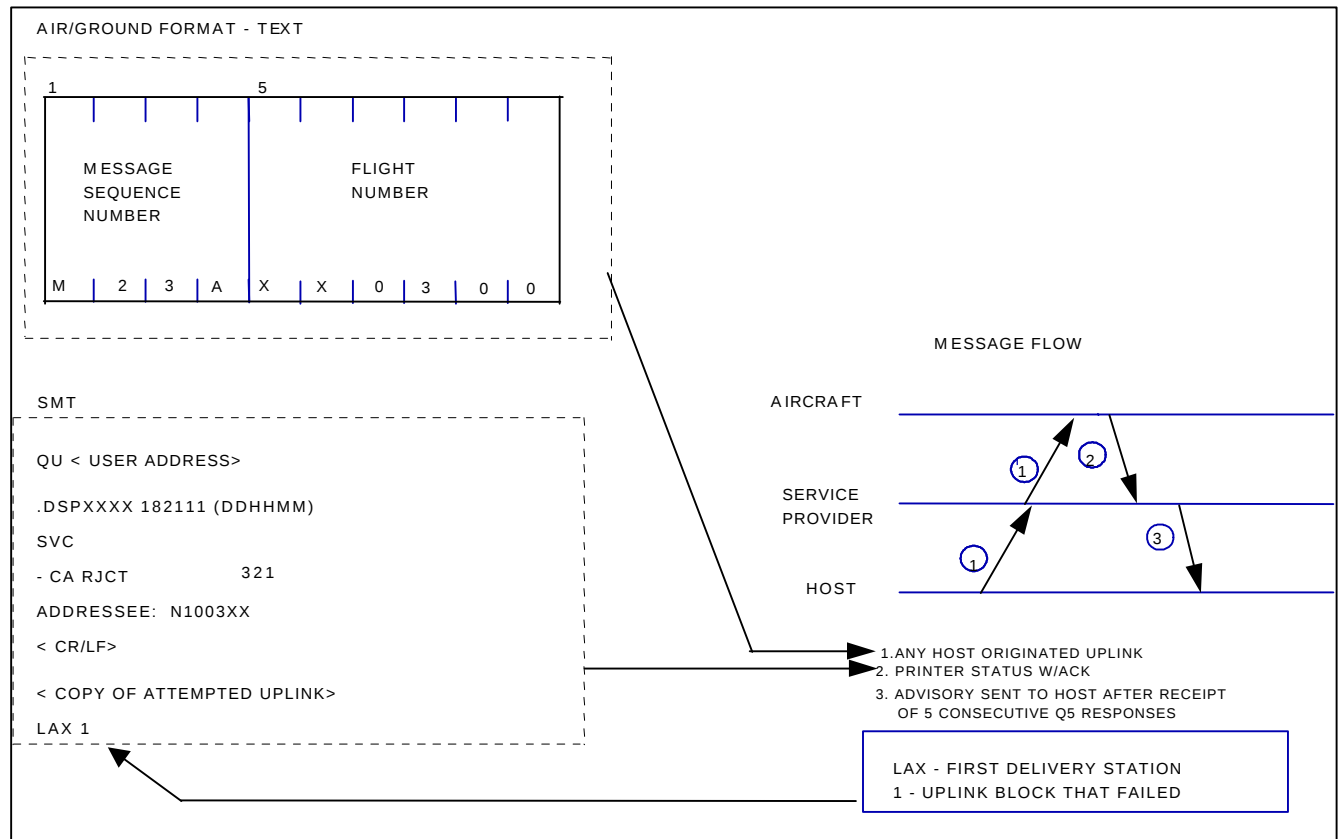
c-1

Note:

Some users may desire to downlink additional text in some of these status messages. Also, they may elect to use one of the codes to indicate crew acknowledgment of the uplinked message. Because the time taken by the crew to take the acknowledgment action, push a button on the printer, for example, will exceed the ACARS turn-around time, it will not be possible for the acknowledgment message to be the response to the uplink requiring it. In this case, the response will be other traffic or a general response, and the acknowledgment message will be a separate, air-initiated downlink.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier                 |                                                                   |

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**Figure 5.2.9-1 Cockpit Printer Status**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3 Downlink Message Formats, Service-Related Messages

The MU need only generate those service-related downlinks specified by the user to his supplier. While service-related downlink utilization is thus optional in terms of user deployment, procedures governing the ground handling of these messages necessitates adherence to the formats and other rules concerning them set forth in this document.

AEEC Staff Note: Appendix C contains a complete listing of applications (messages) indexed by SMI and a second listing indexed by message label. These listings include a reference to the appropriate Section and may be used to locate a specific message more rapidly

5.3.1 Emergency Situation Report (Aircraft Hijack) - Label 00

Emergency Situation Report should contain Label characters 00.

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| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier;                |                                                                   |
| 11 thru n     | “Free Text” where n ≤ 220         |                                                                   |

Characters 11 through 220 are available for “Free Text” in the form of a crew-entered security report. The format of the security report will be determined by the user.

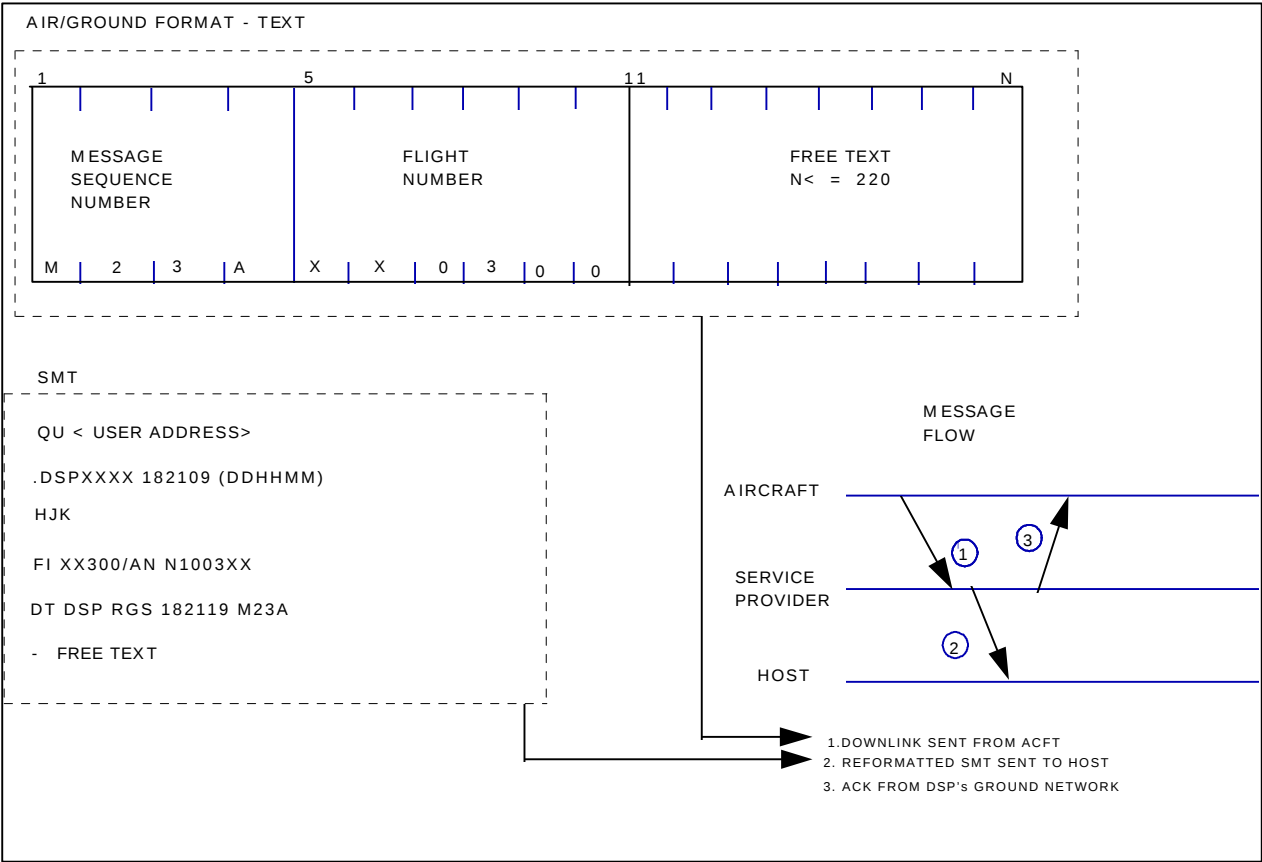


Figure 5.3.1-1 Emergency Situation Report

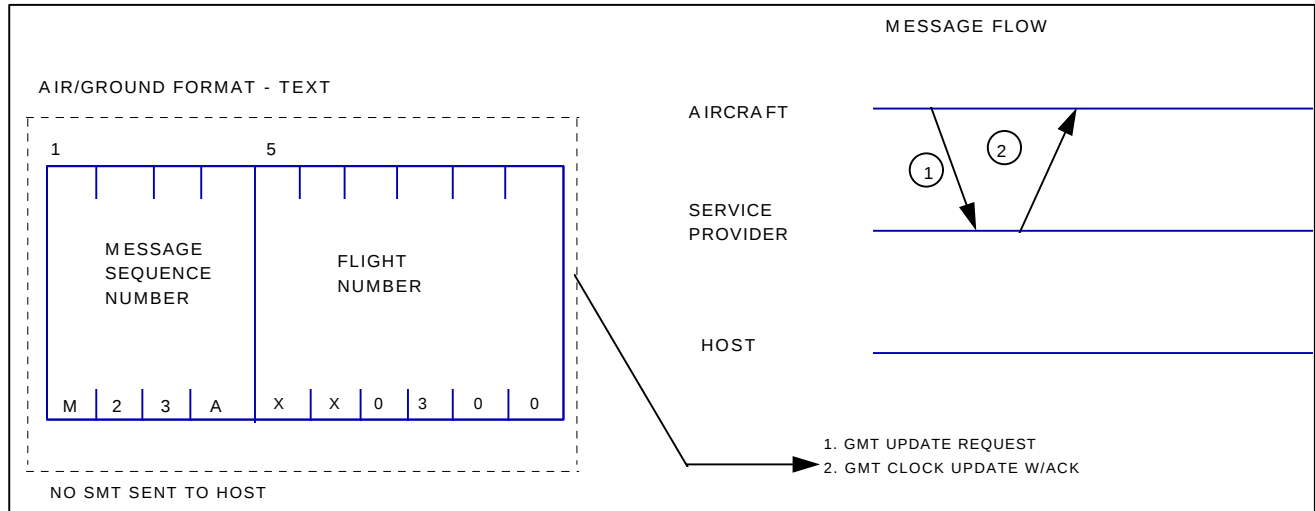
**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.2 Ground GMT Request - Label 51**

This message is downlinked to request the GMT time only. See Section 5.3.1. Ground UTC (Label 52) is preferred. See Section 5.3.3.

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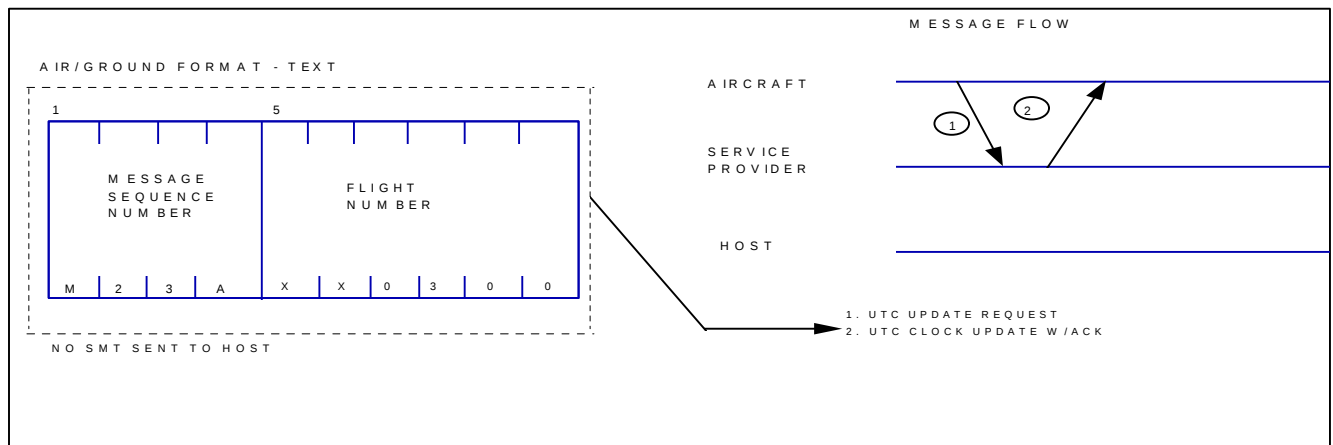
| Character No. | Character Content                 | Notes             |
|---------------|-----------------------------------|-------------------|
| 1             | Message [Originator]              | Refer to Section  |
| 2-3           | Sequence [Message Number]         | 3.4 of ARINC      |
| 4             | Number [Block Sequence Character] | Specification 618 |
| 5-10          | Flight Identifier;                | See Section 5.2.1 |

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**Figure 5.3.2-1 Clock Update Request****5.3.3 Ground UTC Request - Label 52**

This message is downlinked to request UTC time, date and an alternative ground UTC report. See Section 5.3.2.

| Character No. | Character Content                 | Notes             |
|---------------|-----------------------------------|-------------------|
| 1             | Message [Originator]              | Refer to Section  |
| 2-3           | Sequence [Message Number]         | 3.4 of ARINC      |
| 4             | Number [Block Sequence Character] | Specification 618 |
| 5-10          | Flight Identifier;                | See Section 5.2.1 |



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5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

Figure 5.3.3 Ground UTC Request - Label 52

5.3.4 ATIS Request - Label 5D

Automated Terminal Information Service (ATIS) request downlinks should contain Label characters 5D. The standardized ATIS information will be encoded into the “Free Text”.

COMMENTARY

Label B9 has been developed to provide ATIS information obtained directly from a CAA or from another party such as an airline or a service provider under an agreement with the CAA. The use of Label B9 is preferred. See Section 5.5.9 for a definition of B9.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier;                |                                                                   |
| 11 thru n     | “Free Text” where $n \leq 220$    |                                                                   |

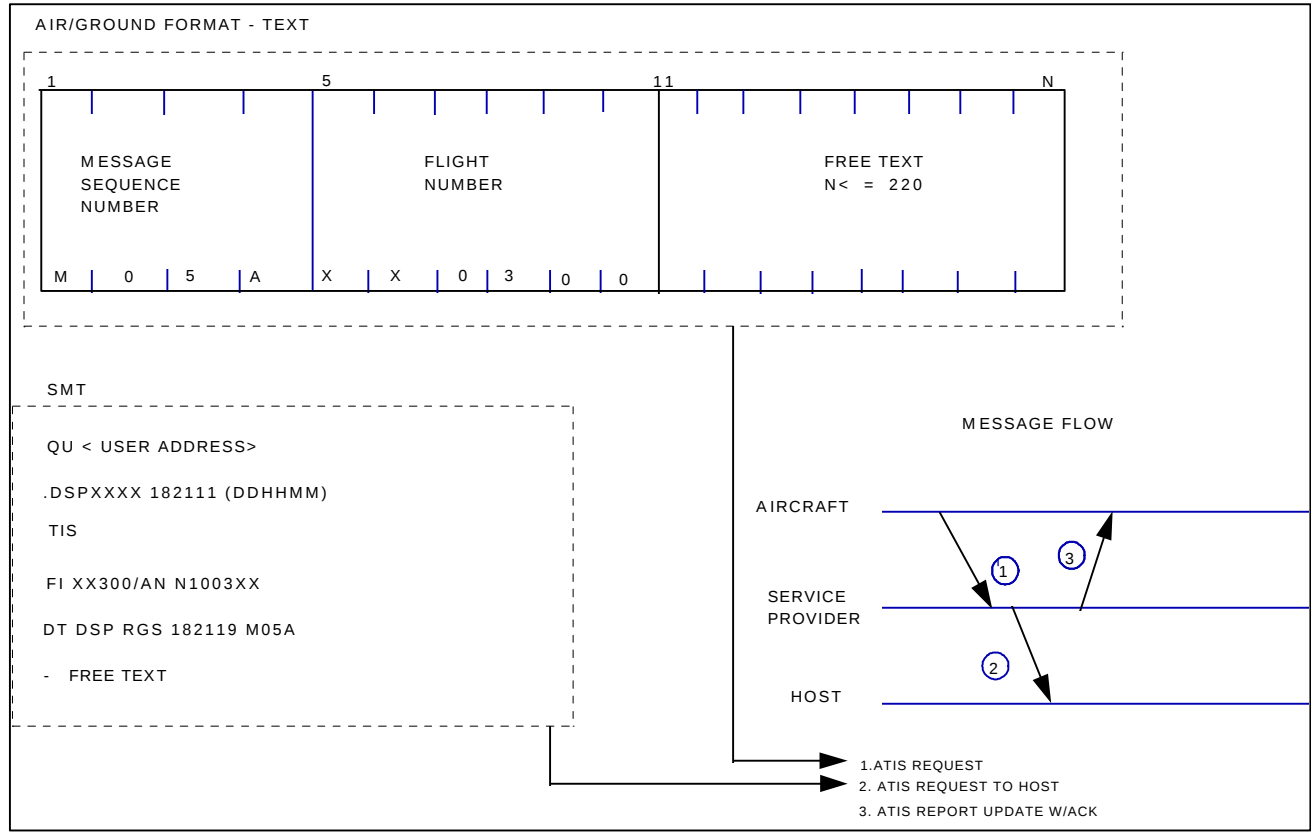


Figure 5.3.4-1 ATIS Request

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.5 Aircrew Initiated Position Report - Label 5R**

Aircraft Initiated Position Reports should contain Label characters 5R.

The format should be as follows:

| <u>Character No.</u> | <u>Character Content</u>                   | <u>Notes</u>                                                               |
|----------------------|--------------------------------------------|----------------------------------------------------------------------------|
| 1                    | Message [Originator]                       | Refer to Section<br>3.4 of ARINC<br>Specification 618<br>See Section 5.2.1 |
| 2-3                  | Sequence [Message Number]                  |                                                                            |
| 4                    | Number [Block Sequence Character]          |                                                                            |
| 5-10                 | Flight Identifier;                         |                                                                            |
| 11                   | Current Position Alpha Character           |                                                                            |
| 12                   | Current Position Alpha Character           |                                                                            |
| 13                   | Current Position Alpha Character           |                                                                            |
| 14                   | Time Hours (Tens)                          |                                                                            |
| 15                   | Time Hours (Units)                         |                                                                            |
| 16                   | Time Minutes (Tens)                        |                                                                            |
| 17                   | Time Minutes (Units)                       |                                                                            |
| 18                   | Flight Level Numeric Character             |                                                                            |
| 19                   | Flight Level Numeric Character             |                                                                            |
| 20                   | Flight Level Numeric Character             |                                                                            |
| 21                   | Next Report Point Alpha Character          |                                                                            |
| 22                   | Next Report Point Alpha Character          |                                                                            |
| 23                   | Next Report Point Alpha Character          |                                                                            |
| 24                   | Time Over Hours (Tens)                     |                                                                            |
| 25                   | Time Over Hours (Units)                    |                                                                            |
| 26                   | Time Over Minutes (Tens)                   |                                                                            |
| 27                   | Time Over Minutes (Units)                  |                                                                            |
| 28                   | Fuel on Board Numeric Character            |                                                                            |
| 29                   | Fuel on Board Numeric Character            |                                                                            |
| 30                   | Fuel on Board Numeric Character            |                                                                            |
| 31                   | Fuel on Board Numeric Character            |                                                                            |
| 32                   | Static Air Temp Sign (see Note 2)          |                                                                            |
| 33                   | Static Air Temp (Tens) degrees             |                                                                            |
| 34                   | Static Air Temp (Units) degrees            |                                                                            |
| 35                   | Wind Direction (Hundreds) degrees          |                                                                            |
| 36                   | Wind Direction (Tens) degrees              |                                                                            |
| 37                   | Wind Direction (Units) degrees             |                                                                            |
| 38                   | Wind Speed (Hundreds) knots                |                                                                            |
| 39                   | Wind Speed (Tens) knots                    |                                                                            |
| 40                   | Wind Speed (Units) knots                   |                                                                            |
| 41                   | Sky Condition - Alpha/Numeric Ch. #1/Space |                                                                            |
| 42                   | Sky Condition - Alpha/Numeric Ch. #2/Space |                                                                            |
| 43                   | Sky Condition - Alpha/Numeric Ch. #3/Space |                                                                            |
| 44                   | Sky Condition - Alpha/Numeric Ch. #4/Space |                                                                            |
| 45                   | Sky Condition - Alpha/Numeric Ch. #5/Space |                                                                            |
| 46                   | Sky Condition - Alpha/Numeric Ch. #6/Space |                                                                            |
| 47                   | Sky Condition - Alpha/Numeric Ch. #7/Space |                                                                            |
| 48                   | Sky Condition - Alpha/Numeric Ch. #8/Space |                                                                            |
| 49                   | Turbulence - Alpha/Numeric Ch. #1/Space    |                                                                            |
| 50                   | Turbulence - Alpha/Numeric Ch. #2/Space    |                                                                            |
| 51                   | Turbulence - Alpha/Numeric Ch. #3/Space    |                                                                            |
| 52                   | Turbulence - Alpha/Numeric Ch. #4/Space    |                                                                            |
| 53                   | Turbulence - Alpha/Numeric Ch. #5/Space    |                                                                            |
| 54                   | Turbulence - Alpha/Numeric Ch. #6/Space    |                                                                            |
| 55                   | Turbulence - Alpha/Numeric Ch. #7/Space    |                                                                            |
| 56                   | Turbulence - Alpha/Numeric Ch. #8/Space    |                                                                            |
| 57                   | Cruising Speed - Alpha Character "M"       |                                                                            |
| 58                   | Cruising Speed - Numeric Character         |                                                                            |
| 59                   | Cruising Speed - Decimal Point "."         |                                                                            |
| 60                   | Cruising Speed - Numeric Character         |                                                                            |
| 61                   | Cruising Speed - Numeric Character         |                                                                            |
| 62 thru n            | "Free Text" where $n \leq 220$             |                                                                            |

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5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.5 Aircrew Initiated Position Report - Label 5R (cont'd)

Notes:

- [1] Fixed fields for which there is no data input should be filled with “Null” characters (0/0).
- [2] The characters used for indicating whether the sign of the static air temperature input is positive or negative should be selected from those characters which can transit ground communications systems and be handled by users’ data processing systems. Users should advise their avionics suppliers what the crew inputs for sign will be and into what characters they should be translated for the downlink.

COMMENTARY

Users should consult with their service providers for information on the transmitting of their messages through the ground communications system in both normal and abnormal conditions. If, for example, fixed fields with no data input are filled with spaces, the message may be delivered to the proverbial “bit bucket”!

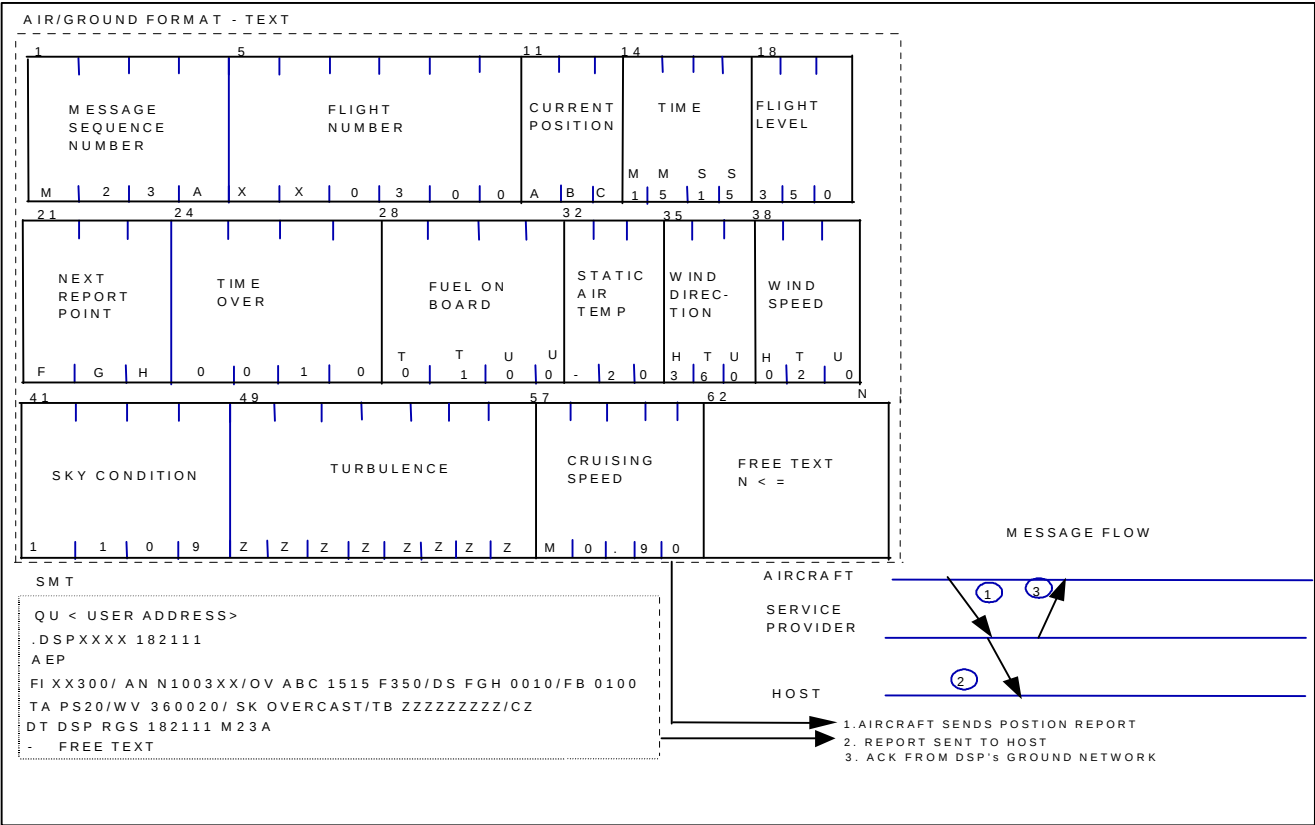


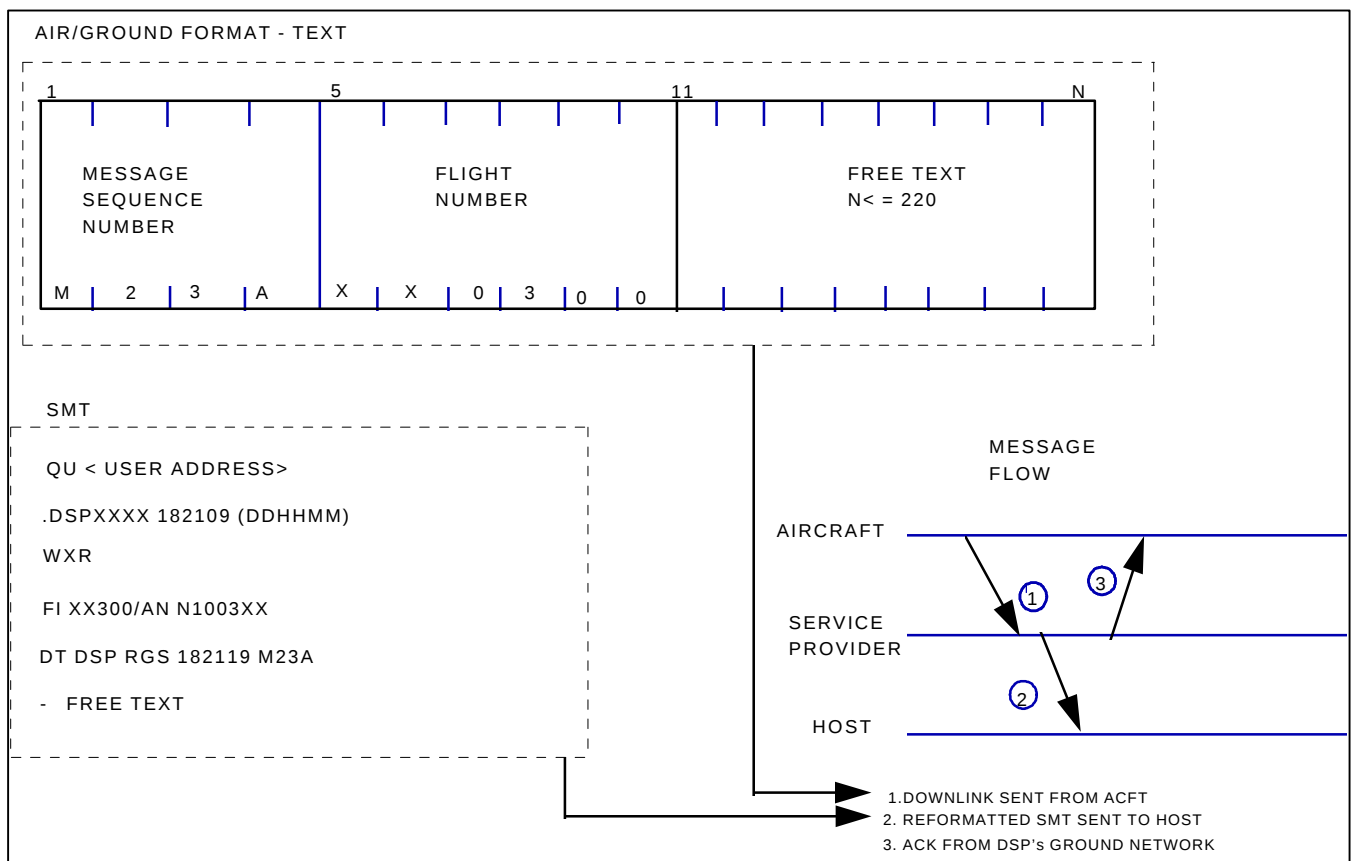
Figure 5.3.5-1 Aircrew-Initiated Position Report

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.6 Weather Request - Label 5U**

Weather request downlinks should contain Label character 5U.

| <u>Character No.</u> | <u>Character Content</u>          | <u>Notes</u>                                                      |     |
|----------------------|-----------------------------------|-------------------------------------------------------------------|-----|
| 1                    | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 | c-1 |
| 2-3                  | Sequence [Message Number]         |                                                                   |     |
| 4                    | Number [Block Sequence Character] |                                                                   |     |
| 5-10                 | Flight Identifier;                |                                                                   |     |
| 11 thru n            | "Free Text" where $n \leq 220$    |                                                                   |     |

"Free Text" will be comprised of information pertaining to the specifics of the request.



**Figure 5.3.6-1 Weather Request**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.7 Airline Designated Downlink - Label 5Z

The airline designated downlink should contain Label character 5Z. It should be transmitted when the entered text cannot be appended to a Departure/Arrival or ETA report, either because it is too long, or because no such reports are awaiting transmission.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier;                |                                                                   |
| 11 thru n     | Free text                         |                                                                   |

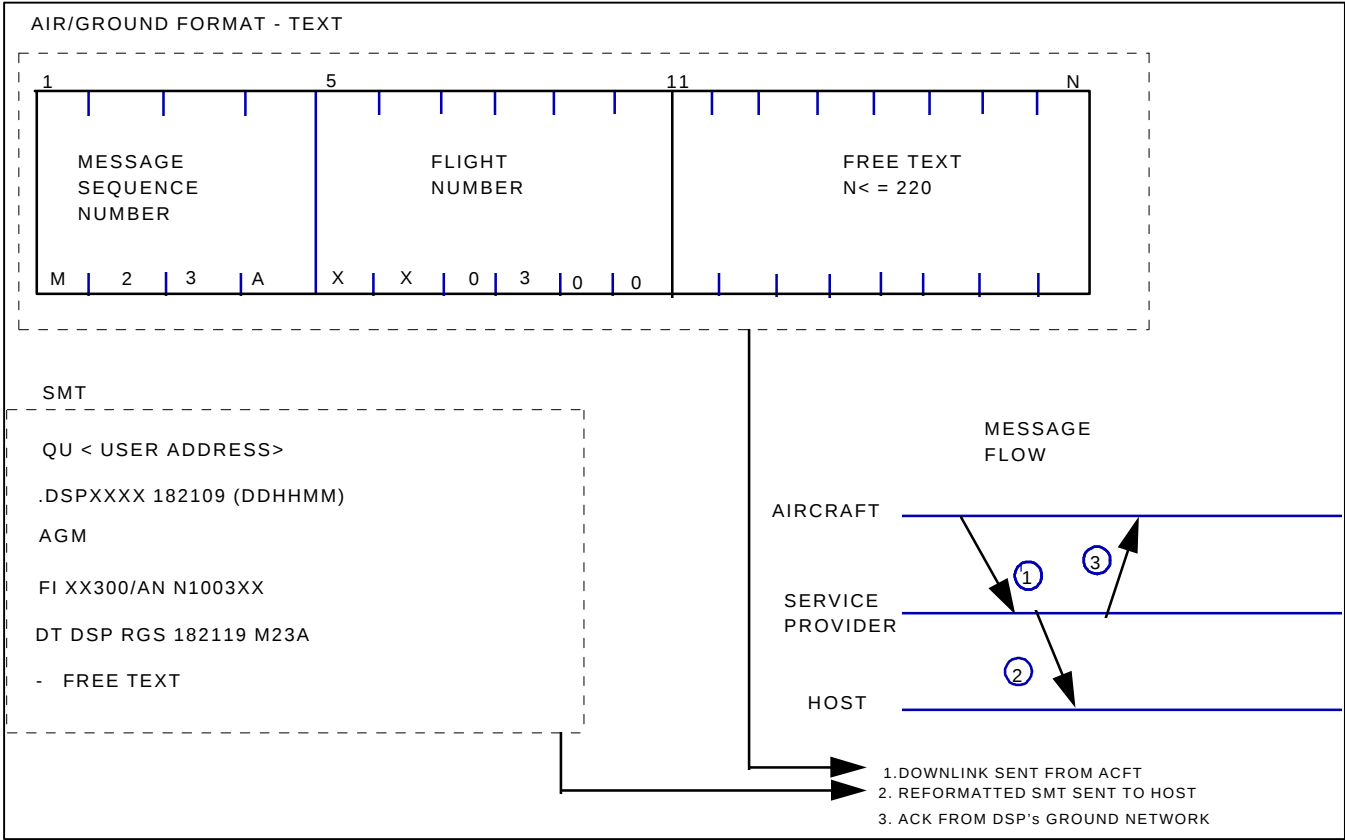


Figure 5.3.7-1 Airline Designated Downlink

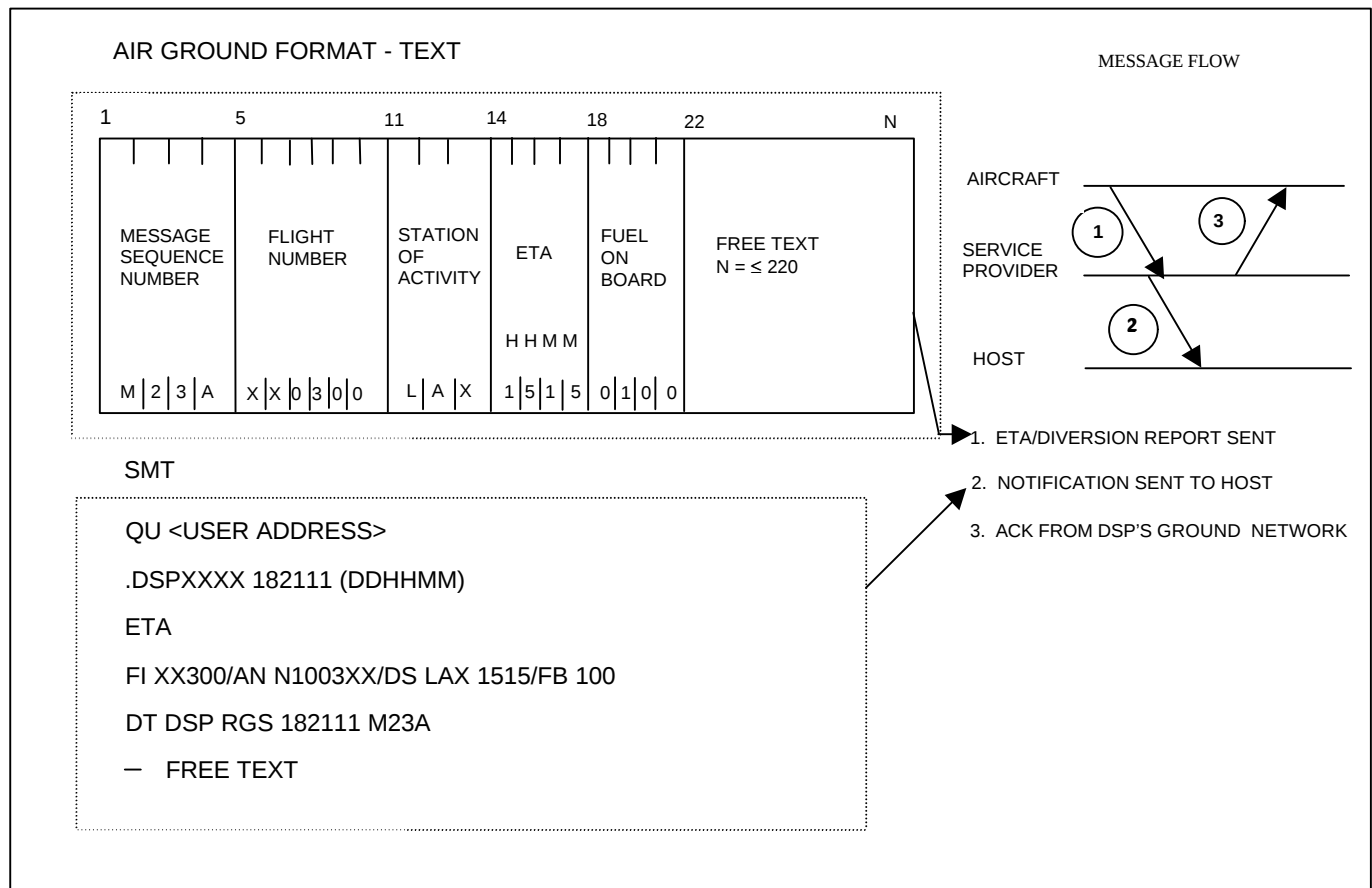
**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.8 Aircrew Revision to Previous ETA/Diversion - Label 5Y**

Aircrew Revision to Previous ETA or Diversion Reports should contain Label characters 5Y.

The format should be as follows:

| <u>Character No.</u> | <u>Character Content</u>             | <u>Notes</u>                                                      |
|----------------------|--------------------------------------|-------------------------------------------------------------------|
| 1                    | Message [Originator]                 | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3                  | Sequence [Message Number]            |                                                                   |
| 4                    | Number [Block Sequence Character]    |                                                                   |
| 5-10                 | Flight Identifier;                   |                                                                   |
| 11                   | New Destination Station Alpha Ch. #1 |                                                                   |
| 12                   | New Destination Station Alpha Ch. #2 |                                                                   |
| 13                   | New Destination Station Alpha Ch. #3 |                                                                   |
| 14                   | ETA Hours (Tens)                     |                                                                   |
| 15                   | ETA Hours (Units)                    |                                                                   |
| 16                   | ETA Minutes (Tens)                   |                                                                   |
| 17                   | ETA Minutes (Units)                  |                                                                   |
| 18                   | Fuel on Board Numeric Ch. #1         |                                                                   |
| 19                   | Fuel on Board Numeric Ch. #2         |                                                                   |
| 20                   | Fuel on Board Numeric Ch. #3         |                                                                   |
| 21                   | Fuel on Board Numeric Ch. #4         |                                                                   |
| 22 thru n            | "Free Text" where $n \leq 220$       |                                                                   |

c-1



**Figure 5.3.8 ETA/Diversion Report**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.9 Aircrew Initiated Engine Data/Takeoff Thrust Report - Label 7A

Aircrew Initiated Engine Data or Takeoff Thrust Report should contain Label characters 7A.

Characters 11 through 220 are available for “free text” consisting of data manually entered by the crew. The format of the “free text” field will be determined by the user. The format should be as follows:

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier;                |                                                                   |
| 11 thru n     | “Free Text” where $n \leq 220$    |                                                                   |

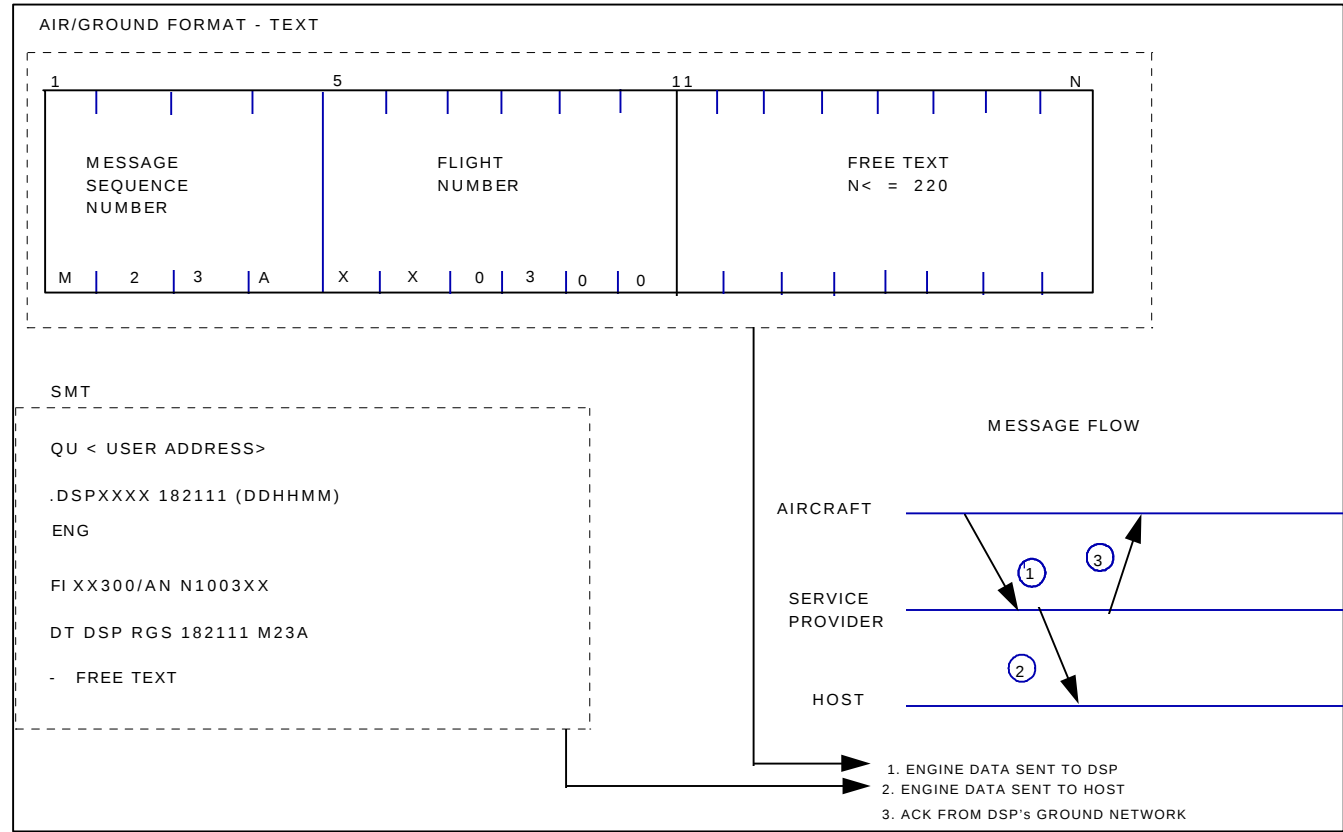


Figure 5.3.9 Engine Data

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.10 Aircrew Entered Miscellaneous Message - Label 7B**

In some avionics systems, provision has been made for the aircrew to enter Miscellaneous Messages from the Control/Display unit. Miscellaneous messages should be downlinked with the Label characters 7B.

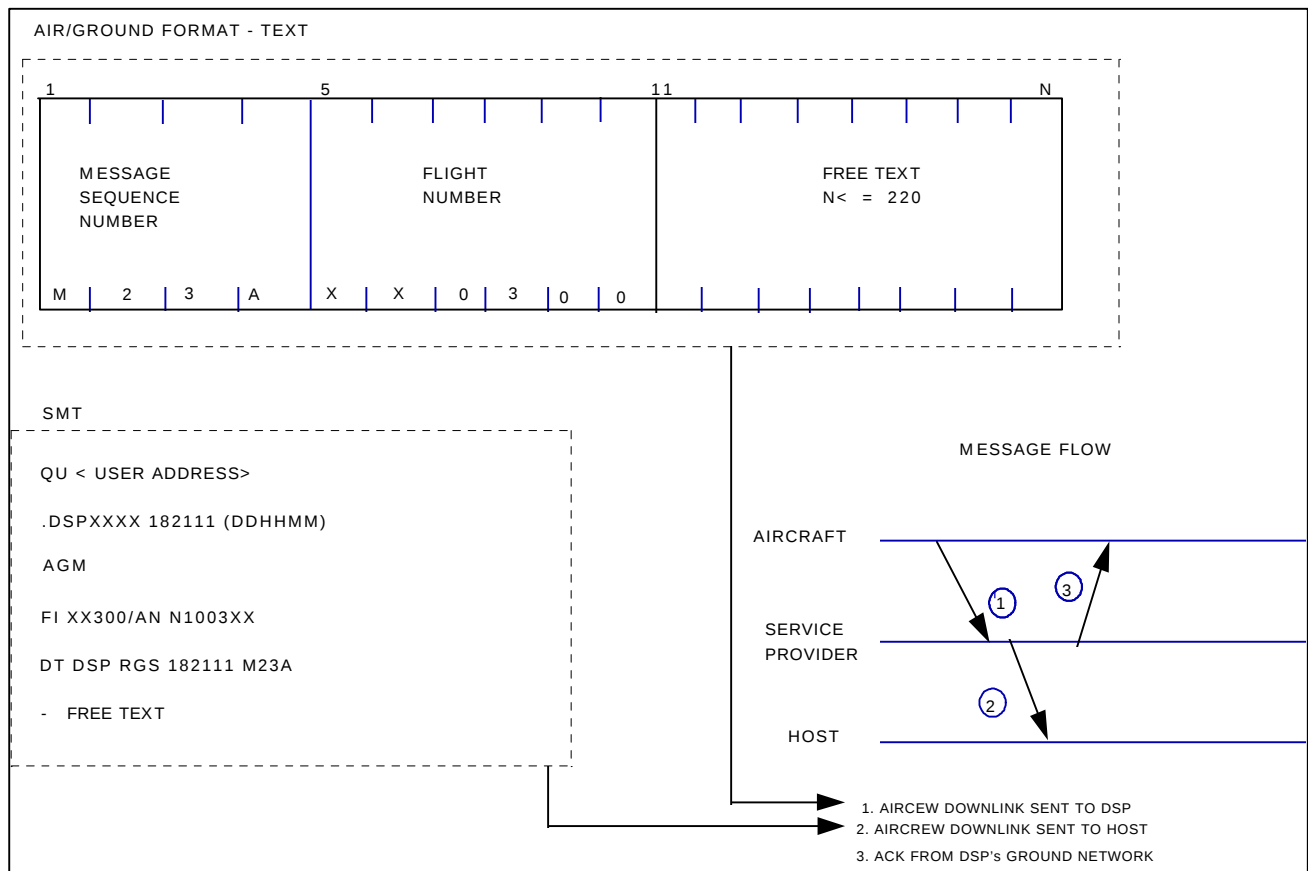
c-1

The format of the message should be as follows:

| Character No. | Character Content                    | Notes                                           |
|---------------|--------------------------------------|-------------------------------------------------|
| 1             | Message [Originator]                 | Refer to Section 3.4 of ARINC Specification 618 |
| 2-3           | Sequence [Message Number]            |                                                 |
| 4             | Number [Block Sequence Character]    |                                                 |
| 5-10          | Flight Identifier; See Section 5.2.1 |                                                 |
| 11 thru n     | "Free Text" where $n \leq 220$       |                                                 |

c-1

The format of the "Free Text" field will be determined by the user.



**Figure 5.3.10 Miscellaneous Message**

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**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.11 Aircrew-Addressed Downlink - Labels 80 through 8~**

Aircrew-addressed downlinks contain Labels selected from the range 80 through 8~. Aircrew -addressed downlinks are routed by the ACARS ground processor to (an) address(es) implied from the Label, to (an) address(es) entered by the flight crew or both, as negotiated between users and ground service providers. When multiple addresses are entered by the flight crew, they are separated by a space character (2/0). The address field is terminated by a period (2/14). The maximum number of addresses is 16.

Predefined addresses should be encoded in the following format:

| <u>Character No.</u> | <u>Character Content</u> | <u>Notes</u>                      |
|----------------------|--------------------------|-----------------------------------|
| c-1                  | 1                        | Message [Originator]              |
|                      | 2-3                      | Sequence [Message Number]         |
|                      | 4                        | Number [Block Sequence Character] |
|                      | 5-10                     | Flight Identifier;                |
|                      | 11                       | First text character              |
|                      | 12 thru n                | Text                              |

If the aircrew entered addresses take the form of conventional seven-character teletype addresses, the following message format should be used:

| <u>Character No.</u> | <u>Character Content</u> | <u>Notes</u>                               |
|----------------------|--------------------------|--------------------------------------------|
| c-1                  | 1                        | Message [Originator]                       |
|                      | 2-3                      | Sequence [Message Number]                  |
|                      | 4                        | Number [Block Sequence Character]          |
|                      | 5-10                     | Flight Identifier;                         |
|                      | 11                       | "Slash" (2/15)                             |
|                      | 12 thru 18               | First aircrew entered address              |
|                      | 19                       | "Space" (2/0)                              |
|                      | 20 thru 26               | Second aircrew entered addresses (if used) |
|                      | 27                       | "Period" (2/14)                            |
|                      | 28 thru n                | Text                                       |

If the aircrew entered addresses take the form of three-character station identifiers, the following message format should be used:

| <u>Character No.</u> | <u>Character Content</u> | <u>Notes</u>                               |
|----------------------|--------------------------|--------------------------------------------|
| c-3                  | 1                        | Message [Originator]                       |
|                      | 2-3                      | Sequence [Message Number]                  |
|                      | 4                        | Number [Block Sequence Character]          |
|                      | 5-10                     | Flight Identifier;                         |
|                      | 11                       | "Slash" (2/15)                             |
|                      | 12 thru 14               | First aircrew entered address              |
|                      | 15                       | "Space" (2/0)                              |
|                      | 16 thru 18               | Second aircrew entered addresses (if used) |
|                      | 19                       | "Period" (2/14)                            |
|                      | 20 thru n                | Text                                       |

Only if 2nd address is present

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.11 Aircrew-Addressed Downlink - Labels 80 through 8~ (cont'd)

If the aircrew entered addresses take the form of four-character station identifiers, the following message format should be used:

| Character No. | Character Content                          | Notes                                                             |     |
|---------------|--------------------------------------------|-------------------------------------------------------------------|-----|
| 1             | Message [Originator]                       | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 | c-1 |
| 2-3           | Sequence [Message Number]                  |                                                                   |     |
| 4             | Number [Block Sequence Character]          |                                                                   |     |
| 5-10          | Flight Identifier;                         |                                                                   |     |
| 11            | “Slash” (2/15)                             | Only if 2nd address is present                                    | c-3 |
| 12 thru 15    | First aircrew entered address              |                                                                   |     |
| 16            | “Space” (2/0)                              |                                                                   |     |
| 17 thru 20    | Second aircrew entered addresses (if used) |                                                                   |     |
| 21            | “Period” (2/14)                            |                                                                   |     |
| 22 thru n     | Text                                       |                                                                   |     |

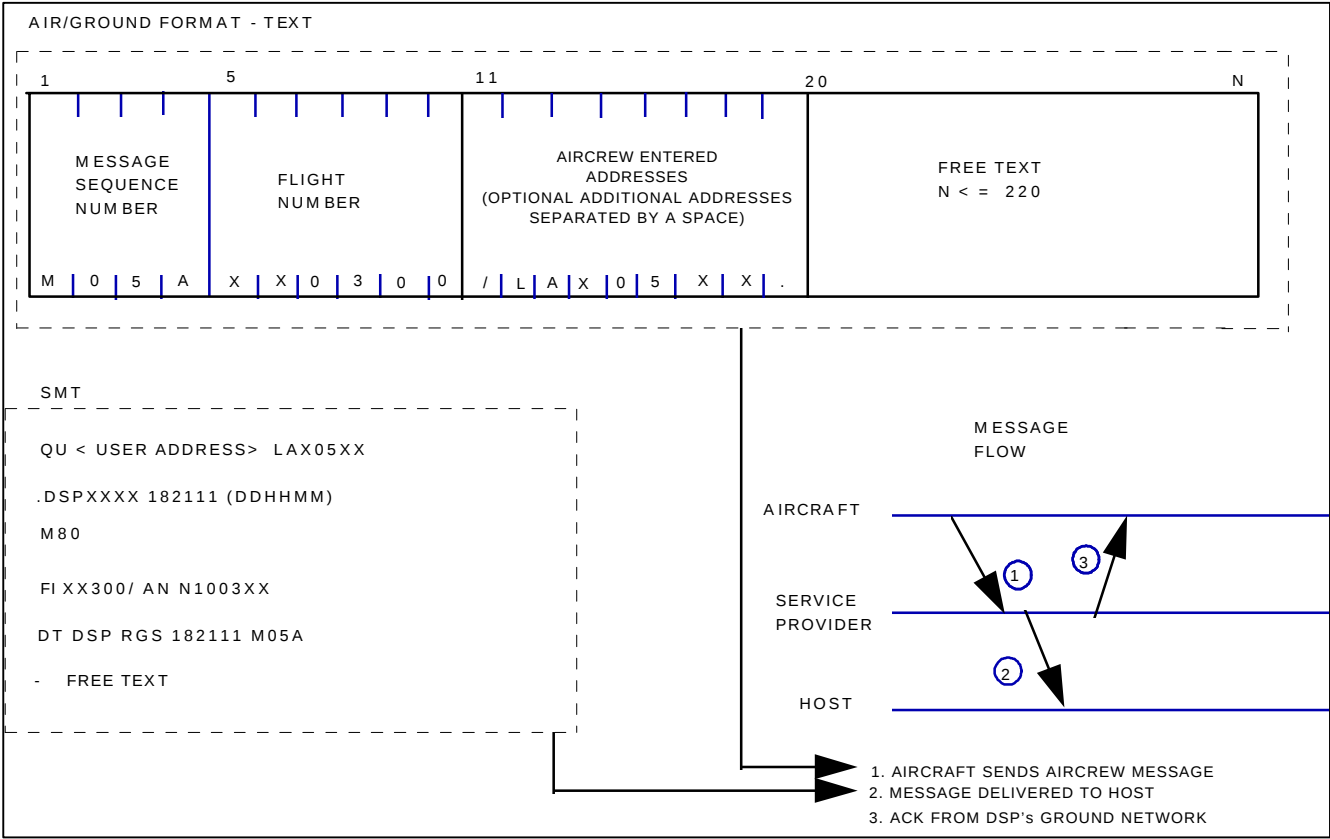


Figure 5.3.11-1 Aircrew-Addressed Downlink

5.3.12 Unassigned

The description of Labels CA-CF were moved to Section 5.2.9.

5.3.13 Meteorological Report - Label or MFI H2

Subsystems onboard the aircraft may be programmed to provide automatic downlinks of meteorological data at predetermined altitudes or at timed intervals as specified by the user. These Meteorological Report downlink messages should contain the Label (or MFI) characters H2.

There are two versions of Meteorological Report defined. Version 1 provides a unified format for all flight phases. Version 2 divides the report data and associated data sampling times into three flight regimes.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**c-4 | 5.3.13.1 Meteorological Report, Version 1 - MFI or Label H2c-2 | **Table 5.3.13-1 Meteorological Reports, Version 1**

|        | <u>Number of Chars</u> | <u>Character Content</u>                                                                                                                                                                                                                                                                     | <u>Notes</u>                                       |
|--------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| c-2    | 10                     | Standard Message Header                                                                                                                                                                                                                                                                      | Refer to Section 3.4 of ARINC Specification 618    |
|        | 2                      | Version Number (01)                                                                                                                                                                                                                                                                          |                                                    |
|        | 7                      | Flight Identifier                                                                                                                                                                                                                                                                            | See Note 1                                         |
| c-3    | 7                      | Registration Number                                                                                                                                                                                                                                                                          |                                                    |
|        | 36                     | Data Sample 1                                                                                                                                                                                                                                                                                |                                                    |
|        | 36                     | Data Sample 2                                                                                                                                                                                                                                                                                |                                                    |
| c-2    | .                      | .                                                                                                                                                                                                                                                                                            | See Note 6                                         |
|        | .                      | .                                                                                                                                                                                                                                                                                            |                                                    |
|        | 36                     | Data Sample 5                                                                                                                                                                                                                                                                                |                                                    |
| Notes: |                        |                                                                                                                                                                                                                                                                                              |                                                    |
| c-1    | [1]                    | The Flight Identifier is made up from the 3 letter ICAO Airline code and the 4 digit (or) alpha character Flight Number.                                                                                                                                                                     |                                                    |
| c-4    | [2]                    | The format of latitude and longitude are with North/South (abbreviated N/S) and East/West (abbreviated E/W) following the values of latitude and longitude and a resolution in degrees and minutes.                                                                                          |                                                    |
|        |                        | For example:                                                                                                                                                                                                                                                                                 | 4811N12030W or<br>3530S14845E.                     |
| c-3    |                        | Latitude<br><u>DDMM (N/S)</u><br>4811N<br>3530S                                                                                                                                                                                                                                              | Longitude<br><u>DDMM (E/W)</u><br>02030W<br>14845E |
| c-1    | [3]                    | The character "F" followed by 3 numerals. For example: F350                                                                                                                                                                                                                                  |                                                    |
| c-2    | [4]                    | The range of Static Air Temperature is from -99 to +99 Celsius. The format used is 4 characters. The characters "MS" are used to indicate a negative value and "PS" are used to indicate a positive value followed by temperature in degrees Celsius (2 numerals). For example: MS23 or PS24 |                                                    |
| c-1    | [5]                    | If the roll angle exceeds 5 degrees, then the characters "RA" are used, otherwise the field is filled with 2 space characters.                                                                                                                                                               |                                                    |
|        | [6]                    | Up to 5 samples can be included in a report. Each data sample will contain the following data:                                                                                                                                                                                               |                                                    |
| c-2    |                        | <u>Number of Chars</u>                                                                                                                                                                                                                                                                       | <u>Notes</u>                                       |
|        |                        | <u>Data Sample</u>                                                                                                                                                                                                                                                                           |                                                    |
|        | 5                      | Latitude                                                                                                                                                                                                                                                                                     | See Note 2                                         |
|        | 6                      | Longitude                                                                                                                                                                                                                                                                                    | See Note 2                                         |
|        | 6                      | Date/Time (UTC) of Observation                                                                                                                                                                                                                                                               | Format: ddhhmm                                     |
|        | 4                      | Flight Level                                                                                                                                                                                                                                                                                 | See Note 3                                         |
|        | 4                      | Static Air Temperature (Celsius)                                                                                                                                                                                                                                                             | See Note 4                                         |
|        | 3                      | Wind Direction (degrees)                                                                                                                                                                                                                                                                     | Range: 000-359                                     |
|        | 3                      | Wind Speed (knots)                                                                                                                                                                                                                                                                           | Range: 000-999                                     |
|        | 2                      | Roll Angle Flag                                                                                                                                                                                                                                                                              | See Note 5                                         |
|        | 3                      | Humidity                                                                                                                                                                                                                                                                                     | Range: 0 to 100 percent                            |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.13.2 Meteorological Report, Version 2 - MFI or Label H2**

c-4

There are three flight phases with regard to meteorological data gathering and reporting. The expected sequence and timing of meteorological data acquisition the timing of meteorological reports are enumerated below.

**ASCENT REPORTS**

At the end of the sampling period a single Ascent report (message) is prepared and sent consisting of:

Initial Meteorological data measured at the time of the "OFF" event (take-off).

Series #1                      Following the Initial sample, Series #1 data measurement samples are accumulated at intervals from 3 to 20 seconds (modifiable via uplink; default to 6 seconds) until the limit of 30 to 200 seconds (modifiable via uplink, default to 90 seconds) after "OFF" event. A delimiter (Slash </>) is used to designate the conclusion of Series #1 data.

c-2

Series #2                      Series #2 data samples are accumulated from the expiration of the Series #1 data acquisition period. Series #2 data samples are taken at intervals from 20 to 60 seconds (modifiable via uplink; default to 20 seconds) until 510-1110 seconds (modifiable via uplink, default to 510 seconds).

**ENROUTE REPORTS**

Series #1                      One Enroute report is sent consisting of six consecutive data measurement samples. The interval of data measurement is from 1 to 60 minutes; the default interval is 3 minutes. Enroute data measurements should begin at the conclusion of data sampling for the Ascent report and terminate when Descent report measurements commence.

Although discouraged, the Ascent and Descent reports may be inhibited and only the Enroute report generated. This option can be selected via data link uplink. In this case, the first Enroute data sample should be taken at the "OFF" event and data accumulation should continue at a uniform interval until the "ON" event unless the interval is modified by an uplink message.

**DESCENT REPORTS**

Series #1                      Normally more than one Descent report will be sent consisting of ten data measurement samples taken over a period of approximately 10 minutes. Descent data measurements begin at 18,000 to 30,000 feet (top of descent). The point of initiation of Descent data measurement sampling is modifiable via uplink (default to 25,000 feet). The interval of Descent data measurement samples is 20 to 300 seconds, modifiable via uplink (default to 60 seconds). Descent reports for downlink will be assembled after every 10 samples and sent as one message. The final report is sent at the "ON" event (when the wheels touch down).

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**5.3.13.2 Meteorological Report, Version 2 - MFI or Label H2 (cont'd)

The format of the Meteorological Report Messages should be as follows:

**Table 5.3.13.2-1 Ascent Weather Report Format**

|     | Character<br>Number | #of<br>Char | Character Content       | Format  | Notes                                                                 |
|-----|---------------------|-------------|-------------------------|---------|-----------------------------------------------------------------------|
| c-2 | 1-10                | 10          | Standard Message Header |         | 1                                                                     |
|     | 11-12               | 2           | Version Number          | 02      |                                                                       |
|     | 13                  | 1           | Type of Met Format      | A, E, D | 2                                                                     |
| c-4 | 14-15               | 2           | Date Message Assembled  | dd      |                                                                       |
|     | 16-19               | 4           | Time Message Assembled  | hhmm    |                                                                       |
|     | 20-23               | 4           | Departure Station       | xxxx    |                                                                       |
|     | 24-27               | 4           | Destination Station     | xxxx    |                                                                       |
| c-2 | Initial report:     |             |                         |         |                                                                       |
|     |                     | 6           | Latitude                | ADDMMT  | 3                                                                     |
|     |                     | 7           | Longitude               | ADDMMT  | 4                                                                     |
| c-4 |                     | 2           | Date of Observation     |         | dd                                                                    |
|     |                     | 4           | Time of Observation     | hhmm    | 5                                                                     |
|     |                     | 4           | Pressure Altitude       | nnnn    | 6                                                                     |
|     |                     | 4           | Static Air Temperature  | annn    | 7                                                                     |
|     |                     | 4           | WV Mixing Ratio         |         | nnnQ 9                                                                |
|     | Series #1           |             |                         |         |                                                                       |
|     |                     | 4           | Pressure Altitude       | nnnn    | 6                                                                     |
|     |                     | 4           | Static Air Temperature  | annn    | 7                                                                     |
|     |                     | 3           | Wind direction          | nnn     | Degrees true                                                          |
|     |                     | 3           | Wind Speed              | nnn     | Knots                                                                 |
|     |                     | 1           | Roll Angle Flag         | n       | 8                                                                     |
| c-2 |                     | 4           | WV Mixing Ratio         |         | nnnQ 9                                                                |
|     | Delimiter           |             |                         |         |                                                                       |
|     |                     | 1           | Slash </>               | '/'     | Indicates end of<br>Series #1 data/<br>beginning of<br>Series #2 data |
|     | Series #2           |             |                         |         |                                                                       |
|     |                     | 6           | Latitude                | ADDMMT  | 3                                                                     |
|     |                     | 7           | Longitude               | ADDMMT  | 4                                                                     |
|     |                     | 4           | Pressure Altitude       | nnnn    | 6                                                                     |
|     |                     | 4           | Static Air Temperature  | annn    | 7                                                                     |
|     |                     | 3           | Wind Direction          | nnn     | Degrees true                                                          |
|     |                     | 3           | Wind Speed              | nnn     | Knots                                                                 |
|     |                     | 1           | Roll Angle Flag         | n       | 8                                                                     |
|     |                     | 4           | WV Mixing Ratio         |         | nnnQ 9                                                                |
|     |                     |             | End of Text             | <ETX>   |                                                                       |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****Table 5.3.13.2-2 Enroute Weather Report Format**

| <u>Character Number</u> | <u>#of Char</u> | <u>Character Content</u> |         | <u>Format</u> | <u>Notes</u> |     |
|-------------------------|-----------------|--------------------------|---------|---------------|--------------|-----|
| 1-10                    | 10              | Standard Header          |         | 1             |              | c-2 |
| 11-12                   | 2               | Version Number           | 02      |               |              |     |
| 13                      | 1               | Type of Met Format       | A, E, D | 2             |              |     |
| 14-15                   | 2               | Date of Message Assembly | dd      |               |              | c-4 |
| 16-19                   | 4               | Departure Station        | xxxx    |               |              |     |
| 20-23                   | 4               | Destination Station      | xxxx    |               |              |     |
| Series #1               |                 |                          |         |               |              |     |
|                         | 6               | Latitude                 | ADDMMT  | 3             |              | c-2 |
|                         | 7               | Longitude                | ADDMMT  | 4             |              |     |
|                         | 4               | Time of Observation      | hhmm    | 5             |              | c-4 |
|                         | 4               | Pressure Altitude        | nnnn    | 6             |              |     |
|                         | 4               | Static Air Temperature   | annn    | 7             |              |     |
|                         | 3               | Wind Direction           | nnn     | Degrees true  |              |     |
|                         | 3               | Wind Speed               | nnn     | Knots         |              |     |
|                         | 1               | Roll Angle Flag          | n       | 8             |              |     |
|                         | 4               | WV Mixing Ratio          |         | nnnQ          | 9            |     |
|                         | 5               | Turbulence               | Cnnnn   | 10            |              |     |
|                         |                 | End of Text              | <ETX>   |               |              |     |

**Table 5.3.13.2-3 Descent Weather Report Format**

| <u>Character Number</u> | <u>#of Char</u> | <u>Character Content</u> |         | <u>Format</u> | <u>Notes</u> |     |
|-------------------------|-----------------|--------------------------|---------|---------------|--------------|-----|
| 1-10                    | 10              | Standard Header          |         | 1             |              | c-2 |
| 11-12                   | 2               | Version Number           | 02      |               |              |     |
| 13                      | 1               | Type of Met Format       | A, E, D | 2             |              |     |
| 14-15                   | 2               | Date of Message Assembly | dd      |               |              | c-4 |
| 16-19                   | 4               | Departure Station        | xxxx    |               |              |     |
| 20-23                   | 4               | Destination Station      | xxxx    |               |              |     |
| Series #1               |                 |                          |         |               |              |     |
|                         | 6               | Latitude                 | ADDMMT  | 3             |              | c-2 |
|                         | 7               | Longitude                | ADDMMT  | 4             |              |     |
|                         | 4               | Time of Observation      | hhmm    | 5             |              | c-4 |
|                         | 4               | Pressure Altitude        | nnnn    | 4             |              |     |
|                         | 4               | Static Air Temperature   | annn    | 7             |              |     |
|                         | 3               | Wind Direction           | nnn     | Degrees true  |              |     |
|                         | 3               | Wind Speed               | nnn     | Knots         |              |     |
|                         | 1               | Roll Angle Flag          | n       | 8             |              |     |
|                         | 4               | WV Mixing Ratio          |         | nnnQ          | 9            | c-2 |
|                         | 4               | Turbulence               | nnnn    | 11            |              |     |
|                         |                 | End of Text              | <ETX>   |               |              |     |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**5.3.13.2 Meteorological Report, Version 2 - MFI or Label H2 (cont'd)

Notes:

- |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-2 | <p>[1] See ARINC Specification 618.</p> <p>[2] (A = Ascent, E = Enroute, D = Descent). Each type has the same <u>order</u> of relevant meteorological information (latitude, longitude, time, pressure (or altitude), wind direction, wind speed, roll angle flag, water vapor, turbulence) but actual information and frequency of reporting levels varies with type.</p> <p>[3] A = "N" (North) or "S" (South), D = degrees, M = minutes, T = tenths of minutes.</p> <p>[4] A = "E" (East) or "W" (West), D = degrees, M = minutes, T = tenths of minutes.</p> <p>[5] h = hours, m = minutes</p> <p>[6] Resolution in tens of feet</p>                                                                                                      |
| c-4 | <p>[7] The value of 'a' is encoded either "P" (plus) or "M" (minus), units are tens, ones, tenths of a degree centigrade</p> <p>[8] If Roll angle exceeds 5 degrees set to [B], otherwise set to [G].</p> <p>[9] <math>nnn = n_1 n_2 n_3</math> which implies <math>n_1 \cdot n_2 \times 10^{-n_3}</math>; e.g., <math>123 = 1.2 \times 10^{-3}</math>.</p>                                                                                                                                                                                                                                                                                                                                                                                   |
| c-2 | <p>Q is a quality control character to be determined after contract award for WVSS.</p> <p>[10] C is a code where if C = "Z" then no turbulence above threshold and no data (characters) follow;<br/>if C = "Q" then some data problem exists and no data (characters) follow;<br/>if C = an integer n = 0 to 9, then 4n hexadecimal characters follow where the first two characters in a group of four are the "average" values of the turbulence metric and the last two characters are the "peak" values of the turbulence metric over a one-minute period.</p> <p>[11] nnnn: First two hexadecimal characters represent the "average" turbulence metric. The last two hexadecimal characters represent the "peak" turbulence metric.</p> |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.13.3 Meteorological Report, Version 3 – MFI or Label H2**

Ascent data measurements continue until top of climb, 18,000 to 30,000 feet. The point of institution of Enroute data measurement samples is modifiable via uplink (default to 25,000 feet).

The format of the Meteorological Report Messages should be as follows:

**Table 5.3.13.3-1 Ascent Weather Report Format**

| Character Number | #of Char | Character Content        | Format  | Notes                                                           |     |
|------------------|----------|--------------------------|---------|-----------------------------------------------------------------|-----|
| 1-10             | 10       | Standard Message Header  |         | 1                                                               | c-3 |
| 11-12            | 2        | Version Number           | 03      |                                                                 |     |
| 13               | 1        | Type of Met Format       | A, E, D | 2                                                               |     |
| 14-15            | 2        | Date of Message Assembly | dd      |                                                                 | c-4 |
| 16-19            | 4        | Time of Message Assembly | hhmm    |                                                                 |     |
| 20-23            | 4        | Departure Station        | xxxx    |                                                                 |     |
| 24-27            | 4        | Destination Station      | xxxx    |                                                                 | c-3 |
| 28-29            | 2        | Series #1 time interval  | ss      | seconds                                                         |     |
| 30-31            | 2        | Series #2 time interval  | ss      | seconds                                                         |     |
| Initial report:  |          |                          |         |                                                                 |     |
|                  | 6        | Latitude                 | ADDMMT  | 3                                                               | c-4 |
|                  | 7        | Longitude                | ADDDMMT | 4                                                               |     |
|                  | 2        | Date of Observation      | dd      |                                                                 |     |
|                  | 4        | Time of Observation      | hhmm    | 5                                                               | c-4 |
|                  | 4        | Pressure Altitude        | nnnn    | 6                                                               |     |
|                  | 4        | Static Air Temperature   | annn    | 7                                                               |     |
|                  | 5        | WV Mixing Ratio          |         | nnnnQ 9                                                         |     |
| Series #1        |          |                          |         |                                                                 |     |
|                  | 4        | Pressure Altitude        | nnnn    | 6                                                               | c-4 |
|                  | 4        | Static Air Temperature   | annn    | 7                                                               |     |
|                  | 3        | Wind direction           | nnn     | Degrees true                                                    |     |
|                  | 3        | Wind Speed               | nnn     | Knots                                                           | c-4 |
|                  | 1        | Roll Angle Flag          | n       | 8                                                               |     |
|                  | 5        | WV Mixing Ratio          |         | nnnnQ 9                                                         |     |
| Delimiter        |          |                          |         |                                                                 |     |
|                  | 1        | Slash </>                | '/'     | Indicates end of Series #1 data/<br>beginning of Series #2 data | c-3 |
| Series #2        |          |                          |         |                                                                 |     |
|                  | 6        | Latitude                 | ADDMMT  | 3                                                               | c-4 |
|                  | 7        | Longitude                | ADDDMMT | 4                                                               |     |
|                  | 4        | Pressure Altitude        | nnnn    | 6                                                               |     |
|                  | 4        | Static Air Temperature   | annn    | 7                                                               | c-4 |
|                  | 3        | Wind Direction           | nnn     | Degrees true                                                    |     |
|                  | 3        | Wind Speed               | nnn     | Knots                                                           |     |
|                  | 1        | Roll Angle Flag          | n       | 8                                                               | c-4 |
|                  | 5        | WV Mixing Ratio          |         | nnnnQ 9                                                         |     |
|                  |          | End of Text              | <ETX>   |                                                                 |     |

Note: The Version 3 Ascent Report will be followed by Version 2 Enroute and Descent Reports.

Refer to Tables 5.3.13.2-2 and Table 5.3.13.2-3. Refer to Section 5.3.13.2 for Notes to this Table.

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.14 Command/Response Downlink - Label RB

Command/Response downlinks should contain Label characters RB. The applications for such downlinks are user-defined and they should be generated as needed in response to Command/Response uplinks.

| Character No. | Character Content                        | Notes                                                             |
|---------------|------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                     | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                |                                                                   |
| 4             | Number [Block Sequence Character]        |                                                                   |
| 5-10          | Flight Identifier;                       |                                                                   |
| 11 thru 19    | Defined per one of the two tables below. |                                                                   |
| 20 thru n     | “Free Text” where $n \leq 220$           |                                                                   |

c-3 | The address can be encoded in one of two forms, Address only and Priority plus Address.

| ADDRESS ONLY |                       |
|--------------|-----------------------|
| Character    | Content               |
| 11           | Space                 |
| 12 - 18      | 7-Letter IATA address |
| 19           | Space                 |

|     |                        |                       |
|-----|------------------------|-----------------------|
| c-4 | PRIORITY + ADDRESS [1] |                       |
|     | Character              | Content               |
| c-3 | 11 - 12                | ‘QU’ Priority         |
|     | 13 - 19                | 7-Letter IATA address |

Note:

c-4 | [1] Currently supported by SITA. This technique may not be supported by other DSPs.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

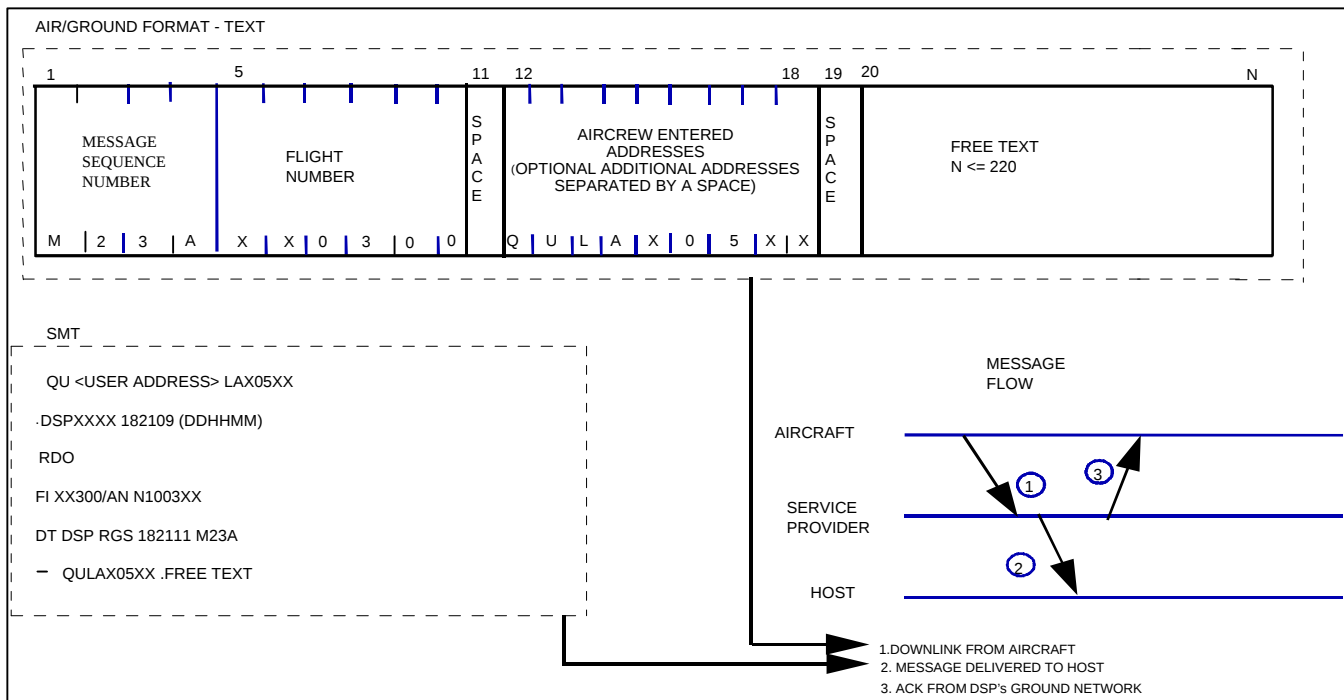
While the free text of this message is user defined, many ACARS MUs have implemented a common format that is defined by:

| <u>Character No.</u> | <u>Character Content</u>            | <u>Notes</u>                                                      |
|----------------------|-------------------------------------|-------------------------------------------------------------------|
| 1                    | Message [Originator]                | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3                  | Sequence [Message Number]           |                                                                   |
| 4                    | Number [Block Sequence Character]   |                                                                   |
| 5-10                 | Flight Identifier;                  |                                                                   |
| 11-12                | Message Priority                    |                                                                   |
| 13-19                | Ground Address                      |                                                                   |
| 20                   | Space                               |                                                                   |
| 21                   | Tilde <~> Character. See note below |                                                                   |
| 22                   | RB Function Indicator (2,3,4)       |                                                                   |
| 23-n                 | "Free Text" where $n \leq 220$      |                                                                   |

c-3

Note: Since some user network interfaces with their service provider are limited to the baudot subset of ASCII, which excludes the tilde <~>, character 21 of the downlink RB message is frequently replaced by the avionics with character number 10 of the corresponding uplink RA message. Consult your avionics supplier.

ACARS multiblock messages are permitted. When used, the fixed format shown above for characters 11 through 22 applies only to the first block. | c-4



**Figure 5.3.14-1 Command/Response Downlink**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.15 Link Test - Label Q0

A message containing Label characters Q0 should be downlinked when the pilot presses the “TEST” key on his/her control unit followed by the “SEND” key.

The Link Test message format should be as follows:

| Character No. | Character Content                 | Notes             |
|---------------|-----------------------------------|-------------------|
| 1             | Message [Originator]              | Refer to Section  |
| 2-3           | Sequence [Message Number]         | 3.4 of ARINC      |
| 4             | Number [Block Sequence Character] | Specification 618 |
| 5-10          | Flight Identifier;                | See Section 5.2.1 |

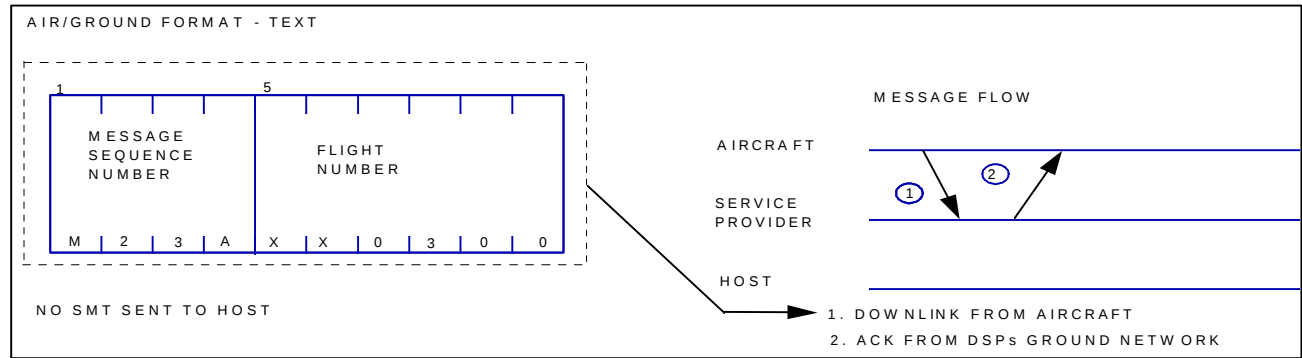


Figure 5.3.15-1 Link Test

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.16 Departure/Arrival Reports (IATA Airport Code) - Label Q1**

Each ACARS user should advise his avionics vendor of the Departure and Arrival report message type option he wishes to see implemented in his hardware. The same label and format is used for both messages.

c-1

A Departure report should be transmitted automatically following the occurrence of the OFF event and an Arrival report following the occurrence of the IN event.

Some users may desire automatic transmission of such a report between these events. The pilot should also be able to command the transmission of an Arrival report at any time between the ON and the IN events. Whether or not the pilot commands either of these transmissions, a Departure report should always be transmitted automatically following the OFF event and an Arrival report sent following the IN event, or at such other times defined by the user.

The Text field should consist of the 36-character fixed format section defined below, followed, when airline needs dictate, by "Free Text" out to the maximum system handling capability of 220 characters.

| <u>Character No.</u> | <u>Character Content</u>                         | <u>Notes</u>      |     |
|----------------------|--------------------------------------------------|-------------------|-----|
| 1                    | Message [Originator]                             | Refer to Section  | c-1 |
| 2-3                  | Sequence [Message Number]                        | 3.4 of ARINC      |     |
| 4                    | Number [Block Sequence Character]                | Specification 618 |     |
| 5-10                 | Flight Identifier;                               | See Section 5.2.1 |     |
| 11                   | Departure Station - Alpha/Numeric Character #1   |                   | c-3 |
| 12                   | Departure Station - Alpha/Numeric Character #2   |                   |     |
| 13                   | Departure Station - Alpha/Numeric Character #3   |                   |     |
| 14                   | OUT Time Hours (Tens)                            |                   |     |
| 15                   | OUT Time Hours (Units)                           |                   |     |
| 16                   | OUT Time Minutes (Tens)                          |                   |     |
| 17                   | OUT Time Minutes (Units)                         |                   |     |
| 18                   | OFF Time Hours (Tens)                            |                   |     |
| 19                   | OFF Time Hours (Units)                           |                   |     |
| 20                   | OFF Time Minutes (Tens)                          |                   |     |
| 21                   | OFF Time Minutes (Units)                         |                   |     |
| 22                   | ON Time Hours (Tens)                             |                   |     |
| 23                   | ON Time Hours (Units)                            |                   |     |
| 24                   | ON Time Minutes (Tens)                           |                   |     |
| 25                   | ON Time Minutes (Units)                          |                   |     |
| 26                   | IN Time Hours (Tens)                             |                   |     |
| 27                   | IN Time Hours (Units)                            |                   |     |
| 28                   | IN Time Minutes (Tens)                           |                   |     |
| 29                   | IN Time Minutes (Units)                          |                   |     |
| 30                   | Fuel Quantity (Thousands)                        |                   |     |
| 31                   | Fuel Quantity (Hundreds)                         |                   |     |
| 32                   | Fuel Quantity (Tens)                             |                   |     |
| 33                   | Fuel Quantity (Units)                            |                   |     |
| 34                   | Destination Station - Alpha/Numeric Character #1 |                   | c-1 |
| 35                   | Destination Station - Alpha/Numeric Character #2 |                   |     |
| 36                   | Destination Station - Alpha/Numeric Character #3 |                   |     |
| 37 thru n            | "Free Text" where $n \leq 220$                   |                   |     |

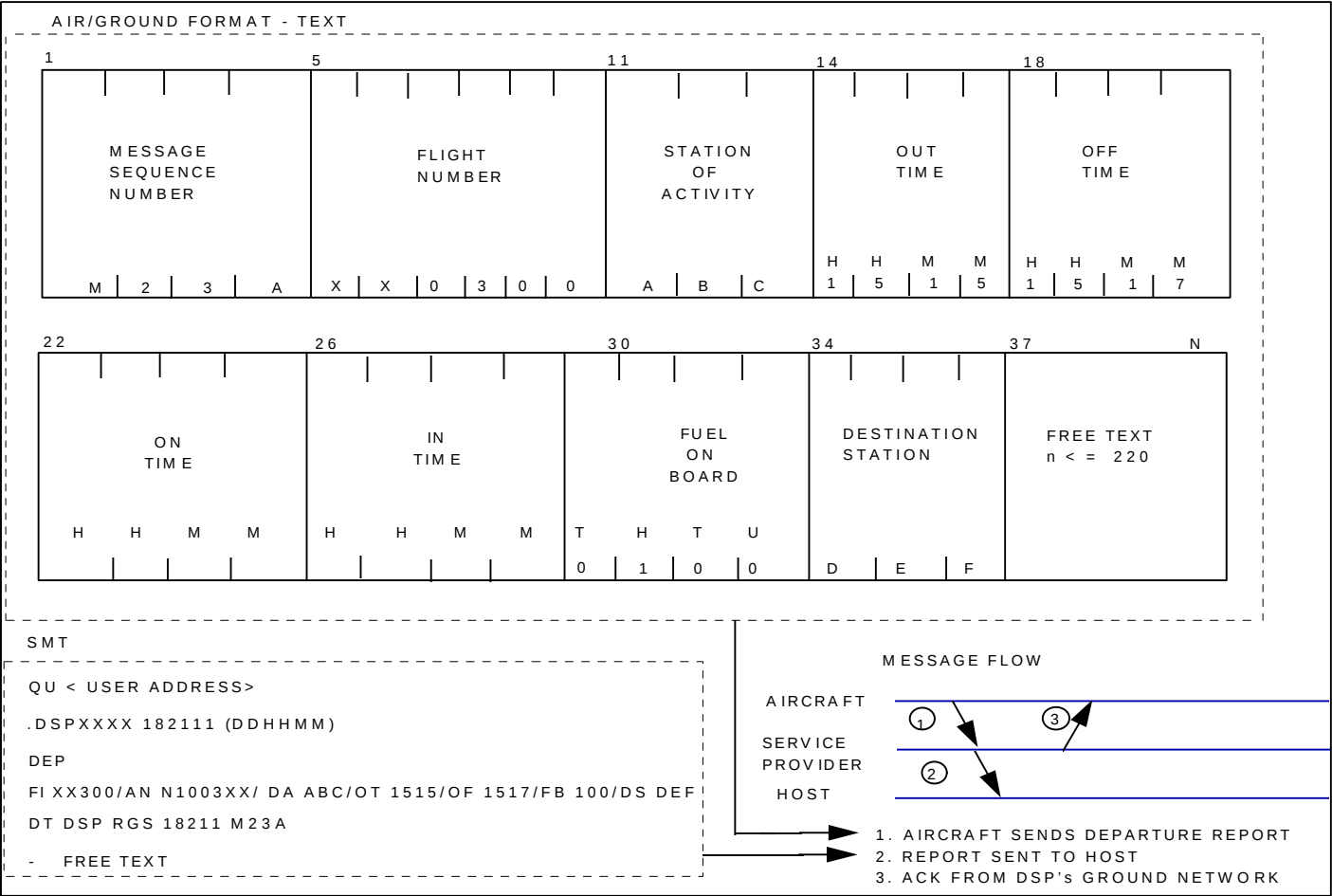
It should also be possible for the pilot to command the transmission of a departure report at any time between the OUT and the OFF events. Refer to Section 3.2.1 for the rules for encoding the SMI of the Type B version of the Q1 message. Refer to Section 3.2.1 for coding Rules for the Free Text field.

c-3

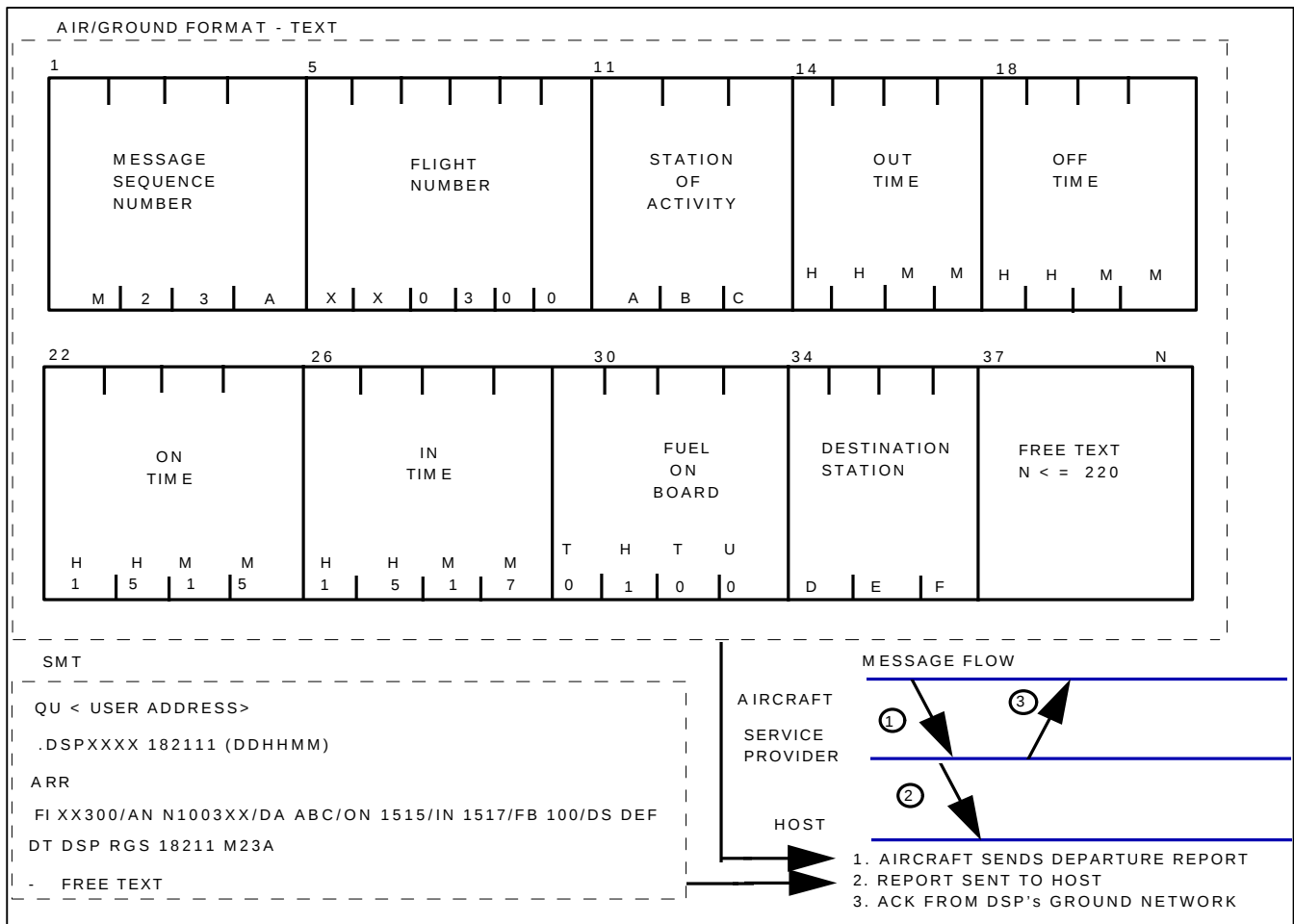
The "Free Text" will usually consist of Captain/First Officer identification information.

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.16 Departure/Arrival Reports (IATA Airport Code) - Label Q1 (cont'd)



c-1 | Figure 5.3.16-1 Departure Report (Q1)

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****Figure 5.3.16-2 Arrival Reports (Q1)**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.17 ETA Report - Label Q2

The Text field should consist of the 21-character fixed format section defined below, followed when airline needs dictate, by “Free Text” out to the maximum system handling capability of 220 characters. The “Free Text” will consist of information derived from manual inputs.

| Character No. | Character Content                                | Notes                                                             |
|---------------|--------------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                        |                                                                   |
| 4             | Number [Block Sequence Character]                |                                                                   |
| 5-10          | Flight Identifier;                               |                                                                   |
| 11            | Destination Station - Alpha/Numeric Character #1 |                                                                   |
| 12            | Destination Station - Alpha/Numeric Character #2 |                                                                   |
| 13            | Destination Station - Alpha/Numeric Character #3 |                                                                   |
| 14            | ETA Hours (Tens)                                 |                                                                   |
| 15            | ETA Hours (Units)                                |                                                                   |
| 16            | ETA Minutes (Tens)                               |                                                                   |
| 17            | ETA Minutes (Units)                              |                                                                   |
| 18            | Fuel Quantity (Thousands)                        |                                                                   |
| 19            | Fuel Quantity (Hundreds)                         |                                                                   |
| 20            | Fuel Quantity (Tens)                             |                                                                   |
| 21            | Fuel Quantity (Units)                            |                                                                   |
| 22 thru n     | “Free Text” where n ≤ 220                        |                                                                   |

Note:

The data in the Fuel Quantity field may be downlinked in either a Departure report or an ETA report. Which downlink is used will depend on which report is transmitted first and when the data is entered.

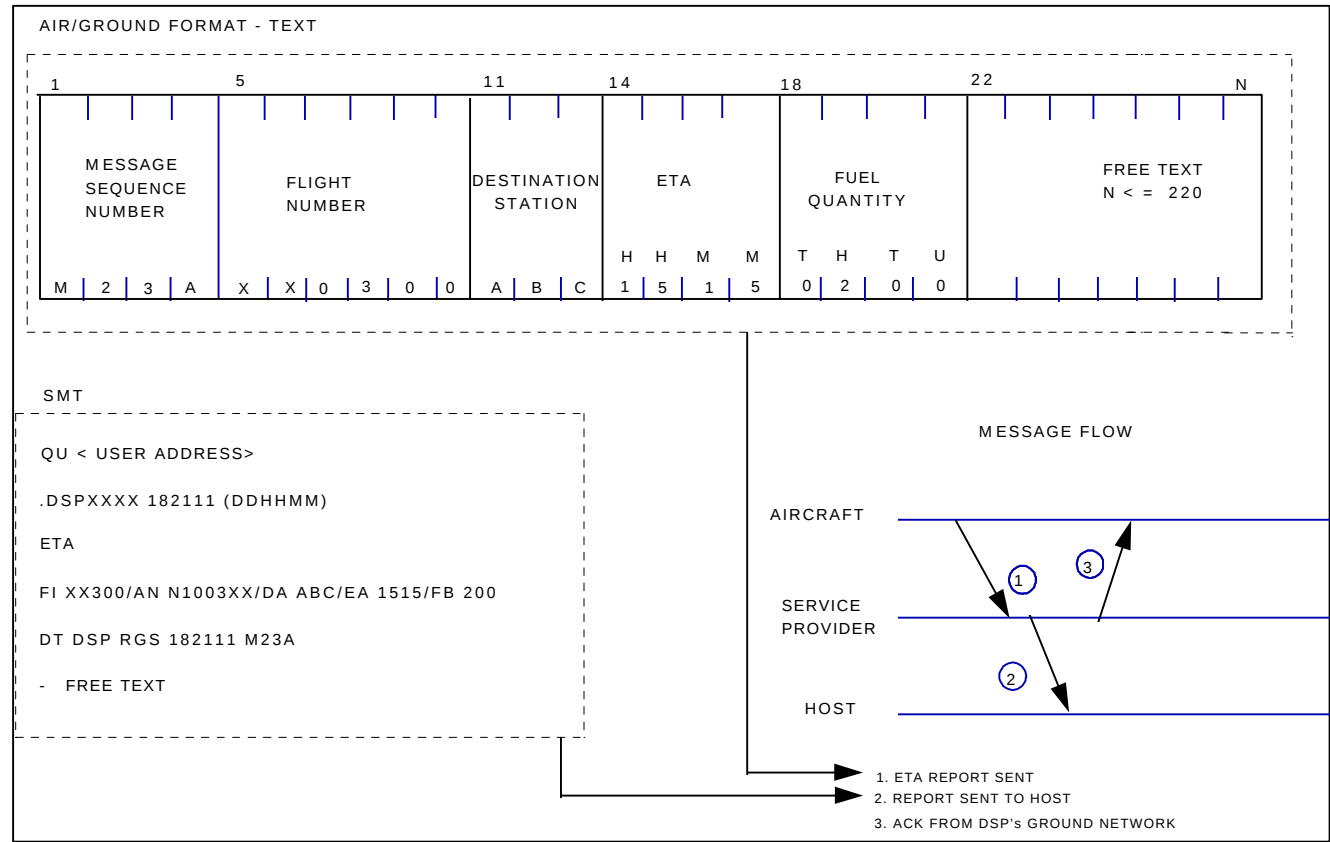


Figure 5.3.17-1 ETA Report

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.18 Clock Update Advisory - Label Q3

The clock update advisory message may, at airline option, be transmitted automatically whenever the clock is updated by the pilot.

It may also be transmitted whenever the clock is updated automatically upon receipt of a Ground UTC Delivery Uplink.

The Text field should consist of the 19-character fixed format sequence shown below.

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier;                |                                                                   |
| 11            | Hours (Tens)                      | } Clock time before reset                                         |
| 12            | Hours (Units)                     |                                                                   |
| 13            | Minutes (Tens)                    |                                                                   |
| 14            | Minutes (Units)                   | } Clock time after reset                                          |
| 15            | Space                             |                                                                   |
| 16            | Hours (Tens)                      |                                                                   |
| 17            | Hours (Units)                     |                                                                   |
| 18            | Minutes (Tens)                    |                                                                   |
| 19            | Minutes (Units)                   |                                                                   |

c-1

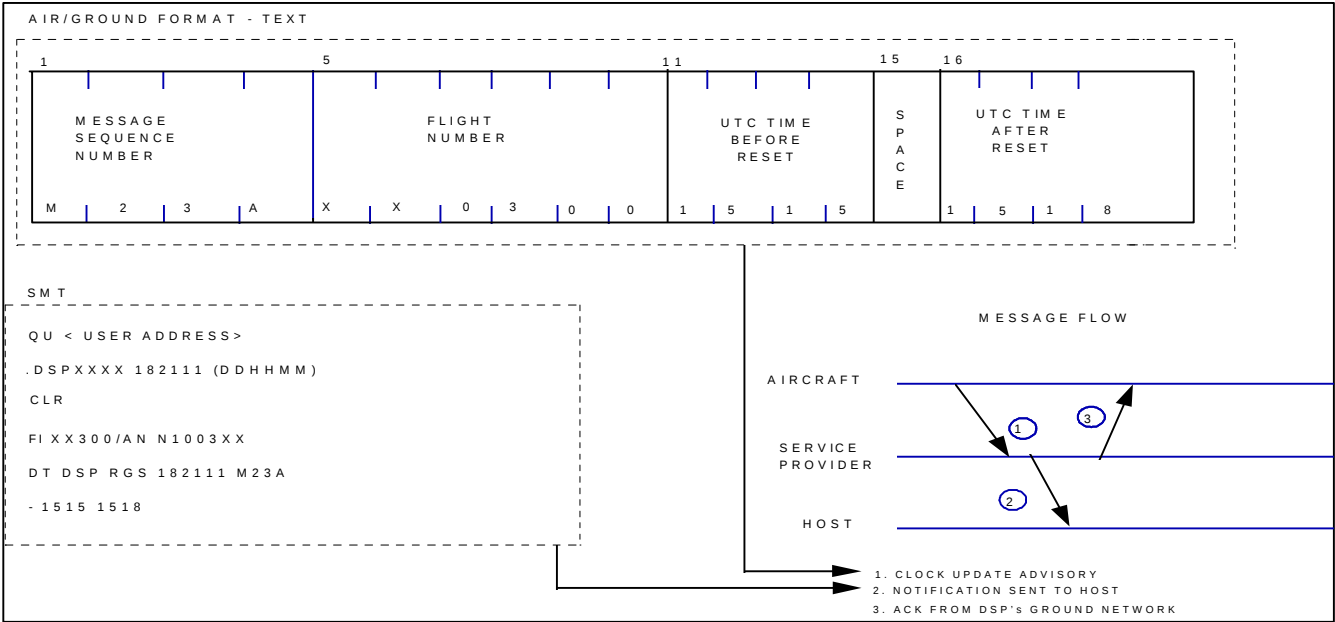


Figure 5.3.18-1 Clock Update Advisory

c-1

5.3.19 Unassigned

This is a placeholder for future assignment.

5.3.20 Unassigned

This is a placeholder for future assignment.

c-3

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

c-3 | 5.3.21 Delay Message - Label Q7

Messages containing information on operational delays should contain Label characters Q7.

The format of the message should be as follows:

| Character No. | Character Content                 | Notes                                                             |
|---------------|-----------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]         |                                                                   |
| 4             | Number [Block Sequence Character] |                                                                   |
| 5-10          | Flight Identifier;                |                                                                   |
| 11 thru n     | "Free Text" where $n \leq 220$    |                                                                   |

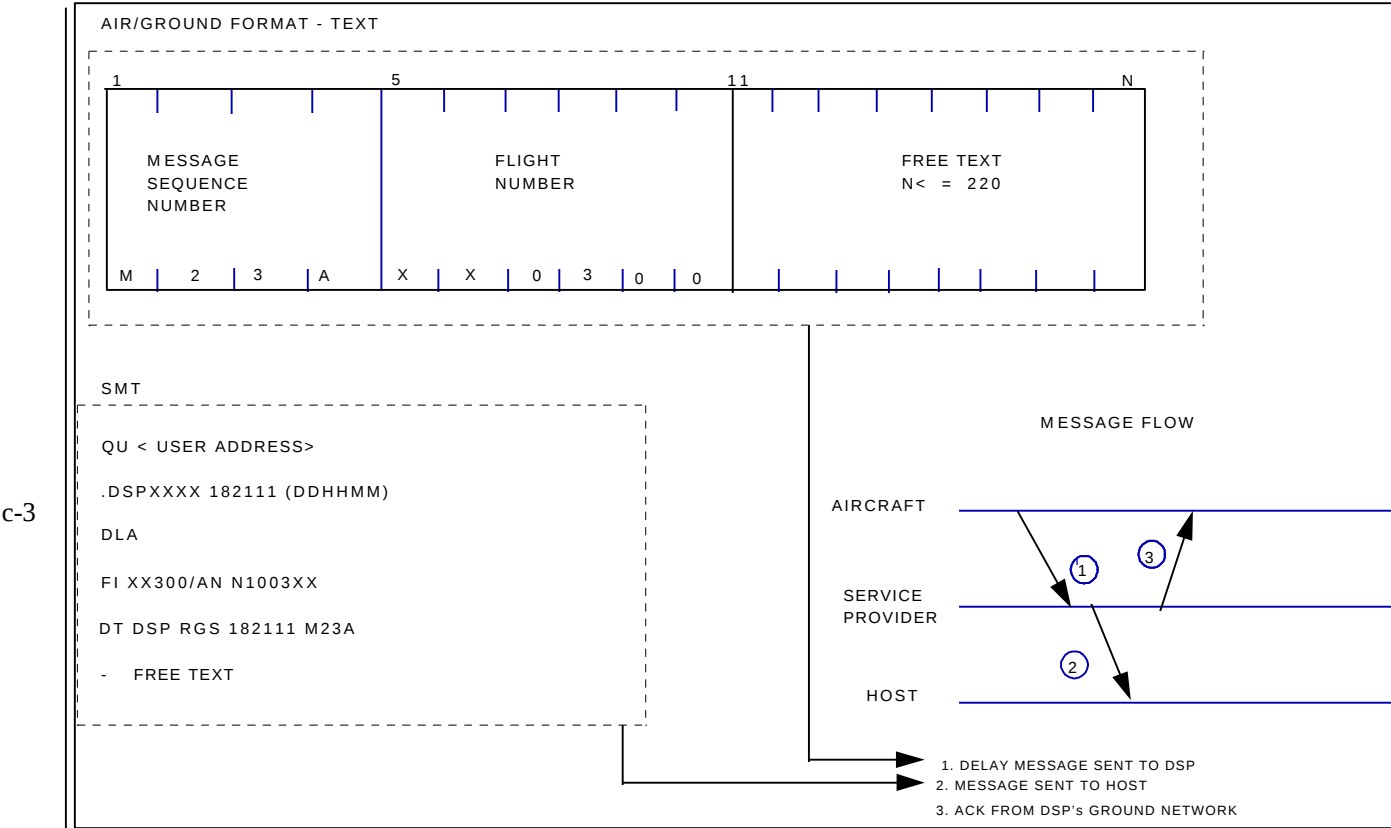


Figure 5.3.21-1 Delay Message - Label Q7

5.3.22 Reserved - Label Q8

Not used in downlink messages.

5.3.23 Reserved - Label Q9

Not used in downlink messages.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.24 OUT/Fuel Report (IATA Airport Code) - Label QA**

The OUT/Fuel report should be transmitted automatically following the declaration of the OUT event.

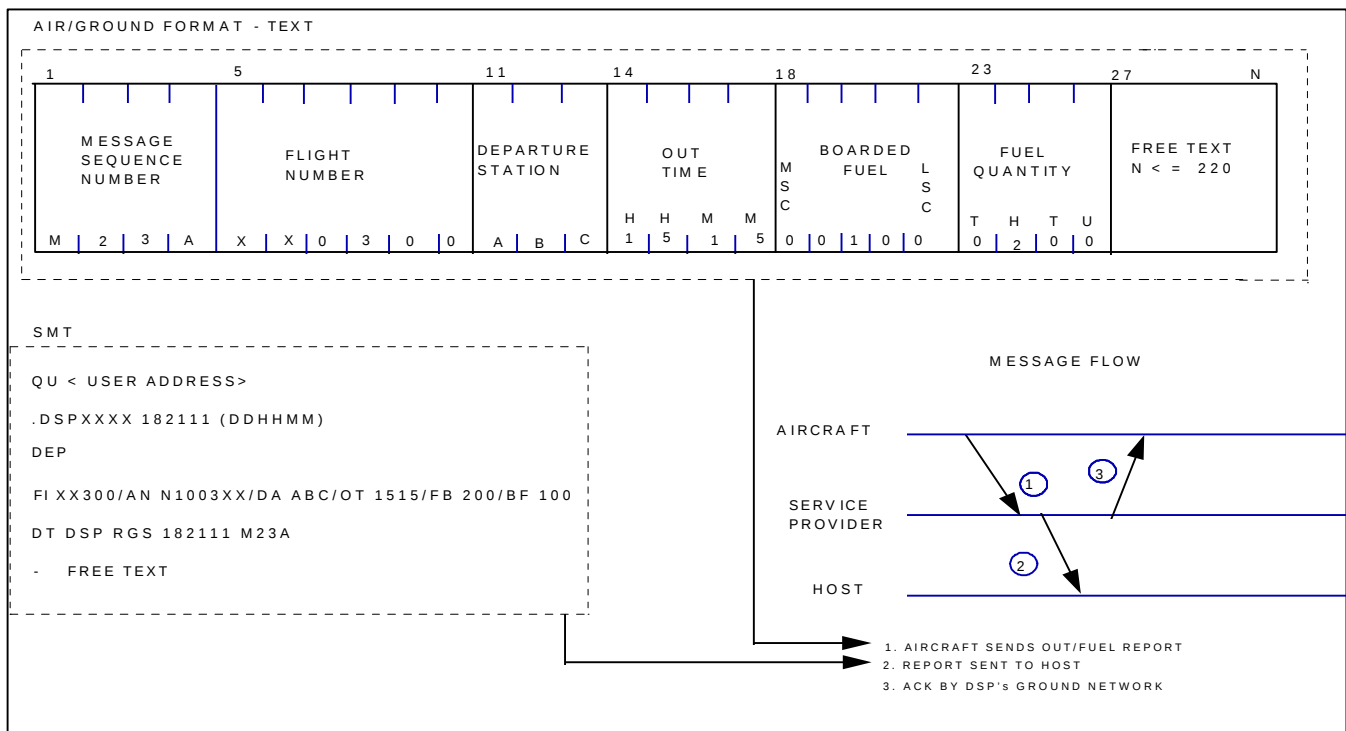
The Text field should consist of the 26-character fixed format section defined below, followed, when airline needs dictate, by "Free Text" out to the maximum system handling capacity of 220 characters. The "Free Text" will consist of information defined by the airline.

c-3

| Character No. | Character Content                              | Notes                                                             |
|---------------|------------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                           | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                      |                                                                   |
| 4             | Number [Block Sequence Character]              |                                                                   |
| 5-10          | Flight Identifier                              |                                                                   |
| 11            | Departure Station - Alpha/Numeric Character #1 | c-1                                                               |
| 12            | Departure Station - Alpha/Numeric Character #2 |                                                                   |
| 13            | Departure Station - Alpha/Numeric Character #3 |                                                                   |
| 14            | OUT time hours (Tens)                          |                                                                   |
| 15            | OUT time hours (Units)                         |                                                                   |
| 16            | OUT time minutes (Tens)                        |                                                                   |
| 17            | OUT time minutes (Units)                       |                                                                   |
| 18            | Boarded Fuel Character #1 (MSC)                |                                                                   |
| 19            | Boarded Fuel Character #2                      |                                                                   |
| 20            | Boarded Fuel Character #3                      |                                                                   |
| 21            | Boarded Fuel Character #4                      |                                                                   |
| 22            | Boarded Fuel Character #5 (LSC)                |                                                                   |
| 23            | Fuel Quantity (Thousands)                      |                                                                   |
| 24            | Fuel Quantity (Hundred)                        |                                                                   |
| 25            | Fuel Quantity (Tens)                           |                                                                   |
| 26            | Fuel Quantity (Units)                          |                                                                   |
| 27 thru n     | Free Text" where $n \leq 220$                  |                                                                   |

The complete text of the OUT/Fuel Report should be transmitted, with those fixed format fields for which information is not required or not available filled with 'NUL's (0/0) or spaces. See Section 3.2.1 for the effect of these options. If the "Free Text" portion of the text field is not used, the control character <ETX> should terminate the field at position number 27. In all other cases, the "ETX" character should terminate the field following the last "Free Text" character.

c-3

**Figure 5.3.24-1 OUT/Fuel Report (IATA Airport Code)**

c-1

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

5.3.25 OFF Report (IATA Airport Code) - Label QB

This report format was defined to deliver the airport identification using the 3-character IATA designator.

The OFF report should be transmitted automatically following the declaration of the OFF event.

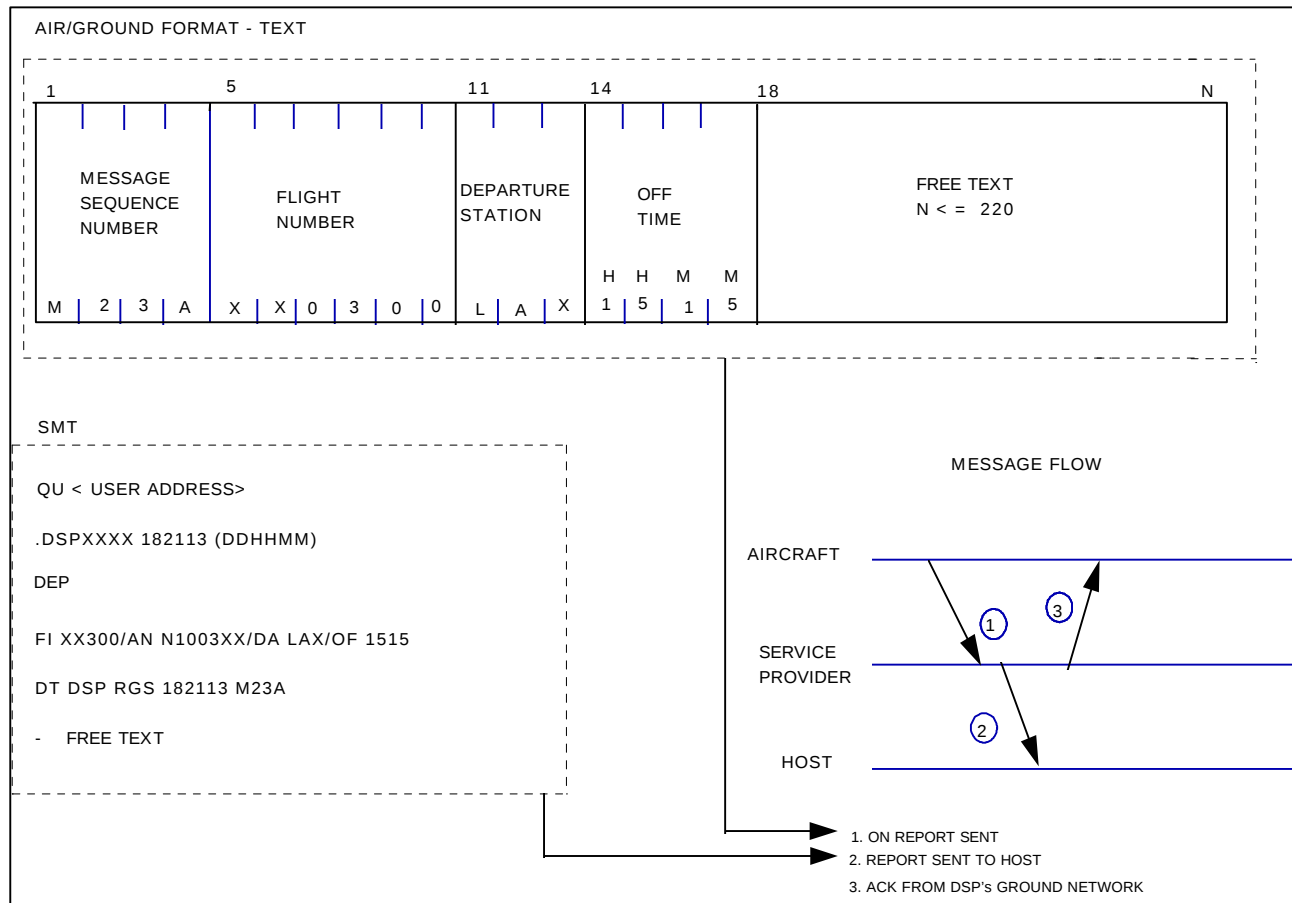
COMMENTARY

c-3 | DSPs use both the aircraft Departure and Destination information to manage its air/ground frequencies for the flight. For this reason, the Label QF message format is preferable to the Label QB format.

The OFF Report should be transmitted automatically following the declaration of the OFF event. Note the possible need to delay the transmission of this message until the aircraft is within radio coverage of the ACARS.

The Text field should consist of the 17-character fixed format section defined below, followed, as necessary, by “Free Text” as already described

|     | <u>Character No.</u>                                                                                                                                                                                                                    | <u>Character Content</u>                       | <u>Notes</u>                                                                     |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------|
| c-1 | 1                                                                                                                                                                                                                                       | Message [Originator]                           | Refer to Section<br>  3.4 of ARINC<br>  Specification 618<br>  See Section 5.2.1 |
|     | 2-3                                                                                                                                                                                                                                     | Sequence [Message Number]                      |                                                                                  |
|     | 4                                                                                                                                                                                                                                       | Number [Block Sequence Character]              |                                                                                  |
|     | 5-10                                                                                                                                                                                                                                    | Flight Identifier;                             |                                                                                  |
|     | 11                                                                                                                                                                                                                                      | Departure Station - Alpha/Numeric Character #1 |                                                                                  |
|     | 12                                                                                                                                                                                                                                      | Departure Station - Alpha/Numeric Character #2 |                                                                                  |
|     | 13                                                                                                                                                                                                                                      | Departure Station - Alpha/Numeric Character #3 |                                                                                  |
|     | 14                                                                                                                                                                                                                                      | OFF Time Hours (Tens)                          |                                                                                  |
|     | 15                                                                                                                                                                                                                                      | OFF Time Hours (Units)                         |                                                                                  |
|     | 16                                                                                                                                                                                                                                      | OFF Time Minutes (Tens)                        |                                                                                  |
|     | 17                                                                                                                                                                                                                                      | OFF Time Minutes (Units)                       |                                                                                  |
|     | 18 thru n                                                                                                                                                                                                                               | “Free Text” where $n \leq 220$                 |                                                                                  |
| c-3 | The complete text of the OFF Report should be transmitted, with those fixed format fields for which information is not required or not available filled with ‘NUL’s (0/0) or spaces. See Section 3.2.1 for the effect of these options. |                                                |                                                                                  |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****Figure 5.3.25-1 OFF Report (IATA Airport Code)**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.26 ON Report (IATA Airport Code) - Label QC

The Text field should consist of the 17-character fixed format section defined below, followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                                | Notes                                                             |
|---------------|--------------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                        |                                                                   |
| 4             | Number [Block Sequence Character]                |                                                                   |
| 5-10          | Flight Identifier;                               |                                                                   |
| 11            | Destination Station - Alpha/Numeric Character #1 |                                                                   |
| 12            | Destination Station - Alpha/Numeric Character #2 |                                                                   |
| 13            | Destination Station - Alpha/Numeric Character #3 |                                                                   |
| 14            | ON Time Hours (Tens)                             |                                                                   |
| 15            | ON Time Hours (Units)                            |                                                                   |
| 16            | ON Time Minutes (Tens)                           |                                                                   |
| 17            | ON Time Minutes (Units)                          |                                                                   |
| 18 thru n     | “Free Text” where n ≤ 220                        |                                                                   |

The complete block of the ON Report should be transmitted, with those fixed format fields for which information is not required or not available filled with ‘NUL’s (0/0) or spaces. See Section 3.2.1 for the effect of these options.

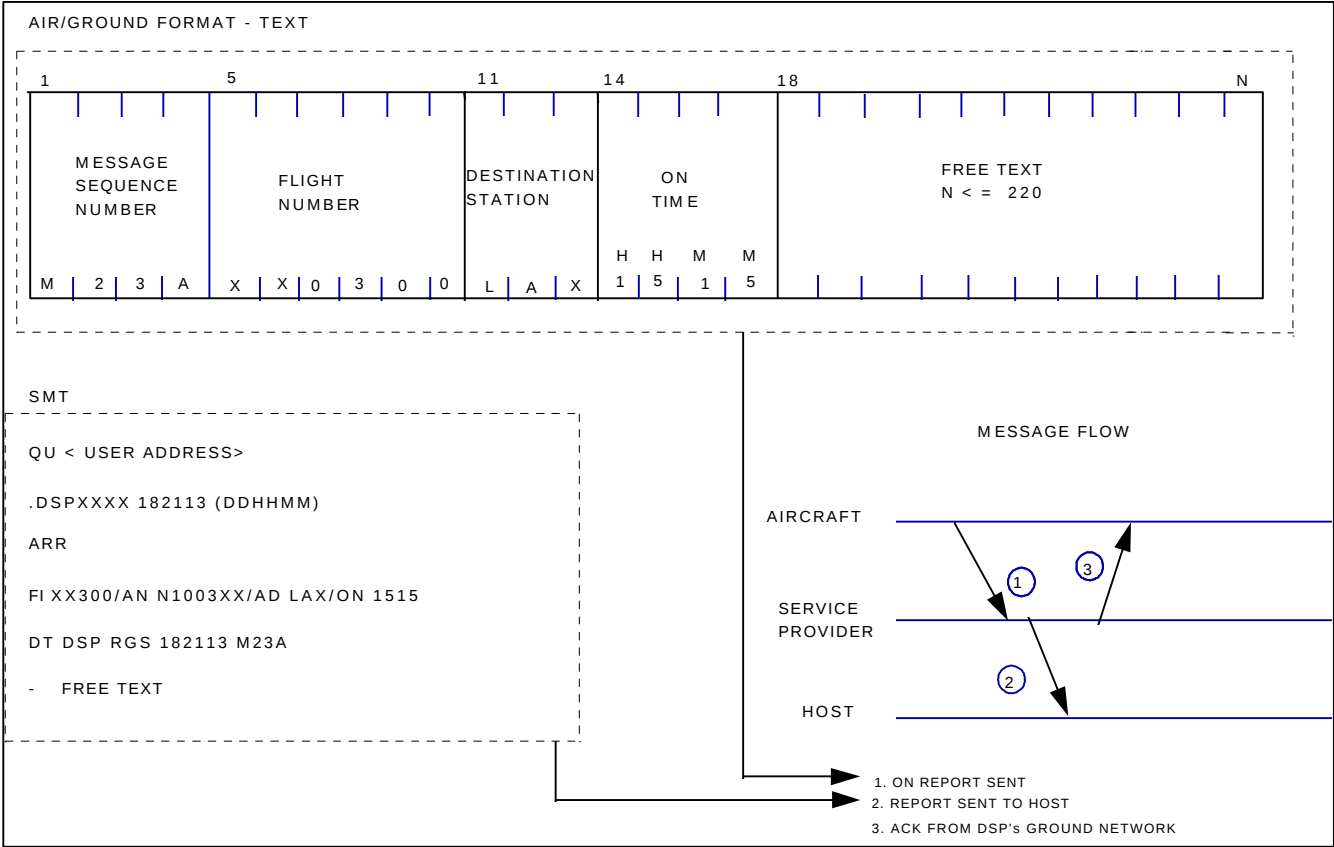


Figure 5.3.26-1 ON Report (IATA Airport Code)

c-1

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.28 OUT/Fuel/Destination Report (IATA Airport Code) - Label QE

The Text field should consist of the 29-character fixed format section defined below followed, as necessary, by “Free Text”, as already described.

|     | Character No.                                                                                                                                                                                                                                            | Character Content                                | Notes                                                             |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------|
| c-1 | 1                                                                                                                                                                                                                                                        | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
|     | 2-3                                                                                                                                                                                                                                                      | Sequence [Message Number]                        |                                                                   |
|     | 4                                                                                                                                                                                                                                                        | Number [Block Sequence Character]                |                                                                   |
|     | 5-10                                                                                                                                                                                                                                                     | Flight Identifier;                               |                                                                   |
|     | 11                                                                                                                                                                                                                                                       | Departure Station - Alpha/Numeric Character #1   |                                                                   |
|     | 12                                                                                                                                                                                                                                                       | Departure Station - Alpha/Numeric Character #2   |                                                                   |
|     | 13                                                                                                                                                                                                                                                       | Departure Station - Alpha/Numeric Character #3   |                                                                   |
|     | 14                                                                                                                                                                                                                                                       | OUT Time Hours (Tens)                            |                                                                   |
|     | 15                                                                                                                                                                                                                                                       | OUT Time Hours (Units)                           |                                                                   |
|     | 16                                                                                                                                                                                                                                                       | OUT Time Minutes (Tens)                          |                                                                   |
|     | 17                                                                                                                                                                                                                                                       | OUT Time Minutes (Units)                         |                                                                   |
|     | 18                                                                                                                                                                                                                                                       | Boarded Fuel Character #1 (MSC)                  |                                                                   |
|     | 19                                                                                                                                                                                                                                                       | Boarded Fuel Character #2                        |                                                                   |
|     | 20                                                                                                                                                                                                                                                       | Boarded Fuel Character #3                        |                                                                   |
|     | 21                                                                                                                                                                                                                                                       | Boarded Fuel Character #4                        |                                                                   |
|     | 22                                                                                                                                                                                                                                                       | Boarded Fuel Character #5 (LSC)                  |                                                                   |
|     | 23                                                                                                                                                                                                                                                       | Fuel Quantity (Thousands)                        |                                                                   |
|     | 24                                                                                                                                                                                                                                                       | Fuel Quantity (Hundreds)                         |                                                                   |
|     | 25                                                                                                                                                                                                                                                       | Fuel Quantity (Tens)                             |                                                                   |
|     | 26                                                                                                                                                                                                                                                       | Fuel Quantity (Units)                            |                                                                   |
| c-1 | 27                                                                                                                                                                                                                                                       | Destination Station - Alpha/Numeric Character #1 |                                                                   |
|     | 28                                                                                                                                                                                                                                                       | Destination Station - Alpha/Numeric Character #2 |                                                                   |
|     | 29                                                                                                                                                                                                                                                       | Destination Station - Alpha/Numeric Character #3 |                                                                   |
|     | 30 thru n                                                                                                                                                                                                                                                | “Free Text” where n ≤ 220                        |                                                                   |
| c-3 | The complete text of the OUT/Fuel Destination Report should be transmitted, with those fixed format fields for which information is not required or not available filled with ‘NUL’s (0/0) or spaces. See Section 3.2.1 for the effect of these options. |                                                  |                                                                   |

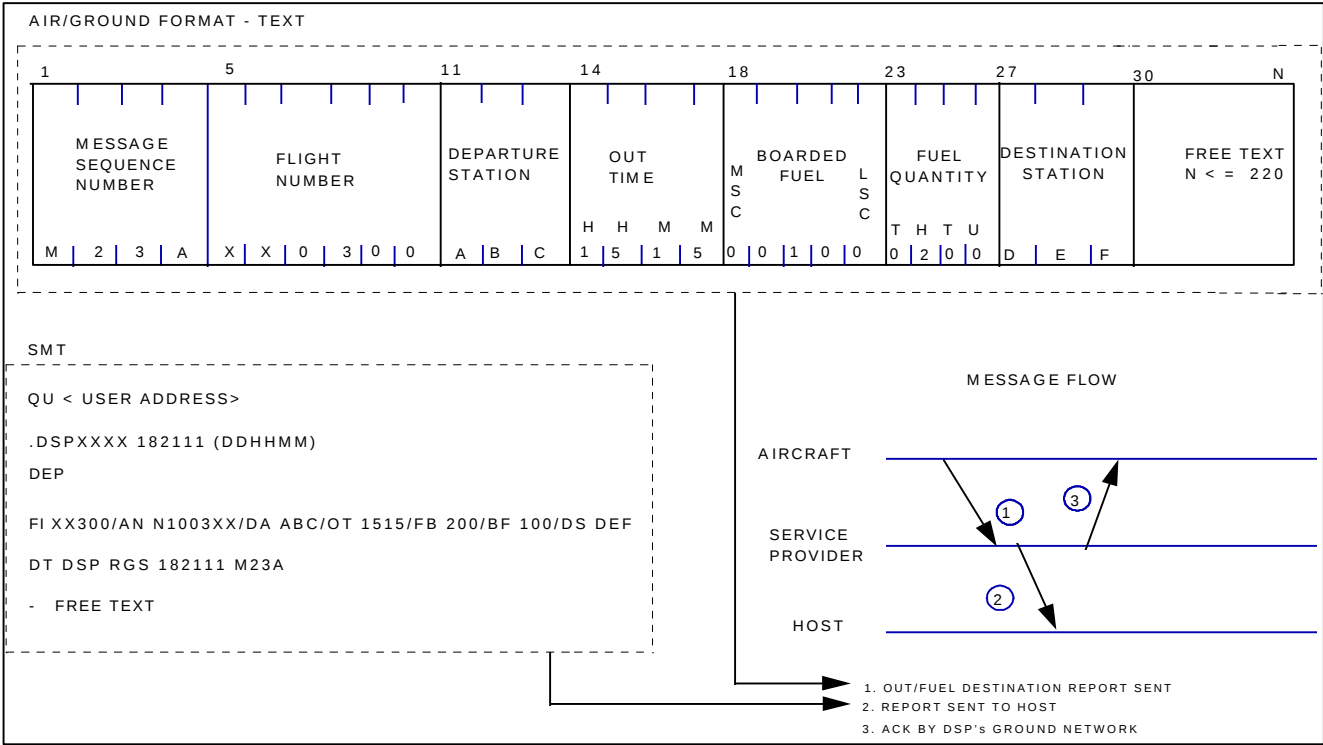


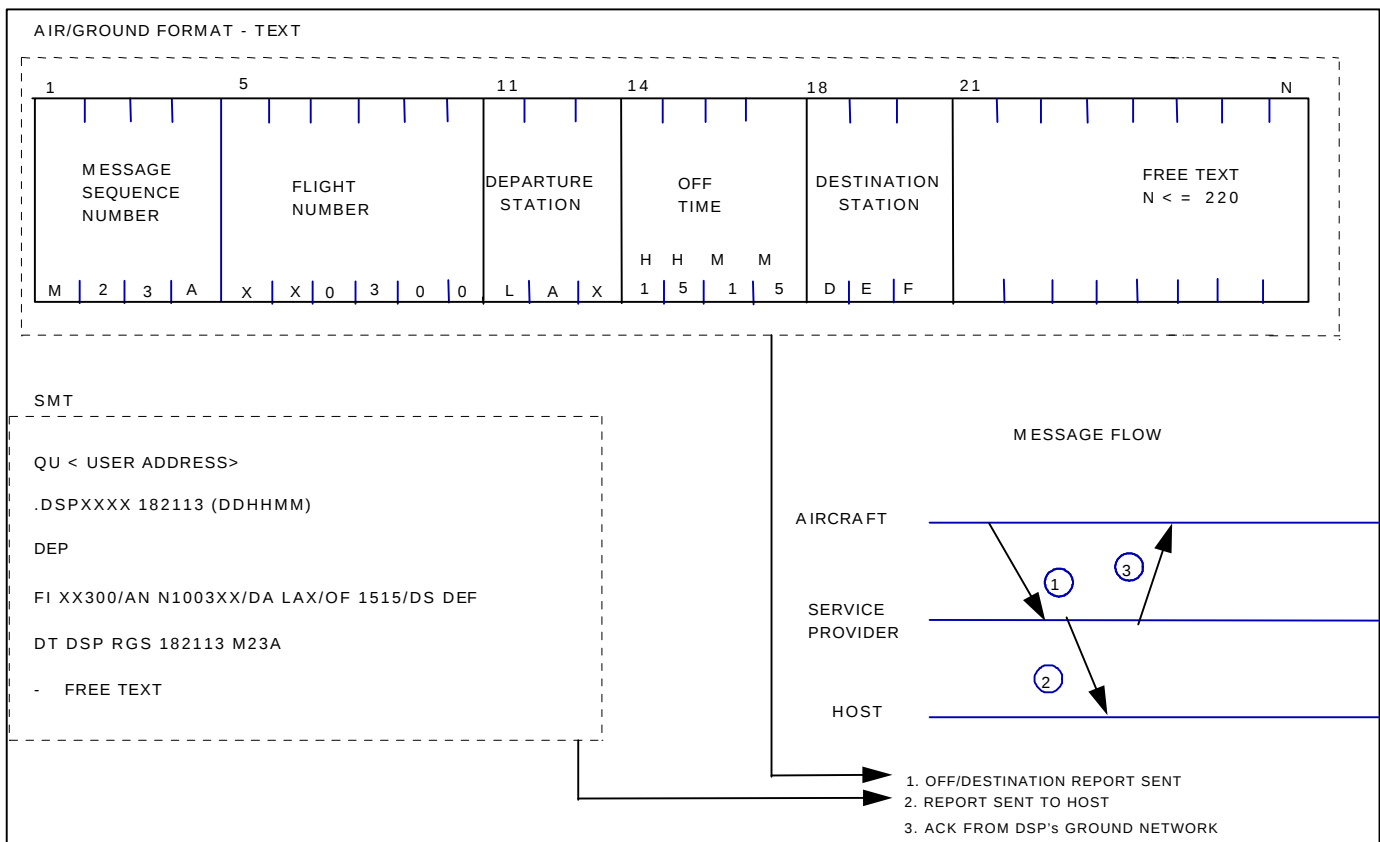
Figure 5.3.28-1 OUT/Fuel/Destination Report (IATA Airport Code)

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.29 OFF/Destination Report (IATA Airport Code) - Label QF**

The Text field should consist of the 20-character fixed format section defined below followed, as necessary, by "Free Text" as already described.

| Character No. | Character Content                                | Notes                                                             |     |
|---------------|--------------------------------------------------|-------------------------------------------------------------------|-----|
| 1             | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 | c-1 |
| 2-3           | Sequence [Message Number]                        |                                                                   |     |
| 4             | Number [Block Sequence Character]                |                                                                   |     |
| 5-10          | Flight Identifier;                               |                                                                   |     |
| 11            | Departure Station - Alpha/Numeric Character #1   |                                                                   |     |
| 12            | Departure Station - Alpha/Numeric Character #2   |                                                                   |     |
| 13            | Departure Station - Alpha/Numeric Character #3   |                                                                   |     |
| 14            | OFF Time Hours (Tens)                            |                                                                   |     |
| 15            | OFF Time Hours (Units)                           |                                                                   |     |
| 16            | OFF Time Minutes (Tens)                          |                                                                   |     |
| 17            | OFF Time Minutes (Units)                         |                                                                   |     |
| 18            | Destination Station - Alpha/Numeric Character #1 |                                                                   |     |
| 19            | Destination Station - Alpha/Numeric Character #2 |                                                                   | c-1 |
| 20            | Destination Station - Alpha/Numeric Character #3 |                                                                   |     |
| 21 thru n     | "Free Text" where $n \leq 220$                   |                                                                   |     |

The complete text of the OFF/Destination Report should be transmitted, with those fixed format fields for which information is not required or not available filled with 'NUL's (0/0) or spaces. See Section 3.2.1 for the effect of these options.

**Figure 5.3.29-1 OFF/Destination Report (IATA Airport Code)**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.30 OUT/Return IN Report (IATA Airport Code) - Label QG

OUT/Return IN reports may be transmitted as the result of aircraft returning to the gate after an OUT report.

The format should be as follows:

| Character No. | Character Content                              | Notes                                                             |
|---------------|------------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                           | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                      |                                                                   |
| 4             | Number [Block Sequence Character]              |                                                                   |
| 5-10          | Flight Identifier;                             |                                                                   |
| 11            | Departure Station - Alpha/Numeric Character #1 |                                                                   |
| 12            | Departure Station - Alpha/Numeric Character #2 |                                                                   |
| 13            | Departure Station - Alpha/Numeric Character #3 |                                                                   |
| 14            | OUT Time Hours (Tens)                          |                                                                   |
| 15            | OUT Time Hours (Units)                         |                                                                   |
| 16            | OUT Time Minutes (Tens)                        |                                                                   |
| 17            | OUT Time Minutes (Units)                       |                                                                   |
| 18            | Return IN Time Hours (Tens)                    |                                                                   |
| 19            | Return IN Time Hours (Units)                   |                                                                   |
| 20            | Return IN Time Minutes (Tens)                  |                                                                   |
| 21            | Return IN Time Minutes (Units)                 |                                                                   |
| 22 thru n     | "Free Text" where n ≤ 220                      |                                                                   |

The complete text of the OUT/Return IN Report should be transmitted, with those fixed format fields for which information is not required or not available filled with 'NUL's (0/0) or spaces. See Section 3.2.1 for the effect of these options.

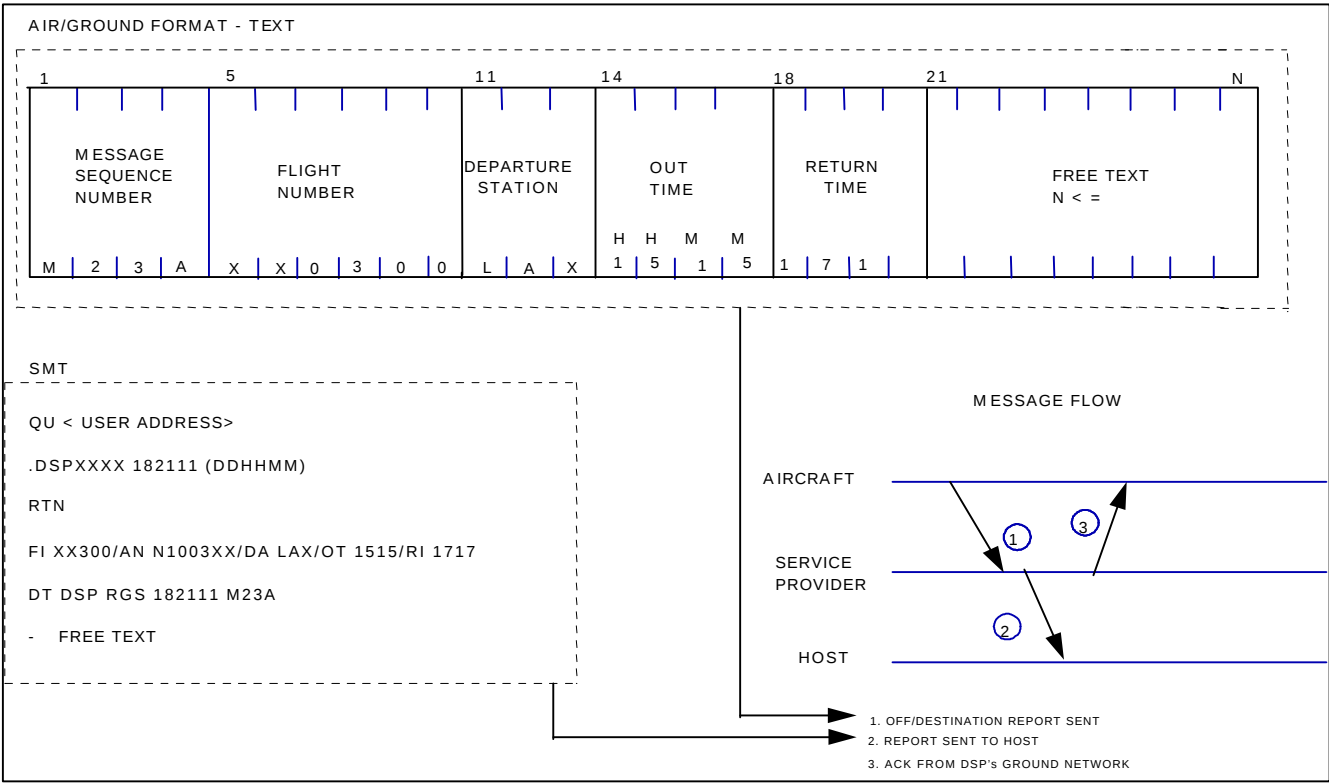


Figure 5.3.30-1 OUT/Return IN Report (IATA Airport Code)

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.31 OUT Report (IATA Airport Code) - Label QH

The format should be as follows:

| Character No. | Character Content                              | Notes                                                             |
|---------------|------------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                           | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                      |                                                                   |
| 4             | Number [Block Sequence Character]              |                                                                   |
| 5-10          | Flight Identifier;                             |                                                                   |
| 11            | Departure Station - Alpha/Numeric Character #1 |                                                                   |
| 12            | Departure Station - Alpha/Numeric Character #2 |                                                                   |
| 13            | Departure Station - Alpha/Numeric Character #3 |                                                                   |
| 14            | OUT Time Hours (Tens)                          |                                                                   |
| 15            | OUT Time Hours (Units)                         |                                                                   |
| 16            | OUT Time Minutes (Tens)                        |                                                                   |
| 17            | OUT Time Minutes (Units)                       |                                                                   |
| 18 thru n     | "Free Text" where n ≤ 220                      |                                                                   |

The complete text of the OUT Report should be transmitted, with those fixed format fields for which information is not required or not available filled with 'NUL's (0/0) or spaces. See Section 3.2.1 for the effect of these options.

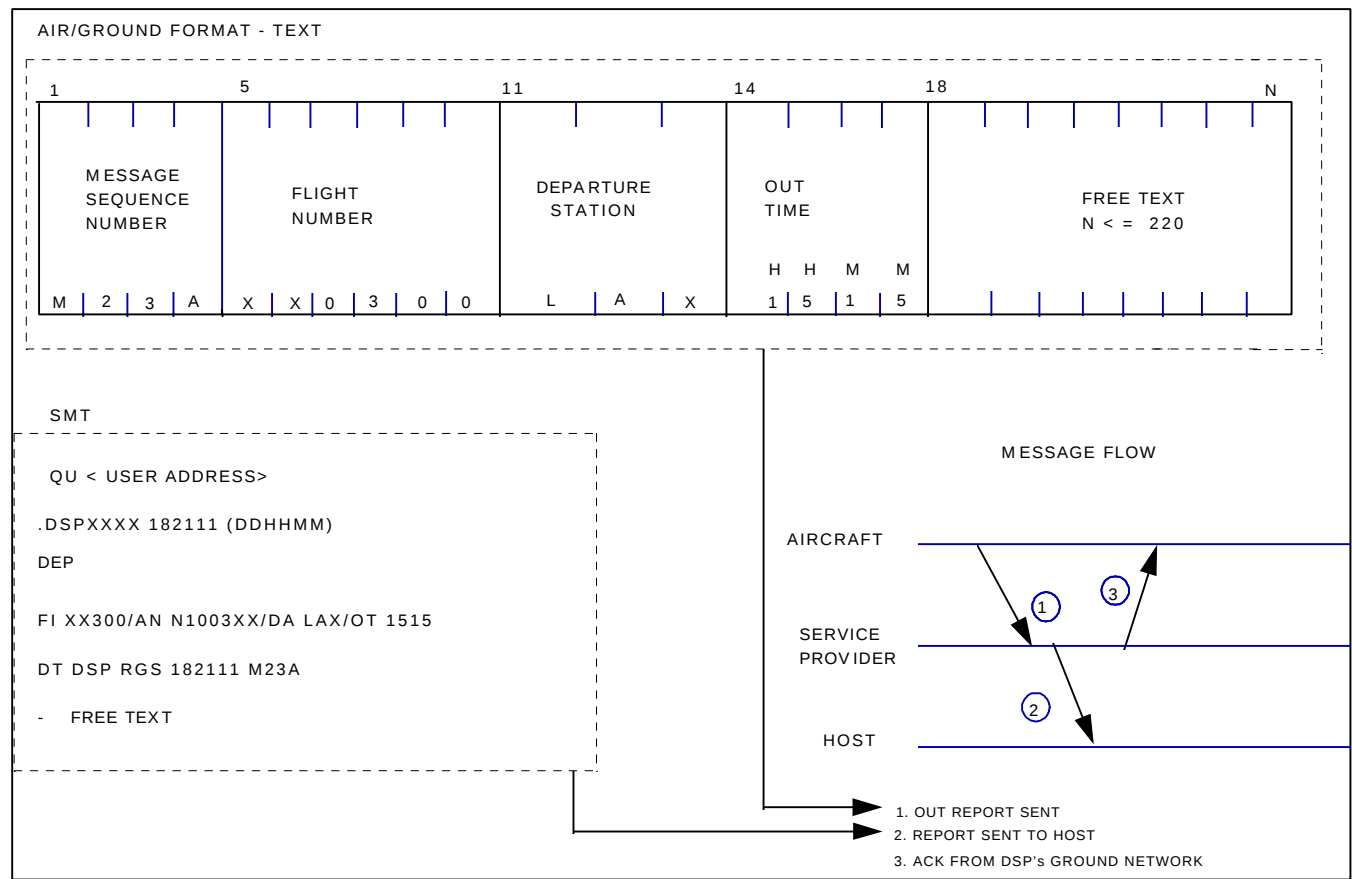


Figure 5.3.31-1 OUT Report (IATA Airport Code)

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

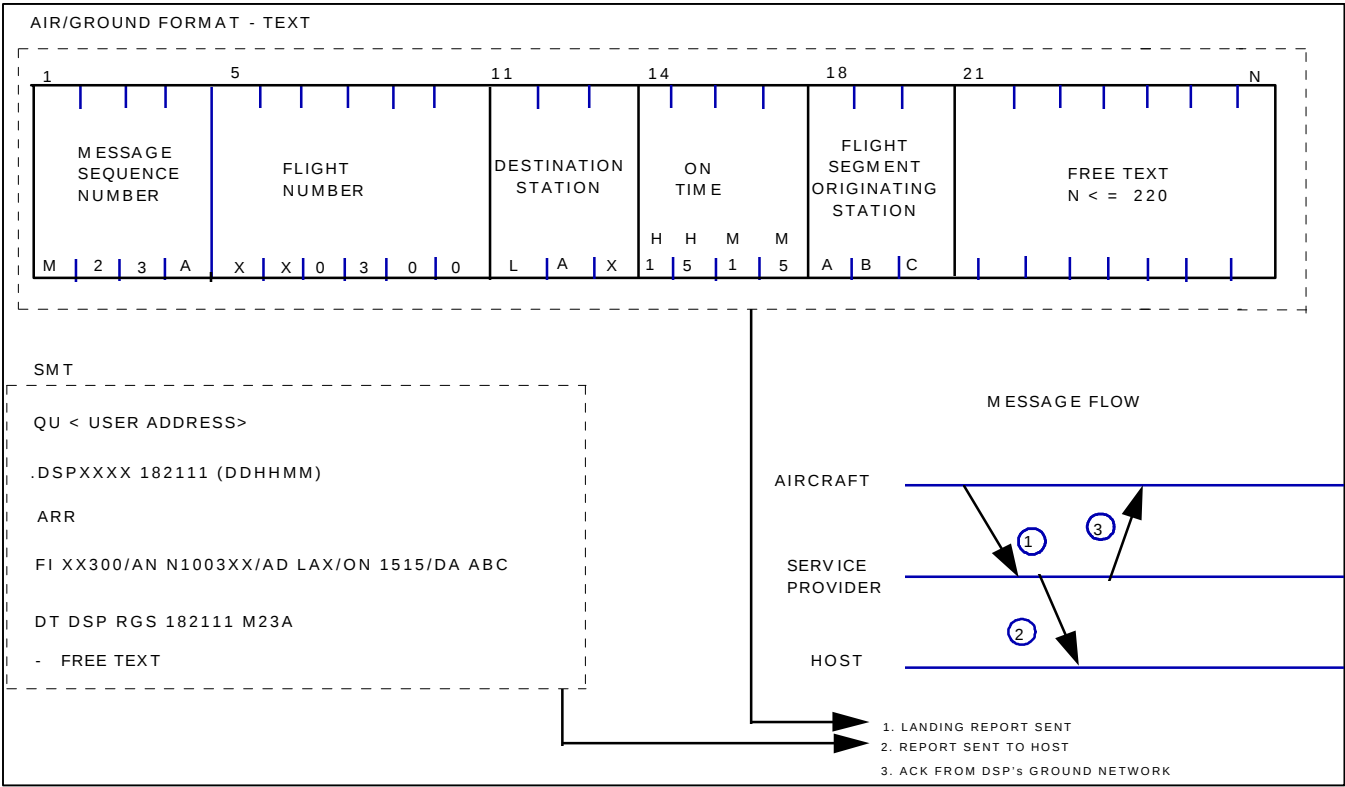
5.3.32 Landing Report (IATA Airport Code) - Label QK

The Landing report should be transmitted automatically following the declaration of the ON event.

The Text field should consist of the 20-character fixed format section defined below followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                                   | Notes                                                             |
|---------------|-----------------------------------------------------|-------------------------------------------------------------------|
| c-1           | 1 Message [Originator]                              | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
|               | 2-3 Sequence [Message Number]                       |                                                                   |
|               | 4 Number [Block Sequence Character]                 |                                                                   |
|               | 5-10 Flight Identifier;                             |                                                                   |
| c-3           | 11 Destination Station - Alpha/Numeric Character #1 |                                                                   |
|               | 12 Destination Station - Alpha/Numeric Character #2 |                                                                   |
|               | 13 Destination Station - Alpha/Numeric Character #3 |                                                                   |
|               | 14 ON Time Hours (Tens)                             |                                                                   |
|               | 15 ON Time Hours (Units)                            |                                                                   |
| c-3           | 16 ON Time Minutes (Tens)                           |                                                                   |
|               | 17 ON Time Minutes (Units)                          |                                                                   |
|               | 18 Departure Station - Alpha/Numeric Character #1   |                                                                   |
|               | 19 Departure Station - Alpha/Numeric Character #2   |                                                                   |
|               | 20 Departure Station - Alpha/Numeric Character #3   |                                                                   |
|               | 21 thru n “Free Text” where $n \leq 220$            |                                                                   |

c-3 | The complete block of the Landing Report should be transmitted, with those fixed format fields for which information is not required or not available filled with ‘NUL’s (0/0) or spaces. See Section 3.2.1 for the effect of these options.



c-1

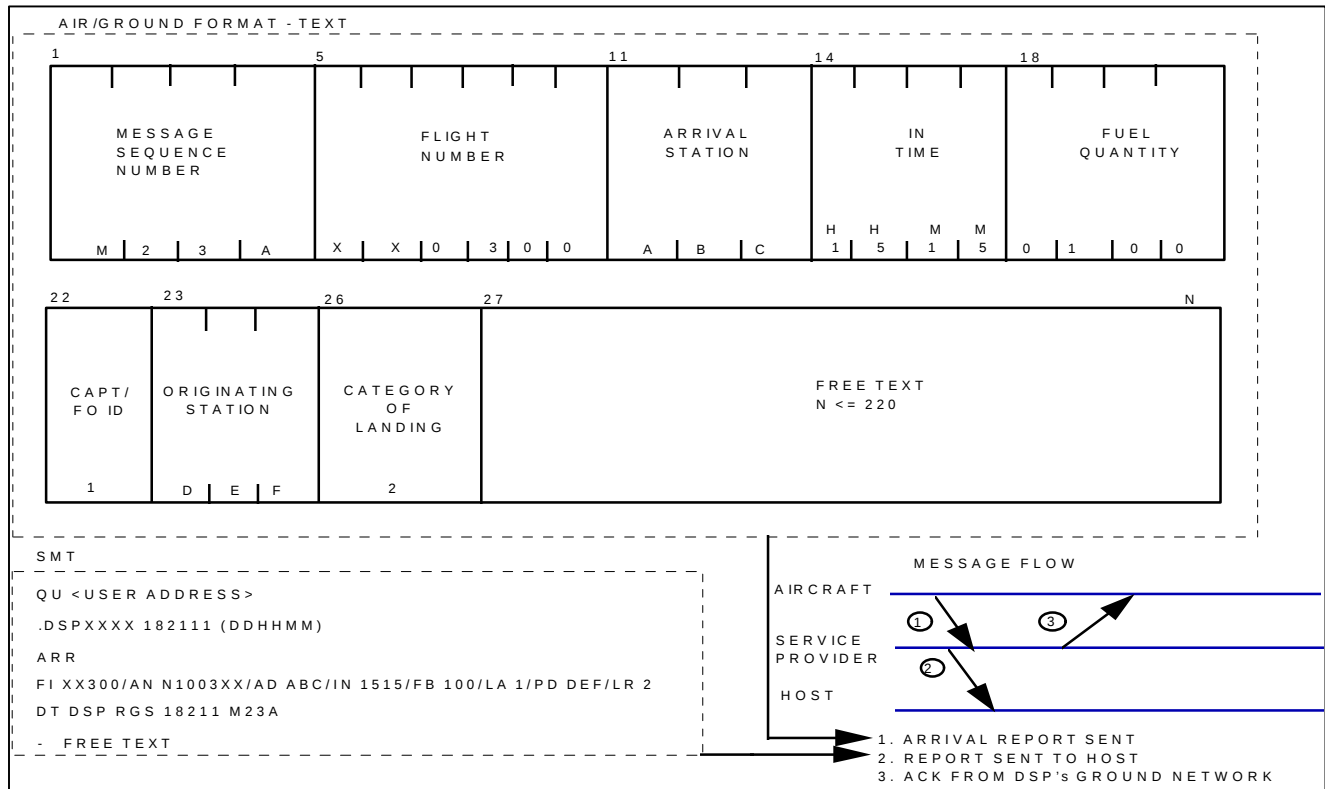
Figure 5.3.32-1 Landing Report (IATA Airport Code)

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.33 Arrival Report (IATA Airport Code) - Label QL**

The message should be transmitted automatically following the declaration of the IN event. The fuel quantity field should contain the fuel on-board at the time of landing. If this field is not loaded prior to the IN event, the MU should fill it, the Captain/First Officer Identifier field and the Category of Landing fields with “NUL” (0/0) characters.

The Text field should consist of the 26-character fixed format section defined below, followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                                | Notes                                                             |     |
|---------------|--------------------------------------------------|-------------------------------------------------------------------|-----|
| 1             | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 | c-1 |
| 2-3           | Sequence [Message Number]                        |                                                                   |     |
| 4             | Number [Block Sequence Character]                |                                                                   |     |
| 5-10          | Flight Identifier;                               |                                                                   |     |
| 11            | Destination Station - Alpha/Numeric Character #1 |                                                                   | c-3 |
| 12            | Destination Station - Alpha/Numeric Character #2 |                                                                   |     |
| 13            | Destination Station - Alpha/Numeric Character #3 |                                                                   |     |
| 14            | IN Time Hours (Tens)                             |                                                                   |     |
| 15            | IN Time Hours (Units)                            |                                                                   |     |
| 16            | IN Time Minutes (Tens)                           |                                                                   |     |
| 17            | IN Time Minutes (Units)                          |                                                                   |     |
| 18            | Fuel Quantity (Thousands)                        |                                                                   |     |
| 19            | Fuel Quantity (Hundreds)                         |                                                                   |     |
| 20            | Fuel Quantity (Tens)                             |                                                                   |     |
| 21            | Fuel Quantity (Units)                            |                                                                   |     |
| 22            | Captain/First Officer Identifier                 |                                                                   | c-1 |
| 23            | Departure Station - Alpha/Numeric Character #1   |                                                                   | c-3 |
| 24            | Departure Station - Alpha/Numeric Character #2   |                                                                   |     |
| 25            | Departure Station - Alpha/Numeric Character #3   |                                                                   |     |
| 26            | Category of Landing                              |                                                                   |     |
| 27 thru n     | “Free Text” where n ≤ 220                        |                                                                   |     |

**Figure 5.3.33-1 Arrival Report (IATA Airport Code)**

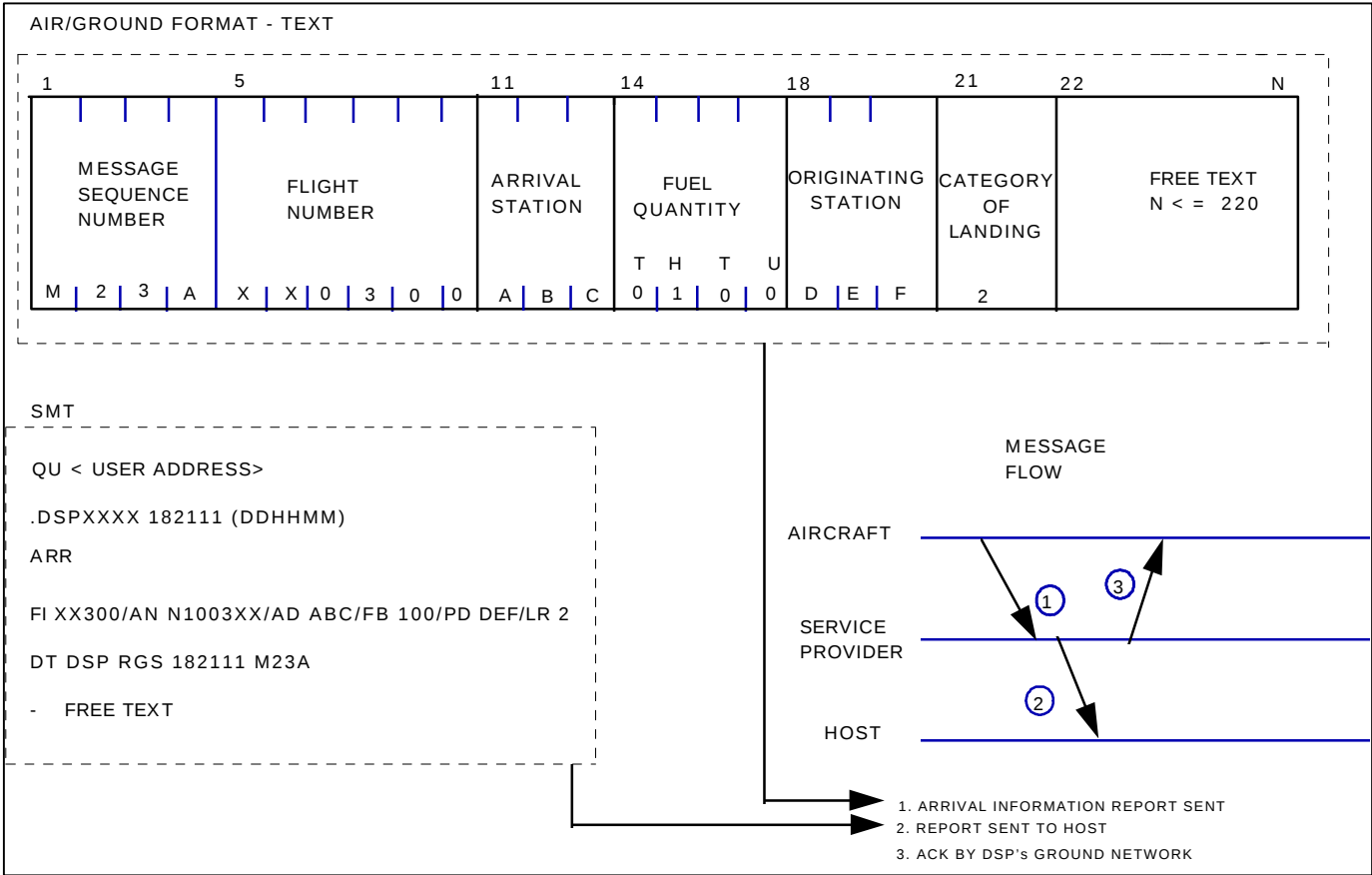
5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.34 Arrival Information Report (IATA Airport Code) - Label QM

Arrival Information Reports should contain Label character QM.

The Text field should consist of the 22-character fixed format section defined below, followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                                | Notes                                                             |
|---------------|--------------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                        |                                                                   |
| 4             | Number [Block Sequence Character]                |                                                                   |
| 5-10          | Flight Identifier;                               |                                                                   |
| 11            | Destination Station - Alpha/Numeric Character #1 |                                                                   |
| 12            | Destination Station - Alpha/Numeric Character #2 |                                                                   |
| 13            | Destination Station - Alpha/Numeric Character #3 |                                                                   |
| 14            | Fuel Quantity (Thousands)                        |                                                                   |
| 15            | Fuel Quantity (Hundreds)                         |                                                                   |
| 16            | Fuel Quantity (Tens)                             |                                                                   |
| 17            | Fuel Quantity (Units)                            |                                                                   |
| 18            | Departure Station - Alpha/Numeric Character #1   |                                                                   |
| 19            | Departure Station - Alpha/Numeric Character #2   |                                                                   |
| 20            | Departure Station - Alpha/Numeric Character #3   |                                                                   |
| 21            | Category of Landing                              |                                                                   |
| 22 thru n     | “Free Text” where n ≤ 220                        |                                                                   |



c-1 | Figure 5.3.34-1 Arrival Information Report (IATA Airport Code)

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.35 Diversion Report (IATA Airport Code) - Label QN

The Text field should consist of the 28-character fixed format section defied below followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                                               | Notes                                                             |
|---------------|-----------------------------------------------------------------|-------------------------------------------------------------------|
| 1             | Message [Originator]                                            | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1 |
| 2-3           | Sequence [Message Number]                                       |                                                                   |
| 4             | Number [Block Sequence Character]                               |                                                                   |
| 5-10          | Flight Identifier;                                              |                                                                   |
| 11            | Previous Destination Station - Alpha/Numeric Character #1       | c-1                                                               |
| 12            | Previous Destination Station - Alpha/Numeric Character #2       |                                                                   |
| 13            | Previous Destination Station - Alpha/Numeric Character #3       |                                                                   |
| 14            | New Destination Station - Alpha/Numeric Character #1            |                                                                   |
| 15            | New Destination Station - Alpha/Numeric Character #2            | c-1                                                               |
| 16            | New Destination Station - Alpha/Numeric Character #3            |                                                                   |
| 17            | Space (2/O)                                                     |                                                                   |
| 18            | ETA at Diversion Station Hours (Tens)                           |                                                                   |
| 19            | ETA at Diversion Station Hours (Units)                          | c-1                                                               |
| 20            | ETA at Diversion Station Minutes (Tens)                         |                                                                   |
| 21            | ETA at Diversion Station Minutes (Units)                        |                                                                   |
| 22            | Fuel Quantity (Thousands)                                       |                                                                   |
| 23            | Fuel Quantity (Hundreds)                                        | c-1                                                               |
| 24            | Fuel Quantity (Tens)                                            |                                                                   |
| 25            | Fuel Quantity (Units)                                           |                                                                   |
| 26            | Flight Segment Originating Station - Alpha/Numeric Character #1 |                                                                   |
| 27            | Flight Segment Originating Station - Alpha/Numeric Character #2 | c-1                                                               |
| 28            | Flight Segment Originating Station - Alpha/Numeric Character #3 |                                                                   |
| 29 thru n     | “Free Text” where n ≤ 220                                       |                                                                   |

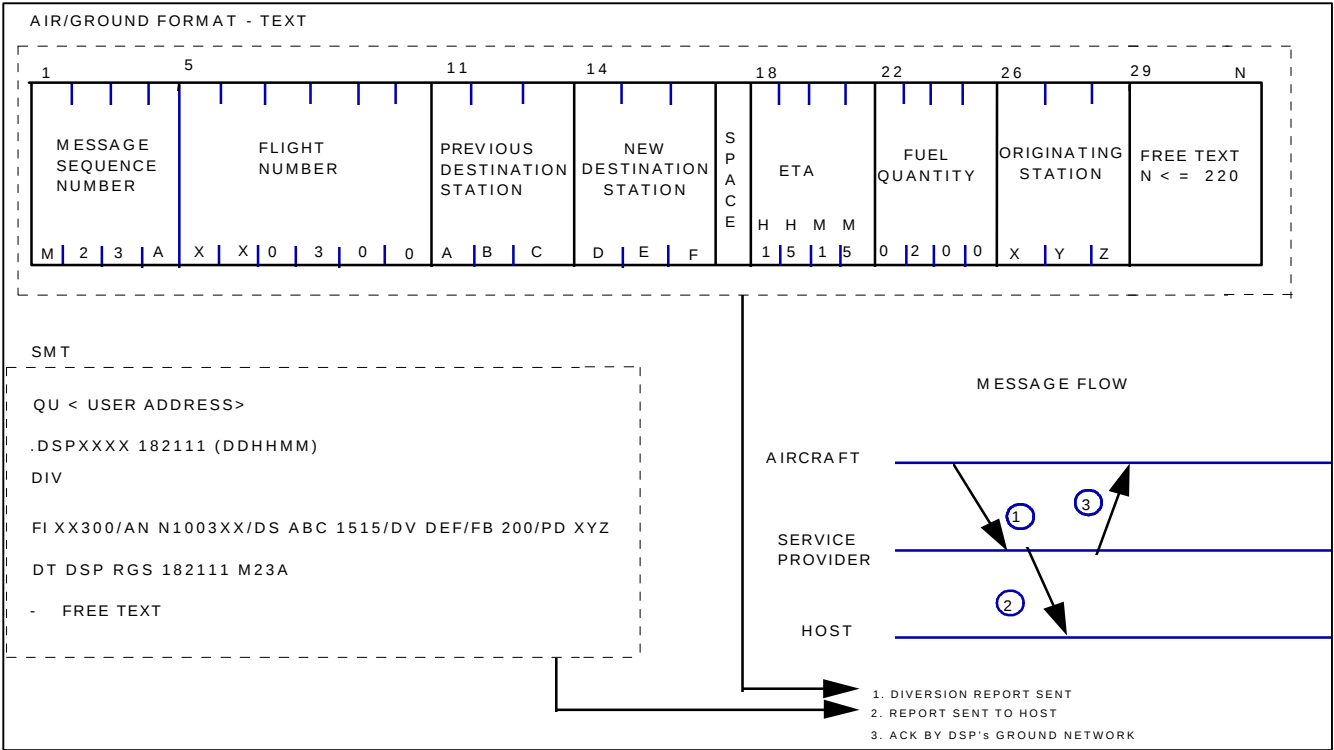


Figure 5.3.35-1 Diversion Report (IATA Airport Code)

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.36 Out Report (ICAO Airport Code) - Label QP**

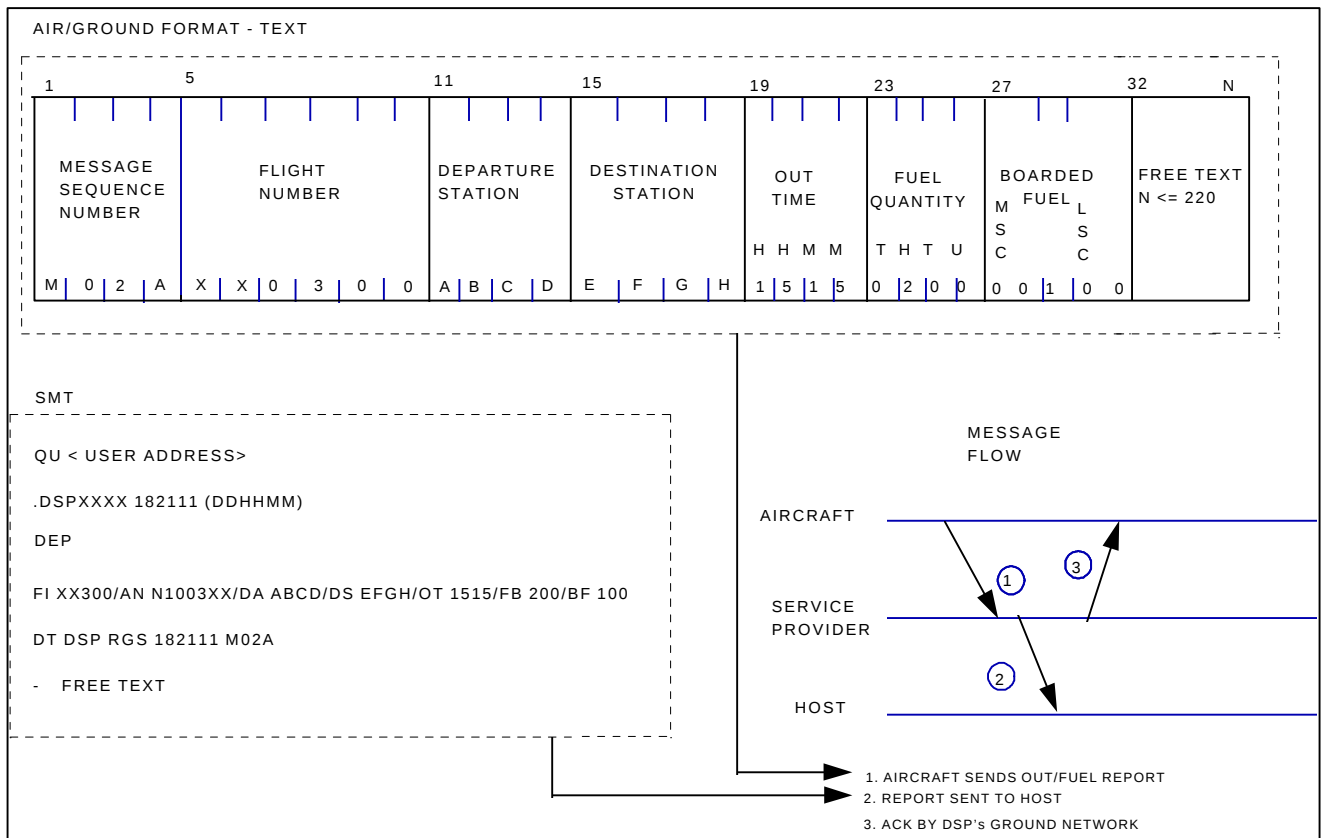
c-3 The Out report should be transmitted automatically following the declaration of the OUT event.

c-4 The Text field should consist of the 31-character fixed format section defined below, followed, when airline needs dictate, by "Free Text" out to the maximum system handling capacity of 220 characters. The "Free Text" will consist of information derived from manual inputs.

| <u>Character No.</u> | <u>Character Content</u>                       | <u>Notes</u>          |
|----------------------|------------------------------------------------|-----------------------|
| 1                    | Message [Originator]                           | Refer to Section      |
| 2-3                  | Sequence [Message Number]                      | 3.4 of ARINC          |
| 4                    | Number [Block Sequence Character]              | Specification 618     |
| 5-10                 | Flight Identifier;                             | See Section 5.2.1     |
| 11                   | Departure Station - Alpha/Numeric Character #1 | IATA 3-character      |
| 12                   | Departure Station - Alpha/Numeric Character #2 | codes may be used     |
| 13                   | Departure Station - Alpha/Numeric Character #3 | with a trailing space |
| c-3 14               | Departure Station - Alpha/Numeric Character #4 | to form 4-characters. |
| 15                   | Destination Station Alpha/Numeric Character #1 | IATA 3-character      |
| 16                   | Destination Station Alpha/Numeric Character #2 | codes may be used     |
| 17                   | Destination Station Alpha/Numeric Character #3 | with a trailing space |
| 18                   | Destination Station Alpha/Numeric Character #4 | to form 4-characters. |
| 19                   | OUT time hours (Tens)                          |                       |
| 20                   | OUT time hours (Units)                         |                       |
| 21                   | OUT time minutes (Tens)                        |                       |
| 22                   | OUT time minutes (Units)                       |                       |
| 23                   | Fuel Onboard Quantity (Thousands)              |                       |
| c-4 24               | Fuel Onboard Quantity (Hundred)                |                       |
| 25                   | Fuel Onboard Quantity (Tens)                   |                       |
| 26                   | Fuel Onboard Quantity (Units)                  |                       |
| 27                   | Boarded Fuel Character #1 (MSC)                |                       |
| 28                   | Boarded Fuel Character #2                      |                       |
| 29                   | Boarded Fuel Character #3                      |                       |
| 30                   | Boarded Fuel Character #4                      |                       |
| 31                   | Boarded Fuel Character #5 (LSC)                |                       |
| 32                   | "Free Text"                                    |                       |
| thru                 |                                                |                       |
| n                    | where $n \leq 220$                             |                       |

c-3 The complete text of the OUT Report should be transmitted, with those fixed format fields for which information is not required or not available filled with 'NUL's (0/0) or spaces. See Section 3.2.1 for the effect of these options. If the "Free Text" portion of the text field is not used, the control character <ETX> should terminate the field at position number 32. In all other cases, the "ETX" character should terminate the field following the last "Free Text" character.

c-4 Note: When IATA 3-character codes are used, the TEI line in the SMT format should omit the trailing space included in the downlink. This is done in order to adhere to the rules for TEI applications (defined in Appendix B).

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

c-3

**Figure 5.3.36-1 OUT Report (ICAO Airport Code)**

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.37 OFF Report (ICAO Airport Code) - Label QQ

The OFF Report should be transmitted automatically following the declaration of the OFF event.

The Text field should consist of the 22-character fixed format section defined below, followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                                | Notes                                                                                                                                                         |
|---------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | Message [Originator]                             | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1.                                                                                            |
| 2-3           | Sequence [Message Number]                        |                                                                                                                                                               |
| 4             | Number [Block Sequence Character]                |                                                                                                                                                               |
| 5-10          | Flight Identifier;                               |                                                                                                                                                               |
| 11            | Departure Station - Alpha/Numeric Character #1   | IATA 3-character codes may be used with a trailing space to form 4-characters. IATA 3-character codes may be used with a trailing space to form 4-characters. |
| 12            | Departure Station - Alpha/Numeric Character #2   |                                                                                                                                                               |
| 13            | Departure Station - Alpha/Numeric Character #3   |                                                                                                                                                               |
| 14            | Departure Station - Alpha/Numeric Character #4   |                                                                                                                                                               |
| 15            | Destination Station - Alpha/Numeric Character #1 |                                                                                                                                                               |
| 16            | Destination Station - Alpha/Numeric Character #2 |                                                                                                                                                               |
| 17            | Destination Station - Alpha/Numeric Character #3 |                                                                                                                                                               |
| 18            | Destination Station - Alpha/Numeric Character #4 |                                                                                                                                                               |
| 19            | OFF Time Hours (Tens                             |                                                                                                                                                               |
| 20            | OFF Time Hours (Units)                           |                                                                                                                                                               |
| 21            | OFF Time Minutes (Tens)                          |                                                                                                                                                               |
| 22            | OFF Time Minutes (Units)                         |                                                                                                                                                               |
| 23            | “Free Text”                                      |                                                                                                                                                               |
| thru          |                                                  |                                                                                                                                                               |
| n             | where n ≤ 220                                    |                                                                                                                                                               |

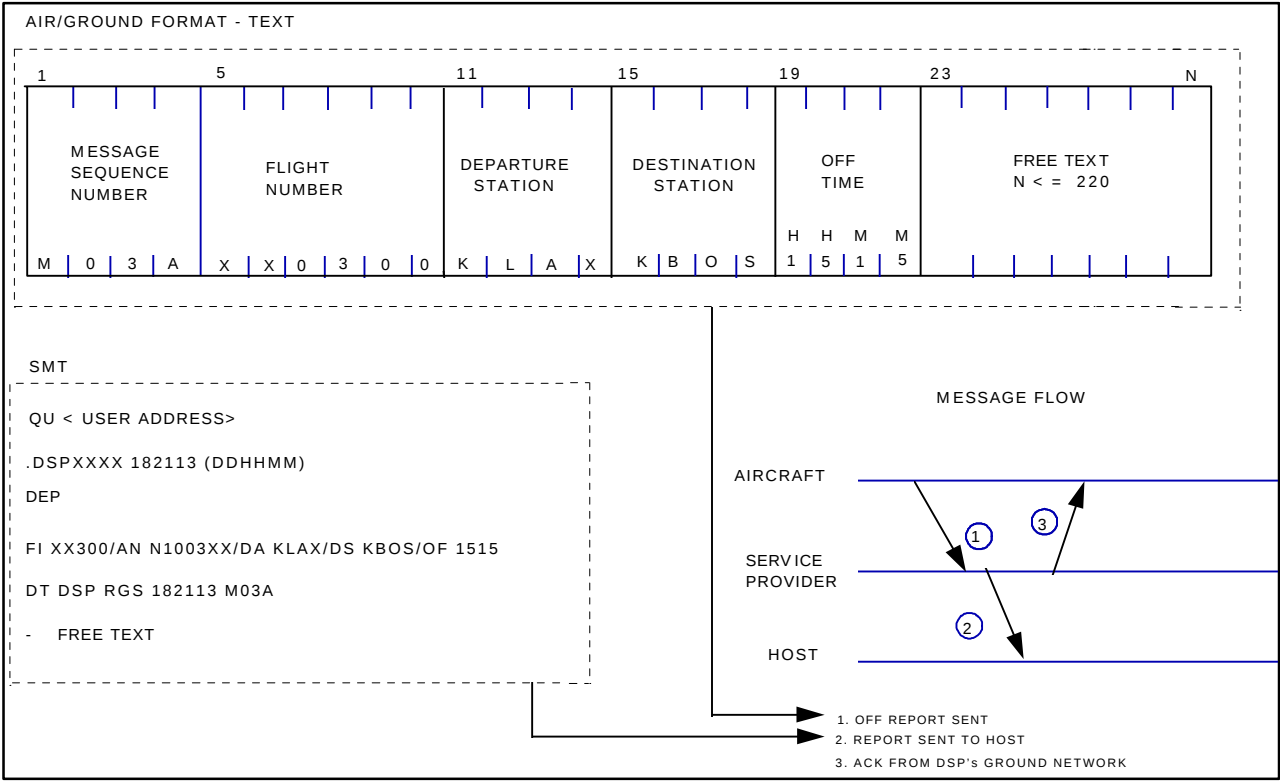


Figure 5.3.37-1 OFF Report (ICAO Airport Code)

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.38 ON Report (ICAO Airport Code) - Label QR

The Text field should consist of the 22-character fixed format section defined below, followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                              | Notes                                                                                                                                                         |
|---------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | Message [Originator]                           | Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1.                                                                                            |
| 2-3           | Sequence [Message Number]                      |                                                                                                                                                               |
| 4             | Number [Block Sequence Character]              |                                                                                                                                                               |
| 5-10          | Flight Identifier;                             |                                                                                                                                                               |
| 11            | Departure Station - Alpha/Numeric Character #1 | IATA 3-character codes may be used with a trailing space to form 4-characters. IATA 3-character codes may be used with a trailing space to form 4-characters. |
| 12            | Departure Station - Alpha/Numeric Character #2 |                                                                                                                                                               |
| 13            | Departure Station - Alpha/Numeric Character #3 |                                                                                                                                                               |
| 14            | Departure Station - Alpha/Numeric Character #4 |                                                                                                                                                               |
| 15            | Destination Station Alpha/Numeric Character #1 |                                                                                                                                                               |
| 16            | Destination Station Alpha/Numeric Character #2 |                                                                                                                                                               |
| 17            | Destination Station Alpha/Numeric Character #3 |                                                                                                                                                               |
| 18            | Destination Station Alpha/Numeric Character #4 |                                                                                                                                                               |
| 19            | ON Time Hours (Tens)                           |                                                                                                                                                               |
| 20            | ON Time Hours (Units)                          |                                                                                                                                                               |
| 21            | ON Time Minutes (Tens)                         |                                                                                                                                                               |
| 22            | ON Time Minutes (Units)                        |                                                                                                                                                               |
| 23            | “Free Text”                                    |                                                                                                                                                               |
| thru          |                                                |                                                                                                                                                               |
| n             | where $n \leq 220$                             |                                                                                                                                                               |

c-3

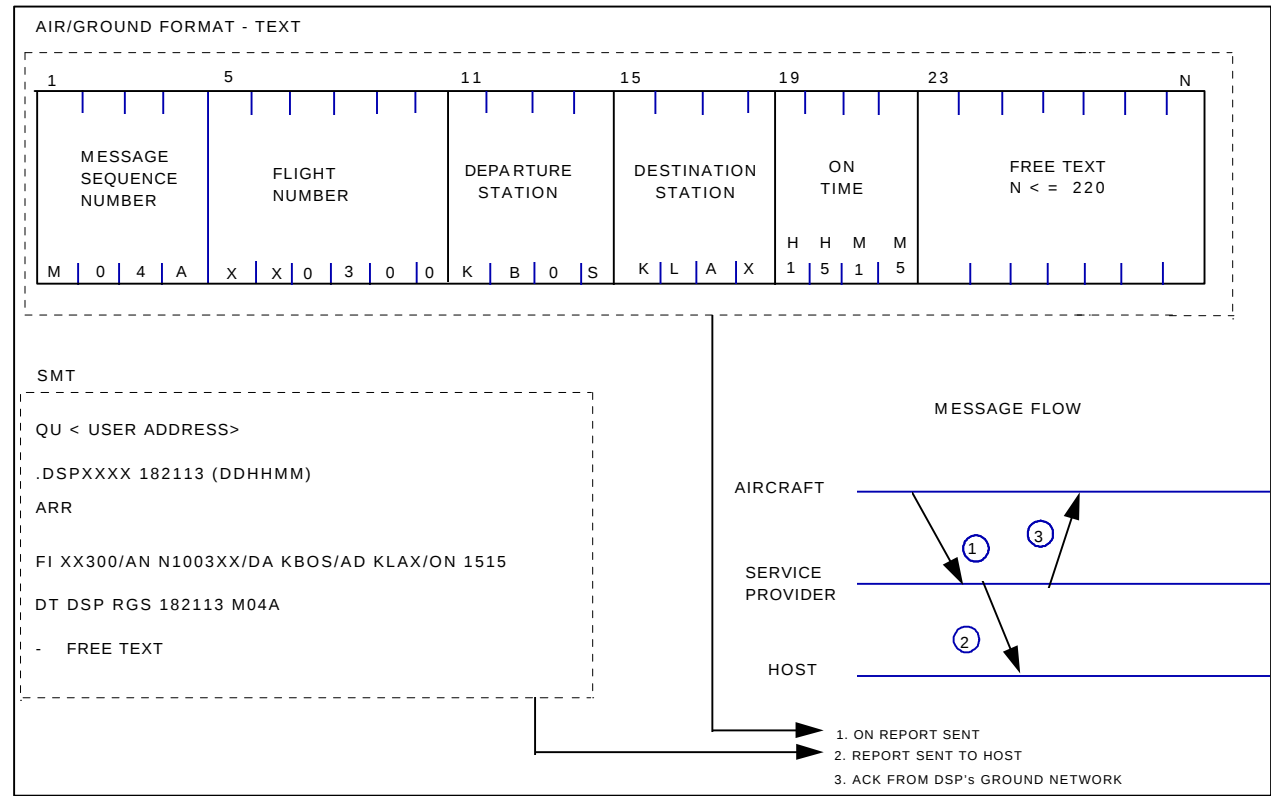


Figure 5.3.38-1 ON Report (ICAO Airport Code)

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.39 IN Report (ICAO Airport Code) - Label QS

The Text field should consist of the 28-character fixed format section followed, as necessary, by “Free Text” as already described.

| Character No. | Character Content                              | Notes                                                                                                                                                         |
|---------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | Message [Originator]                           | Refer to Section 3.4 of ARINC Specification 618<br>See Section 5.2.1                                                                                          |
| 2-3           | Sequence [Message Number]                      |                                                                                                                                                               |
| 4             | Number [Block Sequence Character]              |                                                                                                                                                               |
| 5-10          | Flight Identifier;                             | IATA 3-character codes may be used with a trailing space to form 4-characters. IATA 3-character codes may be used with a trailing space to form 4-characters. |
| 11            | Departure Station - Alpha/Numeric Character #1 |                                                                                                                                                               |
| 12            | Departure Station - Alpha/Numeric Character #2 |                                                                                                                                                               |
| 13            | Departure Station - Alpha/Numeric Character #3 |                                                                                                                                                               |
| 14            | Departure Station - Alpha/Numeric Character #4 |                                                                                                                                                               |
| 15            | Destination Station Alpha/Numeric Character #1 |                                                                                                                                                               |
| 16            | Destination Station Alpha/Numeric Character #2 |                                                                                                                                                               |
| 17            | Destination Station Alpha/Numeric Character #3 |                                                                                                                                                               |
| 18            | Destination Station Alpha/Numeric Character #4 |                                                                                                                                                               |
| 19            | IN Time Hours (Tens)                           |                                                                                                                                                               |
| 20            | IN Time Hours (Units)                          |                                                                                                                                                               |
| 21            | IN Time Minutes (Tens)                         |                                                                                                                                                               |
| 22            | IN Time Minutes (Units)                        |                                                                                                                                                               |
| 23            | Fuel Onboard Quantity (Thousands)              |                                                                                                                                                               |
| 24            | Fuel Onboard Quantity (Hundreds)               |                                                                                                                                                               |
| 25            | Fuel Onboard Quantity (Tens)                   |                                                                                                                                                               |
| 26            | Fuel Onboard Quantity (Units)                  |                                                                                                                                                               |
| 27            | Captain/First Officer Identifier               |                                                                                                                                                               |
| 28            | Landing Category                               |                                                                                                                                                               |
| 29            | “Free Text”                                    |                                                                                                                                                               |
| thru<br>n     | where n ≤ 220                                  |                                                                                                                                                               |

The message should be transmitted automatically following the declaration of the IN event. The “Captain/First Officer Identifier” character position should contain the numeric character “1” or “2” depending on the state of the “Captain/First Officer Identification “ input (“Captain” causing “1” to be transmitted and “First Officer” causing “2” to be transmitted). If, in an airborne sub-system in which “Captain/First Officer” information is to be manually entered, no entry is made, the control character ‘NUL’ (0/0) or spaces should be transmitted in this position. See Section 3.2.1 for the effect of these options.

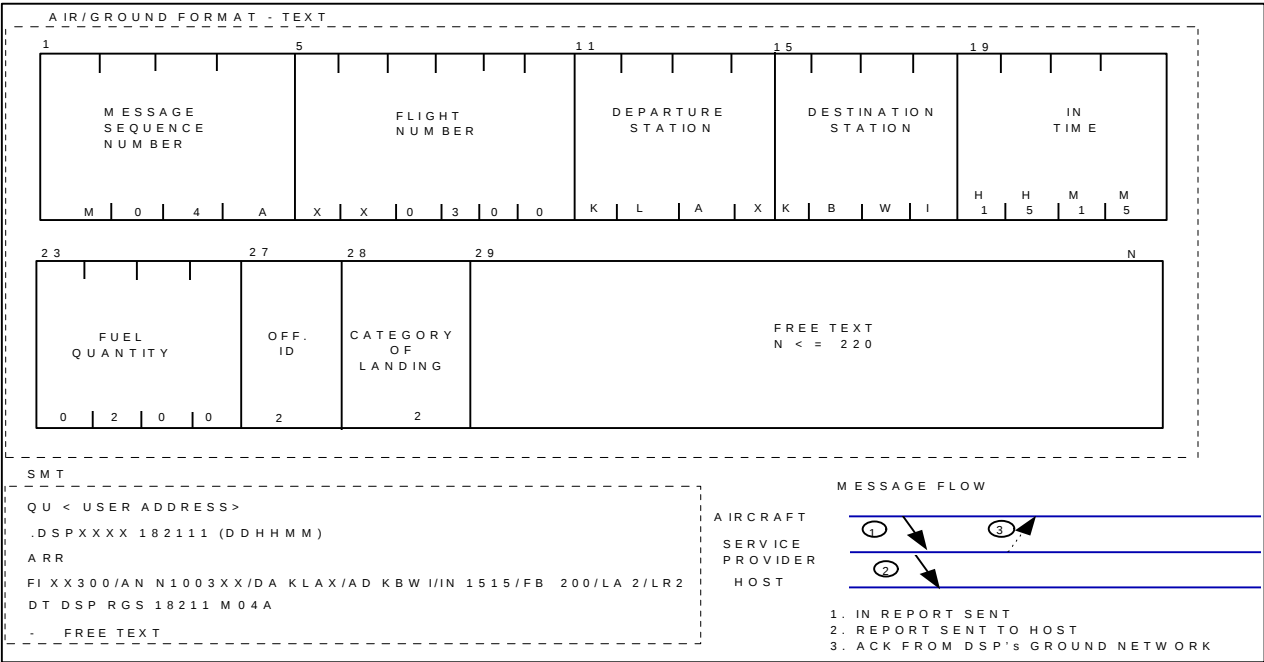


Figure 5.3.39-1 IN Report (ICAO Airport Code)

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

c-4

5.3.40 OUT/Return IN Report (ICAO Airport Code) - Label QT

OUT/Return IN reports may be transmitted as the result of aircraft returning to the gate after an OUT report. OUT/Return IN reports should contain the Label Characters QT. The Text field should consist of the 30-character fixed format section defined below, followed, as necessary, by "Free Text" as already described.

The format should be as follows:

| Character No. | Character Content                              | Notes                                                                                                                                                         |
|---------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | Message [Originator]                           | Refer to Section 3.4 of ARINC Specification 618.<br>See Section 5.2.1.                                                                                        |
| 2-3           | Sequence [Message Number]                      |                                                                                                                                                               |
| 4             | Number [Block Sequence Character]              |                                                                                                                                                               |
| 5-10          | Flight Identifier;                             |                                                                                                                                                               |
| 11            | Departure Station - Alpha/Numeric Character #1 | IATA 3-character codes may be used with a trailing space to form 4-characters. IATA 3-character codes may be used with a trailing space to form 4-characters. |
| 12            | Departure Station - Alpha/Numeric Character #2 |                                                                                                                                                               |
| 13            | Departure Station - Alpha/Numeric Character #3 |                                                                                                                                                               |
| 14            | Departure Station - Alpha/Numeric Character #4 |                                                                                                                                                               |
| 15            | Destination Station Alpha/Numeric Character #1 |                                                                                                                                                               |
| 16            | Destination Station Alpha/Numeric Character #2 |                                                                                                                                                               |
| 17            | Destination Station Alpha/Numeric Character #3 |                                                                                                                                                               |
| 18            | Destination Station Alpha/Numeric Character #4 |                                                                                                                                                               |
| 19            | Out Time Hours (Tens)                          |                                                                                                                                                               |
| 20            | Out Time Hours (Units)                         |                                                                                                                                                               |
| 21            | Out Time Minutes (Tens)                        |                                                                                                                                                               |
| 22            | Out Time Minutes (Units)                       |                                                                                                                                                               |
| 23            | Return IN Time Hours (Tens)                    |                                                                                                                                                               |
| 24            | Return IN Time Hours (Units)                   |                                                                                                                                                               |
| 25            | Return IN Time Minutes (Tens)                  |                                                                                                                                                               |
| 26            | Return IN Time Minutes (Units)                 |                                                                                                                                                               |
| 27            | Fuel Onboard Quantity (Thousands)              |                                                                                                                                                               |
| 28            | Fuel Onboard Quantity (Hundreds)               |                                                                                                                                                               |
| 29            | Fuel Onboard Quantity (Tens)                   |                                                                                                                                                               |
| 30            | Fuel Onboard Quantity (Units)                  |                                                                                                                                                               |
| 31            | "Free Text"                                    |                                                                                                                                                               |
| thru<br>n     | where n ≤ 220                                  |                                                                                                                                                               |

c-3

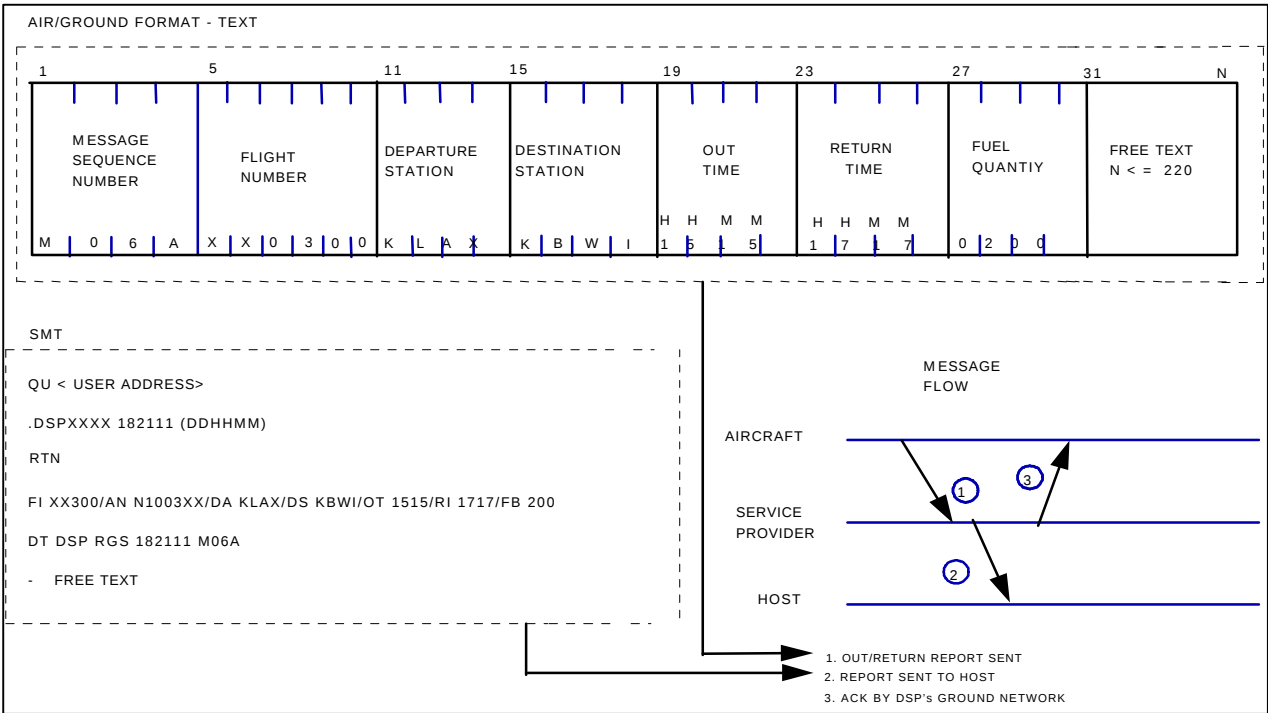


Figure 5.3.40-1 OUT/Return IN Report (ICAO Airport Code)

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

5.3.41 Unassigned - Label QU

This is a placeholder for a potential new section.

5.3.42 Unassigned - Label QV

This is a placeholder for a potential new section.

5.3.43 Unassigned - Label QW

This is a placeholder for a potential new section.

5.3.44 Unassigned - Label QY

This is a placeholder for a potential new section.

5.3.45 Unassigned - Label QZ

This is a placeholder for a potential new section.

5.3.46 Undelivered Uplink Report- Label HX

When the airborne system has acknowledged all the block(s) of an uplink message, and is subsequently unsuccessful in its attempts to deliver that message to an airborne subsystem, it may initiate an Undelivered Uplink Report message containing the Label characters HX, indicating that the acknowledged message was not delivered.

Note that the Label HX message is not a response to the DSP for the undelivered uplinked message, as are the Q5 and QX messages. It is queued and downlinked after the DSP has already assumed that the uplinked message was successfully delivered.

| <u>Character No.</u> | <u>Character Content</u>        | <u>Notes</u>                                                                                                                                        |
|----------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                    | Message [Originator]            | Refer to Section 3.4 of ARINC Specification<br>  618. See Section 5.2.1.<br>                                                                        |
| 2-3                  | Sequence [Message Number]       |                                                                                                                                                     |
| 4                    | Number [Block Sequence Char]    |                                                                                                                                                     |
| 5-10                 | Flight Identifier;              |                                                                                                                                                     |
| 11                   | Slash Character </>             | If additional (three, four or seven characters)<br>  addresses are entered, each address is separated<br>  is separated by a Space <_sp> character. |
| 12-m                 | Additional addresses (optional) |                                                                                                                                                     |
| m+1                  | Period character <,>            | If optional additional addressing is not utilized,<br>  the "Free Text" portion begins with character 11.                                           |
| (m+2) thru n         | "Free Text" where n≤220;        |                                                                                                                                                     |
| or                   |                                 |                                                                                                                                                     |
| 11 thru n            |                                 |                                                                                                                                                     |

The "Free Text" area may contain a user defined Reject message or Error code, and may contain any part or all of the text of the undelivered uplink message.

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

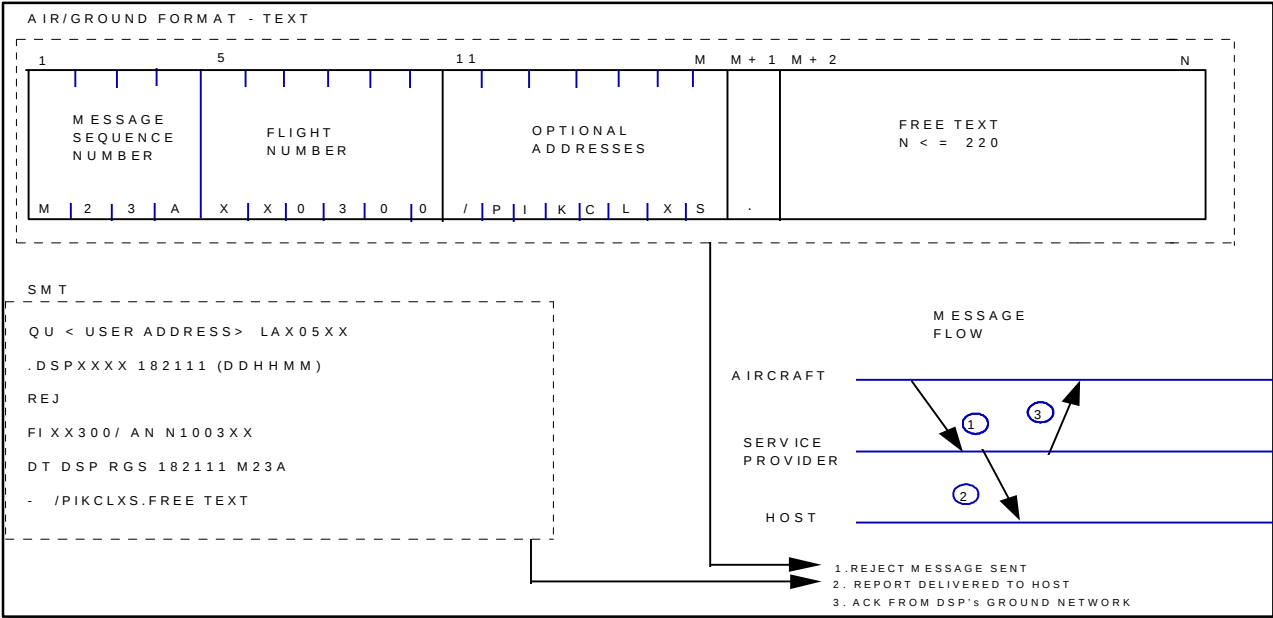


Figure 5.3.46-1 Undelivered Uplink Report - ARINC Implementation

c-4

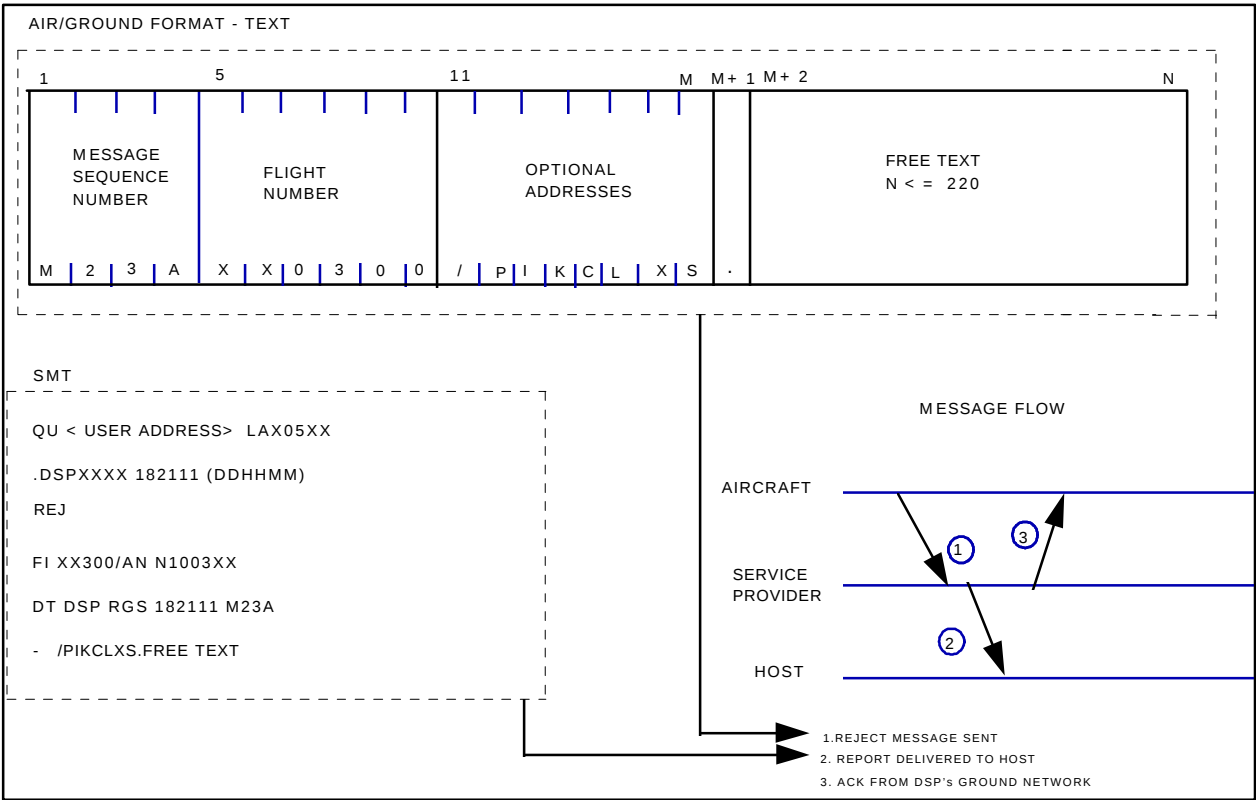


Figure 5.3.46-2 Undelivered Uplink Report - SITA Implementation

c-1

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**c-3 | 5.3.47 Aircrew Initiated Position Report, Alternate Format - Label 57

Alternate Aircrew Initiated Position Reports should contain Label characters 57. These reports may include weather information.

These reports may include weather information. The format should be as follows:

| Character No. | Character Content                                   | Notes                                                                       |
|---------------|-----------------------------------------------------|-----------------------------------------------------------------------------|
| c-1           | 1 Message [Originator]                              | Refer to Section 3.4 of<br>  ARINC Specification 618<br>  See Section 5.2.1 |
|               | 2-3 Sequence [Message Number]                       |                                                                             |
|               | 4 Number [Block Sequence Char]                      |                                                                             |
|               | 5-10 Flight Identifier;                             |                                                                             |
|               | 11 Current Position - Alpha Character #1            |                                                                             |
|               | 12 Current Position - Alpha Character #2            |                                                                             |
|               | 13 Current Position - Alpha Character #3            |                                                                             |
|               | 14 Current Position - Alpha Character #4            |                                                                             |
|               | 15 Current Position - Alpha Character #5            |                                                                             |
|               | 16 Time Hours (Tens)                                |                                                                             |
|               | 17 Time Hours (Units)                               |                                                                             |
|               | 18 Time Minutes (Tens)                              |                                                                             |
|               | 19 Time Minutes (Units)                             |                                                                             |
|               | 20 Flight Level - Numeric Character #1              |                                                                             |
|               | 21 Flight Level - Numeric Character #2              |                                                                             |
|               | 22 Flight Level - Numeric Character #3              |                                                                             |
|               | 23 Next Report Point - Alpha Character #1           |                                                                             |
|               | 24 Next Report Point - Alpha Character #2           |                                                                             |
|               | 25 Next Report Point - Alpha Character #3           |                                                                             |
|               | 26 Next Report Point - Alpha Character #4           |                                                                             |
|               | 27 Next Report Point - Alpha Character #5           |                                                                             |
|               | 28 Time Over Hours (Tens)                           |                                                                             |
|               | 29 Time Over Hours (Units)                          |                                                                             |
|               | 30 Time Over Minutes (Tens)                         |                                                                             |
|               | 31 Time Over Minutes (Units)                        |                                                                             |
|               | 32 Fuel on Board - Numeric Character #1             |                                                                             |
|               | 33 Fuel on Board - Numeric Character #2             |                                                                             |
|               | 34 Fuel on Board - Numeric Character #3             |                                                                             |
|               | 35 Fuel on Board - Numeric Character #4             |                                                                             |
|               | 36 Static Air Temp Sign (see Note 2)                |                                                                             |
|               | 37 Static Air Temp (Units) degrees                  |                                                                             |
|               | 38 Static Air Temp (Units) degrees                  |                                                                             |
|               | 39 Wind Direction (Hundreds) degrees                |                                                                             |
|               | 40 Wind Direction (Tens) degrees                    |                                                                             |
|               | 41 Wind Direction (Units) degrees                   |                                                                             |
|               | 42 Wind Speed (Hundreds) knots                      |                                                                             |
|               | 43 Wind Speed (Tens) knots                          |                                                                             |
|               | 44 Wind Speed (Units) knots                         |                                                                             |
|               | 45 Sky Condition - Alpha/Numeric Character #1/Space |                                                                             |
|               | 46 Sky Condition - Alpha/Numeric Character #2/Space |                                                                             |
|               | 47 Sky Condition - Alpha/Numeric Character #3/Space |                                                                             |
|               | 48 Sky Condition - Alpha/Numeric Character #4/Space |                                                                             |
|               | 49 Sky Condition - Alpha/Numeric Character #5/Space |                                                                             |
|               | 50 Sky Condition - Alpha/Numeric Character #6/Space |                                                                             |
|               | 51 Sky Condition - Alpha/Numeric Character #7/Space |                                                                             |
|               | 52 Sky Condition - Alpha/Numeric Character #8/Space |                                                                             |
|               | 53 Turbulence - Alpha/Numeric Character #1/Space    |                                                                             |
|               | 54 Turbulence - Alpha/Numeric Character #2/Space    |                                                                             |
|               | 55 Turbulence - Alpha/Numeric Character #3/Space    |                                                                             |
|               | 56 Turbulence - Alpha/Numeric Character #4/Space    |                                                                             |
|               | 57 Turbulence - Alpha/Numeric Character #5/Space    |                                                                             |
|               | 58 Turbulence - Alpha/Numeric Character #6/Space    |                                                                             |
|               | 59 Turbulence - Alpha/Numeric Character #7/Space    |                                                                             |
|               | 60 Turbulence - Alpha/Numeric Character #8/Space    |                                                                             |
|               | 61 Cruising Speed - Alpha Character "M"             |                                                                             |
|               | 62 Cruising Speed - Numeric Character (MSC)         |                                                                             |

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

| Character No. | Character Content                        | Notes |
|---------------|------------------------------------------|-------|
| 63            | Cruising Speed - Decimal Point <,>       |       |
| 64            | Cruising Speed - Numeric Character       |       |
| 65            | Cruising Speed - Numeric Character (LSC) |       |
| 66 thru n     | "Free Text" where n ≤ 220                |       |

Notes:

- [1] Fixed fields for which there is no data input should be filled with "Null" characters <0/0>.
- [2] The characters used for indicating whether the sign of the static air temperature input is positive or negative should be selected from those characters which can transit ground communications systems and be handled by users' data processing systems. Users should advise their avionics suppliers what the crew input for sign will be and into what characters they should be translated for the downlink.

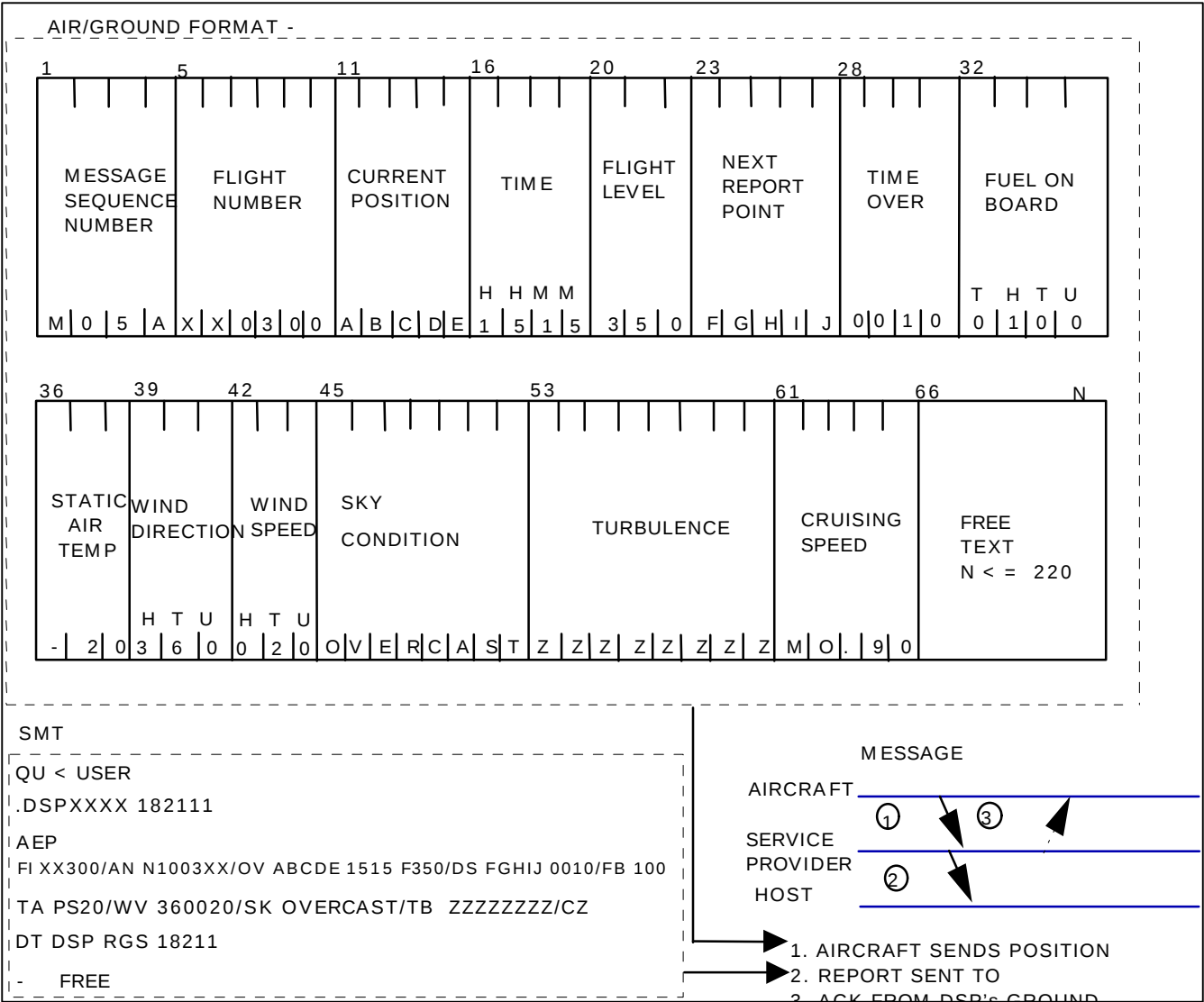


Figure 5.3.47-1 Alternate Aircrew Initiated Position Report

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.48 VHF Network Statistics Report - Label S1**

When so equipped, the aircraft should accumulate data concerning the performance of the ACARS VHF network. A Network Statistics Report containing this data should be sent via a Label S1 downlink message. Network Statistics Report downlink messages will be delivered to the user with the SMI of NSR.

The Network Statistics Report downlink message can be generated immediately upon request (via uplink) or at the occurrence of the "IN" event. See Section 4.3.23 for the definition of the uplink request message.

There are two types of Network Statistics Reports defined in this specification: Summary and Detailed.

The Summary report message should be sent per user requirements or in response to a Label S1 uplink request for report SA or SC. Any data which is unavailable will be blank filled. The Summary report should be assembled according to the formats defined in Table 5.3.49-1.

The Detailed report message should be sent per user requirements or in response to a Label S1 uplink request for report DA or DC. Any data which is unavailable will be blank filled. The Detailed report should be assembled according to the format defined in Table 5.3.49-2.

**Table 5.3.48-1 Version 1 - VHF Network Statistics Report, Summary**

| Size     | Format  | Description                                                                | Example   | Notes         |
|----------|---------|----------------------------------------------------------------------------|-----------|---------------|
| 10       |         | Standard Message Header                                                    |           |               |
| Variable | XXXXXXX | TTY address from uplink                                                    | /CIDRICR. | optional, 4,5 |
| 1        | 1       | Version identifier                                                         | 1         |               |
| 2        | XX      | summary report identifier                                                  | SA        | 3             |
| 6        | AAXNNN  | Flight identifier                                                          | AC9999    |               |
| 4        | XXXX    | Departure station                                                          | YYZb      | 1             |
| 4        | XXXX    | Destination station                                                        | LAXb      | 1             |
| 4        | HHMM    | OUT time                                                                   | 1220      |               |
| 4        | HHMM    | OFF time                                                                   | 1240      |               |
| 4        | HHMM    | ON time                                                                    | 1840      |               |
| 4        | HHMM    | IN time                                                                    | 1855      |               |
| 1        | /       | slash (Delimiter)                                                          | /         |               |
| 3        | NNN     | Downlink messages during OUT                                               | 033       | 2             |
| 3        | NNN     | Downlink blocks during OUT                                                 | 041       | 2             |
| 3        | NNN     | Uplink messages during OUT                                                 | 009       | 2             |
| 3        | NNN     | Uplink blocks during OUT                                                   | 038       | 2             |
| 3        | NNN     | Blocks ACKed on 1st transmission                                           | 037       | 2             |
| 2        | NN      | Blocks ACKed on 2nd transmission                                           | 03        | 2             |
| 2        | NN      | Blocks ACKed on 3rd transmission                                           | 01        | 2             |
| 2        | NN      | Blocks ACKed on 4th or later transmission                                  | 00        | 2             |
| 1        | N       | NAKs received to downlink blocks while OUT                                 | 0         | 2             |
| 1        | N       | Times retransmit counter (VAC1) limit reached due to no response while OUT | 0         | 2             |
| 1        | N       | Times downlink ACARS multiblock message timer (VAT10) expired while OUT    | 0         | 2             |
| 2        | NN      | Duplicate uplink blocks received while OUT                                 | 0         | 2             |
| 2        | NN      | NAKs transmitted in response to uplink blocks containing errors while OUT  | 01        | 2             |
| 1        | N       | Times uplink message assembly timer (VAT4) expired while OUT               | 00        | 2             |
| 1        | /       | slash (Delimiter)                                                          | /         |               |
| 3        | NNN     | Downlink messages during OFF                                               | 033       | 2             |
| 3        | NNN     | Downlink blocks during OFF                                                 | 041       | 2             |
| 3        | NNN     | Uplink messages during OFF                                                 | 009       | 2             |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****Table 5.3.48-1 Version 1 - VHF Network Statistics Report, Summary (cont'd)**

| Size    | Format | Description                                                                | Example | Notes |     |
|---------|--------|----------------------------------------------------------------------------|---------|-------|-----|
| 3       | NNN    | Uplink blocks during OFF                                                   | 038     | 2     |     |
| 3       | NNN    | Blocks ACKed on 1st transmission                                           | 037     | 2     |     |
| 2       | NN     | Blocks ACKed on 2nd transmission                                           | 03      | 2     | c-2 |
| 2       | NN     | Blocks ACKed on 3rd transmission                                           | 01      | 2     |     |
| 2       | NN     | Blocks ACKed on 4th or later transmission                                  | 00      | 2     |     |
| 1       | N      | NAKs received to downlink blocks while OFF                                 | 0       | 2     |     |
| 1       | N      | Times retransmit counter (VAC1) limit reached due to no response while OFF | 0       | 2     |     |
| 1       | N      | Times downlink ACARS multiblock message timer (VAT10) expired while OFF    | 0       | 2     |     |
| 2       | NN     | Duplicate uplink blocks received while OFF                                 | 00      | 2     | c-4 |
| 2       | NN     | NAKs transmitted in response to uplink blocks containing errors while OFF  | 01      | 2     |     |
| 1       | N      | Times uplink message assembly timer (VAT4) expired while OFF               | 00      | 2     |     |
| 1       | /      | slash (Delimiter)                                                          | /       |       |     |
| 3       | NNN    | Downlink messages during ON                                                | 033     | 2     |     |
| 3       | NNN    | Downlink blocks during ON                                                  | 041     | 2     |     |
| 3       | NNN    | Uplink messages during ON                                                  | 009     | 2     |     |
| 3       | NNN    | Uplink blocks during ON                                                    | 038     | 2     | c-2 |
| 3       | NNN    | Blocks ACKed on 1st transmission                                           | 037     | 2     |     |
| 2       | NN     | Blocks ACKed on 2nd transmission                                           | 03      | 2     |     |
| 2       | NN     | Blocks ACKed on 3rd transmission                                           | 01      | 2     |     |
| 2       | NN     | Blocks ACKed on 4th or later transmission                                  | 00      | 2     |     |
| 1       | N      | NAKs received to downlink blocks while ON                                  | 0       | 2     |     |
| 1       | N      | Times retransmit counter (VAC1) limit reached due to no response while ON  | 0       | 2     |     |
| 1       | N      | Times downlink ACARS multiblock message timer (VAT10) expired while ON     | 0       | 2     | c-4 |
| 2       | NN     | Duplicate uplink blocks received while on                                  | 00      | 2     |     |
| 2       | NN     | NAKs transmitted in response to uplink blocks containing errors while ON   | 01      | 2     |     |
| 1       | N      | Times uplink message assembly timer (VAT4) expired while ON                | 00      | 2     |     |
| 1       | /      | slash (Delimiter)                                                          | /       |       |     |
| 3       | NNN    | Downlink messages during IN                                                | 033     | 2     |     |
| 3       | NNN    | Downlink blocks during IN                                                  | 041     | 2     |     |
| 3       | NNN    | Uplink messages during IN                                                  | 009     | 2     |     |
| 3       | NNN    | Uplink blocks during IN                                                    | 038     | 2     |     |
| 3       | NNN    | Blocks ACKed on 1st transmission                                           | 037     | 2     | c-2 |
| 2       | NN     | Blocks ACKed on 2nd transmission                                           | 03      | 2     |     |
| 2       | NN     | Blocks ACKed on 3rd transmission                                           | 01      | 2     |     |
| 2       | NN     | Blocks ACKed on 4th or later transmission                                  | 00      | 2     |     |
| 1       | N      | NAKs received to downlink blocks while IN                                  | 0       | 2     |     |
| 1       | N      | Times retransmit counter (VAC1) limit reached due to no response while IN  | 0       | 2     |     |
| 1       | N      | Times downlink multiblock message timer (VAT10) expired while IN           | 0       | 2     |     |
| 2       | NN     | Duplicate uplink blocks received while IN                                  | 00      | 2     | c-4 |
| 2       | NN     | NAKs transmitted in response to uplink blocks containing errors while IN   | 01      | 2     |     |
| 1       | N      | Times uplink message assembly timer (VAT4) expired while IN                | 00      | 2     | c-2 |
| total = |        |                                                                            |         |       |     |
| 172     |        |                                                                            |         |       |     |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

5.3.48 VHF Network Statistics Report - Label S1 (cont'd)

**Table 5.3.48-1 Version 1 - VHF Network Statistics Report, Summary (cont'd)**

Notes:

- [1] If IATA (3 character) station IDs are used, provide a blank in the trailing character.
- [2] If any count exceeds the maximum display value, hold the maximum value.
- [3] Report types:
  - SA - Enable generation of summary report to be downlinked subsequent to the IN event.
  - SC - Downlink the summary statistics report with current data.
- [4] If multiple addresses are specified (to a maximum of 7), they will be separated by a space and terminated by a period.
- [5] See Section 3.8

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

The format of the VHF Network Statistics Report is:

**Table 5.3.48-2 Version 1 VHF Network Statistics Report, Detailed**

| Size           | Format     | Description                                                               | Example   | Notes           |     |
|----------------|------------|---------------------------------------------------------------------------|-----------|-----------------|-----|
| 10<br>Variable | /XXXXXXXX. | Standard Header<br>TTY address from uplink                                | /CIDRICR. | optional<br>5,6 |     |
| 1              | 1          | Version identifier                                                        | 1         |                 |     |
| 2              | XX         | Detail report identifier                                                  | DA        | 3               |     |
| 6              | AAXNNN     | Flight identifier                                                         | AC9999    |                 |     |
| 4              | XXXX       | Departure station                                                         | YYZb      | 1               |     |
| 4              | XXXX       | Destination station                                                       | LAXb      | 1               |     |
| 4              | HHMM       | OUT time                                                                  | 1220      |                 |     |
| 4              | HHMM       | OFF time                                                                  | 1240      |                 |     |
| 4              | HHMM       | ON time                                                                   | 1848      |                 |     |
| 4              | HHMM       | IN time                                                                   | 1855      |                 |     |
| 2              | NN         | Total number of reports available                                         | 04        |                 |     |
| 1              | /          | slash (Delimiter)                                                         |           | 4               |     |
| 2              | NN         | Report number                                                             | 01        | 4               | c-2 |
| 4              | NNNN       | Frequency                                                                 | 3147      | 4               |     |
| 1              | X          | Logical channel ID (or 2)                                                 | A         | 4               |     |
| 1              | N          | OOOI state                                                                | 1         | 4, 8            |     |
| 4              | HHMM       | UTC contact established                                                   | 1544      | 4               |     |
| 4              | HHMM       | UTC contact lost                                                          | 1622      | 4               |     |
| 1              | A          | Channel change reason                                                     | S         | 4, 7            |     |
| 2              | NN         | Number of downlink messages transmitted                                   | 21        | 2, 4            |     |
| 3              | NNN        | Number of downlink blocks transmitted                                     | 034       | 2, 4            | c-4 |
| 2              | NN         | Number of uplink messages received                                        | 11        | 2, 4            | c-2 |
| 3              | NNN        | Number of uplink blocks received                                          | 057       | 2, 4            | c-4 |
| 3              | NNN        | Blocks ACKed on 1st transmission                                          | 037       | 2, 4            |     |
| 2              | NN         | Blocks ACKed on 2nd transmission                                          | 03        | 2, 4            |     |
| 2              | NN         | Blocks ACKed on 3rd transmission                                          | 01        | 2, 4            |     |
| 2              | NN         | Blocks ACKed on 4th or later transmission                                 | 00        | 2, 4            |     |
| 1              | N          | Number of NAKs received to downlink blocks                                | 0         | 2, 4            | c-2 |
| 1              | N          | Times retransmit counter (VAC1) limit reached due to no response          | 0         | 2, 4            |     |
| 1              | N          | Times downlink multiblock message timer (VAT10) expired                   | 0         | 2, 4            |     |
| 2              | NN         | Duplicate uplink blocks received                                          | 00        | 2, 4            | c-4 |
| 2              | NN         | Number of NAKs transmitted in response to uplink blocks containing errors | 01        | 2, 4            |     |
| 1              | N          | Times uplink message assembly timer (VAT4)                                | 00        | 2,4             | c-2 |
| 1              | /          | slash (Delimiter)                                                         | /         |                 |     |

Note:

Multiple detailed reports are prepared and concatenated as required to fully document the flight leg. Each report is formatted identically with the example above, beginning with the Report Number field and terminating with the slash </> delimiter. No delimiter is used in the final report.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

5.3.48 VHF Network Statistics Report Label S1 (cont'd)

**Table 5.3.48-2 VHF Network Statistics Report, Detailed (cont'd)**

Notes:

- [1] If IATA (3 character) station IDs are used, provide a blank in the trailing character.
- [2] If any count exceeds the maximum display value, hold the maximum value.
- [3] Report types:
- SA - Enable generation of Summary report to be downlinked subsequent to the IN event.
  - SC - Downlink the Summary report with current data now.
  - DA - Downlink all accumulated Detailed Statistics records subsequent to the IN event.
  - DC - Downlink a Detailed Statistics report with current data now.
- [4] These fields will be repeated as needed to fill downlink message.
- [5] If multiple addresses are specified (to a maximum of 7), they will be separated by a space and terminated by a period.
- [6] See Section 3.8
- [7] Coding:
- A = Timer expiration
  - B = Misc./Channel Change Not Applicable
  - C = Signal quality below threshold
  - D = Category A to Category B preference
  - E = Return to Data mode
  - F = Number of retries exceeded
  - G = OOOI state change (no change in channel or frequency)
  - H = Frequency change by Autotune
  - I = Frequency change by manual command
- [8] OOOI State:
- Coding of the OOOI state should be:
- |     |   |
|-----|---|
| Out | 1 |
| Off | 2 |
| On  | 3 |
| In  | 4 |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.49 VHF Network Performance Report - Label S2**

The ACARS MU will collect data relative to RF activity and associated attributes, particularly BCS failures. The philosophy and collection mechanisms are described in Appendix F to this Specification. The state diagram for collecting data is illustrated in Figure 3-1 of Attachment 3. ARINC Specification 618 specifies details of data to be collected.

VHF Network Performance messages may be sent automatically or upon request. Refer to Section 4 for the definition of the Request message. Automatic message generation can be based on a label S2 request message from the ground. The request may direct the MU:

- a. to provide data gathered from the time it receives the S2 request (Ts) up to a specified period of time (Tf). Send the S2 report at Tf.
- b. to provide data every X minutes from the time it receives the S2 request (Ts) up to a specified period of time (Tf). This periodic transmission may be enable or disable by the receipt of the S2 label with adequate field's values.

This approach implies that a common implementation of Channel Utilization is to be adopted.

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**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.49 VHF Network Performance Report - Label S2 (cont'd)****Table 5.3.49 VHF Network Performance Report - Label S2**

| DATA FIELD                                                                        | Variable  | SIZE | RANGE                                                                | NOTE                                                                                  |
|-----------------------------------------------------------------------------------|-----------|------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Standard Header                                                                   |           | 10   |                                                                      |                                                                                       |
| Frequency                                                                         | F         | 4    | 18.00 to 3697                                                        | 118.00 - 136.97 MHz                                                                   |
| Latitude                                                                          | l         | 5    | DDMM (N/S)                                                           | 1                                                                                     |
| Longitude                                                                         | L         | 6    | DDDMM (E/W)                                                          | 1                                                                                     |
| Altitude                                                                          | H         | 4    | FXXX                                                                 | Flight Level 2                                                                        |
| Comm Conditions                                                                   | CC        | 1    | 1 - Normal<br>2 - Voice<br>3 - No Comm<br>4 - Autotune<br>5 - Others | The CC field is set to 1 whenever the S2 label transmission is triggered by T1 or T2. |
| Service Provider Identification                                                   | DSP       | 2    | <u>XS</u> , <u>XA</u> , <u>XC</u> etc.                               | 3                                                                                     |
| UTC start time of data collection                                                 | Ts        | 6    | HHMMSS                                                               |                                                                                       |
| UTC stop time of data collection                                                  | Tf        | 6    | HHMMSS                                                               |                                                                                       |
| Cumulative amount of time the MU detects the channel is busy (in percent)         | Tcu       | 2    | 00-99                                                                | See ARINC Spec 618                                                                    |
| Cumulative block delivery delay                                                   | Tbdd (ms) | 6    | 000000-999999                                                        | See of ARINC Spec 618                                                                 |
| Cumulative MAC delay per block sent.                                              | Tmac (ms) | 5    | 00000-99999                                                          | See of ARINC Spec 618<br>100 seconds max recording                                    |
| Number of block buffered at Tf                                                    | B1        | 2    | 00-99                                                                | Number of block enqueued in the MU to be transmitted over the RF.                     |
| Number of first downlink block transmissions that require an ACK                  | D1        | 2    | 00-99                                                                |                                                                                       |
| Number of re-transmitted downlink blocks that require an ACK                      | D2        | 3    | 000-999                                                              |                                                                                       |
| Number of downlink blocks received from surrounding aircraft                      | D3        | 3    | 000-999                                                              |                                                                                       |
| Number of incomplete downlink blocks received from surrounding aircraft           | ID3       | 3    | 000-999                                                              |                                                                                       |
| Number of downlink blocks received with bad BCS from surrounding aircraft         | BD3       | 3    | 000-999                                                              |                                                                                       |
| Number of acknowledgments received (General Response or imbedded ACK)             | U1        | 2    | 00-99                                                                |                                                                                       |
| Number of first uplink transmission addressed to the aircraft that require an ACK | U2        | 2    | 00-99                                                                |                                                                                       |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

| DATA FIELD                                                                      | Variable | SIZE | RANGE   | NOTE |
|---------------------------------------------------------------------------------|----------|------|---------|------|
| Number of uplink re-transmissions addressed to the aircraft that require an ACK | U3       | 3    | 000-999 |      |
| Number of uplinks with bad BCS addressed to the aircraft                        | BU3      | 2    | 00-99   |      |
| Number of incomplete uplinks addressed to the aircraft.                         | IU3      | 2    | 00-99   |      |
| Number of uplinks addressed to other aircraft                                   | U4       | 3    | 000-999 |      |
| Number of uplinks with bad BCS addressed to other aircraft                      | BU4      | 3    | 000-999 |      |
| Number of incomplete uplinks addressed to other aircraft                        | IU4      | 3    | 000-999 |      |
| Number of distinct Squitters received (unique RGSSs)                            | SQ1      | 2    | 00-99   |      |
| Total number of Squitters received                                              | SQ2      | 2    | 00-99   |      |
| Number of Squitters received with bad BCS                                       | BSQ2     | 2    | 00-99   |      |
| Number of incomplete Squitters received                                         | ISQ2     | 2    | 00-99   |      |
| Number of Hand-offs in Category-B                                               | CTB1     | 2    | 00-99   |      |
| Number of distinct logical channels active in the SAA table                     | CTB2     | 2    | 00-30   |      |

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Notes:

- [1] Lat/Long position is the position at the end of the sample.
- [2] Altitude is the pressure altitude at the end of the sample
- [3] Refer to Section 3.2.2-3 for DSP assignments. Fill with spaces if DSP is not known. Characters are derived from the most recent uplink Squitter.

**5.3.50 LRU Configuration Report - Label S3**

This report may be automatically sent when any of the following events occur:

- a. In response to an S3 request
- b. software or database loaded
- c. MU is installed in a different aircraft

An ACARS peripheral such as an FMC or SDU can use the LRU configuration report. In this case the MFI S3 is used to allow the service provider to recognize the LRU configuration report. The sublabel/SMI of the downlink identifies which LRU created the report.

The LRU configuration report can hold up to 11 part numbers. The part numbers are divided into two categories: hardware part numbers and software parts. The 11 part number fields can be distributed between the two categories however best suits the vendor. A colon <:> separates the hardware part number fields from the software part number fields. Each part number field may hold up to 15 characters. Part numbers should not contain commas or colon <:> characters. In the following example three part number fields are allocated for hardware and the remainder for software. Unused part number fields are not included in the report, see second example.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.50 LRU Configuration Report - Label S3 (cont'd)**

Example 1:

**M01ARI9999/PAESSCR.01.N123GS963-0758-001,722-1234-501A,723-5678-501X:  
998-2141-511A,998-2142-511A,998-2145-509,998-3102-503,998-2141-511A,998-2145-509,998-3102 03,998-3102-503**

Example 2:

**M01ARI999901.N123GS963-0758-001: 998-2141-511A,998-2142-511A,998-2145-509,998-3102-503**

If the Label S3, LRU configuration report request uplink contains an address then the address is copied to the optional address field of the downlink report. When there is no address in the report then the address field along with the slash </> and period <.> delimiters are omitted.

**Table 5.3.50-1 Example LRU Configuration Report**

| Character Number | Max Field Size | Max Field Size | Content                                        | Example       |
|------------------|----------------|----------------|------------------------------------------------|---------------|
| 1-10             | 10             | 10             | Standard message header (see ARINC 618)        |               |
|                  | 9              | 9              | optional address field (note 5)                | /PAESSCR.     |
|                  | 2              | 2              | Version number                                 | 01            |
|                  | 7              | 7              | Aircraft registration number                   | .N123GS       |
|                  | 15             | Up to 15       | Hardware part number (note 1)                  | 963-0758-001  |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional second hardware part number (note 2)  | 722-1234-501A |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional third hardware part number (note 2)   | 722-5678-501X |
|                  | 1              | 1              | Carriage return line feed (note 4)             | colon <:>     |
|                  | 15             | Up to 15       | software part number                           | 998-2141-511A |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional second software part number (note 2)  | 998-2142-511A |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional third software part number (note 2)   | 998-2145-509  |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional forth software part number (note 2)   | 998-3102-503  |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional fifth software part number (note 2)   | 998-2141-511A |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional sixth software part number (note 2)   | 998-2145-509  |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional seventh software part number (note 2) | 998-3102-503  |
|                  | 1              | 1              | Comma (note 3)                                 | ,             |
|                  | 15             | Up to 15       | Optional eighth software part number (note 2)  | 998-3102-503  |
|                  |                |                |                                                |               |
|                  |                |                |                                                |               |

Notes:

1. Included when possible. Some avionics software is not cognizant of the hardware part number.
2. Optional field, zero length when not use.
3. Comma delimiter only included when following field contains data. Carriage return line feed replaces comma after last occupied data field.
4. Colon (:) separates hardware and software part number fields
5. Multiple addresses may be provided, separated by blanks

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.51 Media Advisory - Label SA**

c-3

The Media Advisory message is to be sent when link status changes as described in Section 9.1.2 of ARINC Specification 618. The Media Advisory message is not a queued message.

c-4

COMMENTARY

The Media Advisory (Label SA) message is to be sent immediately following the loss of a link when an alternate link is available. For example, downlink an SA Media Advisory message (using the designators LV) via SATCOM to report the loss of the VHF link. As an alternative, a high priority ATC message in queue may be sent preceding the Media Advisory (Label SA) message. Use of traffic specific to the link or a Link Test (Label Q0) message is to be used to prevent a high priority message from being delayed during the establishment process while another link is available.

Upon request by the user airline, the DSP should forward the Media Advisory (Label SA) message to other networked DSPs to advise them of a change in link status.

| <u>Character No.</u> | <u>Character Content</u>          | <u>Notes</u>                                                         |
|----------------------|-----------------------------------|----------------------------------------------------------------------|
| 1                    | Message [Originator]              | Refer to Section 3.4 of ARINC Specification 618<br>See Section 5.2.1 |
| 2-3                  | Sequence [Message Number]         |                                                                      |
| 4                    | Number [Block Sequence Character] |                                                                      |
| 5-10                 | Flight Identifier;                | 1<br>2<br>3<br>4<br>5<br>6                                           |
| 11                   | Version Number                    |                                                                      |
| 12                   | Establishment/Loss Flag           |                                                                      |
| 13                   | Media Identification              |                                                                      |
| 14-19                | UTC Time Stamp                    |                                                                      |
| 20-n                 | Current Media Status              |                                                                      |
| n+1                  | Delimiter (slash </>)             |                                                                      |
| n+2 to m             | "Free Text" where $m \leq 220$    |                                                                      |

c-3

Notes:

[1] This format represents Version 0 (zero)

[2] Coding: E = Media Established L = Media Lost

[3] Coding: V = VHF-ACARS  
S = Inmarsat Aero H/H+/I/L Satcom  
H = HF  
I = Iridium Satcom  
G = Global Star Satcom  
C = ICO Satcom  
2 = VDL Mode 2

c-4

c-3

c-4

[4] Time stamp data is captured at transition

c-3

[5] This is a variable length field listing all links currently in the Maintenance state (as defined in ARINC Specification 618). Refer to Section 5.9.4 of ARINC 618 for assignments

c-4

c-3

[6] Additional Vendor-defined parameters may be placed here.

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.3.51 Media Advisory - Label SA (cont'd)

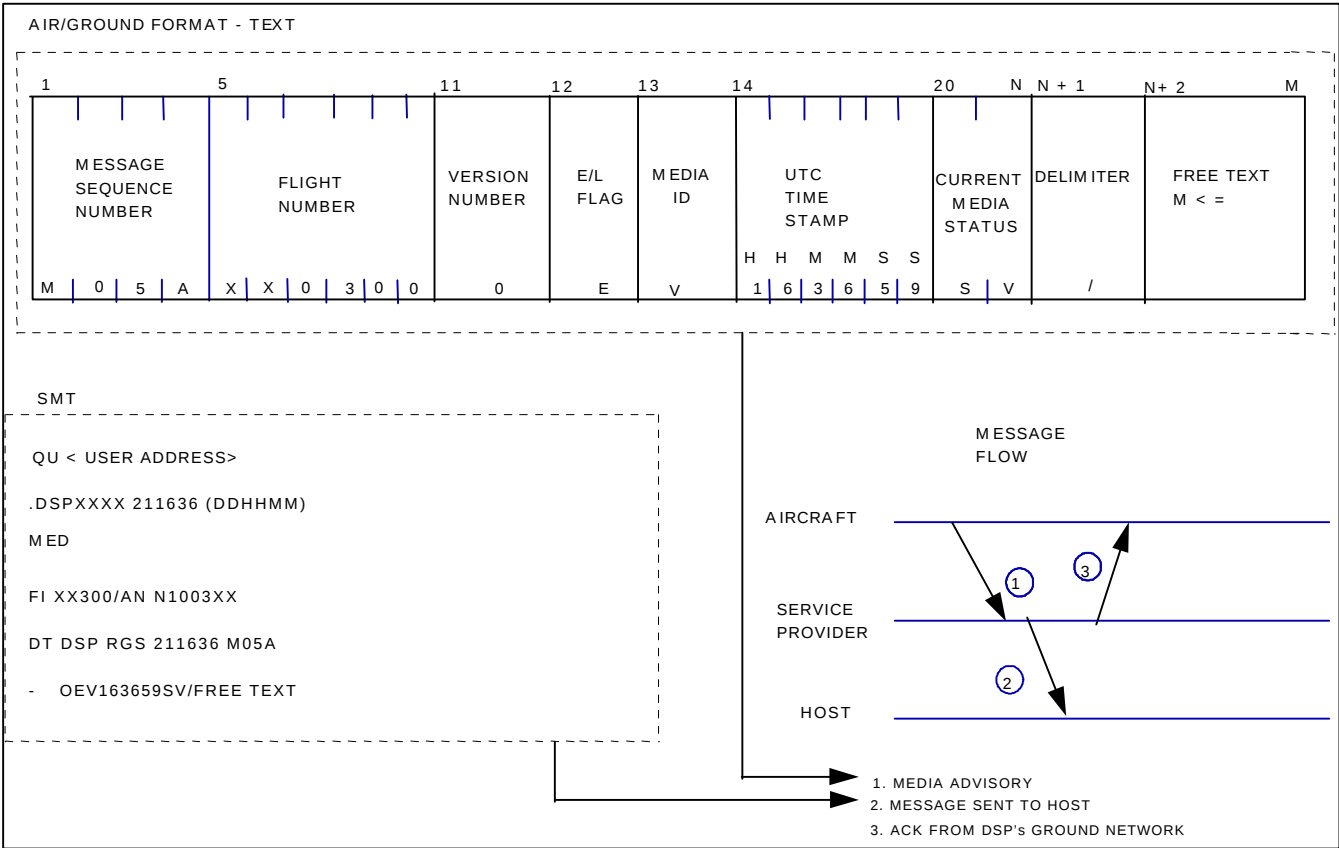


Figure 5.3.51-1 Media Advisory

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.3.52 Icing Report - MFI or Label H3**

Subsystems onboard the aircraft may be programmed to provide automatic downlinks of icing data. These Icing Report downlink messages should contain the Label (or MFI) characters H3. During an icing event, the following icing report will be transmitted every 5 minutes for the duration of icing conditions.

**Table 5.3.52-1 Icing Reports**

| <u>Number of Chars</u> | <u>Character Content</u>     | <u>Notes</u>                                    |
|------------------------|------------------------------|-------------------------------------------------|
| 10                     | Standard Message Header      | Refer to Section 3.4 of ARINC Specification 618 |
| 2                      | Version Number (01)          | See Note 1                                      |
| 7                      | Flight Identifier            |                                                 |
| 7                      | Aircraft Registration Number |                                                 |
| 31                     | Data Sample 1                |                                                 |
| 31                     | Data Sample 2                |                                                 |
| .                      | .                            | See Note 2                                      |
| .                      | .                            |                                                 |
| 31                     | Data Sample 5                |                                                 |

Notes:

- [1] The Flight Identifier is made up from the 3 letter ICAO Airline code and the 4 digit (or) alpha character Flight Number.
- [2] Five samples (taken once each minute) will be included in a report. Each data sample will contain the following data:

| <u>Number of Chars</u> | <u>Data Sample</u>                                   | <u>Notes</u>   |
|------------------------|------------------------------------------------------|----------------|
| 5                      | Latitude                                             | See Note 3     |
| 6                      | Longitude                                            | See Note 3     |
| 6                      | Date/Time (UTC) of Observation                       | Format: ddhhmm |
| 4                      | Flight Level See Note 4                              |                |
| 4                      | Static Air Temperature (Celsius)                     | See Note 5     |
| 1                      | Ice/no-ice signal                                    | See Note 6     |
| 2                      | Peak liquid water content (grams/m <sup>3</sup> )    | See Note 7     |
| 2                      | Average liquid water content (grams/m <sup>3</sup> ) | See Note 7     |
| 1                      | SLD/no-SLD signal                                    | See Note 8     |

- [3] The format of latitude and longitude are with North/South (abbreviated N/S) and East/West (abbreviated E/W) following the values of latitude and longitude and a resolution in degrees and minutes.

For example: 4811N12030W or  
3530S14845E

|                                      |                                        |
|--------------------------------------|----------------------------------------|
| <u>LATITUDE</u><br><u>ddmm (N/S)</u> | <u>LONGITUDE</u><br><u>dddmm (E/W)</u> |
| 4811N                                | 02030W                                 |
| 3530S                                | 14845E                                 |

- [4] The character "F" followed by 3 numerals. For example: F350
- [5] The range of Static Air Temperature is from -99 to +99 degrees Celsius. The format used is 4 characters. The characters "MS" are used to indicate a negative value and "PS" are used to indicate a positive value followed by temperature in degrees Celsius (2 numerals). For example: MS23 or PS24
- [6] A value of 0 indicates no icing conditions. A value of 1 indicates icing conditions are present
- [7] Values will range from 0 - 9.9 grams/m<sup>3</sup> with a resolution of 0.1 grams/m<sup>3</sup>. The format of the data is 00 to 99 where 99 represents 9.9 grams/m<sup>3</sup>.
- [8] A value of 0 indicates no Supercooled Large Droplets (SLD) conditions. A value of 1 indicates SLD conditions are present.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****c-3 | 5.4 Downlink Message Formats, Messages from Avionics Subsystem - Label H1**

c-1 | Provisions have been made for avionic subsystems, acting as a peripheral to the ACARS MU, to prepare messages for the AOC users host systems or ATC facilities on the ground. These messages will be routed through the ACARS Management Unit (MU) for delivery. Typically, these subsystems include the Optional Auxiliary Terminal (OAT), the Flight Management Computer (FMC), the Aircraft Condition Monitoring System (ACMS). Downlink Messages from these designated on-board devices will contain Label characters H1 and text assembled at the source.

c-3 | A listing of sublabels, their associated SMI and Section References can be found in Table C2-A of Appendix C.

c-1 | In aircraft equipped with an ACARS MU designed to ARINC Characteristic 597, the interfaces between the MU and the Aircraft Integrated Data System (AIDS) and the Flight Management Computer (FMC) are provided by the Optional Auxiliary Terminal (OAT). All messages from these airborne systems (peripherals to the MU) originate either in the OAT or in devices attached to an OAT interface. MUs designed to ARINC Characteristic 597 are no longer recommended for new aircraft installations.

c-1 | In aircraft equipped with an ACARS MU designed to either ARINC Characteristic 724 or 724B, the interfaces between the MU and the airborne subsystems (peripherals to the MU), such as the AIDS and FMC, are connected directly.

c-4 | The differences in the two datalink subsystem configurations necessitate variations in the Text field format of some downlink messages. The Application Text field format used to downlink messages from airborne systems connected to an ARINC 597 ACARS MU is described in Section 5.4. The Application Text field format used to downlink messages from subsystems connected to an ARINC 724 ACARS MU is described in Section 5.3.38.2.

c-1 | Each H1-labeled message may be designated as either a Conversational (Type A) message or a Conventional (Type B) message. Currently, ACARS ground systems support only Type B messages.

c-4 | Each data link user employing an OAT in their aircraft configuration defines a standard ground address for H1-labeled downlink messages. If desired, messages may be routed to additional destinations by entering the addresses of the additional destinations in the Application Text field.

**Table 5.4-1A General Format of Downlink Message Originating from an Avionic Subsystem**

|     | AIRCRAFT ADDRESS | LABEL |  | FLIGHT NUMBER | SUB LABEL | OPTIONAL USER ADDRESS | MESSAGE TEXT            |
|-----|------------------|-------|--|---------------|-----------|-----------------------|-------------------------|
| c-3 | .N1234x          | H1    |  | Xx1234        | M1 [1]    | /PIKCLXS.             | <u>Application text</u> |

Note:

[1] Some OATs may not use the Sublabel.

c-1 | The format of the fields in downlink messages generated by an avionics subsystem are the same as those used in downlinks generated by the MU (See Section 5.3) with the following exceptions. The label is H1 and a sublabel field is included. In the above example, the message was generated by the Left FMC, designated by M1 in the Sublabel field.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****Table 5.4-1B Format for ATS Downlink Message Originating from an Avionic Subsystem**

|  | AIRCRAFT ADDRESS | LABEL |  | FLIGHT NUMBER | SUB LABEL | USER ADDRESS  | MESSAGE TEXT            | c-3 |
|--|------------------|-------|--|---------------|-----------|---------------|-------------------------|-----|
|  | .N1234x          | H1    |  | xx1234        | M1        | /MFI LAX05xx. | <u>Application text</u> | c-4 |

The format of the User Address field of ATS downlink messages generated by an avionics subsystem is expanded to include a 2 character Message Function Identifier (MFI) as its first element. The MFI, will be identical to the associated Label, assigned from the block of labels B0 through BZ, that would be used if the message were generated by the MU. c-1

ATS downlink messages are assigned the block of labels (and MFIs) B0 through BX. See Section 5.5 for the format of ATS downlink messages. c-3

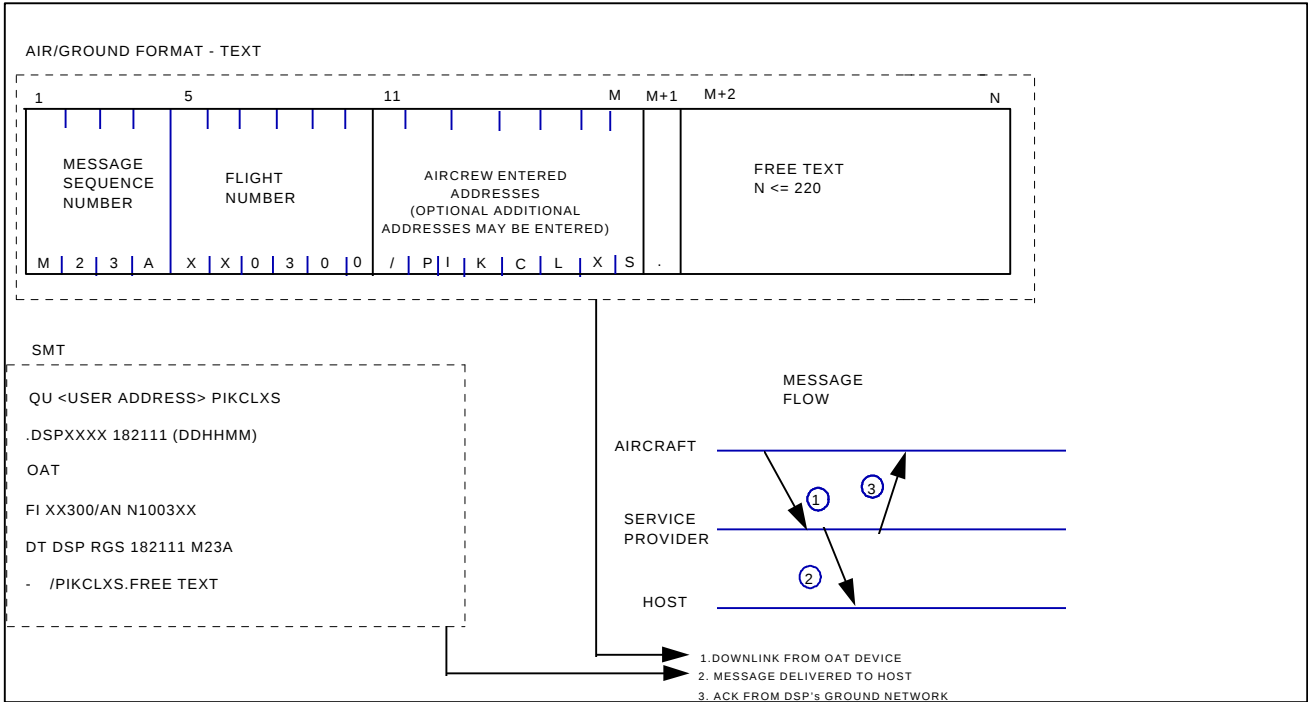
**5.4.1 Messages from Airborne Subsystems: ARINC 597 ACARS - Label H1**

The following Application Text field format should be used for downlink messages when the originating system is a peripheral to the ACARS MU and the aircraft is equipped with an ACARS MU designed to ARINC Characteristic 597. ACARS MUs designed to ARINC Characteristic 597 are no longer recommended for new aircraft installations. c-4  
c-3

| <u>Character No.</u> | <u>Character Content</u>                    | <u>Notes</u>                                               |     |
|----------------------|---------------------------------------------|------------------------------------------------------------|-----|
| 1                    | Message [Originator]                        | Refer to Section 3.4 of ARINC Specification 618.           |     |
| 2-3                  | Sequence [Message Number]                   |                                                            |     |
| 4                    | Number [Block Sequence Character]           |                                                            | c-1 |
| 5-10                 | Flight Identifier;                          | See Section 5.2.1. If additional addresses are             |     |
| 11                   | Slash Character </>                         | entered the addresses are separated by                     |     |
| spaces.              |                                             |                                                            |     |
| 12-m                 | Additional addresses; (3,4 or 7 characters) |                                                            |     |
| m + 1                | Period character <.>                        | If optional addressing is not                              |     |
| (M+2)-n              | "Free Text" where n ≤ 220                   | utilized, the "Free Text" portion begins with character 11 |     |

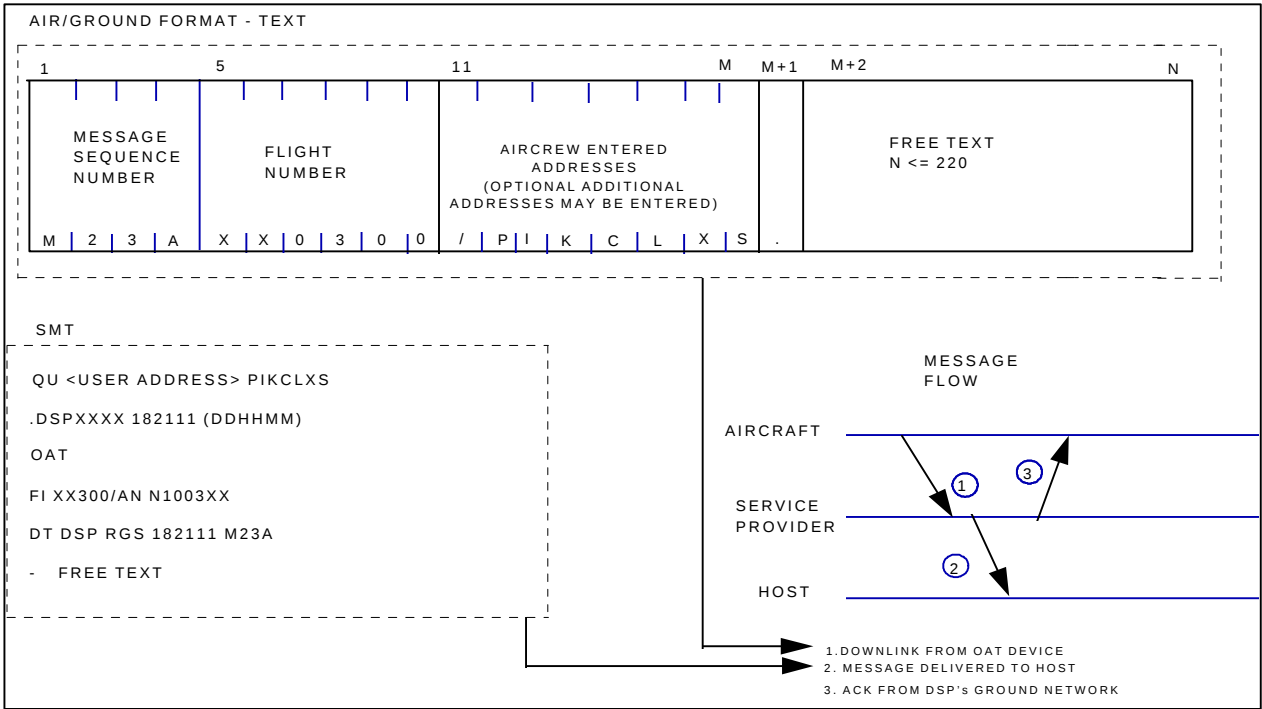
5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.4.1 Messages from Airborne Subsystems: ARINC 597 ACARS - Label H1 (cont'd)



c-1

Figure 5.4.1-1 Downlink by Peripheral to ARINC 597 - ARINC Implementation



c-1

Figure 5.4.1-2 Downlink by Peripheral to ARINC 597 - SITA Implementation

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.4.2 Messages from Airborne Subsystems: ARINC 724 or 724B ACARS MU - Label H1**

The Application Text fields of second and subsequent blocks of ACARS multi-block CFDIU, DFDAU, FMC and Cabin Terminal downlink messages will contain only the text portion of the message. The Application Text fields of second and subsequent blocks of multiblock CFDIU, DFDAU, and FMC, and Cabin Terminal downlinks with additional addresses will start with the POUNDSIGN character <“#”> and the two sublabel characters followed by the character “B”. These will be followed by the next text character in sequence after that with which the previous block ended. All blocks except the final block of an ACARS multiblock downlink will be terminated by the control character ‘ETB’. The final block will be terminated with the control character ‘ETX’.

c-4

c-1

The variations of the possible formats of downlink messages generated by avionics subsystems are provided in the following subsections.

**5.4.2.1 OAT - Simple H1 Message**

| <u>Character No.</u> | <u>Character Content</u>                                                                                         | <u>Notes</u>            |     |
|----------------------|------------------------------------------------------------------------------------------------------------------|-------------------------|-----|
| 1                    | Message [Originator]                                                                                             | Refer to Section 3.4 of | c-1 |
| 2-3                  | Sequence [Message Number]                                                                                        | ARINC Specification 618 |     |
| 4                    | Number [Block Sequence Character]                                                                                | See Section 5.2.1       |     |
| 5-10                 | Flight Identifier;                                                                                               |                         |     |
| 11-n                 | “Free Text” where n represents the maximum data characters over the air/ground link used to deliver the message. |                         | c-4 |

**5.4.2.2 OAT - H1 Message With Additional Addresses**

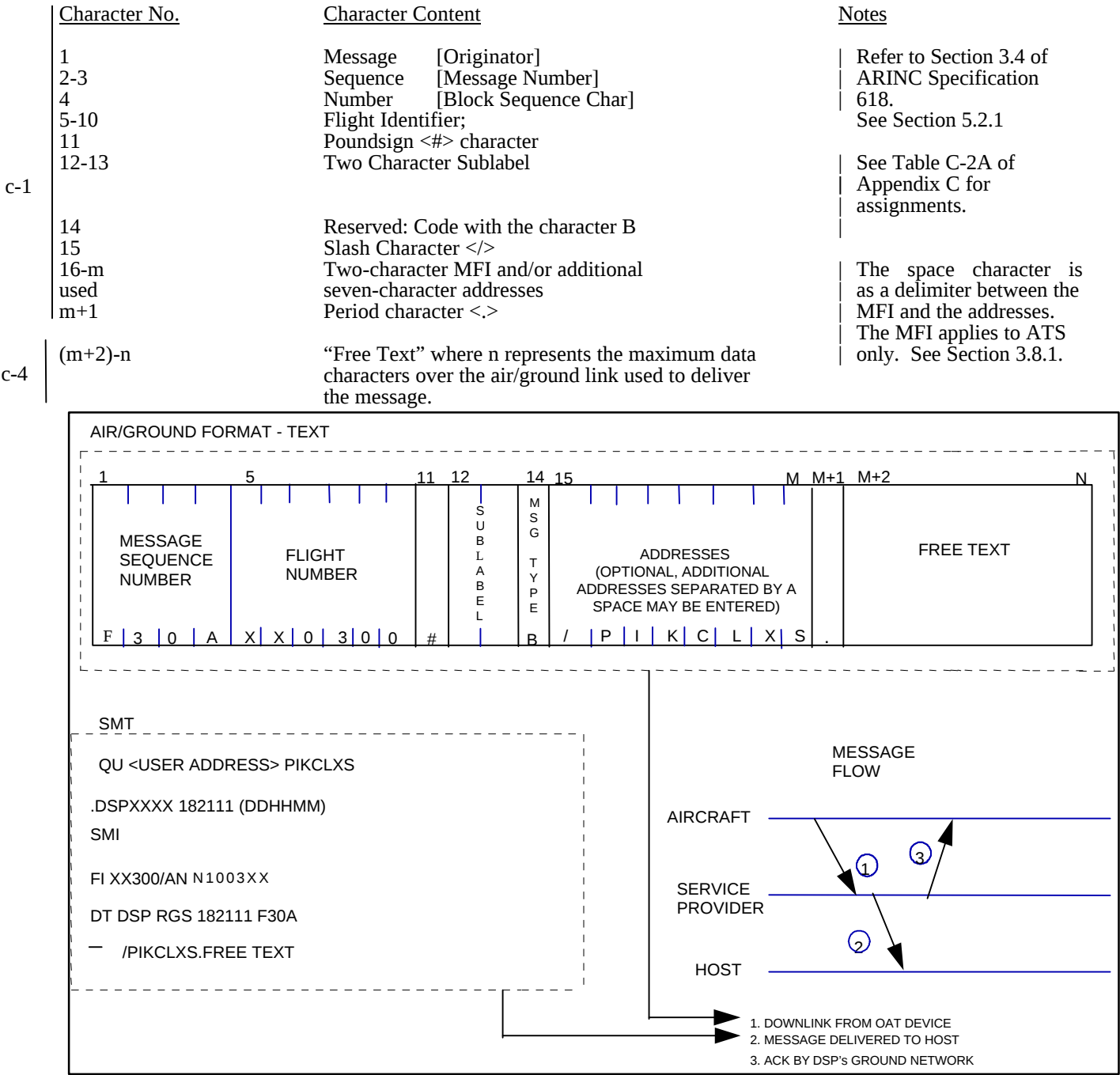
| <u>Character No.</u> | <u>Character Content</u>                                                                                         | <u>Notes</u>                                                                                                                  |     |
|----------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----|
| 1                    | Message [Originator]                                                                                             | Refer to Section 3.4 of                                                                                                       | c-1 |
| 2-3                  | Sequence [Message Number]                                                                                        | ARINC Specification 618                                                                                                       |     |
| 4                    | Number [Block Sequence Character]                                                                                | See Section 5.2.1                                                                                                             |     |
| 5-10                 | Flight Identifier;                                                                                               |                                                                                                                               |     |
| 11                   | Slash Character </>                                                                                              |                                                                                                                               |     |
| 12-m                 | Two character MFI and/or additional addresses.                                                                   | The space character is used as a delimiter between the MFI and the addresses. The MFI applies to ATS only. See Section 3.8.1. | c-4 |
| m+1                  | Period character <.>                                                                                             |                                                                                                                               |     |
| M+2-n                | “Free Text” where n represents the maximum data characters over the air/ground link used to deliver the message. |                                                                                                                               |     |

**5.4.2.3 CFDIU, DFDAU, FMC or Cabin Terminal Messages Without Additional Addresses**

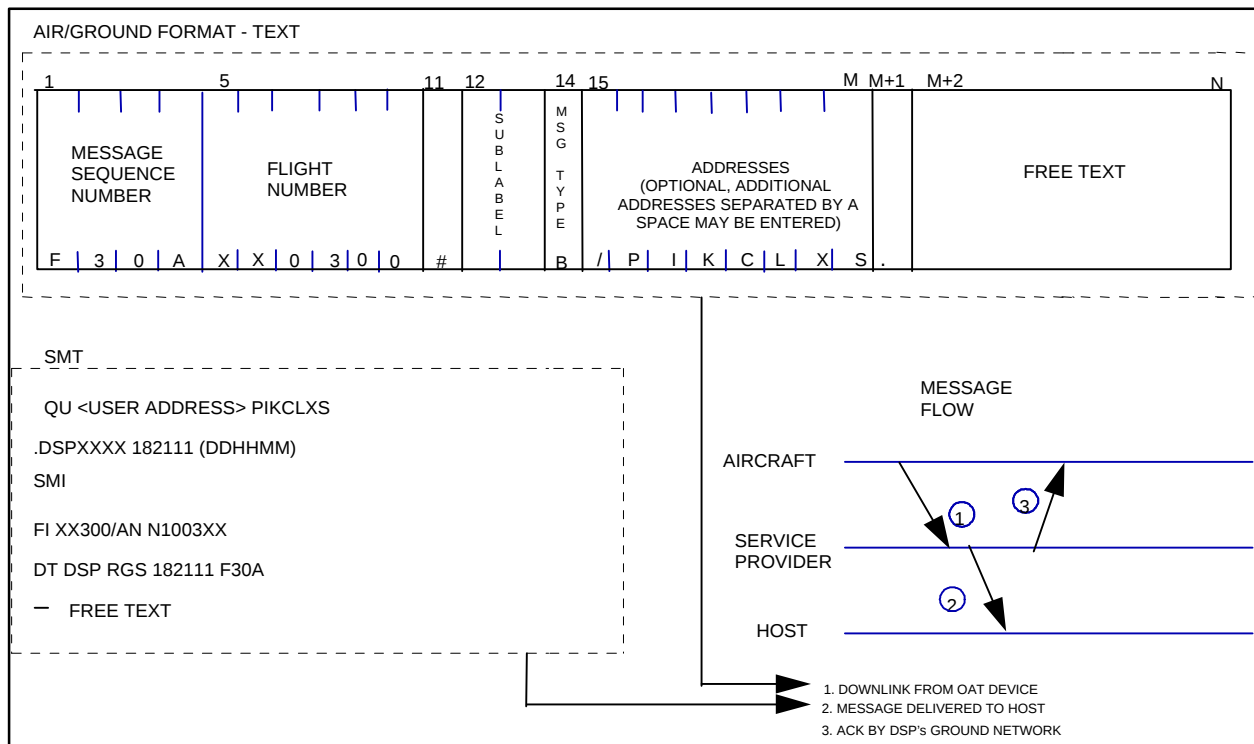
| <u>Character No.</u> | <u>Character Content</u>                                                                                         | <u>Notes</u>                                  |     |
|----------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----|
| 1                    | Message [Originator]                                                                                             | Refer to Section 3.4 of                       | c-1 |
| 2-3                  | Sequence [Message Number]                                                                                        | ARINC Specification                           |     |
| 4                    | Number [Block Sequence Character]                                                                                | 618.                                          |     |
| 5-10                 | Flight Identifier;                                                                                               | See Section 5.2.1                             |     |
| 11                   | Pound sign <#> character                                                                                         |                                               |     |
| 12-13                | Two Character Sublabel                                                                                           | See Table C-2A of Appendix C for assignments. |     |
| 14                   | Reserved: Code with the character B                                                                              |                                               | c-4 |
| 15-n                 | “Free Text” where n represents the maximum data characters over the air/ground link used to deliver the message. |                                               |     |

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.4.2.4 CFDIU, DFDAU, FMC or Cabin Terminal Messages With Additional Addresses



c-3 | Figure 5.4.2.4-1 Messages from Avionics Subsystem - ARINC Implementation

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.4.2.4 CFDIU, DFDAU, FMC or Cabin Terminal Messages With Additional Addresses (cont'd)****Figure 5.4.2.4-2 Messages from Avionics Subsystem - Implementation by Others**

c-3

**5.5 Downlink Message Formats, ATS Messages - MFI or Label Bx**

The following subsections define the handling to be provided for Air Traffic Service (ATS) messages. For character-oriented messages, the format of these messages is found in Specification 623. For bit-oriented messages, the format is defined in RTCA and ICAO documentation. Currently the bit-oriented messages are limited to Automatic Dependent Surveillance (ADS) and Controller/Pilot Data Link Communications (CPDLC).

**COMMENTARY**

The airlines have expressed a desire that both bit and character-oriented ATS messages be processed using the provisions of Specification 622. This will minimize the number of airborne software permutations. Furthermore, the airlines have stated a need that service providers be capable of discretely addressing every application (Label) within an ATS site.

c-3

**MORE COMMENTARY**

Before the application currently referred to as Controller/Pilot Data Link Communications (CPDLC) was defined by ICAO, it was defined by RTCA as Two Way Data Link (TWDL). The function to support CPDLC/TWDL has been defined in AEEC Specifications as ATCComm.

The MU need only generate those service-related downlinks specified by the user to his supplier. While service-related downlink utilization is thus optional in terms of user deployment, procedures governing the ground handling of these messages necessitates adherence to the formats and other rules concerning them set forth in this document. For the reader's convenience, a listing of ATC messages is provided below. See Section 5.3 for a listing of AOC messages.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****Table 5-5 Format for Air-Ground Downlink ATS Messages Generated by an MU**

|  |  | <b>AIRCRAFT ADDRESS</b> |  | <b>LABEL</b> |  | <b>MSN</b> | <b>FLIGHT NUMBER</b> | <b>SUPPLEMENTARY ADDRESS</b> | <b>MESSAGE TEXT</b>     |
|--|--|-------------------------|--|--------------|--|------------|----------------------|------------------------------|-------------------------|
|  |  | .N1003x                 |  | <u>Bx</u>    |  | M01A       | xx5678               | /LAX05xx.                    | <u>Application text</u> |

**Label:**

For downlink messages, the Label will be assigned from the block of labels B0 through BZ.

**Application Text:**

See ARINC Specification 623 for definition of ATS Application Data . Messages that may have an impact on the movement of the aircraft, such as Air Traffic Service (ATS) messages, may have additional content in the Application Text field to insure delivery and integrity. See ARINC Specification 622 for definition of ATS Application Text (definition has precedence). In general, the format of the Message Text field of an ATS message is '-----Application Text-----' with the expanded form being 'IMI/-----Application data-----CRC' for character-oriented messages and 'IMI/-----Application data-----CRC' for bit-oriented messages.

**Imbedded Message Identifier:**

The 3 character Imbedded Message Identifier (IMI) field indicates the format and Version Number of the generated message.

**Delimiter:**

A slash </> character is used in character-oriented messages to separate the IMI from the Application Data. The characters 'AN' are used in bit-oriented messages to separate the IMI from the Application Data per ARINC Specification 622.

**Application Data:**

The contents of the Application data for ATS downlink messages are defined in ARINC Specification 623.

**CRC:**

Messages which may have an impact on the movement of the aircraft, such as Air Traffic Services (ATS) messages, have been deemed to need additional assurance that an end-to-end check is performed on the message content to validate its accurate reconstruction at the receiving equipment. This is done by including a cyclical redundancy check (CRC) as the final element of the message content.

The CRC may be any binary number of 16 bits. Since the ACARS air/ground network can only support the transfer of the character-based message set defined in ARINC Specification 618, the 16-bit CRC must be translated to pass reliably across the ACARS network. The conversion process defined in Specification 622 should be used to process the CRC. In its expanded form, the CRC consumes 4 characters in the message text.

If the "Free Text" portion of a message is greater than that which can be accommodated in the Text field of a single block, multiple blocks will be transmitted. In this case, each intermediate block will be terminated with the control character <ETB>. The final block (and only the final block) of each ACARS multiblock message will contain the control character <ETX>.

Refer to Tables C1 and C2 of Appendix C for a listing of messages, their associated labels, SMIs and Section references.

**5.5.1 Request Oceanic Clearance - MFI or Label B1**

The Request for Oceanic Clearance is a message prepared by an End System on an aircraft and sent to the ground DSP who then forwards the message to the ATC facility designated within the message. The message may be initiated by aircrew action or initiated automatically.

The Label of B1 is used in the air/ground message. The format of the Request for Oceanic Clearance definition provides specific parameters to clearly indicate what information is being requested.

Upon receipt of the air/ground downlink message from the aircraft, if the message is from the MU, the DSP generates a ground/ground message to the ATC facility with the SMI of 'RCL'. If the air/ground downlink message is from a peripheral to the MU, such as the FMC, the DSP generates a ground/ground message to the ATC facility with the SMI of 'FML' or 'FMR'. See Appendix D of Specification 622 for a listing of SMIs and subLabels.

Refer to ARINC Specification 623 for the format of the Application data and Specification 622 for the description of the process needed to transfer this message across the ACARS network. Both the air/ground and ground/ground form

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)**

of the message are illustrated in the examples below. The first set illustrates the structure of a downlink message generated by the MU. The second set illustrates the structure of a message generated by an avionics subsystem.

**Table 5.5.1-1A Request Oceanic Clearance Downlink From an MU - Air/Ground Format**

|  | AIRCRAFT ADDRESS | LABEL     |  | MSN  | FLIGHT NUMBER | SUPPLEMENTARY ADDRESS | MESSAGE TEXT            |
|--|------------------|-----------|--|------|---------------|-----------------------|-------------------------|
|  | .N1234x          | <u>B1</u> |  | M01A | xx5678        | /LAX05xx.             | <u>Application text</u> |

**Table 5.5.1-1B Request Oceanic Clearance Downlink From an MU - Ground/Ground Format**

QU <USER ADDRESS> LAX05xx  
 .DSPxxxx ddhhmm  
RCL  
 FI xx5678/AN N1234x  
 DT DSP RGS 182111 M01A  
 - Application text

**Table 5.5.1-2A Request Oceanic Clearance Downlink From an Avionics Subsystem - Air/Ground Format**

|  | AIRCRAFT ADDRESS | LABEL |  | MSN  | FLIGHT NUMBER | SUB LABEL | SUPPLEMENTARY ADDRESS | MESSAGE TEXT            |
|--|------------------|-------|--|------|---------------|-----------|-----------------------|-------------------------|
|  | .N1234x          | H1    |  | F10A | xx5678        | M1        | /B1 LAX05xx.          | <u>Application text</u> |

**Table 5.5.1-2B Request Oceanic Clearance Downlink From an Avionics Subsystem - Ground/Ground Format**

QU <USER ADDRESS> LAX05xx  
 .DSPXXXX ddhhmm  
FML  
 FI xx5678/AN N1234x  
 DT DSP RGS 182111 F10A  
 - Application text CRC

**5.5.2 Oceanic Clearance Readback - MFI or Label B2**

Upon receipt of an Oceanic Clearance uplink message, identified by Label (or MFI) A1, the avionic end system should deposit the Application Text (information content) in a dedicated "ATC" buffer. The avionic end system should then automatically send a command to print or display the message, as stored in the ATC buffer, for the aircrew's assessment.

Following manual aircrew confirmation of an Oceanic Clearance uplink message, the Oceanic Clearance Readback message is prepared by an End System on the aircraft at the direction of the pilot and sent to the ground DSP who then forwards it to the ATC facility designated within the message.

Upon receipt of the Acknowledge Oceanic Clearance message generated by an MU (containing Label of B2), the DSP forwards the ground/ground message to the ATC facility with the SMI of 'CLA'. Upon receipt of the Oceanic Clearance Readback message generated by a peripheral to the MU (containing MFI of B2), the DSP forwards the ground/ground message to the ATC facility with the SMI of the appropriate peripheral. See Appendix D of Specification 622 for a listing of SMIs and sublabels.

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.5.2 Oceanic Clearance Readback** - MFI or Label B2 (cont'd)

- c-2 | Refer to ARINC Specification 623 for the format of the Application Text and Specification 622 for the description of the process needed to transfer this message across the ACARS network. Both the air/ground and ground/ground form of the message are illustrated in the examples in Section 5.5.1. The first set illustrates the structure of a downlink message generated by the MU. The second set illustrates the structure of a message generated by an avionics subsystem.

**5.5.3 Request Departure Clearance** - MFI or Label B3

- c-1 | The Request for Departure Clearance is a message prepared by an End System on the aircraft and sent to the ground DSP who then forwards the message to the ATC facility designated within the message. The format of the Request for Departure Clearance provides specific parameters to clearly indicate what information is being requested.
- c-3 | Upon receipt of the air/ground downlink message generated by the MU containing the Label of B3 (or, if generated by a peripheral, the Label H1 and the MFI B3), the DSP sends the complementary ground/ground message to the ATC facility with the SMI of 'RCD' for an MU message, or the appropriate SMI for a message from an ACARS peripheral. See Appendix D of Specification 622 for a listing of SMIs and sublabels.
- c-2 | Refer to ARINC Specification 623 for the format of the Application Text and Specification 622 for the description of the process needed to transfer this message across the ACARS network. Both the air/ground and ground/ground form of the message are illustrated in the examples in Section 5.5.1. The first set illustrates the structure of a downlink message generated by the MU. The second set illustrates the structure of a message generated by an avionics subsystem.
- c-3 |
- c-1 |

**5.5.4 Departure Clearance Readback Downlink** - MFI or Label B4

- c-1 | The Departure Clearance Acknowledgement message is prepared by an End System on the aircraft at the direction of the pilot and sent to the ground DSP who then forwards it to the ATC facility designated within the message.
- c-3 | Upon receipt of the Departure Clearance Acknowledgement downlink message containing Label of B4 (or the Label H1 with the MFI B4), the DSP forwards the ground/ground message to the ATC facility with the SMI of 'CDA' for an MU message or the appropriate SMI for a message from an ACARS peripheral. See Appendix D of Specification 622 for a listing of SMIs and sublabels.
- c-2 | Refer to ARINC Specification 623 for the format of the Application Text and Specification 622 for the description of the process needed to transfer this message across the ACARS network. Both the air/ground and ground/ground form of the message are illustrated in the examples in Section 5.5.1. The first set illustrates the structure of a downlink message generated by the MU. The second set illustrates the structure of a message generated by an avionics subsystem.
- c-3 |

**5.5.5 Waypoint Position Report** - MFI or Label B5

The WPR message may be generated automatically by the avionics (typically the FMC) or may be generated by the FMC or MU through manual pilot entry. The message is intended to be used by an aircraft operating in a non-radar environment. The Waypoint Position Report (WPR) downlink is prepared by an End System on the aircraft at the direction of the pilot and sent to the ground DSP who then forwards it to the ATC facility designated within the message.

- c-3 | If the WPR is created by a peripheral, such as the FMC, the message will be downlinked as Label H1 with the MFI of B5.
- When it is received by the DSP, it is translated to SMI 'POS' if generated by an MU or, alternatively, to the appropriate SMI if generated by a peripheral. Refer to ARINC Specification 623 for the format of the Application Data and for message generation logic.

**5.5.6 Provide ADS Report** - MFI or Label B6

- c-1 | This message may be generated by the MU or by an avionics subsystem onboard the aircraft. When it is received by the DSP, it is translated to SMI 'PAR' if generated by an MU, or the appropriate SMI if generated by a peripheral. The message is meant to be used by an aircraft operating in a non-radar environment.
- c-2 | Refer to ARINC Specification 622 for the definition of ADS and the process needed to transfer this message across the ACARS network. Refer to ARINC Character 745 for the format of the Application data. Both the air/ground and ground/ground formats of the message are illustrated in the examples in Section 5.5.1.
- c-3 |

**5.5.7 "Free Text" to ATC** - MFI or Label B7

- c-1 | The Free Text message is meant to provide the ability for the pilot to communicate directly with an ATC agency. It provides a way to augment the exchanges provided by ATCComm messages (See Section 5.5.11). This message, generated by the pilot, is translated to SMI 'FTD' by the service provider if from an MU, or the appropriate SMI if from a peripheral. See Appendix D of Specification 622 for a listing of SMIs and sublabels.
- c-3 |

**5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)****5.5.8 Request Departure Slot - MFI or Label B8**

This message, generated by the pilot, is translated to SMI 'RDS' by the service provider if the message is from an MU, or the appropriate SMI, if from a peripheral. The processing is similar to the label (or MFI) B1. This message is meant to be a standard text message forwarded to a specific ATC unit in charge of slotting departure time for a given airspace.

**5.5.9 Request ATIS Report - MFI or Label B9**

This message, generated by the aircraft, is translated to SMI 'RAI' by the service provider if the message is from an MU, or the appropriate SMI if from a peripheral. See Appendix D of Specification 622 for a listing of SMIs and sublabels. Refer to ARINC Specification 623 for the format of the Application data and Specification 622 for the description of the process needed to transfer the message across the ACARS network. Both the air/ground and ground/ground form of the message are illustrated by the examples in Section 5.5. The first set illustrate an ATIS Request generated by the MU. The second set illustrate an ATIS Request generated by an avionics subsystem.

**COMMENTARY**

It has been recognized that the label 5D already exists with SMI 'TIS' but the 5D message is intended to access only one address while the B9 has the capability of forwarding the message to a different addresses based on the code contained in the downlink. Both are expected to be supported for the interim period.

**5.5.10 ATS Facilities Notification (AFN) - MFI or Label B0**

This message, generated by the pilot or the avionics, is translated to SMI 'AFD' by the service provider if from an MU, or the appropriate SMI if from a peripheral. See Appendix D of Specification 622 for a listing of SMIs and sublabels. Refer to ARINC Specification 623 for the format of the AFN Application Data. AFN messages are used: (1) to notify the ATC agency that the aircraft is ready to begin data communications (to support applications such as ADS), (2) to pass down relevant ATS application information needed by the ATC agency, and (3) for the current ATC agency to advise the aircraft to contact another ATC agency.

**5.5.11 ATCCommunications - MFI or Label BA**

This message, generated by the pilot, is translated to SMI 'ATC' by the service provider if from an MU, or the appropriate SMI if from a peripheral. See Appendix D of Specification 622 for a listing of SMIs and sublabels. This message type covers a list of at least 100 possible interactions between the controller and the pilot. Refer to RTCA DO-219 for the format of the ATCComm Application Data. Refer to ARINC Specification 622 for information on processing of the bit-oriented ATCComm message for transfer across the ACARS network.

Both the air/ground and ground/ground forms of the message are illustrated by the examples in Section 5.5.1. The first set illustrates the structure of the message downlink generated by the MU. The second set illustrates the structure of the message generated by an avionics subsystem.

**5.5.12 Terminal Weather Information for Pilots - MFI or Label BB**

This message, generated by the aircraft, is translated to SMI 'TWR' by the service provider if the downlink was composed by an MU, or the appropriate SMI if from a peripheral. See Appendix D of Specification 622 for a listing of SMIs and subLabels. Refer to ARINC Specification 623 for the format of the Application Data and Specification 622 for the description of the process needed to transfer the message across the ACARS network.

**5.5.13 Pushback Clearance Request - MFI or Label BC**

This message is generated by the aircraft, translated to SMI 'PBR' by the service provider if from an MU, or the appropriate SMI if from a peripheral. Reference Appendix D of ARINC Specification 622 for a listing of SMIs and sublabels. Refer to ARINC Specification 623 for the format of the Application data and ARINC Specification 622 for the detailed description of the process needed to transfer the message across the ACARS network.

**5.5.14 Expected Taxi Clearance Request - MFI or Label BD**

This message is generated by the aircraft, translated to SMI 'ETR' by the service provider if from an MU, or the appropriate SMI if from a peripheral. Reference Appendix D of ARINC Specification 622 for a listing of SMIs and sublabels. Refer to ARINC Specification 623 for the format of the Application Data and ARINC Specification 622 for the detailed description of the process needed to transfer the Message across the ACARS network.

5.0 DOWNLINK MESSAGE TEXT FORMATS (cont'd)

5.5.15 CPC Aircraft Log-On/Log-Off Request - MFI or Label BE

To initiate CPC service, the CPC Aircraft Log-On/Log-Off Request downlink is generated by the MU or other avionics peripheral. The CPC Aircraft Log-On/Log-Off Request downlink indicates a CPC Log-On request or Log-Off request from the aircraft.

In all cases, the CPC Aircraft Log-On/Log-Off Request is routed to the CPC provider to indicate that an aircraft/flight capable of supporting CPC is ready to begin or end the CPC Service (Refer to ARINC Specification 623 for a complete description of the use and format of this message.)

c-3 Upon receipt of the CPC Aircraft Log-On/Log-Off Request downlink message containing Label BE (or the Label H1 with the MFI of BE), the DSP forwards the ground/ground message to the CPC Application using a SMI of 'CPL' (CPC Log On/Off) for an MU message or the appropriate SMI for a message from an ACARS peripheral. The CPC Application address for this message is determined by the Supplementary Address field or, based on DSP-to-airline coordination, another address configured within the DSP's front-end processor. See Appendix D of Specification 622 for a listing of SMIs and Sublabels.

Refer to Specification 623 for the format of the Application data and Specification 622 for the description of the process needed to transfer this message across the ACARS network. Both the air/ground and ground/ground form of the message are illustrated in the examples in Section 5.5.1.

5.5.16 CPC WILCO/UNABLE Response - MFI or Label BF

The crew will use the CPC WILCO/UNABLE Response downlink to respond, positively or negatively, to CPC Command/Response uplinks. Depending on the specific type of CPC uplink (See ARINC Specification 623), the crew may also be required to enter and confirm supplementary data. This downlink serves as an end-to-end acknowledgment or response for the CPC Command/Response uplink.

c-3 Upon receipt of the CPC WILCO/UNABLE Response message generated by an MU (Label BF), the DSP forwards the ground/ground message to the addressed ATC facility with the SMI of 'CWR'. Upon receipt of the CPC WILCO/UNABLE Response message generated by a peripheral to the MU (containing MFI of BF), the DSP forwards the ground/ground message to the ATC facility with the SMI of the appropriate peripheral. See Appendix D of Specification 622 for a listing of SMIs and Labels.

Refer to ARINC Specification 623 for the formats of the Application data and Specification 622 for the description of the process needed to transfer this message across the ACARS network. Both the air/ground and ground/ground forms of this message are illustrated in the examples in Section 5.5.1. The first set illustrates a downlink message generated by the MU. The second set illustrates a downlink message generated by a peripheral to the ACARS MU.

5.5.17 Unassigned - MFI or Label BG

This Section is a placeholder for a future assignment.

5.6 Downlink Message Format, User-Defined

A label in the group from 10 to 4~ denotes the address of a ground destination. The use of each label is negotiated between the data link service user and the DSP.

| Character No. | Character Content                 | Notes                         |
|---------------|-----------------------------------|-------------------------------|
| c-1 1         | Message [Originator]              | Refer to Section 3.4 of ARINC |
| 2-3           | Sequence [Message Number]         | Specification 618.            |
| 4             | Number [Block Sequence Character] | See Section 5.2.1             |
| 5-10          | Flight Identifier                 |                               |
| 11 thru n     | "Free Text" where ≤220            |                               |

## **6.0 SERVICE LEVEL STANDARD**

### **6.1 Introduction**

The intent of this section is to describe some methods that data link service providers may use to judge the performance of their data link service. It should be well understood that the level and quality of service that are provided will vary from service provider to service provider and will be treated on an individual contractual basis between the data link user and the data link service provider.

### **6.2 Transit Times**

The time it takes for a message to traverse a node, a system of nodes, or a network is defined as the message transit time. The timely arrival of messages in the data link environment is critical to the daily operations of data link service users. Therefore it is imperative to ensure that messages reach their ultimate destination in a timely fashion.

Note: The data link ground system is currently defined without a priority scheme (although ARINC and SITA treat voice/data switchover messages with a higher priority than normal traffic).

Since data link service providers may have varying network designs (ground networks size, multiple data link processors, centralized versus distributed networks), data link service users can only be concerned with, and can only measure, end-to-end message transit times.

#### **COMMENTARY**

Each service provider may use its own unique method of determining the beginning and end points of the time measurement. This selection will be based on the type of network system used.

The end-to-end uplink transit delay can be defined from the time the Ground User submit the uplink Ground/Ground message to the DSP for delivery to the target aircraft, to the time the last bit of information is received by the intended Airborne User.

The end-to-end downlink transit delay can be defined from the time the Airborne User submit the downlink Air/Ground message to the DSP to the time the last bit of information is received by the intended Ground User.

### **6.3 Availability**

Availability is a measure of the degree that a system or part of a system is in an operational state.

Availability is calculated by the expression

$$A = (1 - (\text{total time of outage})/(\text{total operating time})) \times 100 \text{ percent.}$$

Network availability is the most critical form of measurement a service provider will provide to its data link users. These measurements can include ground network impairments, ground station outages, and critical airport outages as described below.

### **6.3.1 System**

System non-availability results in the complete loss of end to end user communications. Availability at the system level is addressed in terms of the two primary areas of the communications system, the central data link processor(s) and the ground communications network.

The central data link processor(s) is responsible for the management of all data link system transactions. As a result, the availability requirement for the central data link processor(s) is 100 percent.

The availability of the ground communications network is based on the interface with the central data link

processor(s) and the data link ground users. The DSP is responsible for ensuring constant communications between the ground communications network and the central data link processor(s). However, it is the ground user's responsibility to supply redundant ground communications network connections.

### **6.3.2 Ground Stations**

In terms of availability, a ground station is considered a controller which manages a single channel.

Each ground station is, in turn, responsible for communicating with the ground communications network.

Though the ground station is a critical part of the ground network, non-availability of a single ground station may not result in a loss of end to end user communications since multiple ground stations can operate on the same channel.

Additional availability enhancements may include Uninterruptable Power Supplies (UPS), a dial back-up for alternate telephone communications, or satellite communications in order to provide improved reliability.

The service provider requirement for availability at the non-critical ground station is a system wide average of 99.50 percent.

### **6.3.3 Critical Airports**

Some airports are of a nature that no failures can be allowed for any reason. For these "critical airports", a configuration should be designed by the DSP to ensure maximum availability.

The configuration of the critical airport is based on the following principles:

- a. Redundancy - In order to ensure maximum reliability, the critical airport consists of more than one cluster (multiple channels) of ground stations. In addition, the clusters are physically separated from each other.

Additional redundancy is established by having each station connected to different nodal elements of the ground network.

- b. Power - In order to ensure continuous power, a system of uninterruptable power supplies can be installed.

**6.0 SERVICE LEVEL STANDARDS (cont'd)**

**6.3.3 Critical Airports (cont'd)**

- c. Communications - In order to ensure continuous communications, additional communication features may be installed. Satellite communications may be used to improve the reliability of the link from one ground network node to another. Alternatively, each ground station cluster could make use of dial back-up telephone connections in the event of a dedicated line failure.
- d. Channel Utilization - In order to ensure maximum transmission and receipt of uplink and downlink messages, a system of multiple channels (clusters) for improved channel utilization is required. In addition, channels should be assigned in a configuration which supports large volumes of enroute and on-ground aircraft.

The service provider requirement for availability at the critical airports is a system wide average of 99.99 percent.

**6.4 Clock Accuracy**

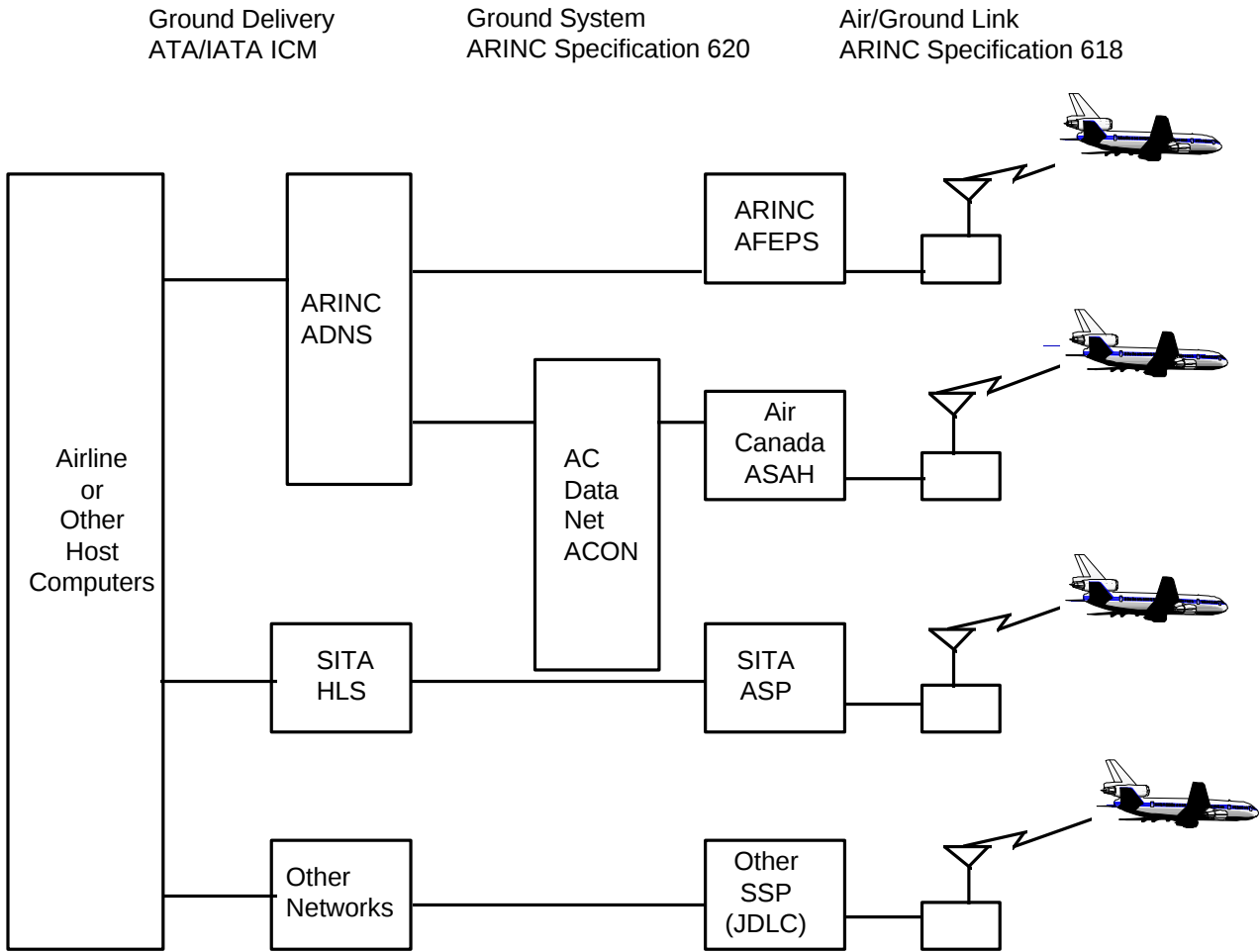
All messages delivered to airborne users or ground users by the DSP which contain clock or timing information (aircraft internal clock updates, or message time stamps) should be time stamped by the data link central processor with an accuracy within 1 second of the Coordinated Universal Time (UTC).

## **7.0 REFERENCE DOCUMENTS**

1. Federal Register, Volume 55, Number 30, Tuesday, February 13, 1990
2. Federal Register, Volume 55, Number 97, Friday, May 18, 1990
- 3a. ARINC Specification 429 P1, Mark 33 Digital Information Transfer System (DITS) - Part 1 Functional Description and Word Formats
- 3b. ARINC Specification 429 P2, Mark 33 Digital Information Transfer System (DITS) - Part 2 Discrete Data Words
- 3c. ARINC Specification 429 P3, Mark 33 Digital Information Transfer System (DITS) - Part 3 - File Data Transfer Techniques
4. ARINC Specification 618, Air/Ground Character-Oriented Protocol Specification
5. ARINC Specification 619, ACARS Protocols for Avionic End Systems
6. ARINC Specification 622, Processes for ATS Data Link Applications Over ACARS Air-Ground Network
7. ARINC Specification 623, Character-Oriented Air Traffic Service (ATS) Applications
8. ARINC Characteristic 724, Mark 2 Aircraft Communications Addressing and Reporting System
9. ARINC Characteristic 724B, Aircraft Communications Addressing and Reporting System (ACARS)
10. ARINC Characteristic 741P1, Aviation Satellite Communications System
11. ARINC Characteristic 741P2, Satellite Communications System
12. ARINC Characteristic 750, VHF Data Radio (VDR)
13. ARINC Characteristic 758, Communications Management Unit (CMU) Mark 2
14. ICAO Document 4444
15. ATA/IATA Interline Communications Manual, Doc/Gen/1840 Rev 8, October 1, 1987

Note: AEEC Characteristics and Specifications published by ARINC are normally written using generic references, i.e., the document is referenced without naming any Supplements that may have been added to update the standard. It is prudent practice to contact ARINC to determine the most current status of each relevant ARINC document before proceeding with any design.

**ATTACHMENT 1**  
**GROUND SYSTEMS STANDARDS RELATIONSHIPS**



**Figure 1-1 Functional Depiction of Internetworking**

**ATTACHMENT 2**  
**SERVICE MESSAGES - REASON CODES**

**Table 2-1 Reason Codes for Unformattable Downlink Service Messages**

| CODE | REASON FOR REJECTION           | EXPLANATION                                                                          | NOTE |     |
|------|--------------------------------|--------------------------------------------------------------------------------------|------|-----|
| 111  | Inconsistent Message Length    | Wrong text length for label                                                          |      |     |
| 112  | Unknown Label                  | The label is not known                                                               | 1    |     |
| 113  | Unknown Sublabel               | The sublabel is not known                                                            | 1    |     |
| 114  | Unknown Aircraft               | Aircraft registration is not known                                                   | 2,3  |     |
| 115  | Unknown Agency                 | The agency is unknown to the DSP                                                     | 4    | c-1 |
| 121  | Inconsistent H1 Message Format | The defined part of the free text of an OAT message is incorrect.                    |      |     |
| 122  | Inconsistent 8x Message Format | The Supplementary Address field in an aircrew address message is incorrect.          |      |     |
| 123  | Inconsistent Mx Message Format | The Supplementary Address field in an Arrival/Departure (IATA) message is incorrect. |      |     |
| 124  | Unknown Format                 | Unknown message format                                                               |      |     |
| 131  | Too many Type B Addresses      | Too many addresses in the Supplementary Address field                                |      |     |
| 132  | Unknown 3 or 4 Letter Code     | Unconfigured code in the Supplementary Address field                                 |      | c-3 |
| 133  | Missing Address for H1         | No supplementary address in OAT message                                              |      |     |
| 134  | Unknown Address                | Supplementary address is unknown to the DSP                                          |      |     |
| 141  | Unknown Reason                 | Reason not identified                                                                |      |     |
| 142  | Invalid MFI                    | This is an invalid MFI for ATS routing                                               |      | c-3 |
| 143  | No ETX                         | Invalid termination of an ACARS multiblock downlink                                  | 4    | c-4 |

**Notes:**

- [1] Although all service providers will support each of the defined labels, the user may need to specify the subset of defined labels used.
- [2] The service provider cannot identify specific aircraft. Typically, the service provider will maintain a list of aircraft for each user.
- [3] SITA supports this code, other service providers may not.
- [4] Supported only by ARINC.

Note: Messages that are declared undeliverable by the service provider are returned to the originator using the SMI of 'SVC'.

**ATTACHMENT 2 (cont'd)**  
**SERVICE MESSAGES - REASON CODES**

c-1 | **Table 2-2 Reason Codes for Untransmittable Uplink Services Messages**

| CODE | REASON FOR REJECTION                          | EXPLANATION                                                                                                         |
|------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 211  | Invalid Aircraft Number                       | The Aircraft Registration is improperly formatted                                                                   |
| 212  | Unknown Aircraft Number                       | The Aircraft Registration has not been identified to DSP                                                            |
| 213  | Invalid Flight Number                         | The Flight Number is improperly formatted                                                                           |
| 214  | Unknown Station in GL or AP                   | The city code is unknown to the DSP or is non-alphabetic                                                            |
| 215  | Invalid Station Type                          | The code is not valid ground station                                                                                |
| 216  | No Addressee                                  | The Text Elements include neither a Flight Number nor a Aircraft Registration                                       |
| 217  | No End of Address                             | The address of the message ends incorrectly                                                                         |
| 221  | Invalid Uplink Format                         | The format of the message cannot be decoded                                                                         |
| 222  | Unknown SMI                                   | The SMI is not supported                                                                                            |
| 223  | Unknown TEI                                   | An unsupported TEI appears                                                                                          |
| 224  | Duplicate TEI                                 | A TEI appears more than once                                                                                        |
| 225  | Multiple AP TEI(S)                            | More than one AP TEI appear                                                                                         |
| 226  | Multiple GL TEI(S)                            | More than one GL TEI appear                                                                                         |
| 227  | Multiple Stations to: GL and AP               | Both GL and AP TEIs appear                                                                                          |
| 228  | Invalid Originator Line                       | Improperly formatted origin                                                                                         |
| 231  | No Station To                                 | No tracking available and neither GL nor AP appear                                                                  |
| 232  | No known aircraft on this flight              | Flight Number not currently registered                                                                              |
| 234  | Aircraft not logged on                        | Unable to transmit message via SATCOM when aircraft is not logged on.                                               |
| 240  | AN/FI mismatch                                | Message was received with invalid pairing of Aircraft Number (AN) and Flight Identifier (FI).                       |
| 241  | Unable to process - Message too old           | Message delayed in Ground Network                                                                                   |
| 242  | Unauthorized Originator                       | Message received for ATS routing from unauthorized ATS facility                                                     |
| 243  | Invalid SMI                                   | This is an invalid SMI for ATS routing                                                                              |
| 244  | Invalid MFI                                   | This is an invalid MFI for ATS routing                                                                              |
| 245  | TP/GL mismatch                                | Inconsistent TP and GL identified                                                                                   |
| 246  | Missing Message Assurance Value               | Message sent by CAA User doesn't contain a MA TEI                                                                   |
| 247  | Invalid Message Assurance Value               | Message sent by CAA User contains a MA TEI with no value or with an invalid MA Value. (ex: MA 11Z, MA 11A, MAS,...) |
| 248  | Expiry of Message Assurance Timer (SITA only) | Timer has expired for a particular message while waiting for MAS confirmation from SITA or ARINC.                   |
| 249  | Unknown Reason                                | CAA Server Internal Operations is not allowing transmission of this message. Internal Error.                        |

Note: Messages that are declared undeliverable by the service provider are returned to the originator using the SMI of 'SVC'.

**ATTACHMENT 2 (cont'd)**  
**SERVICE MESSAGES - REASON CODES**

**Table 2-3 Reason Code for Undeliverable Uplink Service Messages**

c-1

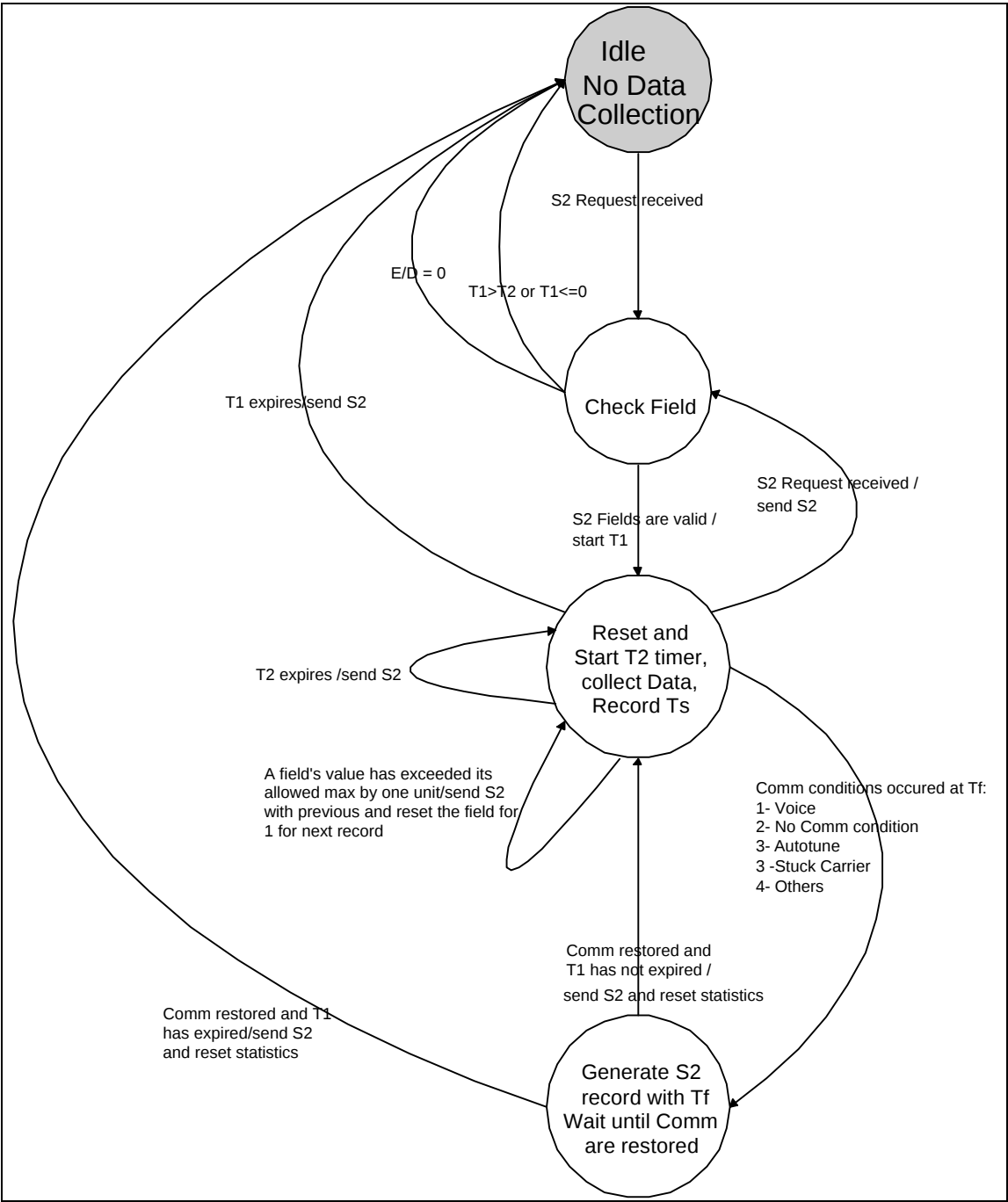
| Code | REASON FOR REJECTION   | EXPLANATION                                                                      |
|------|------------------------|----------------------------------------------------------------------------------|
| 311  | No ACK                 | No response from aircraft                                                        |
| 312  | Aircraft In Voice      | Aircraft is in voice mode                                                        |
| 321  | CA RJCT - Printer Busy | Aircraft printer error occurred                                                  |
| 322  | CB RJCT - Printer Busy | Aircraft printer busy                                                            |
| 323  | CC RJCT - Printer Busy | Aircraft printer in local test mode                                              |
| 324  | CD RJCT - Printer Busy | Aircraft printer out of paper                                                    |
| 325  | CE RJCT - Printer Busy | Aircraft printer buffer full                                                     |
| 326  | CF RJCT - Printer Busy | Aircraft printer has unknown error                                               |
| 331  | NK RJCT - Aircraft NAK | Aircraft decoded its address in uplink block but Block Check Sum (BCS) incorrect |
| 332  | Q5 RJCT                | ACARS MU unable to deliver message to final airborne destination                 |
| 333  | QX RJCT                | ACARS MU unable to handle message; do not re-send                                |

c-2

Note: Messages that are declared undeliverable by the service provider are returned to the originator using the SMI of 'SVC'.

c-3

**ATTACHMENT 3**  
**PERFORMANCE REPORT GENERATION STATE DIAGRAM**



**Figure 3-1 Data Gathering and Report Generation**

**APPENDIX A**  
**GLOSSARY & ACRONYMS**

|        |                                                            |
|--------|------------------------------------------------------------|
| ACARS  | Aircraft Communication Addressing and Reporting System     |
| ACDN   | Air Canada Data Network                                    |
| ACK    | Acknowledge                                                |
| ACMS   | Aircraft Condition Monitoring System                       |
| ADNS   | ARINC Data Network Service                                 |
| ADSU   | ADS Unit                                                   |
| AEEC   | Airline Electronic Engineering Committee                   |
| AFEPS  | ACARS Front End Processor System (ARINC)                   |
| AIDS   | Aircraft Integrated Data System                            |
| ADS    | Automatic Dependent Surveillance                           |
| AOS    | ACARS Outage Status                                        |
| ARA    | ACARS Restoral Advisory                                    |
| ARINC  | Aeronautical Radio, Incorporated                           |
| ASA    | ACARS Station Addition                                     |
| ASD    | ACARS Station Deletion                                     |
| ASP    | AIRCOM Service Processor                                   |
| ATA    | Air Transport Association                                  |
| ATC    | Air Traffic Control                                        |
| ATN    | Aeronautical TELECOMM Network                              |
| AVPAC  | Aviation VHF Packet Protocol                               |
| CAA    | Civil Aviation Authority                                   |
| CFDIU  | Central Fault Display Indicator Unit                       |
| CMC    | Centralized Maintenance Computer                           |
| CMU    | Communicating Management Unit                              |
| CSMA   | Carrier Sense/Multiple Access Protocol                     |
| DBI    | Downlink Block Identifier                                  |
| DDTC   | Digital Delivery of Taxi Clearance                         |
| DFDAU  | Digital Flight Data Acquisition Unit                       |
| DMU    | Data Management Unit                                       |
| DSC    |                                                            |
| DSP    | Data Link Service Provider                                 |
| DSU    | Data Link Service User                                     |
| ETB    | End of Transmission Block (ISO 5 character)                |
| ETX    | End of Transmission (ISO 5 character)                      |
| FMC    | Flight Management Computer                                 |
| FMS    | Flight Management System                                   |
| FWC    | Flight Warning Computer                                    |
| GSN    | Ground Station Network                                     |
| HLS    | High Level System                                          |
| IATA   | International Air Transport Association                    |
| ICAO   | International Civil Aviation Organization                  |
| ICM    | Interline Communications Manual                            |
| IMI    | Imbedded Message Identifier                                |
| MCDU   | Multi-Function-Control Display Unit                        |
| MFI    | Message Function Identifier                                |
| MTD    | Message Text Delimiter                                     |
| MTI    | Message Text Identifier                                    |
| MU     | Management Unit                                            |
| NAK    | Non Acknowledgment                                         |
| OAT    | Optional Auxiliary Terminal                                |
| OSI    | Open Systems Interface                                     |
| RF     | Radio Frequency                                            |
| RGS    | Remote Ground Station                                      |
| RTCA   | RTCA Corporation                                           |
| SATCOM | Satellite Communications                                   |
| SEM    | System Essential Message                                   |
| SITA   | Societe Internationale de Telecommunications Aeronautiques |
| SMI    | Standard Message Identifier                                |
| SMT    | Standard Message Text                                      |
| SPGNF  | Service Provider Global Network Facilities                 |
| SPGS   | Service Provider Ground Station                            |
| SP     | Service Provider                                           |
| SPP    | Service Provider Processor                                 |
| SRM    | Service Related Message                                    |
| STX    | Start-of-Text Control Character                            |

**APPENDIX A (cont'd)**  
**GLOSSARY & ACRONYMS**

|     |      |                                          |
|-----|------|------------------------------------------|
|     | TAK  | Technical Acknowledgment                 |
|     | TCAS | Traffic Alert/Collision Avoidance System |
|     | TEI  | Text Element Identifier                  |
|     | TET  | Text Element Terminator                  |
| c-3 | TWI  | Terminal Weather Information             |
|     | TWIP | Terminal Weather Information for Pilots  |
|     | UBI  | Uplink Block Identifier                  |
|     | UDM  | User Defined Message                     |
|     | UTC  | Universal Coordinated Time               |
| c-3 | WVSS | Water Vapor Sensor System                |

**APPENDIX B**  
**SECTION B.1**  
**TEI CODES**

A TEI is a two-character code that uniquely identifies a text element type contained in SMT. TEIs have been assigned for those text elements most commonly used in the air-ground operations environment. An effort has been made to assign codes that conform to existing international and U.S. domestic standards and to use mnemonic values that are of maximum use when human interpretation and manual processing are required by the recipient.

The following TEIs have been assigned:

| <u>Code</u> | <u>Title (Text Element Form)</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| -<SP>       | Start of “free text” indicator. The TEI consists of a dash and a space character. (Refer to the end of this list of TEIs for a discussion about the incorporation of “free text” in SMT.)                                                                                                                                                                                                                                                                                                                                               |     |
| AC          | Estimated time approach clearance (four numeric characters--GMT hhmm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |
| AD          | Aerodrome of concern or arrival (three or four alpha characters)<br><br>ATA/IATA = three alpha characters<br>ICAO = four alpha characters                                                                                                                                                                                                                                                                                                                                                                                               |     |
| AL          | Altitude or flight level (four, five, or six alphanumeric characters)<br><br>Character “A” plus three numeric characters = altitude to nearest 100 feet<br>Character “F” plus three numeric characters = flight level to nearest 100 feet<br>Character “M” plus four numeric characters = altitude to nearest 10 meters<br><br>The character “C,” “D,” or “L” prefixed to the character “A,” “F,” or “M” indicates that the aircraft is climbing, descending, or leaving (i.e., passing through the indicated altitude or flight level) |     |
| AN          | Aircraft number (up to seven alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |
| AP          | Aircraft located at an airport (three/four alpha characters corresponding to airport designator codes)                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |
| AR          | Arrival runway (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |
| AU          | Auxiliary power unit (APU) (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |
| BF          | Boarded fuel (up to six numeric characters; fuel to be expressed in hundreds of pounds, other units to be identified)                                                                                                                                                                                                                                                                                                                                                                                                                   |     |
| CL          | Cruising level (four or five alphanumeric characters)<br><br>Character “A” plus three numeric characters = altitude to nearest 100 feet<br>Character “F” plus three numeric characters = flight level to nearest 100 feet<br>Character “M” plus four numeric characters = altitude to nearest 10 meters                                                                                                                                                                                                                                 |     |
| CP          | Cargo and Payload Information (Variable length, alpha-numeric sequence)                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | c-3 |
| CZ          | Cruising speed (six alphanumeric characters--speed in knots; five alphanumeric characters--speed stated in a MACH number)<br><br>KTxxxx = knots<br>Mx.xx = MACH number<br>Where x is a numeric character                                                                                                                                                                                                                                                                                                                                |     |
| DA          | Aerodrome of departure (three or four alpha characters)<br><br>ATA/IATA = three alpha characters<br>ICAO = four alpha characters                                                                                                                                                                                                                                                                                                                                                                                                        |     |
| DP          | Dew point (two numeric characters--degrees Celsius)(Downlink only)                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |

**APPENDIX B (cont'd)****SECTION B.1****TEI CODES**

| <u>Code</u> |    | <u>Title (Text Element Form)</u>                                                                                                                                                                                                                                                                                                                                                    |
|-------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-4         | DS | Destination station (three or four alpha characters and, optionally, a space character and four numeric characters—Destination aerodrome and, optionally, UTC hhmm)<br><br>ATA/IATA = three alpha characters<br>ICAO = Four alpha characters                                                                                                                                        |
|             | DT | Communication service information (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                |
| c-3         |    | ACARS message received and processed:<br>DSP sit ddhhmm xxxx<br><br>Where:<br><br>DSP indicates DSP processed the message<br><br>site, airport or city designator of the ACARS site from which the message was received (three or four alpha characters)<br><br>ddhhmm date/time: the message was received (six numeric characters where dd = day of the month and hhmm = time UTC) |
|             |    | xxxx message sequence number: as received from the aircraft; the sequence number as defined in ARINC Specification 618                                                                                                                                                                                                                                                              |
| c-3         | DV | Identification of aircraft being diverted from landing at original destination to another location (variable alphanumeric characters)                                                                                                                                                                                                                                               |
|             | ED | Estimated time of departure (three or four alpha characters, space character, and four numeric characters--aerodrome of departure and UTC hhmm)<br><br>ATA/IATA = three alpha characters<br>ICAO = four alpha characters                                                                                                                                                            |
|             | EN | Endurance (four numeric characters--fuel endurance in hours and minutes, hhmm)                                                                                                                                                                                                                                                                                                      |
|             | EO | Estimated time over (variable number of alphanumeric characters, space character, and four numeric characters--location and UTC hhmm)                                                                                                                                                                                                                                               |
|             | FB | Fuel on board (up to six numeric characters, fuel to be expressed in hundreds of pounds; other units to be identified)                                                                                                                                                                                                                                                              |
|             | FC | Estimated further clearance (four numeric characters--UTC hhmm)                                                                                                                                                                                                                                                                                                                     |
|             | FD | Fuel over destination (up to six numeric characters; fuel to be expressed in hundreds of pounds, other units to be identified)                                                                                                                                                                                                                                                      |
|             | FI | Flight identification (up to seven alphanumeric characters)                                                                                                                                                                                                                                                                                                                         |
|             | GL | Approximate geographic location of aircraft (three/four alpha characters--airport or city designator code)                                                                                                                                                                                                                                                                          |
|             | HD | Aircraft heading (three numeric characters--aircraft heading to the closest ten degrees, true)                                                                                                                                                                                                                                                                                      |
|             | IC | Aircraft icing (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                   |
|             | IN | IN Time (four numeric characters--UTC hhmm)                                                                                                                                                                                                                                                                                                                                         |
|             | LA | Identification of officer landing aircraft (one numeric character)                                                                                                                                                                                                                                                                                                                  |
|             | LP | Log Page. Field length: 10 alpha and/or numeric characters                                                                                                                                                                                                                                                                                                                          |

**APPENDIX B (cont'd)****SECTION B.1****TEI CODES**

| <u>Code</u> | <u>Title (Text Element Form)</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LR          | Identification landing category (one numeric character)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| MA          | <p>Message assurance (three numeric characters and one alpha character--sequence number and function, nnn)</p> <p>Where nnn is a sequence number, 000-999, and a is an alpha character indicating the function of the text element:</p> <p style="margin-left: 40px;"> A = User Request for delivery indication<br/> I = User Request for delivery indication and link acknowledgement<br/> L = DSP identification of link acknowledgement<br/> S = DSP identification of message receipt<br/> X = DSP response for unsupported MA function<br/> F = DSP identification for untransmittable message </p> |
| MN          | Maintenance (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NL          | Number of landings (up to two numeric characters followed by the alpha character "F" or "T." The numeric characters indicate the number of landings, and the alpha character indicates the type of landing. "F" = full stops and "T" = touch and goes. Two sets of character sequences may be used, one indicating the number of full stops and one indicating the number of touch and goes)                                                                                                                                                                                                             |
| NP          | Next report point (variable number of alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| OF          | OFF Time (four numeric characters--UTC hhmm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ON          | ON Time (four numeric characters--UTC hhmm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| OS          | Other supplementary information (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| OT          | OUT Time (four numeric characters--UTC hhmm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| OV          | <p>Present location (variable number of alpha numeric characters, space character, four numeric characters, space character, and an alpha character with three numeric characters--location, UTC hhmm, and altitude or flight level)</p> <p style="margin-left: 40px;">Character "A" plus three numeric characters = altitude to nearest 100 feet</p> <p style="margin-left: 40px;">Character "F" plus three numeric characters = flight level to nearest 100 feet</p> <p style="margin-left: 40px;">Character "M" plus four numeric characters = altitude to nearest 10 meters</p>                      |
| PB          | Number of persons on board (variable alphanumeric characters--ATA/IATA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| PD          | Point of departure (three alpha characters--station of origin for this flight segment)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| QN          | Altimeter setting (two numeric characters, period character, and two numeric characters--value to set altimeter in inches xx.xx; if millibars are used as the reference, the character "M" is suffixed to the value)                                                                                                                                                                                                                                                                                                                                                                                     |
| RD          | Departure runway (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| RF          | Request flight level (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| RI          | Return in time (four numeric characters--UTC hhmm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| RM          | Remarks (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| RO          | Return on time (four numeric characters--UTC hhmm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| RT          | Route information (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**APPENDIX B (cont'd)**  
**SECTION B.1**  
**TEI CODES**

|     |  | <u>Code</u> | <u>Title (Text Element Form)</u>                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|--|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |  | SA          | Alternative aerodrome (three character sequence(s)-- ATA/IATA (Where more than one alternative is given, character sequences are separated by single space characters)                                                                                                                                                                                                                                                                             |
|     |  | SI          | Special communication addressing instruction (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                    |
|     |  | SK          | Sky conditions (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                  |
|     |  | SL          | SELCAL code (four alpha characters)                                                                                                                                                                                                                                                                                                                                                                                                                |
|     |  | SP          | Significant point (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                               |
|     |  | TA          | Static air temperature (two alpha characters and two numeric characters)<br><br>MSxx = temperature in degrees below zero, Celsius (-xx C)<br>PSxx = temperature in degrees above zero, Celsius (xx C)<br><br>Where xx is two numeric characters.                                                                                                                                                                                                   |
|     |  | TB          | Turbulence (variable alphanumeric characters)                                                                                                                                                                                                                                                                                                                                                                                                      |
|     |  | TM          | Surface air temperature (two alpha characters and two numeric characters)<br><br>MSxx = temperature in degrees below zero, Celsius (-xx C)<br>PSxx = temperature in degrees above zero, Celsius (xx C)<br><br>Where xx is two numeric characters.                                                                                                                                                                                                  |
|     |  | TO          | Time over (variable number of alphanumeric characters, space character, and four numeric characters--location and UTC hhmm)                                                                                                                                                                                                                                                                                                                        |
| c-4 |  | TP          | Transmission Path – Only one value should be used. <i>It</i> indicates to the DSP the medium to use for message delivery. “VHF” indicates the preference for the VHF media. Likewise, “SAT” and “HFD” indicate a preference for SATCOM and HFDL respectively.                                                                                                                                                                                      |
| c-3 |  | VR          | Runway visual range (up to three numeric characters--visual range in 30- to 60-meter increments for ranges to 800 meters)                                                                                                                                                                                                                                                                                                                          |
|     |  | WV          | Wind information (six numeric characters with the first three characters indicating wind direction to the nearest 10 degrees, true, and the second three characters indicating wind speed to the nearest knot)                                                                                                                                                                                                                                     |
|     |  | WX          | This text element may contain a weather-related position report if the weather, observation was taken at a position other than the aircraft’s present position. If a weather-related position report is included, the six numeric characters are followed by a space character and a variable number of alphanumeric characters at describe the position of observation. (The present position of the aircraft is reported by using the TEI “OV”.) |
|     |  | WI          | Weather (variable alphanumeric characters providing weather information or processing information for which there is no assigned TEI)                                                                                                                                                                                                                                                                                                              |
| c-3 |  | ZW          | Zero fuel weight (variable numeric characters)                                                                                                                                                                                                                                                                                                                                                                                                     |

TEIs and the text elements identified by the TEIs are referred to as structured text. A text element follows its TEI and is separated from the TEI by a single space character as shown in the following example:

TA MS29

Where TA identifies the text element as the static air temperature, and the text element indicates that the static air temperature is 29 below zero, Celsius.

**APPENDIX B (cont'd)**  
**SECTION B.2**  
**RULES FOR SMI/TEI APPLICATION**

Text that is not part of a message's structured text is "free text" and immediately follows the last line of the structured text portion of the text field. The start of the "free text" portion of SMT is indicated by a dash character ("-")-space character sequence that is used as a "free text" identifier. This identifier appears at the start of the first line of "free text."

That is, it immediately follows the Carriage Return-Line Feed sequence that ends the last line of structured text. The "free text" identifier is, in turn, followed by a space character that separates the "free text" identifier from the first character of "free text." The "free text" identifier appears only at the start of the first line of "free text." When the "free text" occupies more than one line, the "free text" identifier should not appear at the start of the second and subsequent lines of text.

The rules listed in this section apply to the use of standard message identifiers and text element identifiers in standard message text.

Notes: The ATA/IATA Five-bit Coded Character Set (Alphabet No. 2) uses "CARRET" and "LINE FEED" to refer to the Carriage Return and Line Feed control characters. The ATA/IATA Seven-bit Code for Information Interchange (Alphabet No. 5) uses CR and LF to refer to these characters. In this manual, CR and LF are used to refer to the Carriage Return and Line Feed control characters in both alphabets. The dash character is the FIGS "A" character in Alphabet No. 2.

1. Each message must contain an SMI. A message may not contain more than one SMI unless it is a Possible Duplicate Message (PDM) being (delivered) retransmitted by the service provider's ground/ground network. In this case, the SMI code PDM is inserted in line 3 of the message by the delivering service provider. The original SMI code would follow on line 4 and all other lines would be shifted down by one after this.
2. An SMI must be an approved three-character code and must be on a line by itself at the first part of the message text. All SMI codes presently approved for use with datalink are listed in Appendix C.
3. SMT text received by the datalink service provider from a ground user for transmission to an aircraft must include either an AN (aircraft registration mark) text element or an FI (flight identification) text element.
4. Structured text begins on the line immediately after the SMI line, and each line of structured text must be ended with a <cr/lf> sequence.
5. A TEI and its text element must be separated from each other by a single space; thus, the TEI and its text element must be on the same line. That is, they cannot be separated by a <cr/lf> sequence. This requirement also means that each line of structured text must begin with a TEI. (See, however, item 11 below.)
6. A line of text may contain several structured text elements; i.e., TEIs and their accompanying text elements. Structured text elements must be separated from each other by the slash character </> without any intervening spaces as shown in the following example:

FI XX110/AN N69740/DA IAH/OT 1936/FB 752/BF 268<cr/lf>

c-3

7. In the forming of messages, TEIs need not appear in any fixed order with the following exceptions:

**COMMENTARY**

The order of TEIs, as they appear in ground/ground message, is not necessarily consistent with the order of these fields in the air/ground message.

c-3

- a. In messages that have the flight identification or the aircraft number or both as mandatory text elements, the TEIs for these elements must appear immediately after the <cf/lf> sequence that ends the line containing the SMI.
- b. When present, TA static air temperature, should appear at the beginning of a line of structured text. That is, these TEIs must immediately follow a <cr/lf> sequence.
- c. When present, MA Message Assurance, should appear at the end of structured text; i.e., the TEI must follow the AN/FI sequence.

c-3

**APPENDIX B (cont'd)**  
**SECTION B.2**  
**RULES FOR SMI/TEI APPLICATION**

8. The start of “Free Text” is indicated by the dash character (“-”) followed by a space character. The dash character must be at the beginning of the first line of text and free text should start two spaces after the dash character. The dash character is not repeated at the beginning of subsequent lines of text.
9. When present, the “free text” portion of a message follows the <cr/lf> sequence that ends the last line of structured text. The “free text” portion must be located immediately before and be terminated by the end-of-text character.
10. Structured data elements identified by TEIs may be mandatory or optional for an SMI as defined for an SMT; however, the order and composition of data items within a data element should be standardized for each SMT.
11. If the number of characters in a text element for a TEI causes the standard line length allowed by the communications environment to be exceeded and the text element to be broken by a <cr/lf> sequence, the TEI must be repeated after the <cr/lf> sequence. The repeated TEI is followed by a space character and the remainder of the text element.
12. The use of the TP TEI is optional; however, when used in conjunction with the GL TEI, the ground station’s media must match that specified by the TP TEI.

While it is implied that message texts identified by certain SMIs will always contain specific TEIs, no fixed SMTs have been agreed to at present.

In general, it is intended that data processing be accomplished at the TEI level, not the SMI level.

**APPENDIX C**  
**MESSAGE INFORMATION**

**Table C-1 Message List by SMI**

|     | <b>SMI</b> | <b>LABEL/<br/>SUBLABEL</b> | <b>UPLINK or<br/>DOWNLINK</b> | <b>DESCRIPTION</b>                          | <b>SECTION</b> | <b>NOTES</b> |
|-----|------------|----------------------------|-------------------------------|---------------------------------------------|----------------|--------------|
| c-3 | A80 to A8~ | 80 to 8~                   | DN                            | Aircrew-Addressed Downlink Message          | 5.3.11         |              |
| c-4 | AAM        | N/A                        | G/G                           | Network Advisory Message                    |                |              |
|     | AEP        | 57                         | DN                            | Alternate Aircrew Initiated Position Report | 5.3.47         |              |
|     | AEP        | 5R                         | DN                            | Aircrew Initiated Position Report           | 5.3.5          |              |
|     | AFD        | B0                         | DN                            | ATS Facility Notification (AFN)             | 5.5.10         |              |
|     | AFU        | A0                         | UP                            | ATS Facility Notification (AFN)             | 4.5.10         |              |
|     | AGM        | 5Z                         | DN                            | Airline Designated Downlink                 | 5.3.7          |              |
|     | AGM        | 7B                         | DN                            | Aircrew Entered Miscellaneous Message       | 5.3.10         |              |
| c-3 | AGM        | C1                         | UP                            | Designated Cockpit/Cabin Printer Message    | 4.3.4          |              |
|     | AGM        | Q1                         | DN                            | Departure/Arrival Report                    | 5.3.16         |              |
|     | AID        | N/A                        | N/A                           | Airborne Instrumentation Data System        |                |              |
|     | ALR        | N/A                        | N/A                           | Alerting Message                            |                |              |
|     | AOA        | N/A                        | G/G                           | ACARS Station(s) Outage Advisory            |                |              |
|     | AOS        | N/A                        | G/G                           | ACARS Station(s) Outage Status Advisory     |                |              |
| c-4 | APR        | S3                         | UP                            | LRU Configuration Report Request            | 4.3.8          |              |
|     | APR        | S3                         | DN                            | LRU Configuration Report                    | 5.3.50         |              |
|     | ARA        | N/A                        | G/G                           | ACARS Station(s) Restoral Advisory          |                |              |
|     | ARI        | N/A                        | G/G                           | Fuel/Close-out Report                       |                |              |
|     | ARR        | Q1                         | DN                            | Arrival Report                              | 5.3.16         |              |
|     | ARR        | QC                         | DN                            | ON Report (IATA Airport Code)               | 5.3.26         |              |
|     | ARR        | QD                         | DN                            | IN/Fuel Report (IATA Airport Code)          | 5.3.27         |              |

N/A = Not Applicable G/G = Ground to Ground  
UP = Uplink  
DN = Downlink

**APPENDIX C (cont'd)**  
**MESSAGE INFORMATION**

| Table C-1 Message List by SMI (cont'd) |                    |                       |             |                                                |                   |  |
|----------------------------------------|--------------------|-----------------------|-------------|------------------------------------------------|-------------------|--|
| SMI                                    | LABEL/<br>SUBLABEL | UPLINK or<br>DOWNLINK | DESCRIPTION | SECTION                                        | NOTES             |  |
| c-3                                    | ARR                | QK                    | DN          | Landing Report (IATA Airport Code)             | 5.3.32            |  |
|                                        | ARR                | QL                    | DN          | Arrival Report (IATA Airport Code)             | 5.3.33            |  |
|                                        | ARR                | QM                    | DN          | Arrival Information Report (IATA Airport Code) | 5.3.34            |  |
| c-3                                    | ARR                | QR                    | DN          | ON Report (ICAO Airport Code)                  | 5.3.38            |  |
|                                        | ARR                | QS                    | DN          | IN Report (ICAO Airport Code)                  | 5.3.39            |  |
| c-3                                    | ASA                | N/A                   | G/G         | ACARS Station(s) Addition                      |                   |  |
|                                        | ASD                | N/A                   | G/G         | ACARS Station(s) Deletion                      |                   |  |
|                                        | ATC                | AA                    | UP          | ATCCommunications                              | 4.5.11            |  |
|                                        | ATC                | BA                    | DN          | ATCCommunications                              | 5.5.11            |  |
| c-3                                    | AUD                | H1/AD                 | UP          | ADS (To Selected ATSU/ADSU)                    | 4.3.5             |  |
|                                        | AUL                | H1/A1                 | UP          | ADS (To left ATSU/ADSU)                        | 4.3.5.4           |  |
|                                        | AUR                | H1/A2                 | UP          | ADS (To right ATSU/ADSU)                       | 4.3.5.4           |  |
|                                        | AVR                | 54                    | DN          | Voice Contact Request (Ground Party Address)   | 5.2.2             |  |
|                                        | CDA                | B4                    | DN          | Departure Clearance Readback Downlink          | 5.5.4             |  |
|                                        | CFD                | H1/CF                 | UP/DN       | Central Fault Display (Header)                 | 4.3.5.3,<br>5.4.2 |  |
|                                        | CFX                | H1/CF                 | UP          | Central Fault Display (No Header)              | 4.3.5.4           |  |
|                                        | CLA                | B2                    | DN          | Oceanic Clearance Readback                     | 5.5.2             |  |
|                                        | CLD                | A3                    | UP          | Departure Clearance                            | 4.5.3             |  |
|                                        | CLK                | Q3                    | DN          | Clock Update Advisory                          | 5.3.18            |  |
|                                        | CLX                | A1                    | UP          | Oceanic Clearance                              | 4.5.1             |  |

N/A = Not Applicable    G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

| Table C-1 Message List by SMI (cont'd) |                    |                       |             |                                                       |                   |
|----------------------------------------|--------------------|-----------------------|-------------|-------------------------------------------------------|-------------------|
| SMI                                    | LABEL/<br>SUBLABEL | UPLINK or<br>DOWNLINK | DESCRIPTION | SECTION                                               | NOTES             |
| c-3                                    | CMD                | RA                    | UP          | Command/Response Uplink                               | 4.3.6             |
|                                        | CPL                | BE                    | DN          | CPC Aircraft Log-On/Log-Off Request                   | 5.5.15            |
|                                        | CP0                | C0                    | UP          | Undesignated Cockpit/Cabin Printer Messages, All Call | 4.3.4             |
|                                        | CPR                | AF                    | UP          | CPC Command/Response                                  | 4.5.16            |
| c-3                                    | CP2 to<br>CP9      | C2 to C9              | UP          | Designated Cockpit/Cabin Printer Messages             | 4.3.4             |
|                                        | CWR                | BF                    | DN          | CPC WILCO/UNABLE RESPONSE                             | 5.5.16            |
|                                        | DAI                | A9                    | UP          | ATIS Report                                           | 4.5.9             |
|                                        | DDS                | A8                    | UP          | Deliver Departure Slot                                | 4.5.8             |
| c-3                                    | DEP                | Q1                    | DN          | Departure Report                                      | 5.3.16            |
|                                        | DEP                | QA                    | DN          | OUT/Fuel Report (IATA Airport Code)                   | 5.3.24            |
|                                        | DEP                | QB                    | DN          | OFF Report (IATA Airport Code)                        | 5.3.25            |
|                                        | DEP                | QE                    | DN          | OUT/Fuel/Destination Report (IATA Airport Code)       | 5.3.28            |
| c-3                                    | DEP                | QF                    | DN          | OFF/Destination Report (IATA Airport Code)            | 5.3.29            |
|                                        | DEP                | QH                    | DN          | OUT Report (IATA Airport Code)                        | 5.3.31            |
|                                        | DEP                | QP                    | DN          | OUT Report (ICAO Airport Code)                        | 5.3.36            |
|                                        | DEP                | QQ                    | DN          | OFF Report (ICAO Airport Code)                        | 5.3.37            |
|                                        | DFD                | H1/DF                 | UP/DN       | Digital Flight Data Acquisition Unit (Header)         | 4.3.5.3,<br>5.4.2 |
|                                        | DFX                | H1/DF                 | UP          | Digital Flight Data Acquisition Unit (No Header)      | 4.3.5.4           |
|                                        | DIV                | QN                    | DN          | Diversion Report (IATA Airport Code)                  | 5.3.35            |
|                                        | DLA                | Q7                    | DN          | Delay Message                                         | 5.3.21            |

N/A = Not Applicable    G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

**APPENDIX C (cont'd)**  
**MESSAGE INFORMATION**

| <b>Table C-1 Message List by SMI (cont'd)</b> |                            |                               |                    |                                                     |              |
|-----------------------------------------------|----------------------------|-------------------------------|--------------------|-----------------------------------------------------|--------------|
| <b>SMI</b>                                    | <b>LABEL/<br/>SUBLABEL</b> | <b>UPLINK or<br/>DOWNLINK</b> | <b>DESCRIPTION</b> | <b>SECTION</b>                                      | <b>NOTES</b> |
| c-3                                           | ECS                        | H1/EC                         | DN                 | Engine Display System                               | 5.3.48       |
|                                               | ENG                        | 7A                            | DN                 | Aircrew Initiated Engine Data/Takeoff Thrust Report | 5.3.9        |
|                                               | ENG                        | H1/E1                         | DN                 | Engine Report                                       | 5.4          |
|                                               | ETA                        | 5Y                            | DN                 | Aircrew Revision to Previous ETA/Diversion Report   | 5.3.8        |
| c-3                                           | ETA                        | Q2                            | DN                 | Estimated Time of Arrival Report                    | 5.3.17       |
|                                               | ETC                        | AD                            | UP                 | Expect Taxi Clearance                               | 4.5.14       |
|                                               | ETR                        | BD                            | DN                 | Pushback Clearance Request                          | 5.5.14       |
| c-3                                           | FC3                        | H1/M3                         | UP                 | Flight Management Computer, Center (Header)         | 4.4.3        |
|                                               | FCD                        | H1/MD                         | UP                 | Flight Management Computer, Selected (Header)       | 4.4.3        |
|                                               | FCL                        | H1/M1                         | UP                 | Flight Management Computer, Left (Header)           | 4.4.3        |
| c-3                                           | FCR                        | H1/M2                         | UP                 | Flight Management Computer, Right (Header)          | 4.4.3        |
|                                               | FM3                        | H1/M3                         | UP/DN              | Flight Management Computer, Center (No Header)      | 4.4.4, 5.4.2 |
|                                               | FMD                        | H1/MD                         | UP                 | Flight Management Computer, Selected (No Header)    | 4.4.4        |
|                                               | FML                        | H1/M1                         | UP/DN              | Flight Management Computer, Left (No Header)        | 4.4.4, 5.4.2 |
| c-3                                           | FMR                        | H1/M2                         | UP/DN              | Flight Management Computer, Right (No Header)       | 4.4.4, 5.4.2 |
|                                               | FSM                        | A4                            | UP                 | Flight Systems Message                              | 4.5.4        |
|                                               | FTD                        | B7                            | DN                 | “Free Text” to ATC                                  | 5.5.7        |
|                                               | FTU                        | A7                            | UP                 | “Free Text” from ATC                                | 4.5.7        |
| c-3                                           | GVR                        | 54                            | UP                 | Voice Go-ahead (or ACARS Frequency Uplink)          | 4.2.3        |
|                                               | HDD                        | H1/HD                         | UP                 | HF Data Radio, Selected (No Header)                 | 4.4.3        |
|                                               | HDL                        | H1/H1                         | UP/DN              | HF Data Radio, Left (No Header)                     | 4.4.3, 5.4   |
|                                               | HDR                        | H1/H2                         | UP/DN              | HF Data Radio, Right (No Header)                    | 4.4.3, 5.4   |
|                                               | HJK                        | 00                            | DN                 | Emergency Situation Report (Aircraft Hijack)        | 5.3.1        |

N/A = Not Applicable    G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

| Table C-1 Message List by SMI (cont'd) |               |                    |                           |                                              |                   |       |
|----------------------------------------|---------------|--------------------|---------------------------|----------------------------------------------|-------------------|-------|
|                                        | SMI           | LABEL/<br>SUBLABEL | UPLINK or<br>DOWNLIN<br>K | DESCRIPTION                                  | SECTION           | NOTES |
| c-4                                    | ICE           | H3                 | DN                        | Icing Report                                 | 5.3.52            |       |
| c-3                                    | M10 to<br>M4~ | 10 to 4~           | UP/DN                     | User Defined Messages (No Header)            | 4.6, 5.6          |       |
|                                        | MAS           | N/A                | G/G                       | Message Assurance                            |                   |       |
|                                        | MED           | SA                 | DN                        | Media Advisory                               | 5.3.51            |       |
| c-3                                    | MVA           | M2                 | DN                        | User Defined Message                         | 5.6               |       |
|                                        | MX1           | X1                 | UP/DN                     | Service Provider Defined                     |                   |       |
|                                        | MX2 to<br>MX9 | X2 to X9           | UP/DN                     | Service Provider Defined                     |                   |       |
|                                        | N10 to<br>N4~ | H1/10 to H1/4~     | UP/DN                     | User Defined Messages (No Header)            | 4.3.5.4,<br>5.4.2 |       |
|                                        | NPR           | S2                 | UP/DN                     | Network Performance Report                   | 4.3.7, 5.3.49     |       |
|                                        | NSR           | S1                 | UP                        | VHF Network Statistics Report Request        | 4.3.7             |       |
|                                        | NSR           | S1                 | DN                        | VHF Network Statistics Report                | 5.3.49            |       |
|                                        | OAT           | H1/Any Undefined   | DN                        | Optional Auxiliary Terminal Message (Header) | 4.4.1, 5.4.2      |       |
|                                        | OAT           | H1/None            | UP/DN                     | Optional Auxiliary Terminal (Header)         | 4.4.1, 5.4        |       |
|                                        | OAT           | H1/PS              | DN                        | Keyboard/Display Unit                        | 4.4.4, 5.4        |       |
| c-4                                    | OAX           | H1/None            | UP                        | Optional Auxiliary Terminal (No Header)      | 4.4.1             |       |
|                                        | PAR           | B6                 | DN                        | Provide ADS Report                           | 5.5.6             |       |
|                                        | PBC           | AC                 | UP                        | Pushback Clearance                           | 4.5.13            |       |
|                                        | PBR           | BC                 | DN                        | Pushback Clearance Request                   | 5.5.13            |       |
|                                        | PDM           | N/A                | G/G                       | Possible Duplicate Message                   |                   |       |
| c-3                                    | POS           | B5                 | DN                        | Waypoint Position Report                     | 5.5.5             |       |
|                                        | QTB           | N/A                | G/G                       | Incomplete Message                           |                   |       |

N/A = Not Applicable    G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

| Table C-1 Message List by SMI (cont'd) |                    |                       |             |                                                                                          |               |
|----------------------------------------|--------------------|-----------------------|-------------|------------------------------------------------------------------------------------------|---------------|
| SMI                                    | LABEL/<br>SUBLABEL | UPLINK or<br>DOWNLINK | DESCRIPTION | SECTION                                                                                  | NOTES         |
| c-3                                    | RAI                | B9                    | DN          | Request ATIS Report                                                                      | 5.5.9         |
|                                        | RAR                | A6                    | UP          | Request ADS Report                                                                       | 4.5.6         |
|                                        | RCD                | B3                    | DN          | Request Departure Clearance                                                              | 5.5.3         |
|                                        | RCL                | B1                    | DN          | Request Oceanic Clearance                                                                | 5.5.1         |
|                                        | RDO                | RB                    | DN          | Command/Response Downlink                                                                | 5.3.14        |
|                                        | RDS                | B8                    | DN          | Request Departure Slot                                                                   | 5.5.8         |
|                                        | REJ                | HX                    | DN          | Undelivered Uplink Report                                                                | 5.3.46        |
| c-3                                    | RTN                | QG                    | DN          | OUT/Return IN Report (IATA Airport Code)                                                 | 5.3.30        |
|                                        | RTN                | QT                    | DN          | OUT/Return IN Report (ICAO Airport Code)                                                 | 5.3.40        |
|                                        | SDD                | H1/SD                 | UP          | SDU, Selected (No Header)                                                                | 4.4.4         |
|                                        | SDL                | H1/S1                 | UP/DN       | SDU, Left (No Header)                                                                    | 4.4.4, 5.4    |
| c-3                                    | SDR                | H1/S2                 | UP/DN       | SDU, Right (No Header)                                                                   | 4.4.4, 5.4    |
|                                        | SVC                | CA                    | DN          | Communication Service Message, Printer Status<br>Annunciation - Error in Printer         |               |
|                                        | SVC                | CB                    | DN          | Printer Busy                                                                             | 5.2.9         |
|                                        | SVC                | CC                    | DN          | Printer in Local or Test Mode                                                            | 5.2.9         |
|                                        | SVC                | CD                    | DN          | Printer Out of Paper                                                                     | 5.2.9         |
|                                        | SVC                | CE                    | DN          | Printer Buffer Overrun                                                                   | 5.2.9         |
|                                        | SVC                | CF                    | DN          | Printer Initialized Before Completion<br>Printer Status Communication - Error in Printer |               |
| c-3                                    | SVC                | N/A                   | G/G         | Communication Service Message                                                            |               |
|                                        | SVC                | Q5                    | DN          | Unable to Deliver Uplink Messages                                                        | 5.2.5, 5.3.20 |
|                                        | SVC                | QX                    | DN          | Intercept/Unable to Process                                                              | 5.2.7         |
|                                        | TIS                | 5D                    | DN          | ATIS Request                                                                             | 5.3.4         |

N/A = Not Applicable    G/G = Ground to Ground  
                                   UP = Uplink  
                                   DN = Downlink

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| Table C-1 Message List by SMI (cont'd) |                    |                       |                                             |            |           |
|----------------------------------------|--------------------|-----------------------|---------------------------------------------|------------|-----------|
| SMI                                    | LABEL/<br>SUBLABEL | UPLINK or<br>DOWNLINK | DESCRIPTION                                 | SECTION    | NOTES     |
| TTO                                    | H1/T0              | UP                    | Cabin Terminal Message All Call (No Header) | 4.4.4      | Undefined |
| TT1 to TT8                             | H1/T1 to<br>H1/T8  | UP/DN                 | Cabin Terminal Message (No Header)          | 4.4.4, 5.4 |           |
| TWI                                    | AB                 | UP                    | Terminal Weather Information for Pilots     | 4.5.12     |           |
| TWR                                    | BB                 | DN                    | Terminal Weather Information for Pilots     | 5.5.12     |           |
| TX1 to TX8                             | H1/T1 to<br>H1/T8  | UP                    | Cabin Terminal Messages (No Header)         | 4.4.3      |           |
| WXM                                    | H2                 | UP                    | Meteorological Report Command               | 4.3.9      |           |
| WXM                                    | H2                 | DN                    | Meteorological Report                       | 5.3.13     |           |
| W XO                                   | H1/WO              | UP/DN                 | Weather Observation Report                  | 4.4, 5.4   |           |
| WXR                                    | 5U                 | DN                    | Weather Request                             | 5.3.6      |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |
|                                        |                    |                       |                                             |            |           |

N/A = Not Applicable    G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

APPENDIX C (cont'd)  
 MESSAGE INFORMATION

**APPENDIX C (cont'd)**  
**MESSAGE INFORMATION**

| Table C-2 Message List by Label |            |                    |                                                     |              |       |
|---------------------------------|------------|--------------------|-----------------------------------------------------|--------------|-------|
| LABEL                           | SMI        | UPLINK or DOWNLINK | DESCRIPTION                                         | SECTION      | NOTES |
| ::                              | N/A        | UP                 | Data Transceiver Auto-Tune                          | 4.2.6        |       |
| _j                              | N/A        | N/A                | Reserved                                            | 4.2.2        |       |
| _DEL                            | N/A        | UP/DN              | General Response (Demand Mode)                      | 4.2.1, 5.2.1 |       |
| 00                              | HJK        | DN                 | Emergency Situation Report (Aircraft Hijack)        | 5.3.1        |       |
| 10 to 4~                        | M10 to M4~ | UP/DN              | User Defined Messages (No Header)                   | 4.6, 5.6     |       |
| 51                              | N/A        | DN                 | Ground GMT Request                                  | 5.3.2        |       |
| 51                              | N/A        | UP                 | Ground GMT Report                                   | 4.3.1        |       |
| 52                              | N/A        | DN                 | Ground UTC Request                                  | 5.3.3        |       |
| 52                              | N/A        | UP                 | Ground UTC Report                                   | 4.3.2        |       |
| 54                              | AVR        | DN                 | Voice Contact Request (Ground Party Address)        | 5.2.2        |       |
| 54                              | GVR        | UP                 | Voice Go-ahead (or ACARS Frequency Uplink)          | 4.2.3        |       |
| 57                              | AEP        | DN                 | Alternate Aircrew Initiated Position Report         | 5.3.47       |       |
| 5D                              | TIS        | DN                 | ATIS Request                                        | 5.3.4        |       |
| 5P                              | N/A        | DN                 | Temporary Suspension                                | 5.2.4        |       |
| 5R                              | AEP        | DN                 | Aircrew Initiated Position Report                   | 5.3.5        |       |
| 5U                              | WXR        | DN                 | Weather Request                                     | 5.3.6        |       |
| 5Y                              | ETA        | DN                 | Aircrew Revision to Previous ETA/Diversion Report   | 5.3.8        |       |
| 5Z                              | AGM        | DN                 | Airline Designated Downlink                         | 5.3.7        |       |
| 7A                              | ENG        | DN                 | Aircrew Initiated Engine Data/Takeoff Thrust Report | 5.3.9        |       |
| 7B                              | AGM        | DN                 | Aircrew Entered Miscellaneous Message               | 5.3.10       |       |
| 80 to 8~                        | A80 to A8~ | DN                 | Aircrew-Addressed Downlink Message                  | 5.3.11       |       |

N/A = Not Applicable G/G = Ground to Ground  
UP = Uplink  
DN = Downlink

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**APPENDIX C (cont'd)**  
**MESSAGE INFORMATION**

| <b>Table C-2 Message List by Label (cont'd)</b> |            |                           |                    |                                                |              |
|-------------------------------------------------|------------|---------------------------|--------------------|------------------------------------------------|--------------|
| <b>LABEL</b>                                    | <b>SMI</b> | <b>UPLINK or DOWNLINK</b> | <b>DESCRIPTION</b> | <b>SECTION</b>                                 | <b>NOTES</b> |
| c-3                                             | A1         | CLX                       | UP                 | Oceanic Clearance                              | 4.5.1        |
|                                                 | A2         | Unassigned                | UP                 | Unassigned                                     | 4.5.2        |
|                                                 | A3         | CLD                       | UP                 | Departure Clearance                            | 4.5.3        |
| c-3                                             | A4         | FSM                       | UP                 | Flight Systems Message                         | 4.5.4        |
|                                                 | A5         | Unassigned                | UP                 | Unassigned                                     | 4.5.5        |
|                                                 | A6         | RAR                       | UP                 | Request ADS Reports                            | 4.5.6        |
| c-3                                             | A7         | FTU                       | UP                 | “Free Text” from ATC                           | 4.5.7        |
|                                                 | A8         | DDS                       | UP                 | Deliver Departure Slot                         | 4.5.8        |
|                                                 | A9         | DAI                       | UP                 | ATIS Report                                    | 4.5.9        |
|                                                 | A0         | AFU                       | UP                 | ATS Facility Notification (AFN)                | 4.5.10       |
|                                                 | AA         | ATC                       | UP                 | ATC Communications                             | 4.5.11       |
|                                                 | AB         | TWI                       | UP                 | Terminal Weather Information for Pilots (TWIP) | 4.5.12       |
|                                                 | AC         | PBC                       | UP                 | Pushback Clearance                             | 4.5.13       |
|                                                 | AD         | ETC                       | UP                 | Expected Taxi Clearance                        | 4.5.14       |
|                                                 | AE         | Unassigned                | UP                 | Unassigned                                     | 4.5.15       |
|                                                 | AF         | CPR                       | UP                 | CPC Command Response                           | 4.5.16       |
|                                                 | AG         | Unassigned                | UP                 | Unassigned                                     | 4.5.17       |

N/A = Not Applicable G/G = Ground to Ground

UP = Uplink

DN = Downlink

**APPENDIX C (cont'd)**  
**MESSAGE INFORMATION**

| <b>Table C-2 Message List by Label (cont'd)</b> |            |                           |                    |                                         |              |
|-------------------------------------------------|------------|---------------------------|--------------------|-----------------------------------------|--------------|
| <b>LABEL</b>                                    | <b>SMI</b> | <b>UPLINK or DOWNLINK</b> | <b>DESCRIPTION</b> | <b>SECTION</b>                          | <b>NOTES</b> |
| c-3                                             | B1         | RCL                       | DN                 | Request Oceanic Clearance               | 5.5.1        |
|                                                 | B2         | CLA                       | DN                 | Oceanic Clearance Readback              | 5.5.2        |
|                                                 | B3         | RCD                       | DN                 | Request Departure Clearance             | 5.5.3        |
|                                                 | B4         | CDA                       | DN                 | Departure Clearance Readback Downlink   | 5.5.4        |
| c-3                                             | B5         | POS                       | DN                 | Waypoint Position Report                | 5.5.5        |
|                                                 | B6         | PAR                       | DN                 | Provide ADS Report                      | 5.5.6        |
|                                                 | B7         | FTD                       | DN                 | “Free Text” to ATC                      | 5.5.7        |
|                                                 | B8         | RDS                       | DN                 | Request Departure Slot                  | 5.5.8        |
| c-3                                             | B9         | RAI                       | DN                 | Request ATIS Report                     | 5.5.9        |
|                                                 | B0         | AFD                       | DN                 | ATS Facility Notification (AFN)         | 5.5.10       |
|                                                 | BA         | ATC                       | DN                 | ATC Communications                      | 5.5.11       |
|                                                 | BB         | TWR                       | DN                 | Terminal Weather Information for Pilots | 5.5.12       |
|                                                 | BC         | PBR                       | DN                 | Pushback Clearance Request              | 5.5.13       |
|                                                 | BD         | ETR                       | DN                 | Expected Taxi Clearance Request         | 5.5.14       |
|                                                 | BE         | CPL                       | DN                 | CPC Log-on/Log-off Request              | 5.5.15       |
|                                                 | BF         | CWR                       | DN                 | CPC WILCO/UNABLE Response               | 5.5.16       |
|                                                 | BG         | Unassigned                | DN                 | Unassigned                              | 5.5.17       |

N/A = Not Applicable G/G = Ground to Ground  
UP = Uplink  
DN = Downlink

| Table C-2 Message List by Label (cont'd) |          |                    |             |                                                                                          |            |
|------------------------------------------|----------|--------------------|-------------|------------------------------------------------------------------------------------------|------------|
| LABEL                                    | SMI      | UPLINK or DOWNLINK | DESCRIPTION | SECTION                                                                                  | NOTES      |
| c-3                                      | C0       | CP0                | UP          | Undesignated Cockpit/Cabin Printer Messages, All Call                                    | 4.3.4      |
|                                          | C1       | AGM                | UP          | Designated Cockpit/Cabin Printer Messages                                                | 4.3.4      |
|                                          | C2 to C9 | CP2 to CP9         | UP          | Designated Cockpit/Cabin Printer Messages                                                | 4.3.4      |
| c-3                                      | CA       | SVC                | DN          | Communication Service Message, Printer Status Annunciation - Error in Printer            | 5.2.9      |
|                                          | CB       | SVC                | DN          | Printer Busy                                                                             | 5.2.9      |
|                                          | CC       | SVC                | DN          | Printer in Local or Test Mode                                                            | 5.2.9      |
|                                          | CD       | SVC                | DN          | Printer Out of Paper                                                                     | 5.2.9      |
|                                          | CE       | SVC                | DN          | Printer Buffer Overrun                                                                   | 5.2.9      |
|                                          | CF       | SVC                | DN          | Printer Initialized Before Completion<br>Printer Status Communication - Error in Printer | 5.2.9      |
|                                          | F3       | N/A                | DN          | Dedicated Transceiver Advisory                                                           | 5.2.8      |
| c-4                                      | H1       | Various            | UP/DN       | See Table C-2A                                                                           | Table C-2A |
|                                          | H2       | WXM                | UP          | Meteorological Report Command                                                            | 4.3.9      |
| c-4                                      | H2       | WXM                | DN          | Meteorological Report                                                                    | 5.3.13     |
|                                          | H3       | ICE                | DN          | Icing Report                                                                             | 5.3.52     |
| c-3                                      | HX       | REJ                | DN          | Undelivered Uplink Report                                                                | 5.3.46     |
|                                          | M2       | MVA                | DN          | User Defined Message                                                                     | 5.6        |

N/A = Not Applicable G/G = Ground to Ground  
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**APPENDIX C (cont'd)**  
**MESSAGE INFORMATION**

| <b>Table C-2 Message List by Label (cont'd)</b> |            |                           |                                                 |                |                 |
|-------------------------------------------------|------------|---------------------------|-------------------------------------------------|----------------|-----------------|
| <b>LABEL</b>                                    | <b>SMI</b> | <b>UPLINK or DOWNLINK</b> | <b>DESCRIPTION</b>                              | <b>SECTION</b> | <b>NOTES</b>    |
| Q0                                              | N/A        | DN                        | Link Test                                       | 5.3.15         |                 |
| Q1                                              | AGM        | DN                        | Departure/Arrival Report                        | 5.3.16         |                 |
| Q1                                              | ARR        | DN                        | Arrival Report                                  | 5.3.16         |                 |
| Q1                                              | DEP        | DN                        | Departure Report                                | 5.3.16         |                 |
| Q2                                              | ETA        | DN                        | Estimated Time of Arrival Report                | 5.3.17         |                 |
| Q3                                              | CLK        | DN                        | Clock Update Advisory                           | 5.3.18         |                 |
| Q4                                              | N/A        | UP                        | Voice Circuit Busy                              | 4.2.4          | (Not Supported) |
| Q5                                              | SVC        | DN                        | Unable to Deliver Uplink Messages               | 5.2.5          |                 |
| Q6                                              | N/A        | DN                        | Voice to Data Channel Changeover Advisory       | 5.2.6          |                 |
| Q7                                              | DLA        | DN                        | Delay Message                                   | 5.3.21         |                 |
| QA                                              | DEP        | DN                        | OUT/Fuel Report (IATA Airport Code)             | 5.3.24         |                 |
| QB                                              | DEP        | DN                        | OFF Report (IATA Airport Code)                  | 5.3.25         |                 |
| QC                                              | ARR        | DN                        | ON Report (IATA Airport Code)                   | 5.3.26         |                 |
| QD                                              | ARR        | DN                        | IN/Fuel Report (IATA Airport Code)              | 5.3.27         |                 |
| QE                                              | DEP        | DN                        | OUT/Fuel/Destination Report (IATA Airport Code) | 5.3.28         |                 |
| QF                                              | DEP        | DN                        | OFF/Destination Report (IATA Airport Code)      | 5.3.29         |                 |
| QG                                              | RTN        | DN                        | OUT/Return IN Report (IATA Airport Code)        | 5.3.30         |                 |
| QH                                              | DEP        | DN                        | OUT Report (IATA Airport Code)                  | 5.3.31         |                 |
| QK                                              | ARR        | DN                        | Landing Report (IATA Airport Code)              | 5.3.32         |                 |

N/A = Not Applicable G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

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| Table C-2 Message List by Label (cont'd) |          |                    |             |                                                |        |
|------------------------------------------|----------|--------------------|-------------|------------------------------------------------|--------|
| LABEL                                    | SMI      | UPLINK or DOWNLINK | DESCRIPTION | SECTION                                        | NOTES  |
| c-3                                      | QL       | ARR                | DN          | Arrival Report (IATA Airport Code)             | 5.3.33 |
|                                          | QM       | ARR                | DN          | Arrival Information Report (IATA Airport Code) | 5.3.34 |
|                                          | QN       | DIV                | DN          | Diversion Report (IATA Airport Code)           | 5.3.35 |
|                                          | QP       | DEP                | DN          | OUT Report (ICAO Airport Code)                 | 5.3.36 |
|                                          | QQ       | DEP                | DN          | OFF Report (ICAO Airport Code)                 | 5.3.37 |
|                                          | QR       | ARR                | DN          | ON Report (ICAO Airport Code)                  | 5.3.38 |
|                                          | QS       | ARR                | DN          | IN Report (ICAO Airport Code)                  | 5.3.39 |
|                                          | QT       | RTN                | DN          | OUT/Return IN Report (ICAO Airport Code)       | 5.3.40 |
|                                          | QX       | SVC                | DN          | Intercept/Unable to Process                    | 5.2.7  |
|                                          | RA       | CMD                | UP          | Command/Response Uplink                        | 4.3.5  |
| c-3                                      | RB       | RDO                | DN          | Command/Response Downlink                      | 5.3.14 |
|                                          | S1       | NSR                | UP          | Network Statistics Report Request              | 4.3.6  |
|                                          | S1       | NSR                | DN          | VHF Network Statistics Report                  | 5.3.48 |
|                                          | S2       | NPR                | UP          | VHF Performance Report Request                 | 4.3.7  |
| c-4                                      | S2       | NPR                | DN          | VHF Performance Report                         | 5.3.49 |
|                                          | S3       | APR                | UP          | LRU Configuration Report Request               | 4.3.8  |
|                                          | S3       | APR                | DN          | LRU Configuration Report                       | 5.3.50 |
| c-3                                      | SA       | MED                | DN          | Media Advisory                                 | 5.3.51 |
|                                          | SQ       | N/A                | UP          | Squitter Message                               | 4.2.5  |
|                                          | X1       | MX1                | UP/DN       | Service Provider Defined                       |        |
|                                          | X2 to X9 | MX2 to MX9         | UP/DN       | Service Provider Defined                       |        |

N/A = Not Applicable G/G = Ground to Ground  
UP = Uplink  
DN = Downlink

| Table C-2A Peripheral Messages (Label H1) Listed by SubLabel |            |                    |                                                  |            |       |
|--------------------------------------------------------------|------------|--------------------|--------------------------------------------------|------------|-------|
| SUBLABEL                                                     | SMI        | UPLINK or DOWNLINK | DESCRIPTION                                      | SECTION    | NOTES |
| A1                                                           | AUL        | UP                 | ADS (To left ATSU/ADSU)                          | 4.4.4      |       |
| A2                                                           | AUR        | UP                 | ADS (To right ATSU/ADSU)                         | 4.4.4      |       |
| AD                                                           | AUD        | UP                 | ADS (To Selected ATSU/ADSU)                      | 4.4.4      |       |
| CF                                                           | CFD        | UP/DN              | Central Fault Display                            | 4.4.3, 5.4 |       |
| CF                                                           | CFX        | UP                 | Central Fault Display (No Header)                | 4.4.4      |       |
| DF                                                           | DFD        | UP/DN              | Digital Flight Data Acquisition Unit (Header)    | 4.4.3, 5.4 |       |
| DF                                                           | DFX        | UP                 | Digital Flight Data Acquisition Unit (No Header) | 4.4.4      |       |
| EC                                                           | ECS        | DN                 | Engine Display System                            | 5.4        |       |
| EI                                                           | ENG        | DN                 | Engine Report                                    | 5.4        |       |
| H1                                                           | HDL        | UP/DN              | HF Data Radio, Left (No Header)                  | 4.4.3, 5.4 |       |
| H2                                                           | HDR        | UP/DN              | HF Data Radio, Right (No Header)                 | 4.4.3, 5.4 |       |
| HD                                                           | HDD        | UP                 | HF Data Radio, Selected (No Header)              | 4.4.3      |       |
| M1                                                           | FCL        | UP                 | Flight Management Computer, Left (Header)        | 4.4.3      |       |
| M1                                                           | FML        | UP/DN              | Flight Management Computer, Left (No Header)     | 4.4.4, 5.4 |       |
| M2                                                           | FCR        | UP                 | Flight Management Computer, Right (Header)       | 4.4.3      |       |
| M2                                                           | FMR        | UP/DN              | Flight Management Computer, Right (No Header)    | 4.4.4, 5.4 |       |
| M3                                                           | FC3        | UP/DN              | Flight Management Computer, Center (Header)      | 4.4.3, 5.4 |       |
| M3                                                           | FM3        | UP/DN              | Flight Management Computer, Center (No Header)   | 4.4.4, 5.4 |       |
| MD                                                           | FCD        | UP                 | Flight Management Computer, Selected (Header)    | 4.4.3      |       |
| MD                                                           | FMD        | UP                 | Flight Management Computer, Selected (No Header) | 4.4.4, 5.4 |       |
| 10 to 4~                                                     | N10 to N4~ | UP/DN              | User Defined Messages (No Header)                | 4.4.4, 5.4 |       |

N/A = Not Applicable G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

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| Table C-2A Peripheral Messages (Label H1) Listed by SubLabel (cont'd) |            |                    |                                              |             |           |
|-----------------------------------------------------------------------|------------|--------------------|----------------------------------------------|-------------|-----------|
| SUBLABEL                                                              | SMI        | UPLINK or DOWNLINK | DESCRIPTION                                  | SECTION     | NOTES     |
| Any Undefined                                                         | OAT        | DN                 | Optional Auxillary Terminal Message (Header) | 4.4.1., 5.4 |           |
| None                                                                  | OAT        | UP/DN              | Optional Auxiliary Terminal (Header)         | 4.4.3       |           |
| None                                                                  | OAX        | UP                 | Optional Auxiliary Terminal (No Header)      | 4.4.4, 5.4  |           |
| PS                                                                    | OAT        | DN                 | Keyboard/Display Unit                        | 4.4.4, 5.4  |           |
| S1                                                                    | SDL        | UP/DN              | SDU, Left (No Header)                        | 4.4.4, 5.4  |           |
| S2                                                                    | SDR        | UP/DN              | SDU, Right (No Header)                       | 4.4.4, 5.4  |           |
| SD                                                                    | SDD        | UP                 | SDU, Selected (No Header)                    | 4.4.4       |           |
| T0                                                                    | TT0        | UP                 | Cabin Terminal Message                       | 4.4.4       | Undefined |
| T1 to T8                                                              | TT1 to TT8 | UP/DN              | Cabin Terminal Messages (No Header)          | 4.4.4       |           |
| T1 to T8                                                              | TX1 to TX8 | UP                 | Cabin Terminal Messages ( Header)            | 4.4.3       |           |
| WO                                                                    | W XO       | UP/DN              | Weather Observation Report                   | 4.4, 5.4    |           |

N/A = Not Applicable    G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

**APPENDIX C (cont'd)**  
**MESSAGE INFORMATION**

| Table C-2B MFI Assignments |     |                    |                                 |         |       |
|----------------------------|-----|--------------------|---------------------------------|---------|-------|
| MFI                        | SMI | UPLINK or DOWNLINK | DESCRIPTION                     | SECTION | NOTES |
| A1                         | CLX | UP                 | Oceanic Clearance               | 4.5.1   |       |
| A2                         | --- | UP                 | Unassigned                      | 4.5.2   |       |
| A3                         | CLD | UP                 | Departure Clearance Response    | 4.5.3   |       |
| A4                         | FSM | UP                 | Flight Systems Message          | 4.5.4   |       |
| A5                         | --- | UP                 | Assigned                        | 4.5.5   |       |
| A6                         | RAR | UP                 | Request ADS Reports             | 4.5.6   |       |
| A7                         | FTU | UP                 | Free Text                       | 4.5.7   |       |
| A8                         | DDS | UP                 | Deliver Departure Slot          | 4.5.8   |       |
| A9                         | DAI | UP                 | ATIS report                     | 4.5.9   |       |
| A0                         | AFU | UP                 | ATS Facility Notification (AFN) | 4.5.10  |       |
| AA                         | ATC | UP                 | ATCComm                         | 4.5.11  |       |
| AB                         | TWI | UP                 | TWIP Report                     | 4.5.12  |       |
| AC                         | PBC | UP                 | Pushback Clearance              | 4.5.13  |       |
| AD                         | ETC | UP                 | Expected Taxi Clearance         | 4.5.14  |       |
| AE                         | --- | UP                 | Unassigned                      | 4.5.15  |       |
| AF                         | CPR | UP                 | CPC Command/Response            | 4.5.16  |       |
| B1                         | RCL | DN                 | Request Oceanic Clearance       | 5.5.1   |       |
| B2                         | CLA | DN                 | Oceanic Clearance Readback      | 5.5.2   |       |
| B3                         | RCD | DN                 | Request Departure Clearance     | 5.5.3   |       |
| B4                         | CDA | DN                 | Departure Clearance Readback    | 5.5.4   |       |
| B5                         | --- | DN                 | Reserved                        | 5.5.5   |       |
| B6                         | PAR | DN                 | Provide ADS Report              | 5.5.6   |       |
| B7                         | FTD | DN                 | Free Text                       | 5.5.7   |       |

N/A = Not Applicable      G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

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| Table C-2B MFI Assignments (cont'd) |     |                       |                                 |         |       |
|-------------------------------------|-----|-----------------------|---------------------------------|---------|-------|
| MFI                                 | SMI | UPLINK or<br>DOWNLINK | DESCRIPTION                     | SECTION | NOTES |
| B8                                  | RDS | DN                    | Request Departure Slot          | 5.5.8   |       |
| B9                                  | RAI | DN                    | Request ATIS Report             | 5.5.9   |       |
| B0                                  | AFD | DN                    | ATS Facility Notification       | 5.5.10  |       |
| BA                                  | ATC | DN                    | ATCComm                         | 5.5.11  |       |
| BB                                  | TWR | DN                    | Request TWIP Report             | 5.5.12  |       |
| BC                                  | PBR | DN                    | Pushback Clearance Request      | 5.5.13  |       |
| BD                                  | ETR | DN                    | Expected Taxi Clearance Request | 5.5.14  |       |
| BE                                  | CPL | DN                    | CPC Aircraft Log-On/Off Request | 5.5.15  |       |
| BF                                  | CWR | DN                    | CPC WILCO/UNABLE Response       | 5.5.15  |       |
| H2                                  | WXM | UP                    | Meteorological Report Request   | 4.3.9   |       |
| H2                                  | WXM | DN                    | Meteorological Report           | 5.3.13  |       |
| H3                                  | ICE | DN                    | Icing Report                    | 5.3.32  |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |
|                                     |     |                       |                                 |         |       |

N/A = Not  
 Applicable
 G/G = Ground to Ground  
 UP = Uplink  
 DN = Downlink

APPENDIX C (cont'd)  
 MESSAGE INFORMATION

**APPENDIX D**  
**BLOCKING MULTIBLOCK MESSAGES**

**APPENDIX D REMOVED FROM SUPPLEMENT 4 BUT RETAINED AS A PLACEHOLDER.**

**APPENDIX E****Table E-1 BaudotLimits to ASCII (ISO #5) Code Set**

|             |       |       |       |                      |                        |                        |                      |         |         |         |         |                        |
|-------------|-------|-------|-------|----------------------|------------------------|------------------------|----------------------|---------|---------|---------|---------|------------------------|
| BIT 7-----> |       |       |       |                      | 0                      | 0                      | 0                    | 0       | 1       | 1       | 1       | 1                      |
| BIT 6-----> |       |       |       |                      | 0                      | 0                      | 1                    | 1       | 0       | 0       | 1       | 1                      |
| BIT 5-----> |       |       |       |                      | 0                      | 1                      | 0                    | 1       | 0       | 1       | 0       | 1                      |
| BIT 4       | BIT 3 | BIT 2 | BIT 1 | Column<br>→<br>Row ↓ | 0                      | 1                      | 2                    | 3       | 4       | 5       | 6       | 7                      |
| 0           | 0     | 0     | 0     | 0                    | 00<br>NUL              | 10<br>DLE              | 20<br>SP             | 30<br>0 | 40<br>@ | 50<br>P | 60<br>~ | 70<br>p                |
| 0           | 0     | 0     | 1     | 1                    | 01<br>SOH              | 11<br>DC1              | 21<br>!              | 31<br>1 | 41<br>A | 51<br>Q | 61<br>a | 71<br>q                |
| 0           | 0     | 1     | 0     | 2                    | 02<br>STX              | 12<br>DC2              | 22<br>"              | 32<br>2 | 42<br>B | 52<br>R | 62<br>b | 72<br>r                |
| 0           | 0     | 1     | 1     | 3                    | 03<br>ETX              | 13<br>DC3              | 23<br># <sup>1</sup> | 33<br>3 | 43<br>C | 53<br>S | 63<br>c | 73<br>s                |
| 0           | 1     | 0     | 0     | 4                    | 04<br>EOT              | 14<br>DC4              | 24<br>\$             | 34<br>4 | 44<br>D | 54<br>T | 64<br>d | 74<br>t                |
| 0           | 1     | 0     | 1     | 5                    | 05<br>ENQ              | 15<br>NAK              | 25<br>%              | 35<br>5 | 45<br>E | 55<br>U | 65<br>e | 75<br>u                |
| 0           | 1     | 1     | 0     | 6                    | 06<br>ACK              | 16<br>SYN              | 26<br>&              | 36<br>6 | 46<br>F | 56<br>V | 66<br>f | 76<br>v                |
| 0           | 1     | 1     | 1     | 7                    | 07 <sup>3</sup><br>BEL | 17<br>ETB              | 27<br>               | 37<br>7 | 47<br>G | 57<br>W | 67<br>g | 77<br>w                |
| 1           | 0     | 0     | 0     | 8                    | 08<br>BS               | 18<br>CAN              | 28<br>(              | 38<br>8 | 48<br>H | 58<br>X | 68<br>h | 78<br>x                |
| 1           | 0     | 0     | 1     | 9                    | 09<br>HT               | 19<br>EM               | 29<br>)              | 39<br>9 | 49<br>I | 59<br>Y | 69<br>i | 79<br>y                |
| 1           | 0     | 1     | 0     | 10                   | 0A<br>LF               | 1A<br>SUB              | 2A<br>*              | 3A<br>: | 4A<br>J | 5A<br>Z | 6A<br>j | 7A<br>z                |
| 1           | 0     | 1     | 1     | 11                   | 0B<br>VT               | 1B<br>ESC <sup>2</sup> | 2B<br>+              | 3B<br>; | 4B<br>K | 5B<br>[ | 6B<br>k | 7B<br>{                |
| 1           | 1     | 0     | 0     | 12                   | 0C<br>FF               | 1C<br>FS               | 2C<br>,              | 3C<br>< | 4C<br>L | 5C<br>\ | 6C<br>l | 7C<br>                 |
| 1           | 1     | 0     | 1     | 13                   | 0D<br>CR               | 1D<br>GS               | 2D<br>-              | 3D<br>= | 4D<br>M | 5D<br>] | 6D<br>m | 7D<br>}                |
| 1           | 1     | 1     | 0     | 14                   | 0E<br>SO               | 1E<br>RS <sup>—</sup>  | 2E<br>. <sup>1</sup> | 3E<br>> | 4E<br>N | 5E<br>^ | 6E<br>n | 7E<br>~                |
| 1           | 1     | 1     | 1     | 15                   | 0F<br>SI               | 1F<br>US               | 2F<br>/ <sup>1</sup> | 3F<br>? | 4F<br>O | 5F<br>— | 6F<br>o | 7F <sup>4</sup><br>DEL |

Hex value — 04 1 — Note  
Character — EOT

— Shading indicates that the character is not recommended in the "Free Text" portion of either Uplink or Downlink Messages.

- [1] See Section 2.2.8 for guidance on usage.  
 [2] The ESC character will pass through the SITA network.  
 [3] The BEL character will pass through the ARINC network.  
 [4] The DEL character is reserved.

**APPENDIX E (cont'd)****Table E-2 Baudot Character Set**

|                                           |       |       |       |                      |     |     |    |    |    |    |    |     |
|-------------------------------------------|-------|-------|-------|----------------------|-----|-----|----|----|----|----|----|-----|
| BIT 7-----><br>BIT 6-----><br>BIT 5-----> |       |       |       |                      | 0   | 0   | 0  | 0  | 1  | 1  | 1  | 1   |
|                                           |       |       |       |                      | 0   | 0   | 1  | 1  | 0  | 0  | 1  | 1   |
|                                           |       |       |       |                      | 0   | 1   | 2  | 3  | 4  | 5  | 6  | 7   |
| BIT 4                                     | BIT 3 | BIT 2 | BIT 1 | Column<br>→<br>Row ↓ | 00  | 10  | 20 | 30 | 40 | 50 | 60 | 70  |
| 0                                         | 0     | 0     | 0     | 0                    | NUL | DLE | SP | 0  | @  | P  | ~  | p   |
| 0                                         | 0     | 0     | 1     | 1                    | 01  | 11  | 21 | 31 | 41 | 51 | 61 | 71  |
|                                           |       |       |       |                      | SOH | DC1 | !  | 1  | A  | Q  | a  | q   |
| 0                                         | 0     | 1     | 0     | 2                    | 02  | 12  | 22 | 32 | 42 | 52 | 62 | 72  |
|                                           |       |       |       |                      | STX | DC2 | "  | 2  | B  | R  | b  | r   |
| 0                                         | 0     | 1     | 1     | 3                    | 03  | 13  | 23 | 33 | 43 | 53 | 63 | 73  |
|                                           |       |       |       |                      | ETX | DC3 | #  | 3  | C  | S  | c  | s   |
| 0                                         | 1     | 0     | 0     | 4                    | 04  | 14  | 24 | 34 | 44 | 54 | 64 | 74  |
|                                           |       |       |       |                      | EOT | DC4 | \$ | 4  | D  | T  | d  | t   |
| 0                                         | 1     | 0     | 1     | 5                    | 05  | 15  | 25 | 35 | 45 | 55 | 65 | 75  |
|                                           |       |       |       |                      | ENQ | NAK | %  | 5  | E  | U  | e  | u   |
| 0                                         | 1     | 1     | 0     | 6                    | 06  | 16  | 26 | 36 | 46 | 56 | 66 | 76  |
|                                           |       |       |       |                      | ACK | SYN | &  | 6  | F  | V  | f  | v   |
| 0                                         | 1     | 1     | 1     | 7                    | 07  | 17  | 27 | 37 | 47 | 57 | 67 | 77  |
|                                           |       |       |       |                      | BEL | ETB |    | 7  | G  | W  | g  | w   |
| 1                                         | 0     | 0     | 0     | 8                    | 08  | 18  | 28 | 38 | 48 | 58 | 68 | 78  |
|                                           |       |       |       |                      | BS  | CAN | (  | 8  | H  | X  | h  | x   |
| 1                                         | 0     | 0     | 1     | 9                    | 09  | 19  | 29 | 39 | 49 | 59 | 69 | 79  |
|                                           |       |       |       |                      | HT  | EM  | )  | 9  | I  | Y  | i  | y   |
| 1                                         | 0     | 1     | 0     | 10                   | 0A  | 1A  | 2A | 3A | 4A | 5A | 6A | 7A  |
|                                           |       |       |       |                      | LF  | SUB | *  | :  | J  | Z  | j  | z   |
| 1                                         | 0     | 1     | 1     | 11                   | 0B  | 1B  | 2B | 3B | 4B | 5B | 6B | 7B  |
|                                           |       |       |       |                      | VT  | ESC | +  | ;  | K  | [  | k  | {   |
| 1                                         | 1     | 0     | 0     | 12                   | 0C  | 1C  | 2C | 3C | 4C | 5C | 6C | 7C  |
|                                           |       |       |       |                      | FF  | FS  | ,  | <  | L  | \  | l  |     |
| 1                                         | 1     | 0     | 1     | 13                   | 0D  | 1D  | 2D | 3D | 4D | 5D | 6D | 7D  |
|                                           |       |       |       |                      | CR  | GS  | -  | =  | M  | ]  | m  | }   |
| 1                                         | 1     | 1     | 0     | 14                   | 0E  | 1E  | 2E | 3E | 4E | 5E | 6E | 7E  |
|                                           |       |       |       |                      | SO  | RS  | .  | >  | N  | ^  | n  | ~   |
| 1                                         | 1     | 1     | 1     | 15                   | 0F  | 1F  | 2F | 3F | 4F | 5F | 6F | 7F  |
|                                           |       |       |       |                      | SI  | US  | /  | ?  | O  | —  | o  | DEL |

Hex value — 04 1  
 Character — EOT

Note



Shading indicates that the character is not recommended for text that is intended to pass through baudot ground/ground connections.

- ① See Section 2.2.8 for guidance on usage.
- ② The ESC character will pass through the SITA network.
- ③ The BEL character will pass through the ARINC network.
- ④ The DEL character is reserved.

## APPENDIX F

### VHF ACARS NETWORK PERFORMANCE REPORTING

#### 1.1 Background

There is a growing interest among some ACARS users to improve the Network Management function found within the present air-ground ACARS systems. The user, from its Ground Host, should be able to request the status of a VHF RF activity. Similarly, the DSP will be able to probe the aircraft system to check its ACARS activity status. This capability will assist the management of ACARS traffic congestion and fault isolation.

#### 1.2 S2 Label

The label 'S2' should be used to provide reports of air-ground systems indicators pertinent to RF load level and protocol management.

- The S2 label will serve as a tool to provide pertinent Indicators of real time performance such as :
  - Downlink success rate
  - Retransmission rate
  - Delivery delays
  - Block Error Rate

#### 1.3 S2 Format and Content

A standardized suite of data measurements and set of indicators needs to be identified. This section provides an overview of a proposed set of indicators. It is recommended that the whole set of data would fit in a **single block**.

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##### 1.3.1 Aircraft Profile

The 618 Specification contains many system requirements which are not mandatory (i.e. "may", "can") and it may be useful to know from Service Providers' point of view what kind of options are supported by an aircraft. To cope with such an implementation diversities, this report would allow the DSP to dynamically integrate data's per aircraft basis and accommodate the 618 protocol to certain specificities.

Example of Aircraft Profile field (Yes/No):

FANS-1 Equipped Aircraft  
 SAT Equipped Aircraft  
 HF Equipped Aircraft  
 LAT/LON available (FMC)  
 AT7 range (12-25 sec or 6-12 sec as an example)  
 AC1 value (3-8)  
 Support ATS applications on-board  
 Support S1 Statistic Label  
 Support nested downlink ACARS multiblock message  
 Support nested uplink ACARS multiblock message  
 Category-A/B  
 Support 5P/Q6/F3 enable/disable  
 Support SA label  
 Support Tracker Timer (optional in cat-B..)  
 MAC algorithm (P-persistent, 1-persistent, Non-persistent)

##### 1.3.2 Environmental indicators

###### 1.3.2.1 Channel Utilization

This data indicator will provide on frequency use so as isolate traffic conditions. An S2 label can be used as a probing point in the air to measure the Channel load as seen from aircraft in a particular area and take appropriate decision within the respective DSP's multi frequency management algorithms.

**APPENDIX F (cont'd)**  
**VHF ACARS NETWORK PERFORMANCE REPORTING**

1.3.2.1 Channel Utilization (cont'd)

- Possible definitions ( in percentage)**

This parameter represents the percentage of time the channel is busy with ACARS traffic blocks. The Channel Utilization is calculated by dividing the cumulative time the channel has been busy over the measurement period (Tf-Ts). It includes the contribution of aborted packets and invalid packets which occupy the channel for some period but which are not successfully received.

$$CU_{Util1}(\Delta t) = \frac{a}{\Delta t} \times NB\_BLK \times (\overline{TXT} + \overline{PRK} + NTXT)$$

Where :

|                  |                                                                                                                                             |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| $a$              | is the character duration within a 2400bps transmission rate ( 1/300 sec)                                                                   |
| $\Delta t$       | is the time slot duration (Tf-Ts sec)                                                                                                       |
| $\overline{TXT}$ | is the text field length (in characters) over the time slot duration                                                                        |
| $\overline{PRK}$ | is the average block Prekey length ( fixed for 42 characters for SITA)                                                                      |
| $NTXT$           | is the fixed number of characters in each ACARS block which are not text characters (22 characters for BAR, SYN, SOH, Mode, ETX, BCS, DEL). |
| $NB\_BCK$        | is the total number of decoded block : uplink, downlink, pass, failed, squitters.                                                           |

or

$$CU_{Util2} = \frac{T_{cu}}{T_f - T_s}$$

Where

|          |                                                                      |
|----------|----------------------------------------------------------------------|
| $T_{cu}$ | is the cumulative amount of time the MU detects the channel is busy. |
| $T_s$    | is the start time of Data Collection                                 |
| $T_f$    | is the stop time of Data Collection                                  |

1.3.2.2 MAC Delay

It is defined as the time spent to get on the channel. This time depends on the MAC algorithm used (p-persistent, non-persistent...) and channel utilization. A MAC average delay can be measured in the Tf-Ts period by adding each MAC interval computed from the time the block is sent to the MAC layer up to the time it is transmitted over the RF channel.

Cumulative MAC delay within Tf-Ts as computed by the MU:

$$T_{mac} = \sum_{t=T_s}^{T_f} (Time\_Block\_sent\_to\_MAC_i - Time\_block\_sent\_to\_RF_i)$$

Average MAC delay:

$$AvMacDelay = \frac{T_{mac}}{D1 + D2}$$

**APPENDIX F (cont'd)**  
**VHF ACARS NETWORK PERFORMANCE REPORTING**

where Tmac is those downlinks requiring ACKs      D1 = Number of first downlink block transmissions that require an ACK

where Tmac is those downlinks requiring ACKs      D2 = Number of re-transmitted downlink block s that require an ACK

See Section 5.3.49 for usage. See Section 5.10.2 of ARINC Specification 618 for further detail.

### 1.3.2.3 Aircraft VHF Management Indicators

The management indicators aims at defining data elements necessary to live performance management of congestion and fault isolation.

Example of Management Indicators fields :

- Start time of Data Collection : Ts (hhmmss)
- Stop time of Data Collection : Tf (hhmmss)
- Service Provider Id provided in Squitter (XS, XA AC ...)
- Frequency (Base/Alternate) : XYZ.abc
- Air / Ground character indication (cruise or on the ground - OOOI State)

OUT time (hhmmss)  
 OFF time (hhmmss)  
 ON time (hhmmss)  
 IN time (hhmmss)  
 Origin Airport  
 Destination Airport

may not be necessary since these data are already present in the OOOI messages.

- LAT at Tf
- LON at Tf
- Altitude at Tf

define the area where the indicators apply, information which may facilitate Frequency Management

- Cumulative Downlink Success Rate made of :
  - Number of Acknowledgment received
  - Number of blocks transmitted
- Repetition Rate made of:
  - Number of first block transmissions
  - Number of blocks transmitted (encompasses first transmissions and re-transmissions)
- Error Rate Indicators-(i.e Number of Uplink/Downlink Block with failed BCS collected during Tf-Ts)
- Block Delivery Average Delay
- Number of Hand-offs in Category-B
- Number of distinct Logical Channel heard during Tf-Ts.
- Number of distinct Squitters received during Tf-Ts

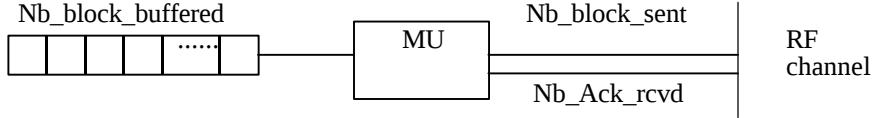
### 1.3.3 Indicator calculations

The following sections give an insight into some indicators that can be extracted from the Statistics Record S2 found in Section 5.3.49.

**APPENDIX F (cont'd)**  
**VHF ACARS NETWORK PERFORMANCE REPORTING**

**1.3.3.1 Cumulative Downlink Success Rate**

This indicator refers to the cumulative number of acknowledgment received to date divided by the number of block transmitted to date (comprise first block transmission and re-transmissions).



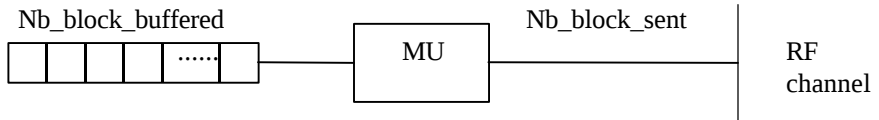
$$R1(Ts, Tf) = \frac{\sum_{t=Ts}^{t=Tf} Nb\_Ack\_rcvd}{\sum_{t=Ts}^{t=Tf} Nb\_Block\_sent} = \frac{U1}{D1 + D2} \quad \text{where } Tf \text{ is the stop time and } Ts \text{ Start Time}$$

This indicator has a maximum outcome value is 1, when all the downlinks did receive their corresponding acknowledgment on the first attempt. The ideal result would be the indicator value equals to 1 during the whole flight. It also check for command response efficiency.

c-4

**1.3.3.2 Channel Efficiency Ratio**

This indicator is computed by dividing the total number of ACARS blocks which have been buffered by the total number of blocks transmitted (no count for re-transmissions) over the RF channel. The R2 ratio provides an accurate measure as regards the RF channel capacity usage.



$$R2(Ts, Tf) = \frac{\sum_{t=Ts}^{t=Tf} Nb\_Block\_buffered}{\sum_{t=Ts}^{t=Tf} Nb\_FirstBlock\_sent} = \frac{B1}{D1} \quad \text{where } Tf \text{ is the Stop time and } Ts \text{ Start time}$$

**1.3.3.3 Downlink retransmissions or repetition rate**

This indicator records the number of times an ACARS block is transmitted before getting an acknowledgment. This indicator can measure the average magnitude of the repetitionsenc to quantify high traffic symptoms.

$$R3(Ts, Tf) = \frac{\sum_{t=Ts}^{t=Tf} Nb\_FirstBlock\_sent}{\sum_{t=Ts}^{t=Tf} Total\_Block\_sent} = \frac{D1}{D1 + D2}$$

**APPENDIX F (cont'd)**  
**VHF ACARS NETWORK PERFORMANCE REPORTING**

**1.3.3.4 Block Error Rate (Bad BCS + Incomplete messages)**

The following is a non-exhaustive sample of Error Rate Indicators that could be derive from the Statistics Record S2 found in Section 5.3.49:

$$\text{Downlink Error Rate} = \frac{ID3 + BD3}{ID3 + BD3 + D3}$$

$$\text{Uplink Error Rate} = \frac{IU3 + BU3 + BU4 + IB4}{IU3 + BU3 + BU4 + IU4 + U2 + U3 + U4}$$

$$\text{Downlink BCS Error Rate} = \frac{BD3}{BD3 + D3}$$

$$\text{Uplink BCS error Rate} = \frac{BU3 + BU4}{BU3 + BU4 + U2 + U3 + U4}$$

c-4

**1.3.3.5 Number of Hand-offs (Category-B only)**

All Category-B downlink are identified within the mode characters @ through ]. The actual mode character inserted in each transmission depends upon the preferred ground system access code the MU may use, based on all valid uplink mode characters captured. This indicator defines the total number of successive mode characters selected by the aircraft during Category-B mode of operation (except the mode '2' which is reserved for the broadcast).

$$\text{Number of Hand-offs} = CTB1$$

**1.3.3.6 Downlink Delivery Average Delay**

This indicator gathered data related to the maximum or average delay per ACARS block ( due to retransmissions). The maximum delivery time is correlated to the maximum number of times the MU attempts to downlink a block. This indicator encompasses the MAC delay and the uniform distributed AT7 timer and can be defined as follows :

Cumulative block delivery delay within Tf-Ts as computed by the MU:

$$Tbdd = \sum_{t=Ts}^{Tf} (Time\_FirstBlock\_sent_i - Time\_Ack\_received_i)$$

$$\text{Average block delivery delay: } AvBlDelay = \frac{Tbdd}{D1 + D2}$$

**APPENDIX F (cont'd)**  
**VHF ACARS NETWORK PERFORMANCE REPORTING**

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SUPPLEMENT 1©

TO

ARINC SPECIFICATION 620

“DATA LINK GROUND SYSTEM STANDARD AND  
INTERFACE SPECIFICATION (DGSS/IS)”

Published: January 15, 1994

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 19, 1993

**A. PURPOSE OF THIS DOCUMENT**

This Supplement describes the enhancements to the definition of the interface between the data link service provider and the users of this service.

**B. ORGANIZATION OF THIS DOCUMENT**

The first part of this document contains description of changes proposed for introduction into this Specification by this Supplement.

The second part consists of revised pages for the Specification, modified to reflect the changes. The modified and added material on each replacement page is identified with highlight.

**C. CHANGES TO ARINC SPECIFICATION 620 INTRODUCED BY THIS DOCUMENT**

This section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed when the Supplement is eventually incorporated. In each case a brief description of the change or addition is included.

**General Comments**

A number of changes were made that affect extensive portions of the Specification. The contents of Chapter 3 were reorganized for clarity. In Chapter 4, the definition of the Message Sequence Number has been revised to reflect the definition in newly adopted ARINC Specification 618, "Air-Ground Character-Oriented Protocol Specification". The entry in message text for Flight Number has been revised to "Flight Identifier", again, to align with the definition in ARINC Specification 618.

**Table of Contents**

Revise old entries to reflect new structure of Chapter 3 and message text moved within Chapter 4. Add new section entries.

**2.2.1 Uplink Message Handling**

Revise section references.

**2.2.2 Downlink Message Handling**

Revise section reference. Revise reference from "block reception" timer to "Incomplete Downlink Message Delivery" timer to agree with ARINC Specification 618.

**2.2.3 Accountability**

Note restriction of message delivery.

**3.0 Message Handling**

Moved sections as follows:

| <u>Old</u>      | <u>New</u> |
|-----------------|------------|
| 3.1             | 3.1        |
| 3.1.1.1         | 3.2        |
| 3.1.1.2         | 3.5        |
| 3.1.1.2.1 3.5.1 |            |
| 3.1.1.2.2 3.5.2 |            |
| 3.1.2           | 3.3        |
| 3.2             | 3.6        |
| 3.2.1           | 3.2.1      |
| 3.2.2           | 3.6.1      |
| 3.2.3           | 3.3.1      |
| 3.3             | 3.7        |
| 3.3.1           | 3.2.2      |
| 3.3.1.1         | 3.7.1      |
| 3.3.1.2         | 3.7.3      |
| 3.3.2           | 3.7.2      |
| 3.3.3.1         | 3.3.2      |
| 3.3.3.2         | 3.3.3      |
| 3.4             | 3.4        |
| 3.2.1           | 3.8        |
| 3.2.1           | 3.8.1      |
| ----            | 3.8.2      |
| 3.2.1           | 3.8.3      |

**3.1 Introduction**

Editorial corrections. Introduce new organization of the document.

**3.2 General Ground/Ground Message Format**

Introduce Flight Identifier format. Explain 2-letter vs 3 letter airline identification.

**3.2.1 Downlink General Format**

Expand description of format. Expand list of service provider codes.

**3.2.2 Uplink Message Format**

Expand description of format.

**3.3.1 Unformattable Downlink Service Messages**

Expand description of format.

**3.3.2 Untransmittable Uplink Service Messages**

Expand description of format.

**3.3.3 Undeliverable Uplink Service Messages**

Expand description of format.

**3.4 Network Advisory Messages**

Editorial clarifications.

**3.5 General Air/Ground Message Format**

Editorial clarifications.

**3.6 Downlink Messages**

Editorial refinements.

### 3.8 Addressing

New section added for clarity.

#### 3.8.1 Uplink Addresses

New Section added.

##### 3.8.1.1 Aircraft Address

New Section added.

##### 3.8.1.2 Uplink Addresses for Messages Delivered to an ACARS Peripheral

New Section added.

##### 3.8.1.3 Air/Ground Uplink User Address(es)

New Section added.

###### 3.8.1.3.1 AOC Messages

New Section added.

###### 3.8.1.3.2 ATC Messages

New section added to describe addressing of Air Traffic Service messages generated by an avionics subsystem.

#### 3.8.2 Downlink Addresses

New Section added.

#### 3.8.3 Supplementary Addresses

New section; derived from old Section 3.2.1.

### 4.1 Introduction

Editorial expansion.

### 4.2 Uplink Message Formats, System Control

Expanded the list of System Control labels.

#### 4.2.6 Data Transceiver Autotune - Label ::

Move here from Section 4.3.16.

### 4.3 Uplink Message Formats, Service Related

Expand the list of messages. Add section references. Introduce the need for a CRC in ATS message text.

#### 4.3.4 Cockpit/Cabin Printer Messages - Labels C0-C9

Change title.

#### 4.3.5 OAT, DFDAU, ADSU and FMC - Label H1

Expand description. Add format diagrams for general case and for ATS message.

##### 4.3.5.1 OAT - Label H1

Add note concerning MFI.

##### 4.3.5.2 OAX - Label H1

Expand description.

##### 4.3.5.3 WITH HEADER: CFD, DFD, FCD, FCL, FCR, TXx, Mxx - Label H1

Expand description.

#### 4.3.7 Oceanic Clearance - MFI or Label A1

Add note concerning MFI.

#### 4.3.8 Unassigned - MFI or Label A2

Add note concerning MFI.

#### 4.3.9 Domestic Clearance - MFI or Label A3

Add note concerning MFI.

#### 4.3.10 Unassigned - MFI or Label A4

Add note concerning MFI.

#### 4.3.11 Request Position Report - MFI or Label A5

Add note concerning MFI.

#### 4.3.12 Request ADS Reports - MFI or Label A6

Add note concerning MFI.

#### 4.3.13 ATC Free Talk - MFI or Label A7

#### 4.3.14 Delivery Departure Slot - MFI or Label A8

#### 4.3.15 Delivery ATIS Information - MFI or Label A9

#### 4.3.16 ATS Facilities Notification - MFI or Label A0

Add replacement section. Previous section, Data Transceiver Autotune moved to Section 4.2.6.

#### 4.3.17 Pilot/Controller Dialogue - MFI or Label AA

Add new section.

### 5.0 Downlink Message Text Field Formats

All downlink message definitions were moved from Chapter 4 to a new Chapter 5. Section 5.1 provides an introduction. Thus former Section 4.5 became Section 5.2, former Section 4.6 became 5.3 and former Section 4.6 became Section 5.4.

#### 5.1 Introduction

New section added.

### 5.2 Downlink Message Formats, System Control

Change title from Essential to Control. Add new messages to list. Add section references.

#### 5.2.1 General Response - Label \_DEL

## SUPPLEMENT 1 TO ARINC SPECIFICATION 620 - Page 4

Change coding of Message Sequence Number and Airline Identifier.

### 5.2.2 Voice Contact Request - Label 54

Change coding of Message Sequence Number and Airline Identifier.

### 5.2.3 Reserved Characters

Delete reference to Polled mode, a provision that was initially thought to offer some future service, but never implemented.

### 5.2.4 Temporary Suspension - Label 5P

Change coding of Message Sequence Number and Airline Identifier.

### 5.2.5 Unable to Deliver Uplinked Message - Label Q5

Change coding of Message Sequence Number and Airline Identifier. Correct figure from "Printer Status" to "Unable to Deliver".

### 5.2.6 Voice to Data Channel Changeover Advisory - Label Q6

Expand description. Change coding of Message Sequence Number and Airline Identifier.

### 5.2.7 Intercept/Unable to Process - Label QX

Change title. Relocate from Section 4.6.36 to System Control category. Change coding of Message Sequence Number and Airline Identifier.

### 5.2.8 Dedicated Transceiver Advisory - Label F3

Move to Section 4.5.8 from Section 4.6.13. Change coding of Message Sequence Number and Airline Identifier.

### 5.2.9 Cockpit Printer Status - Label CA Through CF

Change coding of Message Sequence Number and Airline Identifier.

### 5.3 Downlink Message Formats, Service-Related Message Formats

Add new messages. Add section references. Add introduction to ATS messages.

#### 5.3.1 Emergency Situation Report - Label 00

Change coding of Message Sequence Number and Airline Identifier. Add introduction to ATS messages.

#### 5.3.2 Ground GMT Request - Label 51

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.4 ATIS Request - Label 5D

Change coding of Message Sequence Number and Airline Identifier. Revise figure.

#### 5.3.5 Aircrew Initiated Position Report - Label 5R

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.6 Weather Request - Label 5U

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.7 Airline Designated Downlink - Label 5Z

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.8 Aircrew Revision to Previous ETA/Diversion - Label 5Y

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.9 Aircrew Initiated Engine Data/Takeoff Thrust Report - Label 7A

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.10 Not yet assigned

Contents were moved to Section 4.2.6.

#### 5.3.11 Aircrew-Addressed Downlink - Labels 80 through 8~

Editorial changes for clarity. Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.12 Not yet assigned

Contents were moved to Section 4.5.9.

#### 5.3.13 Not yet assigned

Contents were moved to Section 4.5.8.

#### 5.3.14 Command/Response Downlink - Label RB

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.15 Link Test - Label Q0

Change coding of Message Sequence Number and Airline Identifier. Add figure.

#### 5.3.16 Departure/Arrival Reports - Label Q1

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.17 ETA Report - Label Q2

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.18 Clock Update Advisory - Label Q3

Change coding of Message Sequence Number and Airline Identifier.

#### 5.3.20 Unable to Deliver Uplink - Label Q5

Change title. Change coding of Message Sequence Number and Airline Identifier.

5.3.21 Delay Message - Label Q7

Change coding of Message Sequence Number and Airline Identifier.

5.3.24 Out/Fuel Reports - QA

Change coding of Message Sequence Number and Airline Identifier.

5.3.26 ON Reports - QC

Change coding of Message Sequence Number and Airline Identifier.

5.3.27 IN/Fuel Report - QD

Change coding of Message Sequence Number and Airline Identifier.

5.3.28 OUT/Fuel/Destination Report - Label QE

Change coding of Message Sequence Number and Airline Identifier.

5.3.29 OFF/Destination Report - Label QF

Change coding of Message Sequence Number and Airline Identifier.

5.3.30 OUT/Return IN Report - Label QG

Change coding of Message Sequence Number and Airline Identifier.

5.3.31 OUT Report - Label QH

Change coding of Message Sequence Number and Airline Identifier.

5.3.32 Landing Report - Label QK

Change coding of Message Sequence Number and Airline Identifier.

5.3.33 Arrival Report - Label QL

Change coding of Message Sequence Number and Airline Identifier.

5.3.34 Arrival Information Report - Label QM

Change coding of Message Sequence Number and Airline Identifier.

5.3.35 Diversion Report - Label QN

Change coding of Message Sequence Number and Airline Identifier.

5.3.36 Undelivered Uplink Report - Label HX

Change title. Change coding of Message Sequence Number and Airline Identifier. Add new message description.

5.3.37 Alternate Aircrew Initiated Position Report – Label 57

Change coding of Message Sequence Number and Airline Identifier.

5.3.38 Optional Auxiliary Terminal (OAT) Message - Label H1

Add general format diagram. Add discussion of messages with CRC and related format diagram.

5.3.38.1 Messages from Airborne Subsystems: ARINC 597 ACARS - Label H1

Change coding of Message Sequence Number and Airline Identifier.

5.3.38.2 Messages from ARINC 724 ACARS Airborne Subsystems - Label H1

Change coding of Message Sequence Number and Airline Identifier.

5.3.38.2.1 OAT - Simple H1 Message

Add new section.

5.3.38.2.2 OAT - H1 Message With Additional Addresses

Add new section.

5.3.38.2.3 CFDIU, DFDAU, FMC or Cabin Terminal Messages

Add new section.

5.3.38.2.4 CFDIU, DFDAU, FMC or Cabin Terminal Messages With Additional Addresses

Add new section.

5.3.39 Request Oceanic Clearance - MFI or Label B1

Add MFI. Refer to RTCA for format.

5.3.40 Oceanic Clearance Readback - MFI or Label B2

Add MFI. Refer to RTCA for format.

5.3.41 Request Domestic Clearance - MFI or Label B3

Add MFI. Refer to RTCA for format.

5.3.42 Reserved - MFI or Label B4

Add MFI.

5.3.43 Provide Position Report - MFI or Label B5

Add MFI.

5.3.44 Provide ADS Reports - MFI or Label B6

Add MFI. Refer to ARINC Characteristic 745 for format and ARINC Specification 622 for processing.

5.3.45 Forward Free Text to ATC - MFI or Label B7

Add MFI.

5.3.46 Request Departure Slot - MFI or Label B8

Add MFI.

5.3.47 Request ATIS Information - MFI or Label B9

Add MFI. Refer to ARINC Specification 622 for format.

5.3.48 ATS Facilities Notification - MFI or Label B0

Add new message.

5.3.49 Pilot/Controller Dialogue - MFI or Label BA

Add new message.

5.3.50 Reserved - MFI or Label BB

Anticipated future use.

5.3.51 Weather Report - Label H2

Add new message.

## ATTACHMENT 2

New Attachment containing the list of Reason Codes for unformattable messages from Chapter 3.

## APPENDIX A

Add new acronyms.

## APPENDIX B

Add new Standard Message Identifiers (SMI).

## APPENDIX C

Add new SMI and associated Label identifiers. Add new message services from Air Canada and AVICOM.

Add new Tables C-5 through C-13 to identify the SMI, Label, Sublabel and MFI of messages directed to a peripheral to the ACARS MU.

## APPENDIX G

New Appendix added.

## APPENDIX Z

Delete Items B, D, E, F and G. Add new Item C.

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TO

ARINC SPECIFICATION 620

“DATA LINK GROUND SYSTEM STANDARD AND  
INTERFACE SPECIFICATION (DGSS/IS)”

Published: December 30, 1994

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 19, 1994

## A. PURPOSE OF THIS DOCUMENT

This Supplement adds changes to Air Traffic Service (label Ax and Bx) message definitions to cooperate with the processing functions defined in Specification 622. This Supplement adds Version 2 of the Meteorological report downlink message and its related uplink request (label H2) and Version 2 of the Squitter (label H2) uplink. Sections 3.3.3 and 3.3.4 have been reorganized to clarify the provisions needed to support Message Assurance. Appendix C has been updated to include an expanded list of labels. The Imbedded Message Identifiers (MFI) and Message Format Identifier tables C-3 through C1-3 have been moved to Specification 622.

## B. ORGANIZATION OF THIS DOCUMENT

Changes introduced by Supplement 2 are too extensive to make the integration of replacement pages from a separate supplement into Specification 620-1 practical for our readers.

The changes introduced by Supplement 2 have been identified using change bars and are labeled c-2.

## C. CHANGES TO ARINC SPECIFICATION 620 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete tabulation of the changes and additions to the Specification to be introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed when the Supplement is eventually incorporated. In each case a brief description of the change or addition is included.

-----  
The changes introduced by this Supplement are:

### 2.4.3 Aircraft Identification

New section added.

#### 3.2.1 Forwarding Dowlink Messages

Table 3.2.1-2 was added to define the encoding rules for Table 3.2.1-1. Commentary was modified to note that, although ARINC adds carriage-return/line feed <crLf> characters to AOC messages to satisfy the ICM, ARINC does not add <crLf> characters to ATS messages to avoid violations of the CRC.

#### 3.2.2 Uplink Message Format

This section was revised in its entirety. The change includes expansion of the responsibility of the MU to recognize messages with the aircraft's Flight Number as valid addresses.

#### 3.3.3 Untransmittable Uplink Service Messages

Added explanation that an aircraft that is not logged on to the satellite network cannot be reached.

##### 3.3.3.1 Message Assurance Reports

This new section incorporates provisions from Section 3.3.3 and clarifies the role of Message Assurance.

A reference to the new Table 3.2.1-2 was added to clarify the reading of the Example column of Table 3.3.3.1-1.

#### 3.3.4 Undeliverable Uplink Service Messages

A description of processing of QX downlinks was added.

##### 3.3.4.1 Message Assurance Reports

This new section incorporates provisions from Section 3.3.4 and clarifies the role of Message Assurance. A reference to the new Table 3.2.1-2 was added to clarify the reading of the Example column of Table 3.3.3.4.1-1.

### 3.5 General Air/Ground Message Format

Previous text was replaced by a reference to Specification 618 to avoid duplication. Caution to designers of peripherals regarding the need to restrict downlinks to valid text characters. Data in the Text field is not screened by the MU.

### 3.6 Downlink Messages

The field labelled Free Text was changed to Application Text in order to clarify that this field may contain fixed text, free text or both.

### 3.7 Uplink Messages

The field labelled Free Text was changed to Application Text in order to clarify that this field may contain fixed text, free text or both.

#### 3.7.1 Uplink Message Re-formatting

Added note 3.

##### 3.7.3 Uplink Message Deligery

Added text to note that use of the Geographical Locator (GL) is optional. If used, in conjunction with the Text Element 'TP' identifying the transmission path, the medium of the ground station must match the 'TP' Text Element Identifier.

##### 3.8.1.1 Aircraft Address

Commentary added.

##### 3.8.1.2 Uplink Addresses for Messages Delivered to an ACARS Peripheral

Explanatory text was added to claify how MUs identify messages destined for a peripheral.

#### 4.2.3 ACARS Frequency Uplink- Label 54 or Voice Go-Ahead- Label 54

Editorial correction: Changed Step 3 from "ground system" to "aircraft".

#### 4.2.4 Voice Circuit Busy - Label Q4

Editorial correction: Changed Step 2 from "aircraft" to "DSP".

**4.2.5 Uplink Squitter - Label SQ**

Version 2 was added.

**4.3.7 Oceanic Clearance - MF1 or Label A1**

As the first occurrence of an Air Traffic Service (ATS) uplink message, this Section is now used as a generic model for the format of label Ax messages. The format is consistent with the definition of ATS messages in Specifications 622 and 623.

**4.3.8 Unassigned - MF1 or Label A2**

This Section is a placeholder for a future assignment.

**4.3.9 Departure Clearance - MF1 or Label A3**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**4.3.10 Flight System Message - MF1 or Label A4**

New Section added.

**4.3.11 Unassigned - MF1 or Label A5**

This Section is a placeholder for a future assignment.

**4.3.12 Request ADS Reports - MF1 or Label A6**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**4.3.13 ATC Free Text - MF1 or Label A7**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**4.3.14 Deliver Departure Slot - MF1 or Label A8**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**4.3.15 Deliver ATIS Information - MF1 or Label A9**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**4.3.16 ATS Facilities Notification (AFN)  
- MF1 or Label A0**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**4.3.17 ATCComm - MF1 or Label AA**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**4.3.18 Unassigned - MF1 or Label AB**

This Section is a placeholder for a future assignment.

**4.3.19 Unassigned - MF1 or Label AC**

This Section is a placeholder for a future assignment.

**4.3.20 Unassigned - MF1 or Label AD**

This Section is a placeholder for a future assignment.

**4.3.21 Unassigned - MF1 or Label AE**

This Section is a placeholder for a future assignment.

**4.3.22 Unassigned - MF1 or Label AF**

This Section is a placeholder for a future assignment.

**4.3.23 Unassigned - MF1 or Label AG**

This Section is a placeholder for a future assignment.

**4.3.24 Network Statistics Report Request  
- MFI or Label S1**

Added new Section.

**4.3.25 Terminal Weather Information Report - MF1 or Label 54**

This Section is a placeholder for a future assignment.

**5.2.7 Intercept/Unable to Process - Label QX**

Figure 5.2.7-1 was revised to correct message identification.

**5.3.13 Meteorological Report - MFI or Label H2**

The depiction of Version 1 format changed to clarify the multiple entries of data samples. Version 2 was added.

**5.3.39 Request Oceanic Clearance - MFI or Label B1**

As the first occurrence of an Air Traffic Service (ATS) downlink message, this Section is now used as a generic model for the format of label Ax messages. The format is consistent with the definition of ATS messages in Specifications 622 and 623.

**5.3.40 Oceanic Clearance Readback  
- MFI or Label B2**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**5.3.41 Request Departure Clearance - MFI or Label B3**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

**5.3.42 Departure Clearance Readback Downlink  
- MFI or Label B4**

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

5.3.43 Unassigned - MFI or Label B5

This Section is a placeholder for a future assignment.

5.3.44 Provide ADS Reports - MFI or Label B6

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

5.3.45 Forward Free Text to ATC - MFI or Label B7

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

5.3.46 Request Departure Slot - MFI or Label B8

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

5.3.47 Request ATIS Information - MFI or Label B9

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

5.3.48 ATS Facilities Notification (AFN)  
- MFI or Label B0

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

5.3.49 ATCComm - MFI or Label BA

Editorial revisions were made to coordinate with the provisions of Specifications 622 and 623. Section 4.3.7 is referenced for format.

5.3.50 Unassigned - MFI or Label BB

This Section is a placeholder for a future assignment.

5.3.51 Unassigned - MFI or Label BC

This Section is a placeholder for a future assignment.

5.3.52 Unassigned - MFI or Label BD

This Section is a placeholder for a future assignment.

5.3.53 Unassigned - MFI or Label BE

This Section is a placeholder for a future assignment.

5.3.54 Unassigned - MFI or Label BF

This Section is a placeholder for a future assignment.

5.3.55 Unassigned - MF1 or Label BG

This Section is a placeholder for a future assignment.

5.3.56 Network Statistics Report - Label or MF1 S1

New Section added.

ATTACHMENT 2 - SERVICE MESSAGES - REASON CODES

Three new reason codes were added to Table 2-2. One new reason code was added to Table 2-3.

Section B.2 of Appendix B  
- TEI Codes

Editorial correction to element 'TP'.

Section B.3 of Appendix B  
- Rules for SMI/TEI Application

Rule 1 was expanded to limit the number of SMIs in a message to one, with the exception of Possible Duplicate Messages which will carry the SMI of 'PDM'.

Appendix C - SMI Information

New assignments added. IMI/MFI Tables C-3 through C-13 were moved to Specification 622.

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SUPPLEMENT 3©

TO

ARINC SPECIFICATION 620

“DATA LINK GROUND SYSTEM STANDARD AND  
INTERFACE SPECIFICATION (DGSS/IS)”

Published: December 19, 1997

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 14, 1997

## A. PURPOSE OF THIS DOCUMENT

This Supplement introduces several changes. Sections 5.3.36 through 5.3.42 were inserted to define OOOI messages that use the 4-character ICAO Airport codes in place of the 3-character IATA Airport codes. To accommodate this change, subsections describing messages to peripherals were moved to Section 5.4; subsections describing ATS messages were renumbered and moved to Section 5.5. This Supplement also adds new ATS application definitions: Terminal Weather Information to Pilots (TWIP), Waypoint Position Report (WPR), Digital Delivery of Taxi Clearance (DDTC), and Controller/Pilot Communications (CPC). Corrections and additions were also entered; e.g., editorial corrections to label QX, and harmonizing the rules for TEIs in Appendix B with the provisions for Message Assurance. Finally, new SMIs and labels were added to Appendix C.

## B. ORGANIZATION OF THIS DOCUMENT

Changes introduced by Supplement 3 are too extensive to make the integration of replacement pages from a separate supplement into Specification 620-2 practical for our readers.

The changes introduced by Supplement 3 have been identified using change bars and are labelled in the margin by a “c-3” indicator.

## C. CHANGES TO ARINC CHARACTERISTIC 620 INTRODUCED BY THIS DRAFT SUPPLEMENT

This section, listed directly below, presents a complete tabulation of the changes and additions to the Specification to be introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed when the Supplement is eventually incorporated. In each case a brief description of the change or addition is included.

### 1.3 Relationship of the Specification to Other Standards

The figure was updated to reflect new equipment.

#### 1.4.2 ATN System Description

Editorial correction.

### 2.4.3 Aircraft Identification

Text was added to describe a table-based mechanism for ensuring a valid uplink address to the aircraft. The service provider will accept either the aircraft tail number, the Flight number or both.

#### 3.2.1 Forwarding Downlink Messages

The range of values for hexadecimal characters was corrected in Table 3.2.1-2. The SMI for AAR was corrected to read ARR in the second paragraph of the SMI line description. Text was added to TE Line to describe processing of NULs and SPACE characters in fixed field messages.

The definition of ground station identification was expanded in the DT line.

#### 3.3.1 Uplink Message Receipt Confirmation

In the first sentence of the Commentary, replaced ‘SITA’ with ‘SITA and ARINC’.

#### 3.3.3 Untransmittable Uplink Service Messages

Note 3 was added to Table 3.3.3-1.

##### 3.3.3.1 Message Assurance Report - Untransmittable Link

Note 6 was added to Table 3.3.3.1-1.

#### 3.3.4 Undeliverable Uplink Service Messages

Editorial change: “AN .N123xx” was changed to AN N123xx” in line 7-n of Table 3.3.4-1. The third line in Note 4 was added.

##### 3.3.4.1 Message Assurance Reports

Editorial change: “AN .N123xx” was changed to AN N123xx” in line 7-n of Table 3.3.4.1-1. Note 6 was added to Table 3.3.4.1-1.

#### 3.3.5 Unformattable Downlink Service Messages

Editorial change: “AN .N123xx” was changed to AN N123xx” in line 7-n of Table 3.3.5-1. The last sentence was added to Note 3 of the table.

### 3.6.1 Multiblock Downlink Messages

Editorial change: If Timer VGT4 expires, an Incomplete Downlink message report is sent with the SMI of SVC and the Reason Code of ‘QTB’.

#### 3.8.1.1 Aircraft Address

Text, complementary to Section 2.4.3, was added to indicate that the service provider would be prepared to accept uplink messages by tail number, Flight number or both. Text was added to correctly identify the reason for rejecting a message that fails the address criteria. The code 240 is used.

Text was added stating that messages coded with both the Aircraft Registration Number and the Flight Number will be rejected by certain DSPs..

#### 3.8.2.2 Downlink Supplementary Addresses

In the first Commentary, ARINC now supports 4-letter optional addressing.

A second Commentary was added to note that translation from a 3 or 4 character Supplementary Address to the 7 character format will be affected by airline identifier as well as the downlink label used.

## Chapter 4.0 Uplink Message Text Field Formats

Changes were made to the organization of Chapter 4.0 to isolate Label H1 messages (and messages to peripherals) and Air Traffic Service messages (Label Ax). These topics are located in Sections 4.4 and 4.5 respectively.

#### 4.2 Uplink Message Formats, System Control

Reference to Tables C1 and C2 of Appendix C was added for system control uplink messages.

##### 4.2.1 General Response - Label \_DEL

Editorial correction to change “ground sub-system” to “DSP” and “uplink” to “downlink”.

##### 4.2.3 ACARS Frequency Uplink - Label 54 or Voice Go-Ahead - Label 54

Commentary added to inform the reader that some MU may not support the presentation of free text in this message. Figure 4.2.3-1 deleted. Figure 4.2.3-2 Voice Frequency - SITA Implementation is now 4.2.3-1 Voice Frequency Uplink or Voice Go-Ahead.

##### 4.2.4 Voice Circuit Busy - Label Q4

Figure 4.2.4-1 was deleted. This message is not supported.

##### 4.2.5 Uplink Squitter - Label SQ

MASCOM was removed from the list of Data Link Service Providers.

#### 4.3 Uplink Message Formats, Service Related

The table of Service Related Uplink Messages was deleted. This information was replaced by a reference to Appendix C.

Message Text description for ATS messages was moved to Section 4.5 to complement the new organizational structure of the document.

##### 4.3.1 Ground GMT Update - Label 51

Ax labels were moved to Section 4.4. “Ground GMT Report” was replaced by “Ground GMT Update.” Alternative Ground UTC Report was replaced by “Ground UTC Update.”

##### 4.3.5 Command/Response Uplink - Label RA

This section was previously Section 4.3.6.

A listing of the message format was added. The previous listing of a message format was moved below and identified as typical of that defined by users.

#### 4.4 ACARS Peripherals - Label H1

Note 1 was modified to state that some avionics simply ignore character 10 in uplinks.

A reference to ARINC Specification 622 was added to the Sublabel field description. Table 4.4.-1C was added.

##### 4.3.6 Network Statistics Report Request - Label S1

This section, previously Section 4.3.24, was renumbered to accommodate document restructuring. The text remains the same.

##### 4.3.7 Network Performance Report Request - Label S2

This is a placeholder for a future supplement.

##### 4.3.8 Aircraft Profile Report Request

This is a placeholder for a future supplement.

#### 4.4. ACARS Peripherals - Label H1

This section was created to group messages to peripherals. H1 messages were renumbered as follows:

| <u>Old</u> | <u>New</u> |
|------------|------------|
| 4.3.5.1    | 4.4.1      |
| 4.3.5.2    | 4.4.2      |
| 4.3.5.3    | 4.4.3      |
| 4.3.5.4    | 4.4.4      |

A reference to Table C-2A of Appendix C was added.

Message Text description for ATS messages was moved to Section 4.5 to complement the new organizational structure of the document.

##### 4.4.3 Peripherals With Header - Label H1

SMIs deleted from Section title and displayed in table format. The list of SMIs was expanded to include ‘FM3’ and ‘TX1-TX4’.

##### 4.4.4 Peripheral With No Header: - Label H1

SMIs deleted from Section title and displayed in table format. The list of SMIs was expanded to include ‘FM3’, ‘TT1-TT8’, ‘HDR’, ‘HDL’, and ‘HDD’.

#### 4.5. ATS Messages - MFI or Label Ax

The definition of new ATS messages was added to the already existing pool of messages. To accommodate future expansion, a separate section was created to group ATS message definitions. Figures depicting the enveloping of ATS messages were added. One figure depicts messages to/from an MU. The other depicts messages to/from an onboard peripheral. ATS messages were renumbered as follows:

The ground host ‘PIKCLXS’ was changed to LA05xx as more representative of an ATS facility.

The listings of ATS messages was moved from Section 4.3 to 4.5 which is not strictly devoted to ATS messages. The previous subsections are listed below.

| <u>Old</u> | <u>New</u> |
|------------|------------|
| 4.3.7      | 4.5.1      |
| 4.3.8      | 4.5.2      |
| 4.3.9      | 4.5.3      |
| 4.3.10     | 4.5.4      |
| 4.3.11     | 4.5.5      |
| 4.3.12     | 4.5.6      |

|            |            |
|------------|------------|
| 4.3.13     | 4.5.7      |
| 4.3.14     | 4.5.8      |
| 4.3.15     | 4.5.9      |
| 4.3.16     | 4.5.10     |
| 4.3.17     | 4.5.11     |
| 4.3.18     | 4.5.12     |
| 4.3.19     | 4.5.13     |
| 4.3.20     | 4.5.14     |
| <u>Old</u> | <u>New</u> |
| 4.3.21     | 4.5.15     |
| 4.3.22     | 4.5.16     |
| 4.3.23     | 4.5.17     |

New ATS applications defined in this supplement are:

| <u>Section Label</u> | <u>Function</u>         |    |
|----------------------|-------------------------|----|
| 4.5.12               | TWIP                    | AB |
| 4.5.13               | Pushback Clearance      | AC |
| 4.5.14               | Expected Taxi Clearance | AD |
| 4.5.15               | Unassigned              | AE |
| 4.5.16               | CPC                     | AF |

#### 4.5.12 Terminal Weather Information for Pilots (TWIP) - MFI or Label AB

New Section added.

#### 4.5.13 Pushback Clearance - MFI or Label AC

New Section added.

#### 4.5.14 Expected Taxi Clearance - MFI or Label AD

New Section added.

#### 4.5.15 Unassigned - MFI or Label AE

This is a placeholder for future assignments.

#### 4.5.16 CPC Command/Response - MFI or Label AF

New Section added.

### Chapter 5.0 Downlink Message Text Field Formats

Organizational changes were made to Chapter 5 to isolate Label H1 messages (messages from peripherals) as Air Traffic Service messages. These topics are now located in Sections 5.4 and 5.5 respectively. The Coding of the Message Sequence Number was changed (to reflect the new Version) in numerous diagrams.

The messages were renumbered as follows:

| <u>Old</u> | <u>New</u> |
|------------|------------|
| 5.3.36     | 5.3.46     |
| 5.3.37     | 5.3.47     |
| 5.3.38     | 5.4        |
| 5.3.38.2   | 5.4.2      |
| 5.3.38.2.1 | 5.4.2.1    |
| 5.3.38.2.2 | 5.4.2.2    |
| 5.3.38.2.3 | 5.4.2.3    |
| 5.3.38.2.4 | 5.4.2.4    |
| 5.3.40     | 5.5.2      |
| 5.3.41     | 5.5.3      |
| 5.3.42     | 5.5.4      |

### 5.2 Downlink Message Formats, System Control

A reference to Table C1 and C2 of Appendix C was added.

#### 5.2.1 General Response - Label \_ DEL

Editorial change; corrected reference.

#### 5.2.7 Intercept/Unable to Process - Label QX

Corrections to the SMT text in the Figure were made to change Q5 RJCT 332 (60-62) and address to read QX RJCT 333 (60-62). Note was added to indicate position of data on the printed page.

### 5.3 Service-Related Message Formats

The content of the table listing applications was modified by deleting the entries for IATA Movement Messages and adding those of new messages. New messages consist of OOOI reports with ICAO Airport codes and Media Advisory. Placeholders were added for Network Performance Report and Airplane Profile Report. A complete listing of SMI/Label/Sublabels is contained in Appendix C.

#### 5.3.1 Emergency Situation Report (Aircraft Hijack) - Label 00

Editorial change in section title.

#### 5.3.3 Ground UTC Request - Label 52

Diagram added.

#### 5.3.4 ATIS Request - Label 5D

Diagram added.

#### 5.3.7 Airline Designated Downlink

Diagram added.

#### 5.3.9 Aircrew Initiated Engine Data/Takeoff Thrust Report - Label 7A

Diagram added.

#### 5.3.10 Aircrew Entered Miscellaneous Message - Label 7B

Diagram added.

#### 5.3.11 Aircrew-Addressed Downlink - Labels 80 through 8~

Changes to Character Content for Character Nos. 15 through n from IATA (3) to ICAO (4) character station identifiers.

#### 5.3.13.1 Meteorological Report, Version 1

Note 2 was modified to correct the resolution of position from tenths of degrees to degrees and minutes. An example of the appropriate coding was added.

5.3.13.3 Meteorological Report, Version 3

New Section added.

5.3.14 Command/Response Downlink - Label RB

New Figure added.

5.3.16 Departure/Arrival Reports (IATA Airport Code)  
- Label Q1

Reference to Section 3.2.1 added.

5.3.17 ETA Report - Label Q2

New figure added.

5.3.20 Unassigned - Label Q5

This section added as a placeholder for future assignment.

5.3.21 Delay Message - Label Q7

Diagram added.

5.3.24 OUT/Fuel Report (IATA Airport Code) - QA

The Free text definition for data entry was revised from “manual input” to “defined by the airline.”

Text was modified to indicate that, in addition to NUL characters, spaces could be used as fill in fixed format messages.

5.3.25 OFF Report (IATA Airport Code ) - Label QB

Commentary was added stating the Label QF format is preferred over the Label QB format.

Text was modified to indicate that, in addition to NUL characters, spaces could be used as fill in fixed format messages.

5.3.26 through 5.3.31

Text was modified to indicate that, in addition to NUL characters, spaces could be used as fill in fixed format messages.

5.3.32 Landing Report - Label QK

Changed “Station of Activity” to “Destination Station” and “Flight Segment Originating Station” to “Departure Station”.

5.3.32 Landing Report (IATA Airport Code) -  
Label QK

Figure edited.

5.3.33 Arrival Report - Label QL

Changed “Station of Activity” to “Destination Station” and “Flight Segment Originating Station” to “Departure Station”.

5.3.34 Arrival Information Report - Label QM

Changed “Station of Activity” to “Destination Station” and “Flight Segment Originating Station” to “Departure Station”.

5.3.36 OUT Report (ICAO Airport Code) - Label QP

New section inserted to provide message with ICAO Airport Code identifier. This section was inserted directly following other OOOI messages to provide continuity, resulting in renumbering of subsequent sections.

5.3.37 FF Report (ICAO Airport Code) - Label QQ

New section inserted to provide message with ICAO Airport Code identifier. This section was inserted to following other OOOI messages to provide continuity, resulting in renumbering of subsequent sections.

5.3.38 ON Report (ICAO Airport Code) - Label QR

New section inserted to provide message with ICAO Airport Code identifier. This section was inserted following other OOOI messages to provide continuity, resulting in renumbering of subsequent sections.

5.3.39 IN Report (ICAO Airport Code) - Label QS

New section inserted to provide message with ICAO Airport Code identifier. This section was inserted following other OOOI messages to provide continuity, resulting in renumbering of subsequent sections.

5.3.40 OUT/Return/IN Report (ICAO Airport Code)  
- Label QT

New section inserted to provide message with ICAO Airport Code identifier. This section was inserted following other OOOI messages to provide continuity, resulting in renumbering of subsequent sections.

5.3.41 Unassigned - Label QU

New section inserted as a placeholder.

5.3.42 Unassigned - Label QV

New section inserted as a placeholder.

5.3.43 Unassigned - Label QW

New section inserted as a placeholder.

5.3.44 Unassigned - Label QY

New section inserted as a placeholder.

5.3.45 Unassigned - Label QZ

New section inserted as a placeholder.

5.3.46 Undelivered Uplink Report - Label HX

This section, previously Section 5.3.36, was renumbered to accommodate the addition of new Qx messages. The text remains the same.

5.3.47 Aircrew Initiated Position Report, Alternate Format - Label 57

This section, previously Section 5.3.37, was renumbered to accommodate the addition of new Qx messages. Title revised for clarity; figures renumbered to reflect new section number. The text remains the same.

5.3.49 VHF Network Statistics Report - MFI or Label S1

This is a placeholder for a future supplement.

5.3.50 Aircraft Profile Report Label S3

This Section is a placeholder for a future supplement.

5.3.51 Media Advisory - Label SA

New Section added.

5.4 Messages from Avionics Sybsystem - Label H1

The ground host PICKLXS was changed to LA05xx to reflect an ATS facility.

This section and its subsections, previously Section 5.3.38 and its subsections, were renumbered to accommodate the addition of new Qx messages. The text remains the same. Figures renumbered to reflect new section number.

5.4.1 Messages from Airborne Subsystems: ARINC 597 ACARS - Label H1

Editorial changes were made to Tables 5.4.1A and 5.4.1B.

5.5 ATS Messages - MFI or Label Bx

ATS messages were renumbered to accommodate the addition of new Qx messages. As a part of the renumbering scheme, ATS messages are now grouped under Section 5.4. The text of the ATS messages remains the same. This new section now contains introductory material. Affected section titles are shown below.

The ground host address was changed from PICKLXS to LAX05xx to reflect an ATS facility.

The messages were renumbered as follows:

| <u>Old</u> | <u>New</u> |
|------------|------------|
| 5.3.40     | 5.5.2      |
| 5.3.41     | 5.5.3      |
| 5.3.42     | 5.5.4      |
| 5.3.43     | 5.5.5      |
| 5.3.44     | 5.5.6      |
| 5.3.45     | 5.5.7      |
| 5.3.46     | 5.5.8      |
| 5.3.47     | 5.5.9      |
| 5.3.48     | 5.5.10     |
| 5.3.49     | 5.5.11     |
| N/A        | 5.5.12     |
| N/A        | 5.5.13     |
| N/A        | 5.5.14     |

5.5.5 Waypoint Position Report - MFI or Label B5

New Section added.

5.5.8 Request Departure Slot - MFI Label B8

Editorial change.

5.5.9 Request ATIS Report - MFI or Label B9

Editorial change.

5.5.12 Terminal Weather Information for Pilots - MFI or Label BB

New application defined using unassigned label 'BB'. This section was previously Section 5.3.50.

5.5.13 Pushback Clearance Request - MFI or Label BC

Text moved from Section 5.3.51.

5.5.14 Expected Taxi Clearance Request - MFI or Label BD

Text moved from Section 5.3.52.

5.5.15 CPC Aircraft Log-on/Log-Off Request - MFI or Label BE

New Section added.

5.5.16 CPC WILCO/UNABLE Response - MFI or Label BF

New Section added.

5.5.17 Unassigned - MFI or Label BG

New Section added as a placeholder for future supplement.

5.6 Downlink Message Format, User-Defined

This section, previously Section 5.4, was renumbered to accommodate the addition of new Qx messages. The text remains the same.

Attachment 2

A note was added to inform the reader that messages that are undeliverable are returned to the originator with the SMI of 'SVC'. Added 6 new service messages Codes: 143, 240, 246-249.

Appendix B.1

SMI Code table deleted. Identical SMI documentation is available in Appendix C. The deleted table was replaced by the former Appendix B.2.

New code assignments were added to the MA definition to resolve a conflict with the body of the Specification. A new subsection 7.c was added to clarify the position of the TEI in the message.

## **SUPPLEMENT 3 TO ARINC SPECIFICATION 620 - Page 6**

Text was added to the 'TP' TEI definition to state that only one value should be entered. The new TEI of 'CP' was added.

### Appendix B.2

Section B.3 renumbered as B.2.

### Appendix C

The format of Table C-1 and C-2 was revised to include a reference to the section of text associated with each entry.

Table C-1 New SMIs CPL, CPR, CWR, ETC, ETR, HDL, HDR, HDD PBR, PBC, NPR and associated Label/Sublabels were added. Table C-2 updated to reflect changes made in Table C-1.

New labels (QP through QV) and associated SMIs were added. TWIP assignment was modified from label 53 to labels AB and BB; Pushback Clearance Labels AC and BC were added; Expected Taxi Clearance AD and BD were added; and CPC Log-on/Log-off Label BE was added.

Numerous editorial corrections were made to eliminate contradictions between Table C-1 and C-2. The identification of data link service provider support was updated.

Numerous corrections and updates were entered. The format of Table 1 and Table 2 was modified to increase clarity. The tables were reorganized to increase its structure. Messages to/from peripherals to the MU are broken out separately in sub-table C-2A.

### Appendix E

Note to Table E-1 was revised to change reference from obsolete Characteristic 597 to ARINC Specification 618. Table E-2 revised to include BEL and SYN characters.

### Appendix F

Deleted.

### Appendix Z

Deleted.

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SUPPLEMENT 4

TO

ARINC SPECIFICATION 620

DATA LINK GROUND SYSTEM STANDARD AND INTERFACE SPECIFICATION (DGSS/IS)

Published: November 24, 1999

**A. PURPOSE OF THIS DOCUMENT**

This Supplement introduces provisions for delivering bit-oriented messages through a VDL Mode 2 air/ground link and complementary X.25 based ground/ground network. This Supplement introduces new messages to deliver reports of RF network activity, Aircraft profile data, and Icing conditions.

**B. ORGANIZATION OF THIS DOCUMENT**

The first part of this document, printed on goldenrod-colored paper, is the Supplement itself. It contains descriptions of the changes introduced into the Specification and, where appropriate, extracts from the original text for comparison purposes. The second part consists of replacement white pages for the Specification, modified as required by the Supplement. The modified and added material on each replacement page is identified in the margin by a “c-4” indicator.

**C. CHANGES TO ARINC SPECIFICATION 620  
INTRODUCED BY THIS DRAFT SUPPLEMENT**

This section, listed directly below, presents a complete tabulation of the changes and additions to the Specification to be introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed when the Supplement is eventually incorporated. In each case a brief description of the change or addition is included.

**1.0 Introduction**

This section has been revised to encompass both ACARS and VDL Mode 2. Some sections were renumbered:

| <u>Old</u> | <u>New</u> |
|------------|------------|
| 1.4.1.1    | 1.4.2.1    |
| 1.4.2.2    | 1.4.2.2    |
| 1.4.3.1    | 1.4.2.3    |

**1.2 Scope**

The Commentary has been moved (deleted) to ARINC Specification 618.

**1.3 Relationship of the Specification to Other Standards**

Replaced figure to reflect both ACARS and VDL Mode 2 paths.

**1.4 System Description**

New text inserted.

**1.4.1 ACARS System Description**

Editorial changes were made to make this section generic, covering both ACARS and VDL Mode 2. New paragraph 5 was added.

**1.4.2 ACARS Use of ICAO-Compliant Communication Services**

New section title added.

**1.4.2.1 ICAO-Compliant Subnetworks**

New section added. Text from first paragraph was deleted.

**1.4.2.2 ICAO ATN Communications Services**

New section added.

**1.4.2.3 ACARS Transition Aspects**

New section added.

**2.0 Data Link System**

This section has been revised to encompass both ACARS and VDL Mode 2. Some sections were renumbered:

| <u>Old</u> | <u>New</u> |
|------------|------------|
| 2.4        | 2.3        |
| 2.4.1      | 2.3.1      |
| 2.4.2      | 2.3.2      |
| 2.4.3      | 2.3.3      |
| 2.5        | 2.4        |
| 2.5.1      | 2.4.1      |
| 2.5.2      | 2.4.2      |
| 2.5.3      | 2.4.3      |
| 2.6.2      | 2.5.1      |
| 2.7        | 2.6        |

**2.1 Overview**

Text has been deleted from paragraphs 3, 4, 6 and 7.

**2.2.1 Uplink Message Handling**

Reference to multiple message blocks deleted.

Text (previously paragraph 2) has been moved to ARINC Specification 618.

**2.2.2 Downlink Message Handling**

Text (previously paragraphs 1, 2 and 3) were moved to ARINC Specification 618.

Paragraph 4 was reworded to encompass VDL Mode 2.

**2.2.3.1 Internetworking**

New section added.

**2.3 Flight Following**

This section and sub-sections (previously 2.4) were renumbered.

**2.4 Network Management**

This section and sub-sections (previously 2.5) were renumbered.

**2.6 Internetworking**

This section was deleted from Supplement 3 and replaced by the previous Section 2.7, Function Summary.

### 3.0 Message Handling

Some sections were renumbered:

| <u>Old</u> | <u>New</u> |
|------------|------------|
| 3.2.3      | 3.2.2      |
| 3.8        | 3.2.2.1    |
| 3.8.2.1    | 3.2.2.1.1  |
| 3.8.2.2    | 3.2.2.1.2  |
| 3.2.1.1.3  | 3.2.3.1.3  |
| 3.8.1.1    | 3.2.3      |
| 3.8.1      | 3.2.3.2    |
| 3.8.1.2    | 3.2.3.2.1  |
| 3.8.1.3    | 3.2.3.3    |

#### 3.1.1 Chapter Outline

New section added.

#### 3.1.2 Definitions

New section added.

### 3.2 Ground/Ground Segment Specification (DSP to Ground User Interface)

New section title.

#### 3.2.1 General Ground/Ground Message Format

Text has been deleted from paragraph 7. Reference to ARINC Specification 618 for definition of Flight ID added.

Added definition of Text Element delimiter to Table 3.2.1-2.

#### 3.2.2 Downlink Conversion and Processing Function

New section title. Reference to ARINC Specification 618 was added to SMI Line definition. Text in DT Line description of fields 'a' and 'd' were revised to remove inferences of multiblock because they would be inconsistent with ATN protocols. Four additional three letter DSP Identifier Codes added.

##### 3.2.2.1 Downlink Addressing

New section added using text already in this Specification. Previously the text was in Section 3.8.

##### 3.2.2.1.1 Downlink Addresses of Messages from an ACARS Peripheral

Section renumbered. A reference to Table C-2B (MFI assignments) was added to the Commentary.

##### 3.2.2.1.2 Downlink Supplementary Addresses

Section renumbered. This material was formerly in Section 3.8.2.2. The last sentence was added to the first commentary to clarify that there could be multiple destinations at a single ATC location. Users were advised to inform DSPs of addressing requirements in the last sentence of paragraph 4.

##### 3.2.2.1.3 Supplementary Address Field

Examples were added to clarify coding.

##### 3.2.2.1.4 Downlink Address Conversion

New section added.

#### 3.2.3 Uplink Conversion and Processing Functions

This section was formerly Section 3.7. New section title. Paragraphs 1 through 4 were deleted. Reference to Table 3.3.3-2 for valid TEIs added.

##### 3.2.3.1 TEI Processing of Uplink Ground/Ground Message

New section added.

##### 3.2.3.1.1 AN (Aircraft Tail Number) and FI (Flight Identifier) TEIs Processing

New section added.

##### 3.2.3.1.2 GL (Ground Locator)/AP (Airport Locator) and TP (Transmission Path) TEIs Processing

New section added. Only the first paragraph is new material, the remainder came from Section 3.7. A reference to Appendix B for values of the TEI of 'TP' was added.

##### 3.2.3.1.3 MA (Message Assurance) TEI Processing

Section renumbered. New section title. This material was formerly Section 3.2.2.1.1.

##### 3.2.3.2 Uplink Addressing

New section number. This material was formerly Section 3.8.1.

##### 3.2.3.2.1 Uplink Addresses for Messages Delivered to an ACARS Peripheral

Section renumbered. This Section was formerly 3.8.1.2.

##### 3.2.3.3 Uplink Supplementary Address(es)

Section renumbered. This Section was formerly 3.8.1.3. New text, paragraph 3, and Table 3.2.3-2 were added.

#### 3.3.3 Untransmittable Uplink Service Messages

The AN line of Table 3.3.3-1 was corrected. Note 3 was expanded.

##### 3.3.3.1 Message Assurance Report – Untransmittable Uplink

The AN line of Table 3.3.3.1-1 was corrected. Note 6 was expanded.

##### 3.3.4.1 Message Assurance Reports

The AN line of Table 3.3.4.1-1 was corrected.

##### 3.3.5.1 Incomplete Downlink Service Message Intercept

New section added. Significant portions of this material were formerly in Section 3.6.1.

### 3.5 ACARS Messaging Function Primitives

New section replaced the previous section “General Air/Ground Message Format.”

#### 3.5.1 Standardized Acknowledgment Format

Deleted. Section moved to ARINC Specification 618.

#### 3.5.2 Correlated Acknowledgment Format

Deleted. Section moved to ARINC Specification 618.

#### 3.5.3 Multiblock Downlink Messages

Deleted. Section moved to ARINC Specification 618.

### 3.6 Air/Ground Messages

New title and text inserted. Former Section 3.6, Downlink Messages, and its subsections were moved to ARINC Specification 618.

### 3.7 Uplink Messages (and its Subsections)

Section and its subsections moved to ARINC Specification 618.

### 3.8 Addressing (and its Subsections)

Section and its subsections moved to other sections of this document (see table above) or moved to ARINC Specification 618.

### 4.0 Uplink Message Text Formats

New chapter title; formerly the title was Uplink Message Text Field Formats.

#### 4.2.3 ACAARS Frequency Uplink – Label 54 Or Voice Go-Ahead – Label 54

New text was added to define the range of VHF frequencies. Also, the commentary was expanded to note that some existing radio control units have only 5 digit frequency displays.

#### 4.2.5 Uplink Squitter – Label SQ

Revised format of Version 2 to include VDL Mode 2 Flag and Base Frequency. This resulted in new notes 3, 4, and 5 In note 1, DSP identifiers are included by reference to Section 3.2.2.

#### 4.2.7 DSP Autotune Broadcast Uplink - Label ::

New section added.

#### 4.3.7 Network Performance Report Request - Label S2

New section added.

#### 4.3.8 LRU Configuration Profile Report Request – Label S3

New section added.

#### 4.3.9 Meteorological Report Command Uplink – Label H2

New section added.

### 4.5 ATS Messages

Reference to Application Data changed to Application Text in this section and subsections. The relation of Application Text to Application Data is explained.

#### 4.5.11 ATCCommunications – MFI or Label AA

New text was added to clarify the relationships of controller-pilot dialogue definitions.

### 5.0 Downlink Message Text Formats

New Chapter title; formerly the title was Downlink Message Text Field Formats.

#### 5.3.13.2 Meteorological Report, Version 2 – MFI or Label H2

Ascent data measurements added to Initial Meteorological data Series #2. Note 12 added.

#### 5.3.13.3 Meteorological Report, Version 3 – MFI or Label S2

Editorial corrections were made to clarify date and time of observation from date and time of message assembly.

#### 5.3.14 Command Response Downlink – Label RB

An addition (the second sentence) was made to Note 1.

#### 5.3.30 Out/Return IN Report (IATA Airport Code) – Label QG

The SMI line was changed from “RET” to “RTN”.

#### 5.3.36 Out Report (ICAO Airport Code) – Label QP

Note added.

#### 5.3.48 VHF Network Statistics Report – Label S1

The acronym “ACARS” was inserted in front of the word multiblock to avoid extension of this concept to VDL Mode 2 and ATN. Length of example increased to match the length in the ‘size’ column in Tables.

#### 5.3.49 VHF Network Statistics Report - Label S2

New section added.

#### 5.3.50 LRU Configuration Report Format

New section added. This was formerly a placeholder entitled “Aircraft Profile Report - Label S3.”

#### 5.3.51 Media Advisory – Label SA

Reformatted section. Added coding for ICO SATCOM and VDL Mode 2 in Note 3. Also, in Note 3, the generic SATCOM assignment was expanded to encompass AERO-L, AERO-H and both AERO-H and AERO I. In

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note 5, a reference to ARINC Specification 618 was added.

### 5.3.52 Icing Report - Label or MFI H3

New section added.

### 5.4 Messages from Avionics Subsystem – Label H1

Revised Table 5-4-1B to reflect the definition of Application Text.

#### 5.4.2 Messages from Airborne Subsystems: ARINC 724 or 724B ACARS MU – Label H1

Replaced “Message Text” with “Application Text”.

##### 5.4.2.1 OAT – Simple H1 Message

Replaced “Message Text” with “Application Text”. Editorial clarification was added to “Free Text” character content description.

##### 5.4.2.2 OAT – H1 Message With Additional Addresses

Editorial clarification was added to “Free Text” character content description.

##### 5.4.2.3 CFDIU, DFDAU, FMC or Cabin Terminal Messages Without Additional Addresses

New section title. Editorial clarification was added to “Free Text” character content description.

##### 5.4.2.4 CFDIU, DFDAU, FMC or Cabin Terminal Messages With Additional Addresses

Editorial clarification was added to “Free Text” character content description.

### 5.5 ATS Messages – MFI or Label Bx

“IMI Application data CRC” was replaced by “Application Text” in Table 5-5. The field “Message Text” was changed to “Application Text.” Related changes were made within the new Application Text description to identify the format of both character and bit-oriented applications.

#### 5.5.10 ATS Facilities Notification (AFN) – MFI or Label B0

Replaced reference to Specification 622 with 623. Replaced “Application Text” with “Application Data”.

### 6.2 Transit Times

Paragraph 4 was revised to eliminate a reference to specific transit times. The subsections of Section 6.2 were deleted. The data these subsections contained is covered in Specification 618.

### Attachment 3

New attachment added.

### Appendix B

TP – Transmission Path definition was refined. Specifically, both Satcom and HF are accommodated.

### Appendix C

Added new SMIs of APR, ICE and WXM. Deleted duplicate OAT SMI. Added Table C-2B, MFI Assignments.

### Appendix D

Appendix D deleted.

### Appendix F

New appendix added.