ARINC

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

ARINC SPECIFICATION 620-1

PUBLISHED: January 15, 1994

AN ARINC DOCUMENT

Prepared by
AIRLINES ELECTRONIC ENGINEERING COMMITTEE
Published by
AERONAUTICAL RADIO, INC.
2551 RIVA ROAD, ANNAPOLIS, MARYLAND 21401

This document is based on material submitted by various participants during the drafting process. Neither AEEC nor ARINC has made any determination whether these materials could be subject to claims of patent or other proprietary rights by third parties, and no representation or warranty, express or implied, is made in this regard. Any use of or reliance on this document shall constitute an acceptance hereof "as is" and be subject to this disclaimer.

Copyright© 1994 by
AERONAUTICAL RADIO, INC.
2551 Riva Road
Annapolis, Maryland 21401-7465 USA

ARINC SPECIFICATION 620-1©

DATA LINK GROUND SYSTEM STANDARD AND INTERFACE SPECIFICATION

Published: January 15, 1994

Prepared by the Airlines Electronic Engineering Committee

Specification 620 Adopted by the Airlines Electronic Engineering Committee: November 6, 1990

Specification 620 Adopted by the Industry: February 28, 1991

Specification 620-1 Adopted by the Airlines Electronic Engineering Committee: October 19, 1993

FOREWORD

Activities of AERONAUTICAL RADIO, INC. (ARINC)

and the

Purpose of ARINC Reports and Specifications

Aeronautical Radio, Inc. is a corporation in which the United States scheduled airlines are the principal stockholders. Other stockholders include a variety of other air transport companies, aircraft manufacturers and foreign flag airlines.

Activities of ARINC include the operation of an extensive system of domestic and overseas aeronautical land radio stations, the fulfillment of systems requirements to accomplish ground and airborne compatibility, the allocation and assignment of frequencies to meet those needs, the coordination incident to standard airborne communications and electronics systems and the exchange of technical information. ARINC sponsors the Airlines Electronic Engineering Committee (AEEC), composed of airline technical personnel. The AEEC formulates standards for electronic equipment and systems for airlines. The establishment of Equipment Characteristics is a principal function of this Committee.

It is desirable to reference certain general ARINC Specifications or Reports which are applicable to more than one type of equipment. These general Specifications or Reports may be considered as supplementary to the Equipment Characteristics in which they are referenced. They are intended to set forth the desires of the airlines pertaining to components or equipment is concerned.

An ARINC Report (Specification or Characteristic) has a twofold purpose which is:

(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.

ARINC SPECIFICATION 620
TABLE OF CONTENTS

ITEM	SUBJECT	PAGE
1.0	INTRODUCTION	1
1.1	Purpose of this Document	1
1.2	Scope	1
1.3	Relationship of the Specification to Other Standards	1
1.4	System Description	1
1.4.1	ACARS System Description	1
1.4.2	ATN System Description	2
2.0	DATA LINK SYSTEM	3
2.1	Overview	3
2.2	Message Transport	3
2.2.1	Uplink Message Handling	3
2.2.2	Downlink Message Handling	4
2.2.3	Accountability	4
2.2.4	Prioritization	4
2.2.5	Intercept Message Handling	4
2.2.5.1	Unformattable Uplink Messages	4
2.2.5.2	Undeliverable Uplink Messages	4
2.2.5.3	Unformattable Downlink Messages	5
2.3	Channel Management	5
2.3.1	Multiple Frequencies	5
2.3.2	Frontier Crossing	5
2.3.3	Shared Frequencies	5
2.4	Flight Following	5
2.4.1	Aircraft Tracking	5
2.4..2	Optional Geographic Locator (GL) or Airport Locator (AP)	5
2.5	Network Management	5
2.5.1	Data Link Station Outage Status (AOS)	5
2.5.2	Data Link Station Restoral (ARA)	5
2.5.3	Data Link Station Addition (ASA)	5
2.5.4	Data Link Station Deletion (ASD)	6
2.6	Internetworking	6
2.6.1	Aeronautical TELECOMM Network (ATN) Connectivity	6
2.6.2	Data Link Service Provider Exchanges	6
2.7	Function Summary	6
3.0	MESSAGE HANDLING	7
3.1	Introduction	7
3.2	General Ground/Ground Message Format	7
3.2.1	Forwarding Downlink Messages	8
3.2.2	Uplink Message Format	10
3.2.2.1	Ground/Ground Uplink Messages with Message Assurance	11
3.3	Service Messages	11
3.3.1	Uplink Message Receipt Confirmation	12
3.3.2	Uplink Message Delivery Confirmation	13
3.3.3	Untransmittable Uplink Service Messages	14
3.3.4	Undeliverable Uplink Service Messages	15
3.3.5	Unformattable Downlink Service Messages	16
3.4	Network Advisory Messages	17
3.5	General Air/Ground Message Format	17
3.5.1	Standardized Acknowledgement Format	18
3.5.2	Correlated Acknowledgement Format	19
3.6	Downlink Messages	19
3.6.1	Multiblock Downlink Messages	19
3.7	Uplink Messages	20
3.7.1	Uplink Message Re-formatting	21
3.7.2	Multiblock Uplink Messages	22
3.7.3	Uplink Message Delivery	22
3.8	Addressing	22
3.8.1	Uplink Addressing	23
3.8.1.1	Aircraft Address	23
3.8.1.2	Uplink Addresses for Messaged Delivered to an ACARS Peripheral	23
3.8.1.3	Uplink Supplementary Address(es)	23

ARINC SPECIFICATION 620
TABLE OF CONTENTS

ITEM	SUBJECT	PAGE
3.8.2	Downlink Addressing	23
3.8.2.1	Downlink Addresses of Messages from an ACARS Peripheral	24
3.8.2.2	Downlink Supplementary Addresses	24
4.0	UPLINK MESSAGE TEXT FIELD FORMATS	26
4.1	Introduction	26
4.2	Uplink Message Formats, System Control	26
4.2.1	General Response - Label _DEL	26
4.2.2	General Response, Polled Mode - Label _j	26
4.2.3	ACARS Frequency Uplink - Label 54 or Voice Go-Ahead - Label 54	27
4.2.4	Voice Circuit Busy - Label Q4	28
4.2.5	Uplink Squitter - Label SQ	29
4.2.6	Data Transceiver Autotune - Label :;	30
4.3	Uplink Message Formats, Service Related	30
4.3.1	Ground GMT Report - Label 51	32
4.3.2	Ground UTC Report - Label 52	33
4.3.3	Reserved Spare - Label 53	33
4.3.4	Cockpit/Cabin Printer Messages - Labels C0-C9	33
4.3.5	ACARS Peripherals - Label H1 OAT, DFDAU, ADSC and FMC	34
4.3.5.1	OAT - Label H1	36
4.3.5.2	OAX - Label H1	37
4.3.5.3	With Header: CFD, DFD, FCD, FCL, FCR, TXx, Mxx - Label H1	38
4.3.5.4	With No Header: DFX, CFX, FMD, FML, FMR, TTx, Nxx - Label H1	39
4.3.6	Command/Response Uplink - Label RA	39
4.3.7	Oceanic Clearance - MFI or Label A1	40
4.3.8	Unassigned - MFI or Label A2	41
4.3.9	Departure Clearance - MFI or Label A3	41
4.3.10	Acknowledge Departure Clearance Request - MFI or Label A4	43
4.3.11	Request Position Report - MFI or Label A5	44
4.3.12	Request ADS Reports - MFI or Label A6	44
4.3.13	ATC Free Talk - MFI or Label A7	45
4.3.14	Delivery Departure Slot - MFI or label A8	46
4.3.15	Delivery ATIS Information - MFI or Label A9	46
4.3.16	ATS Facilities Notification (AFN) - Label A0	48
4.3.17	ATCComm - MFI or Label AA	49
4.4	Uplink Message Formats, User Defined	50
5.0	DOWNLINK MESSAGE TEXT FIELD FORMATS	51
5.1	Introduction	51
5.2	Downlink Message Formats, System Control	51
5.2.1	General Response - Label _DEL	51
5.2.2	Voice Contract Request - Label 54	52
5.2.3	Reserved Characters	53
5.2.4	Temporary Suspension - Label 5P	53
5.2.5	Unable to Deliver Uplinked Message - Label Q5	54
5.2.6	Voice to Data Channel Changeover Advisory - Label Q6	54
5.2.7	Intercept/Unable to Process - Label QX	55
5.2.8	Dedicated Transceiver Advisory - Label F3	56
5.2.9	Cockpit Printer Status - Label CA-CF	57
5.3	Service-Related Message Formats	58
5.3.1	Emergency Situation Report - Label 00	60
5.3.2	Ground GMT Request - Label 51	61
5.3.3	Ground UTC Request - Label 52	61
5.3.4	ATIS Request - Label 5D	62
5.3.5	Aircrew Initiated Position Report - Label 5R	63
5.3.6	Weather Request - Label 5U	64
5.3.7	Airline Designated Downlink - Label 5Z	65
5.3.8	Aircrew Revision to Previous ETA/Diversion - Label 5Y	66
5.3.9	Aircrew Initiated Engine Data/Takeoff Thrust Report - Label 7A	66
5.3.10	Aircrew Entered Miscellaneous Message - Label 7B	67
5.3.11	Aircrew-Addressed Downlink - Labels 80 thru 8 ~	67
5.3.12	Not yet assigned	69
5.3.13	Meteorological Report - Label or MFI H2	69
5.3.14	Command/Response Downlink - Label RB	71

ARINC SPECIFICATION 620
TABLE OF CONTENTS

ITEM	SUBJECT	PAGE
5.3.15	Link Test - Label QO	72
5.3.16	Departure/Arrival Reports - Label Q1	72
5.3.17	ETA Report - Label Q2	75
5.3.18	Clock Update Advisory - Label Q3	75
5.3.19	Voice Circuit Busy - Label Q4	76
5.3.20	Unable to Deliver Uplink - Label Q5	76
5.3.21	Delay Message - Label Q7	76
5.3.22	Reserved - Label Q8	77
5.3.23	Reserved - Label Q9	77
5.3.24	Out/Fuel Reports - QA	77
5.3.25	OFF Reports - QB	78
5.3.26	ON Reports - QC	79
5.3.27	IN/Fuel Report - QD	80
5.3.28	OUT/Fuel Destination Report - Label QE	81
5.3.29	OFF/Destination Report - Label QF	82
5.3.30	OUT/Return IN Report - Label QG	83
5.3.31	OUT Report - Label QH	84
5.3.32	Landing Report - Label QK	85
5.3.33	Arrival Report - Label QL	86
5.3.34	Arrival Information Report - Label QM	87
5.3.35	Diversion Report - Label QN	88
5.3.36	Undelivered Uplink Report - Label HX	89
5.3.37	Alternate Aircrew Initiated Position Report - Label 57	91
5.3.38	Avionics Subsystem Acting as and ACARS Peripheral Messages - Label H1	93
5.3.38.1	Messages from Airborne Subsystems: ARINC 597 ACARS - Label H1	94
5.3.38.2	Messages from Airborne Subsystems: ARINC 724/724B ACARS - Label H1	95
5.3.38.2.1	OAT - Simple H1 Message	95
5.3.38.2.2	OAT - H1 Message with Additional Addresses	95
5.3.38.2.3	CFDIU, DFDAU, FMC or Cabin Terminal Messages	96
5.3.38.2.4	CFDIU, DFDAU, FMC or Cabin Terminal Messages	96
5.3.39	Request Oceanic Clearance - MFI or label B1	97
5.3.40	Acknowledge Oceanic Clearance - MFI or Label B2	98
5.3.41	Request Departure Clearance - MFI or Label B3	100
5.3.42	Acknowledge Departure Clearance Downlink - MFI or Label B4	101
5.3.43	Provide Position Report - MFI or label B5	103
5.3.44	Provide ADS Reports - MFI or Label B6	103
5.3.45	Forward Free Text to ATC - MFI or Label B7	104
5.3.46	Request Departure Slot - MFI or Label B8	105
5.3.47	Request ATIS Information - MFI or Label B9	105
5.3.48	ATS Facilities Notification - MFI or Label B0	106
5.3.49	ATCComm - MFI or Label BA	108
5.3.50	Reserved - MFI or Label BB	109
5.3.51	Reserved - MFI or Label BC	109
5.4	Downlink Message Format, User-Defined	109
6.0	SERVICE LEVEL STANDARDS	110
6.1	Introduction	110
6.2	Transit Times	110
6.2.1	First Block Uplink Message Transit Times	110
6.2.2	Multi-Block Uplink Transit Times	110
6.2.3	Single Block Downlink Transit Times	110
6.2.4	Multi-Block Downlink Transit Times	110
6.3	Availability	110
6.3.1	System	110
6.3.2	Ground Stations	110
6.3.3	Critical Airports	111
6.4	Clock Accuracy	111
7.0	REFERENCE DOCUMENTS	112

ARINC SPECIFICATION 620
TABLE OF CONTENTS

ITEM	SUBJECT	PAGE
ATTACHMENTS		
1	Ground Systems Standards Relationships	113
2	Unformattable Downlink Service Messages - Reason Codes	114-116
APPENDICES		
A	Glossary & Acronyms	117
B	Section B.1 SMI Codes	118
	Section B.2 TEI Codes	119-123
	Section B.3 Rules for SMI/TEI Application	124-125
C	SMI Information	126-136
D	Blocking Multiblock Messages	137-139
E	E-1 Baudot Limits to ASC II Code Set	140
	E-2 ASCII Code Set	141
F	F-1 Functions Supported by Service Providers	142
Z	Outstanding Issues/Standards Deviations	143

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.

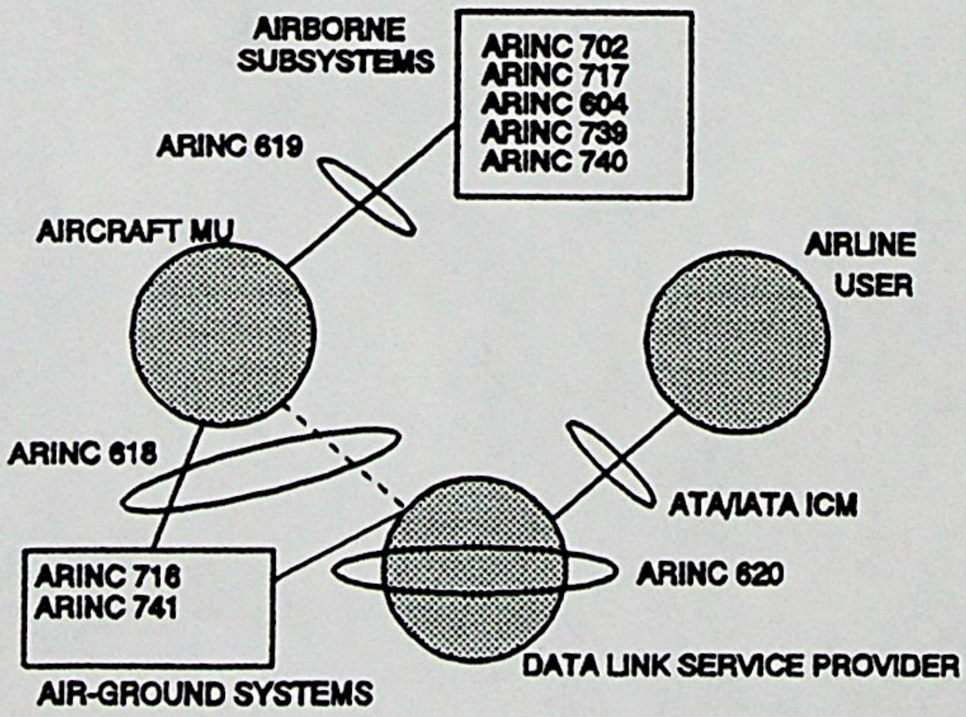
COMMENTARY

C-1

This document, as currently defined, is applicable to the current character-oriented VHF ACARS implementation. It does not describe the data link service provider to satellite interface for communications conducted under the Open Systems Interfaces (OSI) architecture concept. Implementations of the OSI concept include the VHF bit-oriented system (AVPAC) and the user interface for Data Level 3 satellite data communications (ARINC Characteristic 741). These details will be included at a later date.

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 Project Paper 619, "Airborne Equipment Protocols for File Transfer of Character Data."

The protocols and procedures to be used for communications between the airborne user and the data link service provider network are described in ARINC Specification 618, "VHF Air-Ground Character Data link." The capabilities of the onboard equipment are defined in ARINC Characteristics 597, 724 or 724B as applicable. Information from these Specifications and Characteristics is not duplicated in this document except as necessary to clarify the data link service provider to data link user interface.

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

1.4.1 ACARS System Description

The character-oriented version of VHF data link is referred to as the Aircraft Communications Addressing and Reporting System (ACARS). This system enables aircraft to function as mobile communications terminals. With ACARS, aircraft operate as integral parts of an airline's command, control and management systems.

ACARS provides message transfer between airborne users and ACARS Ground Users via ACARS Ground Networks. See Attachment 1-1 which shows a typical end-to-end communications environment and applicable Characteristics/manuals.

The format used to transmit messages between the ACARS Ground User and the data link service provider network differs from the format used to exchange messages between airborne user and the data link service processor. It is the responsibility of the data link service provider to provide translation between these formats and to provide message routing. The data link user to data link service provider network message formats are fully described in this document. The format for message text exchanged between the airborne user and the data link service provider network is defined in this document. The protocol used to facilitate this air-ground exchange is defined in ARINC Specification 618.

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 messages) into SMT format for consumption by the 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

1.0 INTRODUCTION (cont'd)

1.4.1 ACARS System Description (cont'd)

ground based user into air-ground message formats having labels/sublabels and then pass the reformatted messages on to the airborne user.

1.4.2 ATN System Description

A new generation of air-ground communications will be introduced in the 1990s. The new system will feature bit-oriented communications conducted in accordance with the Open Systems Interconnection (OSI) architectural model. AEEC has developed a suite of protocols, selected from International Standards Organization (ISO) documentation. The air-ground network is termed Aviation VHF Packet Communications (AVPAC). The documentation of the air-ground protocols to be used within the ATN for communications across the AVPAC data link is being developed and is available as Draft 1 of Project Paper 631, "Aviation VHF Packet Communications (AVPAC)."

2.0 DATA LINK SYSTEM

2.1 Overview

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. Two possible ways of communicating between a point on the ground and an aircraft in flight are line-of-sight VHF and satellite. As data link use increases, it becomes necessary to have data link channels constantly available. Data link service providers 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 and more efficient use of the RF spectrum. Data link permits transmission of a typical 200 character message across the VHF channel in 1 second. When compared with voice transmission of the same message, channel occupancy time is reduced sufficiently to allow transfer of many more messages using the same level of VHF resources.

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 VHF data link is that digital data are passed between an aircraft and a ground station using amplitude modulation of the VHF signal to code the data. Equipment required onboard for VHF 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.

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). These RGSs must be installed in all locations where data link communications are required. Generally, they are installed at all airports where data link equipped aircraft land. Where there are large distances between airports, enroute RGS are also required to be installed.

The method of coding data on the air/ground path is by modulating the amplitude of the VHF signal. The name of the modulation scheme applied is Minimum Shift Keying. This is equivalent to sending a succession of tones which have either a high or low pitch. A synchronization process allows the receiver to identify the first bit of the transmission and its value (1/0). After this first bit, if the following tone has the same pitch, the value of the following bit remains the same, and if it has a different pitch it changes. Modems in the aircraft and ground stations convert from this form to the standard serial or parallel form used inside all computers.

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 message into one or multiple air/ground message blocks. See Section 2.2.5 for handling of improperly formatted messages. C-1

The air/ground block(s) will be transmitted sequentially to the aircraft through a ground station using the procedure

2.0 DATA LINK SYSTEM (cont'd)

2.2.1 Uplink Message Handling (cont'd)

C-1 detailed in Section 3.7. Each block must be successfully delivered (DSP receives an acknowledgement from the aircraft) to the aircraft before the transmission of the next block is attempted. See Section 2.2.5 for handling of unsuccessful delivery of messages.

2.2.2 Downlink Message Handling

Aircraft may transmit downlink messages to a DSP in either of the two methods described below:

1. CATEGORY A - Aircraft may broadcast the message to all DSP ground stations in the aircraft's VHF coverage area. Message delivery of this type is denoted by a "2" character in the mode character of the downlink message (see Section 3.2.1).

2. CATEGORY B - Aircraft may transmit the message to a single DSP ground station within the aircraft's VHF coverage area. Message delivery of this type is denoted by a character other than "2" in the mode character of the downlink message. Refer to ARINC Specification 618 for details.

Both downlink methods are acceptable to all service providers, however, only those service providers who have implemented Category B operations (SITA, Air Canada, AVICOM) will deliver uplink messages through the ground station specified in the downlink Category B C-1 message. NOTE: A detailed description of Category B operations will be included in a future revision of this document.

Each block of the downlink message is retained by the DSP until the final block is received or the Incomplete Downlink Message Delivery timer (GT4) has expired (See Section 5.4.1 of ARINC Specification 618.).

After receipt of the final downlink message block from the ground station(s), the DSP will convert (reformat) the air/ground message into an SMT ground/ground message and forward the SMT message to the proper address(es). Refer to Section 2.2.5 for air/ground messages that cannot be properly reformatted or addressed.

2.2.3 Accountability

The acknowledgement 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 acknowledgement process. End-to-end acknowledgements are the responsibility of the end systems. Message originators receive positive acknowledgement (ACK's) 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, and in ARINC Specification 618 for air/ground transmissions.

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.

Acknowledgements 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. C-1

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 acknowledgement from the aircraft.

2.0 DATA LINK SYSTEM (cont'd)

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 Channel Management

The frequency spectrum is limited and increasing demands further task the ability of RF resources to meet requirements. Therefore, available frequency channels must be efficiently managed to ensure future demands are satisfied.

2.3.1 Multiple Frequencies

DSPs may supply multiple frequencies as required to minimize frequency congestion at high traffic areas. Under these circumstances, DSPs will uplink auto-tune messages to aircraft to cause aircraft avionics to change to the directed frequency and thereby balance traffic load across all available frequencies.

C-1 ARINC Characteristic 597 provides a complete reference for aircraft responses to auto-tune messages. Also refer to Section 4.2.6 for the format of uplink auto-tune messages.

Individual studies among various service providers have shown that the optional use of multiple frequencies should provide separate frequencies for enroute and terminal communications. This may be achieved in two ways. If frequency management is controlled from the ground by the DSP, some indication is required when an aircraft changes air/ground status. If it is the aircraft that chooses to initiate retune procedures, the DSP must broadcast the available frequencies in an uplink message.

COMMENTARY

ARINC uses the destination station within ON messages and both departure and destination stations within OFF messages to facilitate ground-based frequency management.

2.3.2 Frontier Crossing

C-1 DSP ground stations at the outer borders of DSP areas of coverage uplink squitter messages in lieu of normal operational uplink traffic to notify aircraft that they are entering a certain DSPs area of coverage. The squitter messages are generated by each DSP and conform to the timing characteristics described in ARINC Specification 618. DSPs should ensure that squitters transmitted from adjacent DSP ground stations do not collide. C-1

2.3.3 Shared Frequencies

In areas where multiple data link service providers offer coverage, multiple DSPs may receive downlink messages from the same aircraft. These downlink messages are handled so that messages are not lost due to false acknowledgements.

2.4 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.

2.4.1 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.

2.4.2 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.

2.5 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.

2.5.1 Data Link Station Outage Status (AOS)

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

2.5.2 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.

2.0 DATA LINK SYSTEM (cont'd)

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 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).

2.6.1 Aeronautical TELECOMM Network (ATN) Connectivity

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 DSU concerning error handling is "reporting by exception," that is, the user may assume the message has been delivered unless a reject message is returned.

2.6.2 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.

2.7 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

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.

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. C-1

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.

3.2 General Ground/Ground Message Format

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

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 ddhhmm (day/hour/minute). It is possible to enter further signature information after the timestamp. This line ends with [CARRIAGE RETURN/LINE FEED] <CR/LF>. C-1

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.

The syntax of 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 Elements have the following syntax:

3.0 MESSAGE HANDLING (cont'd)

3.2 General Ground/Ground Message Format (cont'd)

TEXT ELEMENT STRUCTURE		
FIELD	LENGTH	CODING
Text Element Identifier (TEI)	2 characters	Alpha/Numeric
Text Element Data field	Variable (depends on TEI)	
Text Element Terminator	1 character	"/" if another Text Element follows or 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. The first character of the Airline Identifier may be any alpha character or any number 0 though 9. The second character should be an alpha character. Regarding uplink messages, 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.

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.

C-1 Line 5 and above comprise 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.

3.2.1 Forwarding Downlink Messages

Airborne generated ACARS messages, one or more blocks in length, are received by the Datalink Service Provider (DSP) through a ground station. When the DSP receives a downlink block from an aircraft, the Label within the ACARS block indicates whether a Ground/Ground message should be 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:

GENERAL FORMAT OF GROUND/GROUND DOWNLINK MESSAGE		
LINE	CONTENTS	EXAMPLE
1	Priority/Destination Address	QU ADRDPAL
2	Signature/Tansmission time	.DSPXXXX 121212
3	Standard Message Identifier	AGM
4	Text Elements	FI XX0001/AN N123XX
5	Communication Service Line	DT DSP RGS 121212 M01A
6-n	Free Text	- DOWNLINK

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. 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.

3.0 MESSAGE HANDLING (cont'd)

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.

SMI Line: AGM
Line 3, the Standard Message Identifier (SMI) line, is dependent on the label and sub-label of the ACARS block that generated the message. See Section 3.8 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.

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 Free Text containing the message label.

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:

- DSP Identifier (e.g. DDL - see below)
- Remote Ground Station of reception of first block
- Message Reception time stamp (UTC in the form: date, hours, minutes)
- Message Sequence Number of the first received ACARS block

The DSP Identifier codes, in 3 letter format, are:

DDL - ARINC

QXS - SITA AIRCOM

AGC - Air Canada

JDL - AVICOM Japan

QXC - SITA/Air Canada Internetworking

QXJ - SITA/AVICOM Internetworking

QXT - Satellite AIRCOM

QXM - Reserved

Free Text: - DOWNLINK
Inclusion of Free Text is optional. The Free Text section of the ACARS 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 block.

C-1

COMMENTARY

ARINC inserts a <CR/LF> in the Free Text after every 69 characters in downlink messages that do not contain the sequence CR/LF.

For some message types it is possible to include Supplementary Addresses in the message text. See Section 3.8.1 for further details.

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 present in the Text field.

3.0 MESSAGE HANDLING (cont'd)

3.2.1 Forwarding Downlink Messages (cont'd)

Continuing the example of processing a downlink Q1 label message, DSPs may identify the following Text Element Identifiers (TEI's):

TEI	DESCRIPTION	CODING
FI	Flight Identifier	2 Alpha/Numeric plus 1-4 Alpha/Numeric
AD	Destination Airport	3 Alpha Characters (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 (IATA format)
<-$_{SP}$>	Free Text	not to exceed 184 Alpha/Numeric characters

C-1

See Appendix B.2 for a full listing of TEIs.

Datalink service providers assign an SMI for the Q1 label 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:

1) Out-time, Off-time, On-time and In-time fields all contain data

2) 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).

3.2.2 Uplink Message Format

C-1 Ground/Ground messages meant for uplink are sent by the ground user to the DSP as ATA/IATA standard messages (Type B). The DSP converts these messages to ACARS blocks, and transmits them, through a ground station, to the designated aircraft. See Section 3.7 for the Air-Ground Uplink message format.

GENERAL FORMAT OF GROUND/GROUND UPLINK MESSAGE		
LINE	CONTENTS	EXAMPLE
1	Priority / DSP Address	QU DSPXXXX
2	Signature / Transmission time	.ADRDPAL 121212
3	Standard Message Identifier	M10
4	Text Elements	AN N123/FI XX1234
5-n	Free Text	- UPLINK

C-1 Lines 1, 2, 3, 4 and 5-n are constructed the same as their corollary lines in the General format described in Section 3.2.

In line 4, the user host may provide the Airline Identifier as a 3-character code. Note that the DSP is responsible for providing a 2-character Airline Identifier in the uplink message as described in Section 3.2.

3.0 MESSAGE HANDLING (cont'd)

3.2.2.1 Ground/Ground Uplink Messages with Message Assurance

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.

FORMAT OF GROUND/GROUND UPLINK MESSAGE WITH MESSAGE ASSURANCE		
LINE	CONTENTS	EXAMPLE
1	Priority / DSP Address	QU CTYDPAL
2	Signature / Transmission time	.QXSXMXS
3	Standard Message Identifier	AGM
4	Text Elements	AN N123/FI XX1234/MA 123A
5-n	Free Text	- UPLINK

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

where:

- NNN is the Serial Number of the message
- C is the Function Indicator with two possible values, A or I

A = Request delivery indication only (coded, e.g. MA 123A)
I = Request delivery indication and link acknowledgement (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.

3.3 Service Messages

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

GENERAL FORMAT OF GROUND/GROUND SERVICE MESSAGE		
LINE	CONTENTS	EXAMPLE
1	Priority / Destination	QU CTYZZZZ CPYXXXX CTYXXXX
2	Signature / Transmission time	.DSPXXXX (ddhhmm)
3	Standard Message Identifier	SVC (obligatory)
4	Intercept Information	- UP UNKNOWN SMI
5	Carriage Return Line Feed	crlf
6-n	Text of message	

Lines 1, 2, 3, and 5-n are constructed the same as their corollary lines in the General format described in Section 3.2.

Line 4, the Intercept Information line, contains the Type/Reason/Code. The contents of these fields is described in the following sections.

3.0 MESSAGE HANDLING (cont'd)

3.3 Services Messages (cont'd)

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

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 Acknowledgement (see Section 3.2.2.1); 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 acknowledgement.

c-1

FORMAT OF GROUND/GROUND LINK ACKNOWLEDGEMENT MESSAGE		
LINE	CONTENTS	EXAMPLE
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

3.0 MESSAGE HANDLING (cont'd)

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.

FORMAT OF GROUND/GROUND MESSAGE WITH ACKNOWLEDGEMENT NOT SUPPORTED RESPONSE		
LINE	CONTENTS	EXAMPLE
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

Some DSPs will simply not respond at all.

MORE COMMENTARY

SITA supports the Message Assurance functions. For SITA, the X Function Indicator code will be used in the case of certain messages sent through internetworking. In this case, successful delivery assurance may not be possible.

C-1

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 acknowledgement by the flight crew or any avionics subsystem.

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

Line 3, the Standard Message Identifier line, will contain the SMU 'MAS'.

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.

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 acknowledgement for the message; or the final block if a multiblock message is involved.

3.0 MESSAGE HANDLING (cont'd)

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 because there is a format error in the message or because the message does not contain enough information for the DSP to identify either the aircraft or the aircraft's location. 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 service message generated for an untransmittable uplink message is:

FORMAT OF GROUND/GROUND MESSAGE WITH UNTRANSMITTABLE UPLINK REPORT		
LINE	CONTENTS	EXAMPLE
1	Priority / Destination	QU CTYZZZZ CPYXXXX CTYXXXX
2	Signature / Transmission time	.XXXXXXX (ddhhmm)
3	Standard Message Identifier	SVC (obligatory)
4	Intercept Information	- UP INTERCEPT reason 2XY
5	Carriage Return Line Feed	crlf
6-n	Text of Uplink Message	QU DSPXXXX .HDQCMUA CMD AN .N123XX -AMEND RLS IFR PER RLS 03... (up to 220 characters)

Lines 1, 2 and 3 are constructed the same as their corollary lines in the General format described in Section 3.2.

C-1 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 2-2 of Attachment 2.

Line 5-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 one block (220 characters).

If the uplink message contained the 'MA' Text Element calling for Message Assurance, the following Message Report should be used.

FORMAT OF GROUND/GROUND MESSAGE WITH UNTRANSMITTABLE UPLINK MESSAGE ASSURANCE REPORT		
LINE	CONTENTS	EXAMPLE
1	Priority / Destination	QU CTYZZZZ CPYXXXX CTYXXXX
2	Signature / Transmission time	.XXXXXXX (ddhhmm)
3	Standard Message Identifier	MAS (obligatory)
4	Text Elements	AN N123XX/FI XX1234/MA 123F
5	Intercept Information	- UP INTERCEPT reason 2XY
6	Carriage Return Line Feed	crlf
7-n	Text of Uplink Message	QU DSPXXXX .HDQCMUA CMD AN .N123XX -AMEND RLS IFR PER RLS 03... (up to 220 characters)

3.0 MESSAGE HANDLING (cont'd)

Lines 1 and 2 are constructed the same as their corollary lines in the General format described in Section 3.2.

Line 3, the SMI line, will contain 'MAS'.

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'.

Line 7-n, should be the same as in the Table above.

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 acknowledgement 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 acknowledgement 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 block, 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.

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 Service message generated for an undeliverable uplink message is:

FORMAT OF GROUND/GROUND MESSAGE
FOR REPORTING AN UNDELIVERABLE UPLINK MESSAGE

LINE	CONTENTS	EXAMPLE
1	Priority / Destination	QU CTYZZZZ CPYXXXX CTYXXXX
2	Signature / Transmission time	.XXXXXXX (ddhhmm)
3	Standard Message Identifier	SVC (obligatory)
4	Intercept Information	- reason 3Xy
5	Aircraft Registration Number	ADDRESSEE: .N123XX
6	carriage return line feed	crlf
7-n	Text of Uplink Message	QU DSPXXXX .HCQCMUA CMD AN .N123XX - AMEND RLS IFR PER RLS 03... (up to 220 characters)

Lines 1, 2, 3, and 6-n are constructed the same as their corollary lines in the General format described in Section 3.2.

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.

Line 5, the Aircraft Registration Number line, contains only the aircraft registration number, a subset of the information included in a Text Element, preceded by the usual period.

Line 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 one block (220 characters).

3.0 MESSAGE HANDLING (cont'd)

3.3.4 Undeliverable Uplink Service Messages (cont'd)

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 below. Uplink messages,with Message Assurance requested,that are received by the DSP but not transmittable have a different format. See Section 3.3.5.

FORMAT OF GROUND/GROUND MESSAGE FOR REPORTING AN UNDELIVERABLE UPLINK MESSAGE WITH MESSAGE ASSURANCE REQUESTED		
LINE	CONTENTS	EXAMPLE
1	Priority / Destination	QU CTYZZZZ CPYXXXX CTYXXXX
2	Signature / Transmission time	.XXXXXXX (ddhhmm)
3	Standard Message Identifier	MAS (obligatory)
4-m	Text Elements	AN N123XX/FI XX1234/MA 123F
m+1	Intercept Information	- reason xyz
m+2	Aircraft Identification	ADDRESSEE: .N123XX
m+3	carriage return line feed	crlf
n	Text of Uplink Message	QU DSPXXXX .HDQCMUA CMD AN .N123XX - AMEND RLS IFR PER RLS 03... (up to 220 characters)

Lines 1, and 2 are the same as the table above.

Line 3, the SMI line, will contain 'MAS'.

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'.

Line n is the same as the table above.

3.3.5 Unformatable Downlink Service Messages

Unformatable 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 unformatable.

FORMAT OF GROUND/GROUND MESSAGE TO REPORT UNFORMATABLE DOWNLINK		
LINE	CONTENTS	EXAMPLE
1	Priority / Destination	QU XXXXXXX
2	Signature / Transmission time	.DSPXXXX (ddhhmm)
3	Standard Message Identifier	SVC (obligatory)
4	Intercept Information	- DN INTERCEPT reason 1XY
5	carriage return line feed	crlf
6-n	Copy of Intercepted Downlink Message	QU DSPXXXX .HDQCMUA CMD AN .N123XX - AMEND RLS IFR PER RLS 03... (up to 220 characters)

3.0 MESSAGE HANDLING (cont'd)

Lines 1, 2, 3, and 5-n are constructed the same as their corollary lines in the General format described in Section 3.2.

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.

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.

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: | c-1

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 OCCURENCE
STNS: (LAX SIN).	Precedes the list of stations If no stations names are included, contains 'NONE'

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

3.5 General Air/Ground Message Format

The format of the Air/Ground messages is governed by the ARINC Specification 618. The format shown below is that of a single ACARS block. The text of such a block is limited to 220 characters. It is possible to transmit longer messages. These longer messages must be broken up into several blocks. See Section 3.7.2 for the construction of Multiblock uplink messages. | c-1

The following description is included for the readers convenience. The definition provided in ARINC Specification 618 will prevail if any differences arise.

3.0 MESSAGE HANDLING (cont'd)

3.5 General Air/Ground Message Format (cont'd)

GENERAL AIR/GROUND MESSAGE FORMAT																						
FF	FF	FF	FF	FF	FF	FF	FF	+	*	SYN	SYN	SOH	MOD	Aircraft Registration	TAK	Label	XBI	STX	Text	ETX	BCS	DEL
---------- PREKEY ----------												---------- HEADER ----------						-- TEXT --			

C-1 In initial characters of the ACARS block are the prekey. The length of the prekey sequence is variable but it must be at least 16 characters long. The PLUS ASTERISK <+*> character sequence is used to establish bit synchronization. The two <SYN> characters are used to establish character synchronization. These synchronization characters are defined in ARINC Specification 618 and will not be included in any further format diagrams in this section.

The ACARS message Header is the portion from the Start of Header <SOH> character to the Start of Text <STX> character. In diagram form, the contents of the header are as follows:

SOH	MODE	ADDRESS FIELD	TECHNICAL ACKNOWLEDGEMENT (TAK)	LABEL	DBI or UBI	STX

The Start of Text <STX> character is used to indicate the end of the ACARS Header and the beginning of the text portion of the message.

C-1 The content of the Text portion of the message should be generated in conformance with the structure and content defined in Chapter 4 of this Specification. The Text field is concluded with an end of text <ETX> character or end of block <ETB> character. The use of these characters are described in more detail in the Sections 3.6.1 and 3.7.2 which deal with Multiblock messages.

The final field of the message is the Block Check Sequence (BCS). The BCS contains the checksum of the characters in the message. The BCS Suffix is the Delete <DEL> character and follows the BCS. The BCS Suffix is required for modulation reasons. The checksum calculation procedure is described in ARINC Specification 618 and is not discussed here.

3.5.1 Standardized Acknowledgement Format

The Standardized Acknowledgement format provides for the use of a single character to identify an uplink message. This character is referred to as an "uplink block identifier (UBI)," and enables the aircraft to detect duplicate messages.

C-1 A downlink message in the standardized acknowledgement format does not contain a similar "downlink block identifier (DBI)." The Standardized Acknowledgement format is obsolete. It is recommended that the Correlated Acknowledgement defined in Section 3.5.2 be used.

DSPs assign a UBI to all uplink transmissions using one of the following schemes:

A. Each new block uplinked to a given aircraft is assigned a new UBI, even for general responses to downlink retransmissions. The following sequence will be used:

   A, B, C, D... Y, Z, A, B, ... etc.

   The first UBI of all new sequences is an "A".

B. The first block uplinked to a "new" aircraft is assigned a UBI identical to the datalink service provider's logical channel identifier (mode character) and is represented in lowercase: a, b, c ... x, y, or z.

   All subsequent blocks will have UBI's which alternate between lowercase and uppercase. For example, if the first UBI is "s", the sequence starting with the second UBI is:

   S, s, S, s, S, s, ... etc.

Retransmitted blocks retain their original UBI's, except when the retransmission is caused by the aircraft transmitting one of the labels Q5, CA, CB, CC, CD, CE, CF.

NOTE: A "new" aircraft is one that did not use the ground station for a period of "x" (see Appendix D) minutes.

3.0 MESSAGE HANDLING (cont'd)

3.5.2 Correlated Acknowledgement Format

The correlated acknowledgement format provides for the use of alphabetical characters to identify uplink messages, and numeric characters to identify downlink messages. Under the correlated acknowledgement format, one byte is added to the downlink header. This byte contains a DBI ('0' to '9') that uniquely identifies a downlink block. The technical acknowledgment field of the uplink acknowledgement block contains the DBI being acknowledged or a negative acknowledgement (NAK). In addition, for an uplink block correctly received by the avionics, the correlated downlink block contains the UBI ('A' to 'Z') being acknowledged or a NAK in the technical acknowledgement field. Uplink blocks remain the same except for the technical acknowledgement field. Refer to section 3.1.1.2.1 for the assignment of UBI's for uplink messages.

A DBI is a single character located after the label field at the beginning of text, and is provided in all downlinks in the correlated acknowledgement format. Its function is to enable DSPs to detect duplicate messages or message blocks. Airborne sub-systems change the bit pattern transmitted in this character position each time a general response or a new message or message block is transmitted by the aircraft. Any retransmission of a given downlink required to secure a response from the DSP contains the same bit pattern as the first transmission of that downlink.

DSPs handle downlinked messages with or without DBI's. When DSPs receive a downlink message with a DBI, they send an acknowledgement in the following manner:

A. If the Block Check Sequence (BCS) passes, the DBI character is reflected in the technical acknowledgement field of the next uplink sent to the aircraft. The uplink response can be an uplink message already on queue for the aircraft (referred to as an embedded acknowledgement), or a general response acknowledgement.

B. If the BCS fails, no acknowledgement will be sent to the aircraft. It is the aircraft's responsibility to assume a link failure and retransmit the message.

NOTE: A DSP may elect to respond to a downlink message that fails the BCS by embedding the NAK character in the technical acknowledgement field of the next uplink message.

3.6 Downlink Messages

The format of Air/Ground message is governed by the ARINC Specification 618. The format shown below is that of a single ACARS block. The text of such a block is limited to 220 characters. It is possible to transmit longer messages. These longer messages must be broken up into several blocks. See Section 3.6.1 for the construction of Multiblock uplink messages.

GENERAL FORMAT OF AIR/GROUND DOWNLINK MESSAGE

NAME	SOH	Mode	Aircraft Registration Number	TAK	Label	DBI	STX	MSN	Flight ID	Free Text
SIZE	1	1	7	1	2	1	1	4	6	0-210
EXAMPLE	SOH	2	.N123XX		5Z	2	STX	MO1A	XX0000	

c-1

The fields of the Header are constructed the same as their corollary lines in the General format described in Section 3.5. The descriptions below expand on the use of these fields for downlink messages.

The Downlink Block Identifier (DBI) is optional.

3.6.1 Multiblock Downlink Messages

Single block downlink messages are those where the first block is adequate to contain the entire message. An avionics subsystem (the MU or a peripheral to the ACARS MU) may prepare for downlink a message which has text which is longer than the field provided in a single ACARS downlink block. In this case the MU will partition the message into as many blocks as is required.

The final block of any message, either single or multiblock, is terminated by ETX. The first and intermediate blocks of a multiblock message are terminated by ETB. The final block is terminated with an <ETX>. c-1

Downlink messages are immediately formatted into ground/ground messages and transmitted to the user. 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:

3.0 MESSAGE HANDLING (cont'd)

3.6.1 Multiblock Downlink Messages (cont'd)

- The last ACARS block of the message is received.

C-1 - The Incomplete Downlink Message Delivery timer, GT4, expires. See Section 5.4.1 of ARINC Specification 618 for a list and description of ground based timers. If timer GT4 expires, an Incomplete Downlink message report is sent with the SMI '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-1 Multiblock messages may contain Supplemental addresses, as described in Section 3.8.2.2 of this Specification. The first block of the message should contain the Supplemental addresses in its header. Subsequent downlink blocks of a multiblock message will not contain these Supplemental addresses.

3.7 Uplink Messages

C-1 The format of the Air/Ground messages is governed by the ARINC Specification 618. The format shown below is that of a single ACARS block. The text of such a block is limited to 220 characters. It is possible to transmit longer messages. These longer messages must be broken up into several blocks. See Section 3.7.2 for the construction of Multiblock uplink messages.

GENERAL FORMAT OF GROUND/AIR UPLINK MESSAGE								
Name	SOH	MODE	AIRCRAFT REGISTRATION OR FLIGHT ID	TAK	LABEL	UBI	STX	FREE TEXT
Size	1	1	7	1	2	1	1	0-220
Ex.		2	.N123XX		10	A		- UPLINK

C-1 The fields of the Header are constructed the same as their corollary lines in the General format described in Section 3.5. The descriptions below expand on the use of these fields for downlink messages.

Ground messages received by the DSP for transmission to an aircraft are accepted if the following conditions are fulfilled:

1. The timestamp of the message indicates a ground transit time less than the stale message rejection limit.

2. The SMI is valid and is approved for use by the ACARS user.

3. 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:

4. 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.

5. The message text is preceded by the special TEI "- " also referred to as "dash space". Note that an additional space is used as a separation. See Appendix B2.

C-1 If the incoming ground message fails to meet these criteria the datalink service provider will intercept the uplink message (see Section 3.3).

3.0 MESSAGE HANDLING (cont'd)

The permitted text elements in the Text Element line of uplink Ground/Ground messages are:

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	

① Some users may provide a 3-character Airline Identifier. See Section 3.2

② The Aircraft Registration Number may be padded with leading periods.

Valid TEI sequences are:

SEQUENCE	ALTERNATE	COMMENT
FI	FI/GL; FI/AP	
AN	AN/GL; AN/AP	
AN/FI	AN/FI/GL; AN/FI/AP	Not ARINC

NOTE: The Transmission path may follow any of the allowed sequences above.

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. This procedure is discussed in more detail in Section 2.6.

3.7.1 Uplink Message Re-formatting

The parts of the uplink Ground/Air message which depend on the Ground/Ground message are constructed as follows:

Aircraft Address:
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 user is allowed to specify either or both of these values when addressing a message.

COMMENTARY

For SITA, the user may specify both. Since the aircraft number never changes for a particular aircraft, it is given preference by the DSP. If the TE AN is used, the use of the TE FI although allowed is redundant.

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 flight identifier is converted back into an aircraft registration and the message is sent to the aircraft with that registration. If the DSP cannot perform this conversion but the user has included GL or AP TEIs, the uplink ACARS message block will be sent through the station specified with the flight identifier in the address field.

ACARS label:
The 3-character Standard Message Identifier in the Type B message defines the label and the sub-label of the ACARS generated block. The correspondence tables in Appendix C lists the conversion between message label and SMI.

Uplink Text Processing:

Uplink messages should be constructed according to the Type-B SMT format specified in the ATA/IATA ICM. The proper ending of user text, according to the ICM, should be CR/LF/ETX. The DSP removes the ending CR/LF/ETX to extract the user text for further formating. C-1

For text formatting purposes, uplink messages can be divided into four groups: 1) Header and Text, 2) Text, 3) Peripheral Messages and 4) Special Format.

3.0 MESSAGE HANDLING (cont'd)

3.7.1 Uplink Message Re-formatting (cont'd)

The SMI defines what the text of the ACARS block should include.

Header:
The SMI defines whether to include the header part of the ground/ground message in the uplink ACARS block. If the SMI is one of the group for which the header is included (e.g. AGM, CLX, FPL), the ACARS block will start with a copy of the Signature line, the SMI line and the TEI line. This will be followed by the message text.

Text:
If the SMI is one of the group for which the header information is not included, the ACARS block begins with the message text. The uplink correspondence table in Appendix C lists the conversion for each SMI. Messages to a peripheral (see below) are treated separately, but they can also be sent with and without the header.

Peripheral Messages:
C-1 Certain uplink messages are addressed to an avionics peripheral connected to the ACARS Management Unit (MU). The DSP will transmit these messages with the label H1. In some cases the peripheral being addressed is designated using a sub-label. If present, the sub-label is placed at the beginning of the text part of each block. See Sections 3.8.1 and 3.8.2 for information concerning addressing of ATS messages.

The text part of the Ground/Ground (Type B) messages with the Standard Message Identifiers FMR/FML/FMD/DFD/DFX/CFD/CFX begin with the TEI DASH/SPACE <-$_{SP}$>. The DSP will construct the sequence POUNDSIGN/SUB-LABEL corresponding to the SMI and will place it after DASH/SPACE <-$_{SP}$> in the ACARS block. This same sub-label will also be placed in any subsequent blocks if the message is a multiblock message.

Special Format:
C-1 The special format messages are those SMIs for which the DSP does not include the TEI DASH SPACE <-$_{SP}$> sequence in the uplink message block (e.g., GVR/54 and Command Response Uplink CMD/RA). For these SMI's, the DSP does not include the TEI DASH SPACE <-$_{SP}$> in the ACARS block. Please refer to Chapter 6 of ARINC Specification 618 for Voice Go-ahead formats and Section 3.8 of this Specification for Command Response formats.

3.7.2 Multiblock Uplink Messages

The Text part of an ACARS block is limited to 220 characters. Ground generated messages may be longer than one ACARS block in length. In that case, the DSP divides the uplink Ground/Ground message into as many multiple ACARS blocks as necessary and sends them block by block to the airborne avionics.

If the message can be contained in a single ACARS block, this block will be terminated by <ETX> which terminates both the block and the message.

If an uplink message is split up into multiple ACARS blocks all the blocks except the final block will have a text part of length 220 followed by a block terminator <ETB> which indicates that there is a further block to be transmitted. The final block will contain any remaining characters in the text which will be followed <ETX> which terminates both the block and the message.

If a multiblock message contains a sub-label, the sequence DASH/SPACE/POUNDSIGN <-$_{SP}$#> will be sent with each block.

3.7.3 Uplink Message Delivery

Uplink delivery consists of a logical method for delivery of single block and multiblock messages. For an uplink message that requires delivery to an aircraft not active in the system, DSPs start with the geographic locator or airport locator (GL or 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 (TEI's) are used to indicate to the DSP through which ground station the aircraft can be reached; they cannot be used together.

Use of GL is optional. If GL is used, see Appendix Z for service provider differences.

Undeliverable uplink messages are intercepted and processed as described in Section 2.2.5.

3.8 Addressing

C-1 In uplink messages 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.

3.0 MESSAGE HANDLING (cont'd)

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. If necessary, additional addressing information is included in the TE line.

The DSP uses several elements of a downlink 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. Section 3.8.2 and its 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 following subsections describe the address mechanisms used across the air/ground link.

3.8.1 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.

3.8.1.1 Aircraft Address

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 2.3.2 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.

3.8.1.2 Uplink Addresses for Messages Delivered to an ACARS Peripheral

C-1

As with messages delivered to the ACARS MU, the Aircraft Address is the same as described in Section 3.8.1. 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 C-5 through C-8 of Appendix C 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)

3.8.1.3 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 (End System) that is providing the uplink message. 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 as described in Section 3.8.1.3 and any Supplemental Addresses as described in Section 3.8.2.2.

3.8.2 Downlink Addressing

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 3.8.2.1 and 3.8.2.2.

3.0 MESSAGE HANDLING (cont'd)

3.8.2.1 Downlink Addresses of Messages from an ACARS Peripheral

When the message originator is an ACARS peripheral then it augments the downlink addressing scheme by adding 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 C-3 of Appendix C for a listing of ACARS peripheral sublabels.

C-1 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.

3.8.2.2 Downlink Supplementary Addresses

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

Description	Label
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	B1-BA

The DSP will determine the ground address(es) of the downlink message as described in Section 3.8.2 and 3.8.2.1 and will add the addresses included in the Supplementary Address field to Line 1 of the ground/ground message.

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 an ATS message from an ACARS peripheral, the first entry in this field is a 2-character MFI. Subsequent addresses in the 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.

C-1 The Supplementary Address field is constructed as follows:

Description	Character Count	Notes
Slash	1	
Supplementary Address(es)	Variable	Length of 2, 3, 4 or 7 characters; quantity variable
Period	1	

AOC Message Example: /CHIVUUA.
ATC Message Example: /LAX0501. and /Bx LAX0501.

Character No.	Description	Notes
1	Slash	
2-8	Supplementary Address	
9-m	Optional Additional Supplementary Address(es)	1
m+1	Period	

C-1 ⟨1⟩ Each address is separated by a Space

AOC Message Example: /CHIVUUA SANKLUA.
ATC Message Example: /LAX0503 ORD0NY1 PITK123. or /Bx LAX0503 ORD0NY1 PITK123.

3.0 MESSAGE HANDLING (cont'd)

A Supplementary Address is normally either 7, 4, or 3 letters in length. If an MFI is included as the first entry of the Supplementary Address field, it is 2 letters in length. All other Supplemental Addresses in a single message must be of the same length. | C-1

COMMENTARY

The 3 letter codes are from the International Air Transport Association (IATA) table and the 4 letter codes are from the International Civil Aviation Organization (ICAO) table of addresses. ARINC does not currently support the use of 3 or 4 letter optional addressing.

In the case of a 7-letter 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) letter code Supplementary Addresses, a conversion table maintained by the DSP is used to derive an associated 7-letter address to be entered in the Destination Address line, Line 1, of the ground/ground message in place of the 3 or 4 letter code. One 3 (or 4) letter code can generate several Supplementary Addresses. | C-1

4.0 UPLINK MESSAGE TEXT FIELD 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-1 Each message 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.

4.2 Uplink Message Formats, System Control

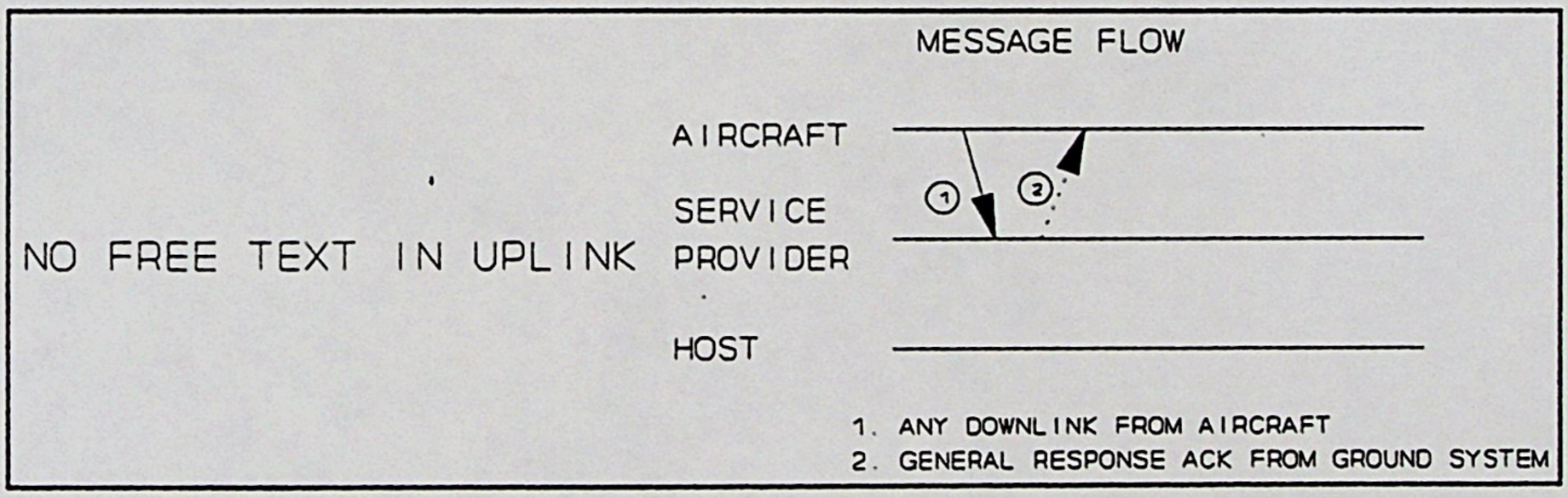
Messages that serve to maintain the network operation are defined as follows:

c-1

System Control Uplink	Label	Section
General Response	_DEL	4.2.1
Voice Go-Ahead	54	4.2.3
Voice Circuit Busy	Q4	4.2.4
Squitter	SQ	4.2.5
Data Transceiver Autotune	:;	4.2.6

4.2.1 General Response - Label _DEL

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



c-1 Figure 4.2.1-1 General Response Uplink

4.2.2 General Response, Polled Mode - Label _j

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

COMMENTARY

c-1 Label characters _j were assigned for a mode that was never used. They remain reserved.

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

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

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

Character No.	Character Content
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 Talk" (n $\leq$ 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.

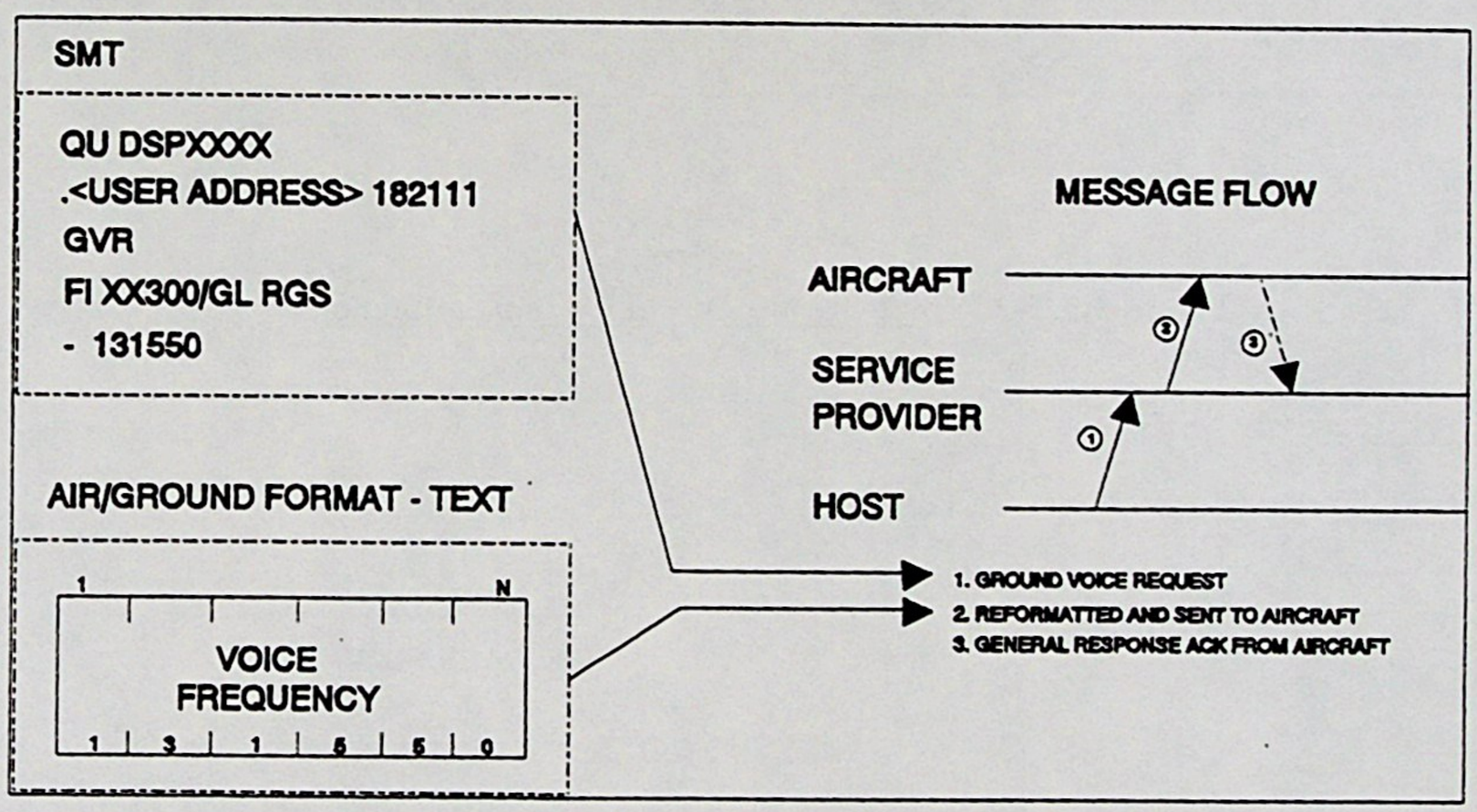
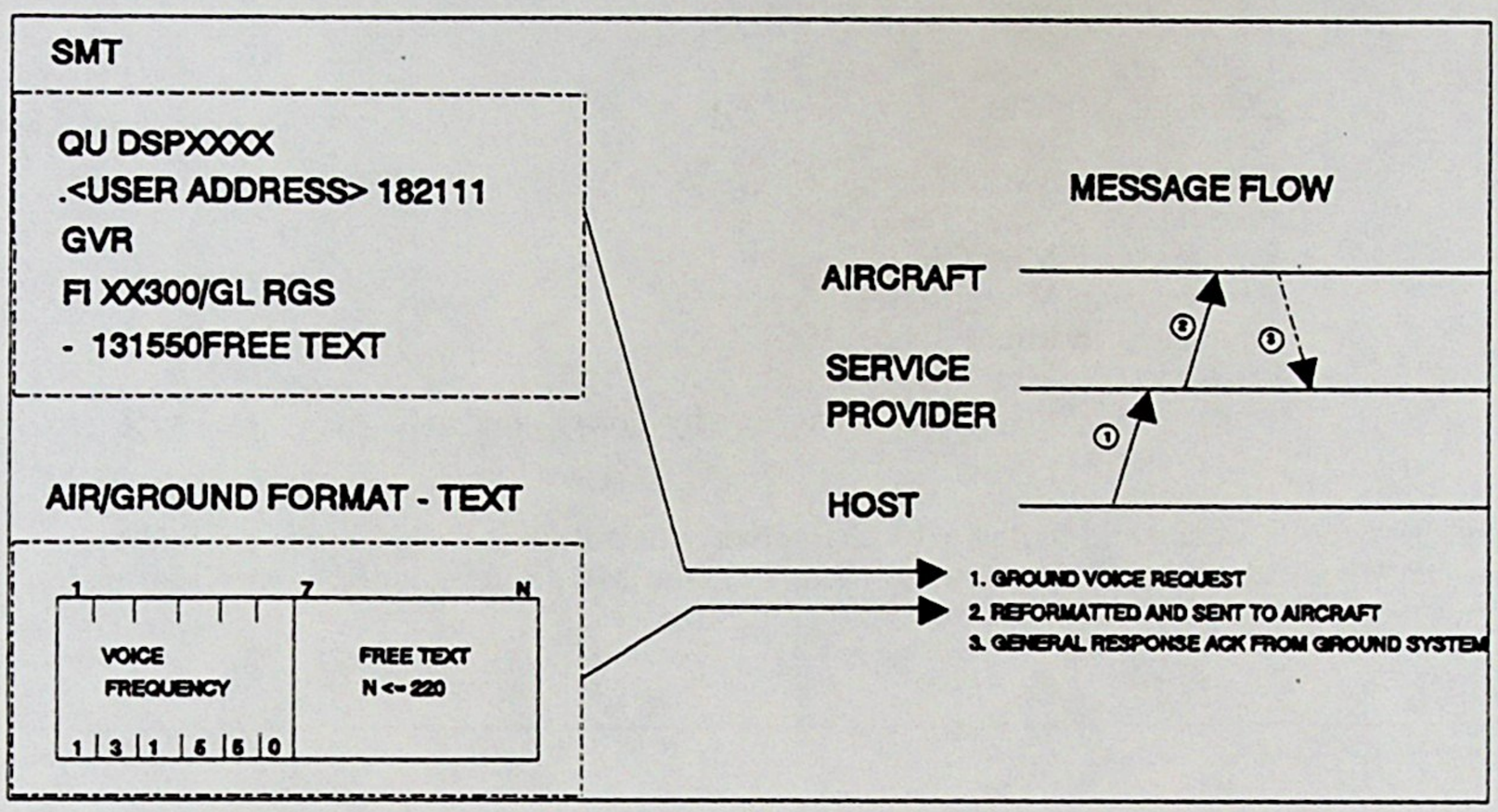


Figure 4.2.3-1 Voice Frequency - ARINC Implementation

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.2.3 ACARS Frequency Uplink - Label 54 or Voice Go-Ahead - Label 54 (cont'd)



C-1| Figure 4.2.3-2 Voice Frequency - SITA Implementation

4.2.4 Voice Circuit Busy - Label Q4

The Text field is not present in messages with Label Q4.

C-1

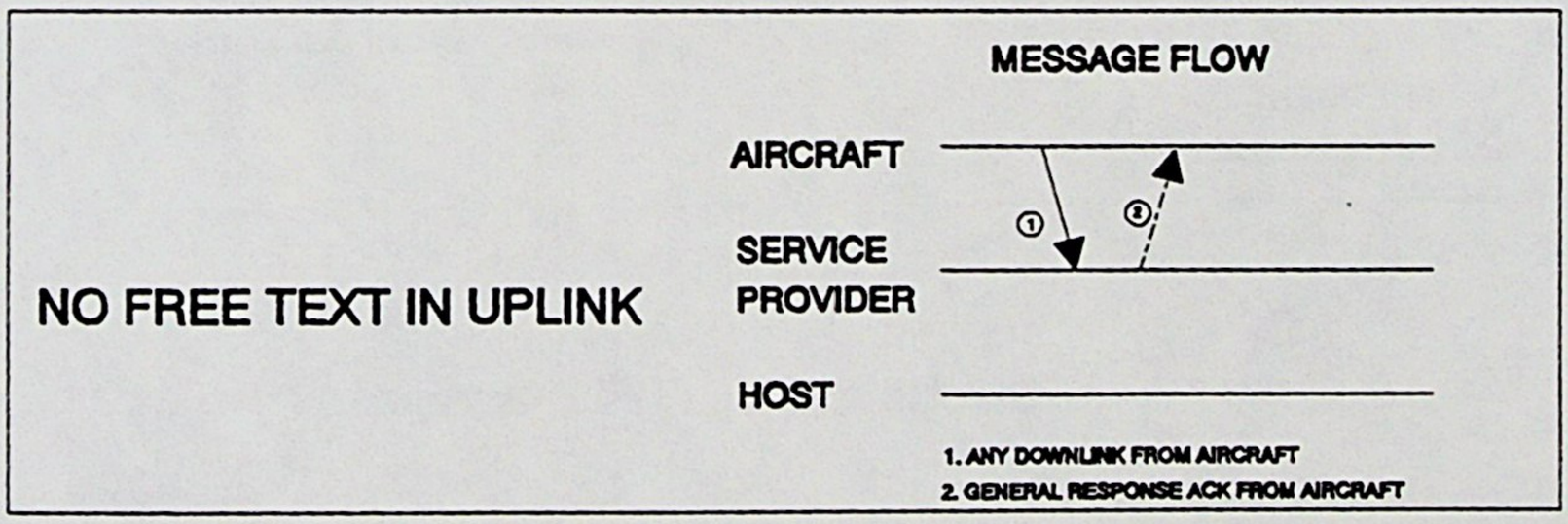


Figure 4.2.4-1 Voice Circuit Busy Message

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.2.5 Uplink Squitter - Label SQ

The format of Version 1 is as follows:

Character No.	Character Content
1-2	0 0
3-4	Service Provider (XA, XS, XC, etc.) See Note 1.
5-n	Free Talk (N≤ 220)

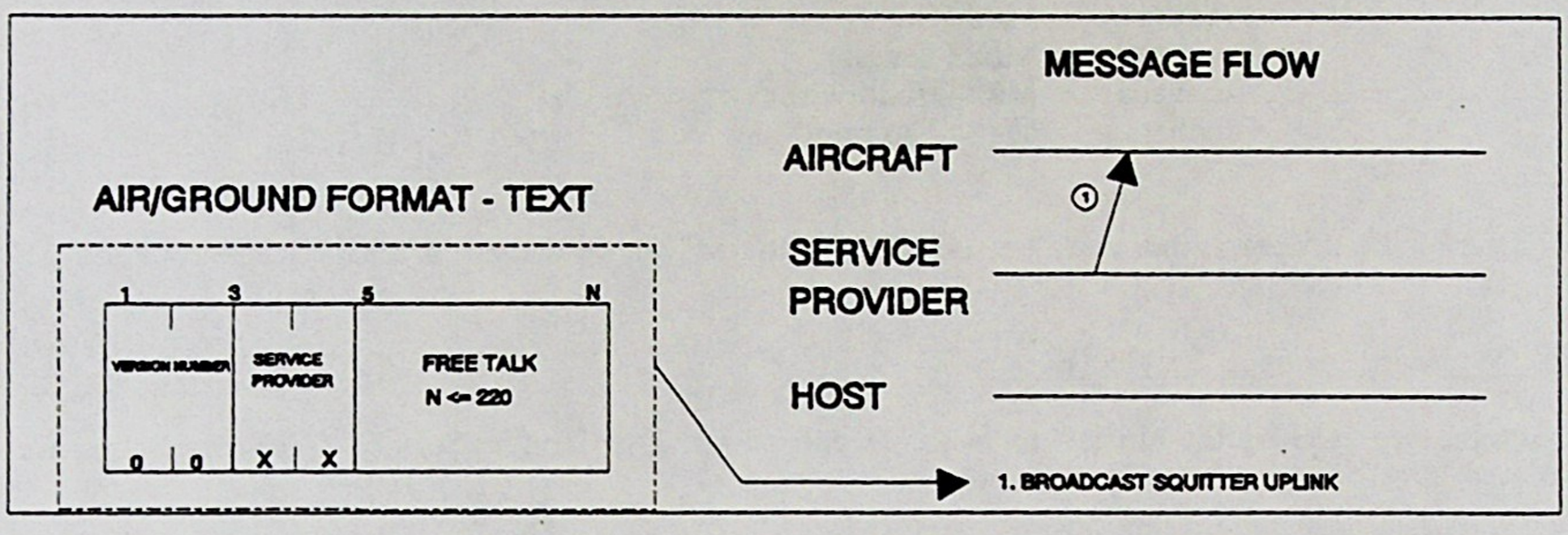


Figure 4.2.5-1 Squitter Message, Version 1

The format of Version 2 is as follows:

Character No.	Character Content
1-2	Version Number (01)
3-4	Service Provider (XA, XS, XC, etc.) See Note 1.
5-7	IATA Station ID (e.g. CID)
8-11	ICAO Station ID (e.g. KCID)
12	Station Number ID (e.g. 2)
13-n	Free Talk (N≤ 220)

C-1

NOTE 1 - Data Link Service Provider (DSP) designations are:

DSP	CODE
ARINC	XA
SITA	XS
Air Canada	XC
AVICOM JAPAN	JD

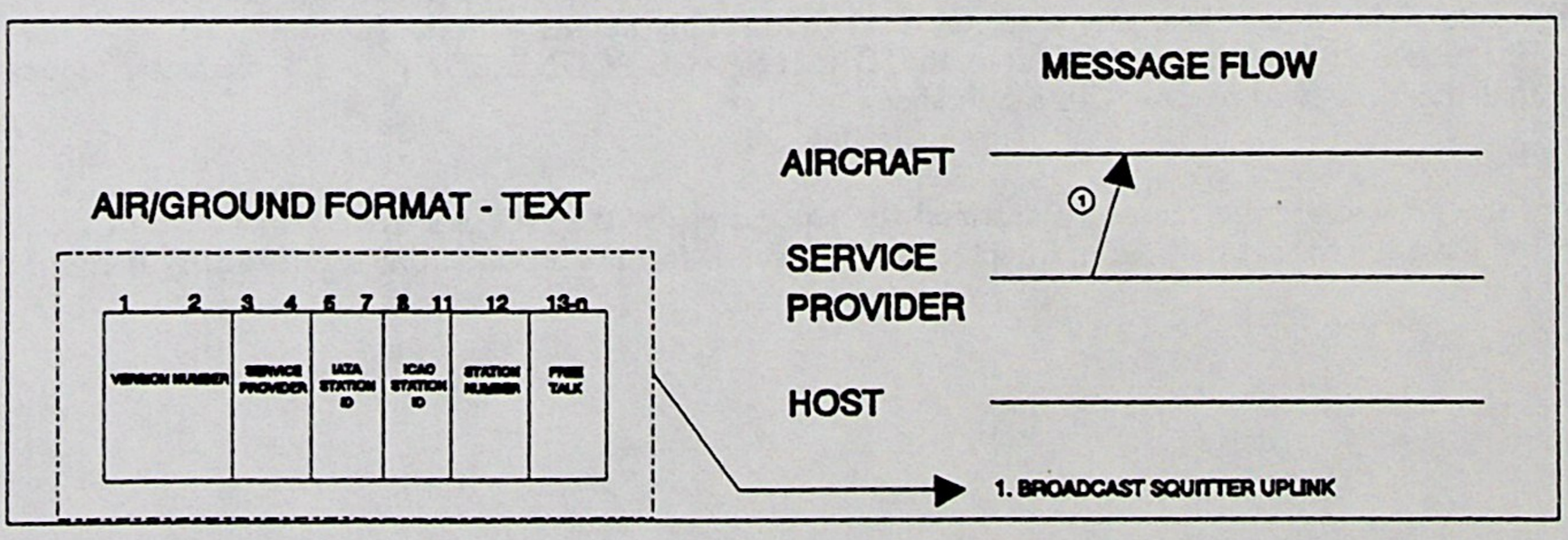


Figure 4.2.5-2 Squitter Message, Version 2

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

C-1 4.2.6 Data Transceiver Autotune - Label :;

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

Character No.	Character Content
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)

C-1 The description of the proper response to be followed by the MU is described in ARINC Specification 618.

4.3 Uplink Message Formats, Service Related

Service messages are used by the aircraft to facilitate operations. Air Traffic Service (ATS) messages are classed as Service Related uplinks.

Service Related Uplinks	Label	SMI	Section
Ground GMT Report	51		4.3.1
Alternative Ground UTC Report	52	AGM	4.3.2
Cockpit/Cabin Printer Messages	C0 thru C9	CPx	4.3.4
OAT, DFDAU and FMC (including ATS uplinks)	H1	Various	4.3.5
Command/Response Uplink	RA	RPR	4.3.6
Deliver Oceanic Clearance	A1	CLX	4.3.7
C-1 Unassigned	A2	CLA	4.3.8
Deliver Departure Clearance	A3	CLD	4.3.9
Acknowledge PDC	A4	RCA	4.3.10
Request Position Report	A5	RPR	4.3.11
Request ADS Reports	A6	RAR	4.3.12
Forward Free Text to ACFT	A7	FTU	4.3.13
Deliver Departure Slot	A8	DDS	4.3.14
Deliver ATIS Information	A9	DAI	4.3.15
ATS Facilities Notification	A0	AFN	4.3.16
ATC Communications	AA	ATC	4.3.17

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 Message 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 Text field begins with a Sublabel.

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.

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

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

Standard format:
QU CTYDPAL
.QXSXMXS ddhhmm
SMI
AN N1003x/GL MAN or FI xx1234/GL MAN
- *application text*

or
ATS format:

QU DSPXXXX
.PIKCLXS ddhhmm
SMI
AN N1003x/GL MAN or FI xx1234/GL MAN
- /PIKCLXS.IMI *application text* CRC

Message Text:
In general, the Message Text of uplink messages should be constructed in the format: '-----application text-----. C-1

Messages which may have an impact on the movement of the aircraft, such as Air Traffic Service (ATS) messages, may have additional data content. In general, the format of the Message Text field of an ATS message is 'IMI------ applications text-----CRC'.

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.

Application Text:
The contents of the Application Text field are defined in the individual Subsections of this Chapter. In the case of ATS messages, the Application Text is included by reference to ARINC Specification 622.

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.

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

AIRCRAFT ADDRESS	*LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	xx	/LAX05xx.	*application text* or IMI *application text* CRC

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3 Uplink Message Formats, Service Related (cont'd)

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.

C-1 **Supplementary Address:**
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. 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.

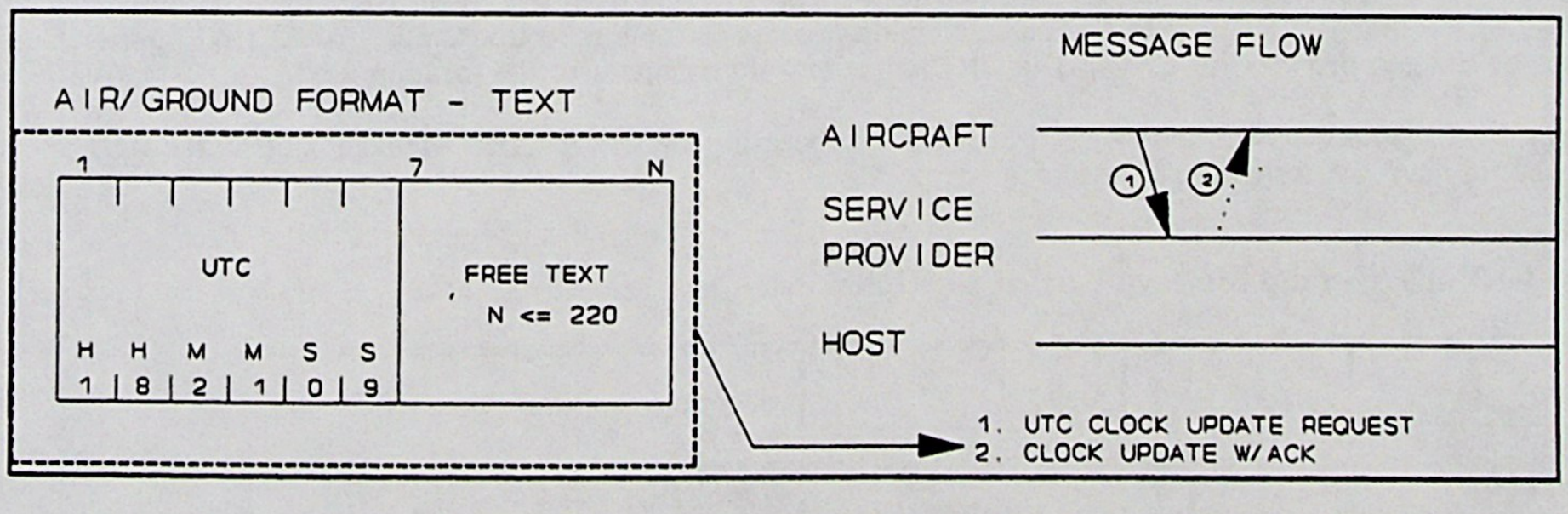
If the message is sent to a peripheral of the MU, such as the FMC, the Label 'H1' will be used. In this case, the Supplementary Address field will be expanded with a 2-character MFI. See Section 4.3.5 of this Specification for a more detailed description.

Message Text:
See the description provided in this section under Table 4.3-1A, Ground/Ground format of Uplink Messages sent to the MU.

4.3.1 Ground GMT Report - Label 51

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

Character No.	Character Content
1	[UTC Hours (Tens)] (MSC)
2	[UTC Hours (Units)]
3	[UTC Minutes (Tens)] (MSC)
4	[UTC Minutes (Units)]
5	[UTC Seconds (Tens)] (MSC)
6	[UTC Seconds (Units)]



C-1 **Figure 4.3.1-1 UTC Report**

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.2 Ground UTC Report - 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)

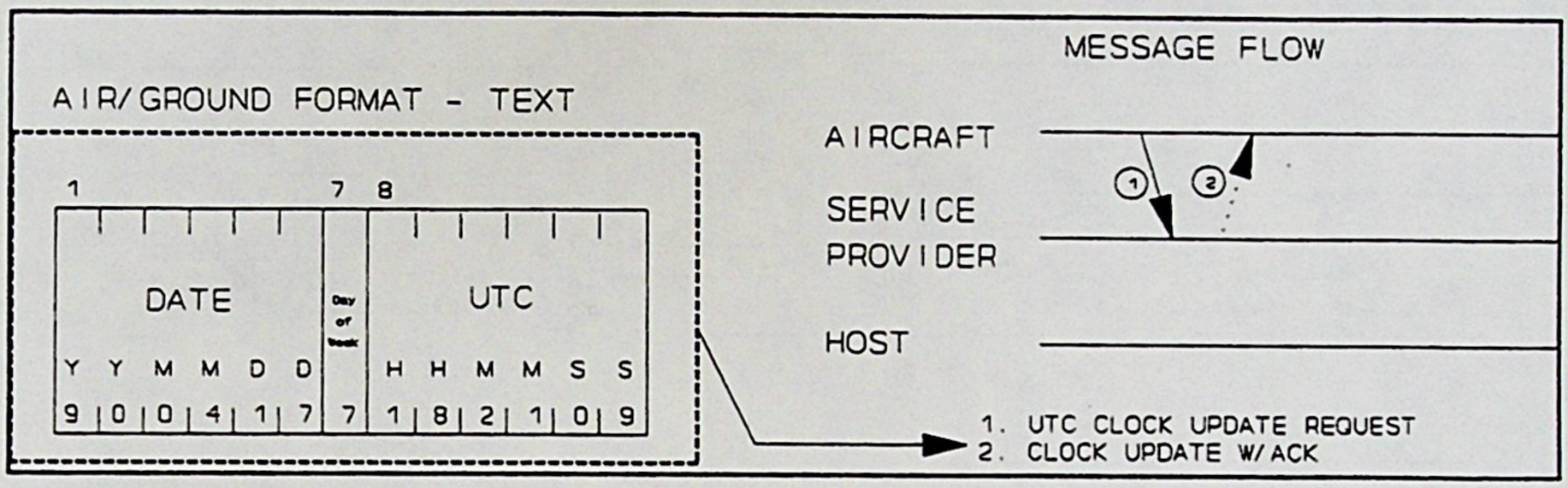


Figure 4.3.2-1 Alternative UTC Report | C-1

4.3.3 Reserved Spare - Label 53

Not assigned.

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

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	Hyphen Character <->
43	Space Character < >
44-n	"Free Talk" where n $\leq$ 220

Only single-block uplinks and the first block of 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.

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.4 Cockpit/Cabin Printer Messages - Labels C0-C9 (cont'd)

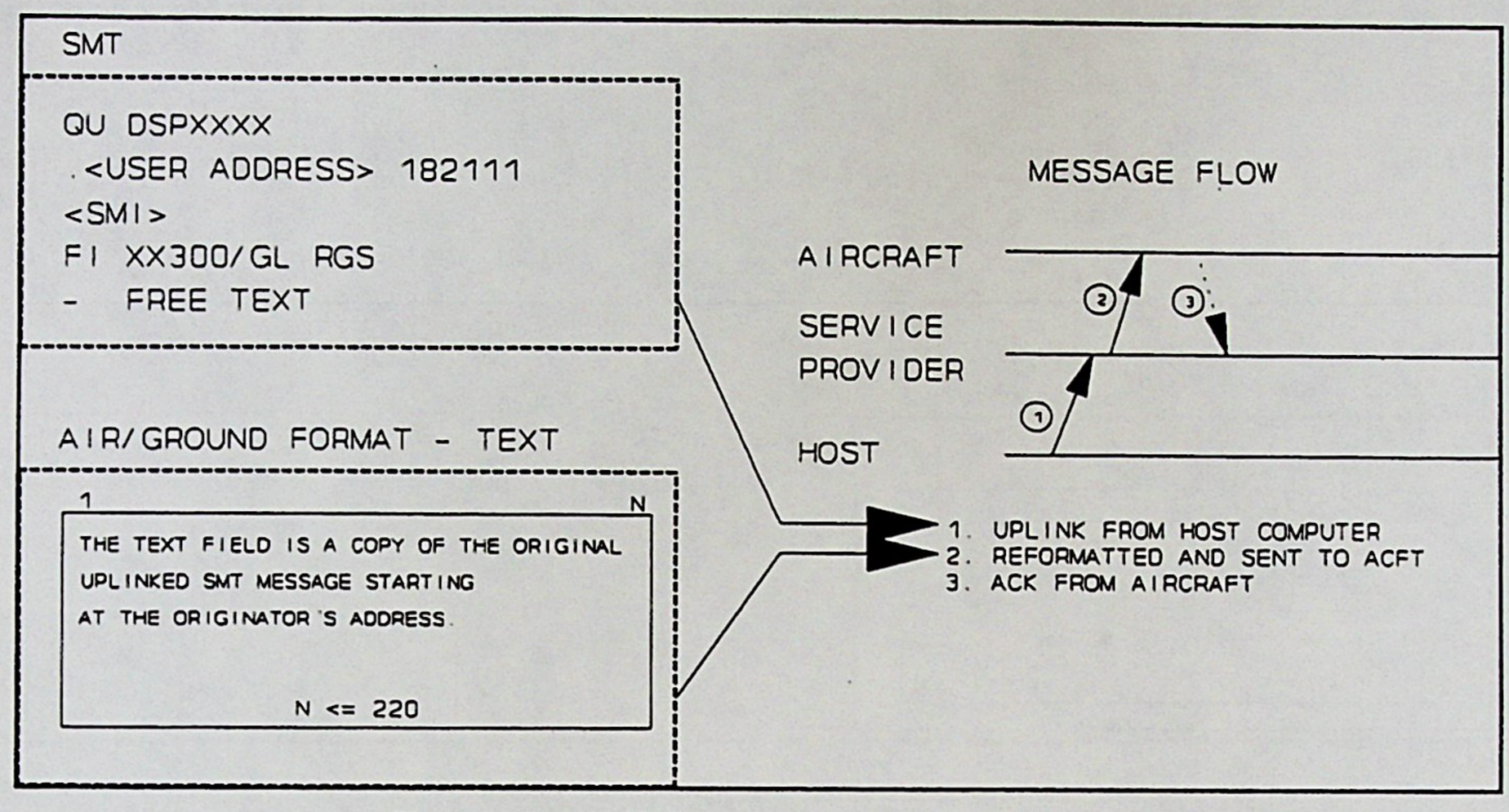


Figure 4.3.4-1 Uplink messages with SMT Header

4.3.5 ACARS Peripherals - Label H1 OAT, DFDAU, ADSU and FMC

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. A list of airborne subsystems that can accept and process uplink messages is provided in Table C-3 of Appendix C. 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).

C-1

Table 4.3.5-1A 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* or ATS format: QU DSPxxxx .LAX05xx ddhhmm SMI AN N1003x/GL or RGS FI xx1234/GL RGS - /Ax LAX05xx.IMI *application text* CRC

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

The message will be delivered to the avionics system identified by the SMI. The actual SMI entry should be taken from Table C-2 of Appendix C, cross referenced to the avionics systems sublabel from Table C-3.

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 4.3.5-1B General Air/Ground Format of Uplink Message to be delivered to an Avionics Subsystem.

AIRCRAFT ADDRESS	*LABEL*	*SUB LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	MD	/LAX05xx. or /Ax LAX05xx.	*application text* or IMI *application text* CRC

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. C-1

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-3 of Appendix C for a full listing of Sublabel assignments for ACARS peripherals.

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 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. 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 as described in Section 4.3.

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 FIELD FORMATS (cont'd)

4.3.5.1 OAT - Label H1

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	Hyphen Character "-"
43	Space Character " "
44-n	"Free Talk" where n ≤ 220

Note: For ATS uplink messages to an OAT, the beginning of the "Free Talk" 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 OAT messages, SITA, an 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 two characters following the POUNDSIGN <#> are taken to be the sublabel. If the message is a 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.

Only single-block uplinks and the first block of 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.

c-1 Figure 4.3.5.1-1 Reserved

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.5.2 OAX - Label H1

Character No.	Character Content
1	Dash Character <->
2	Space Character < >
3-4	"Free Talk" where n ≤ 220

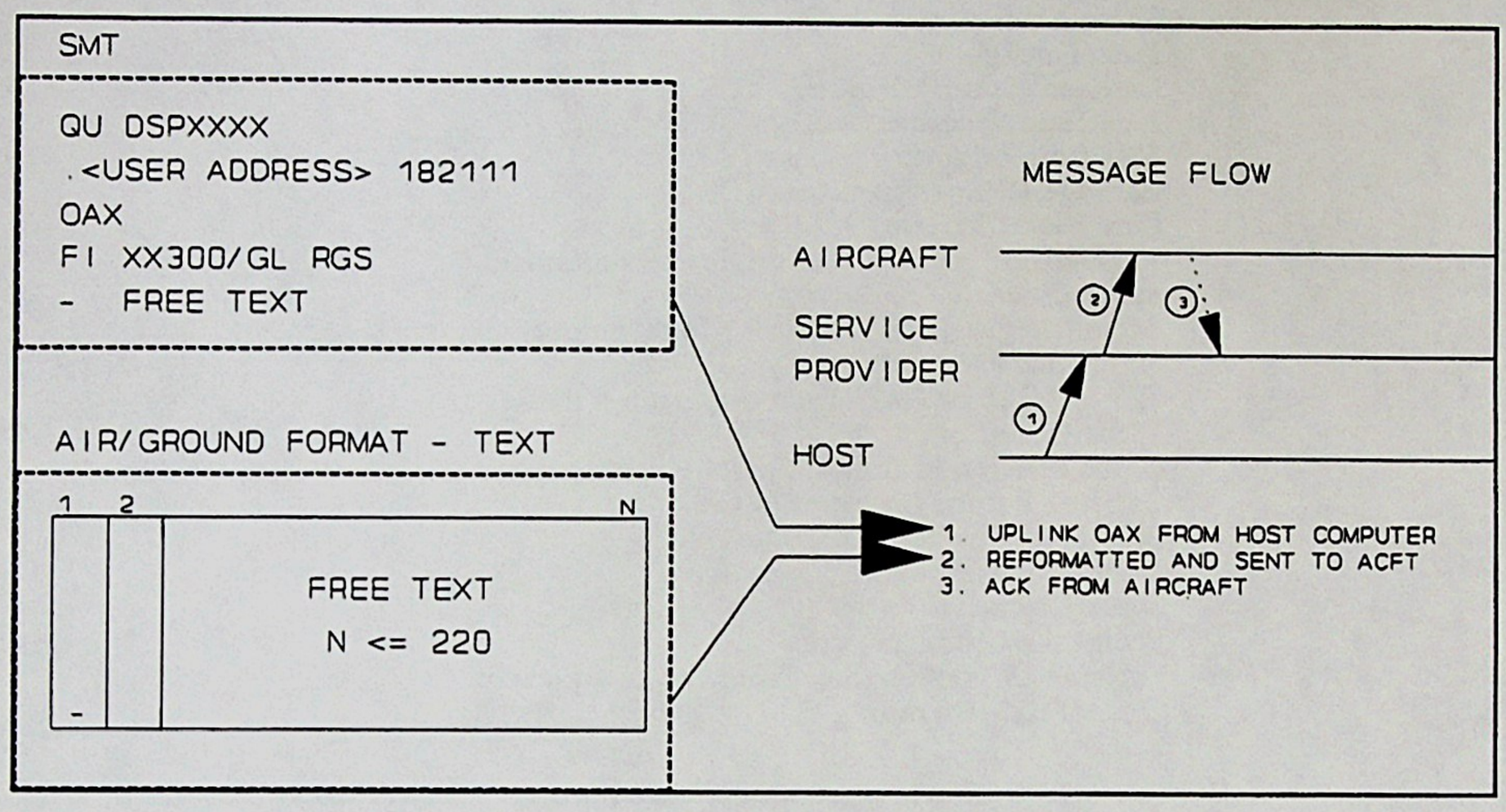


Figure 4.3.5.2-1 OAX - Label H1

Note: For ATS uplink messages to an Optional Auxiliary Terminal (OAX), the beginning of the "Free Talk" 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.)

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 a 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.

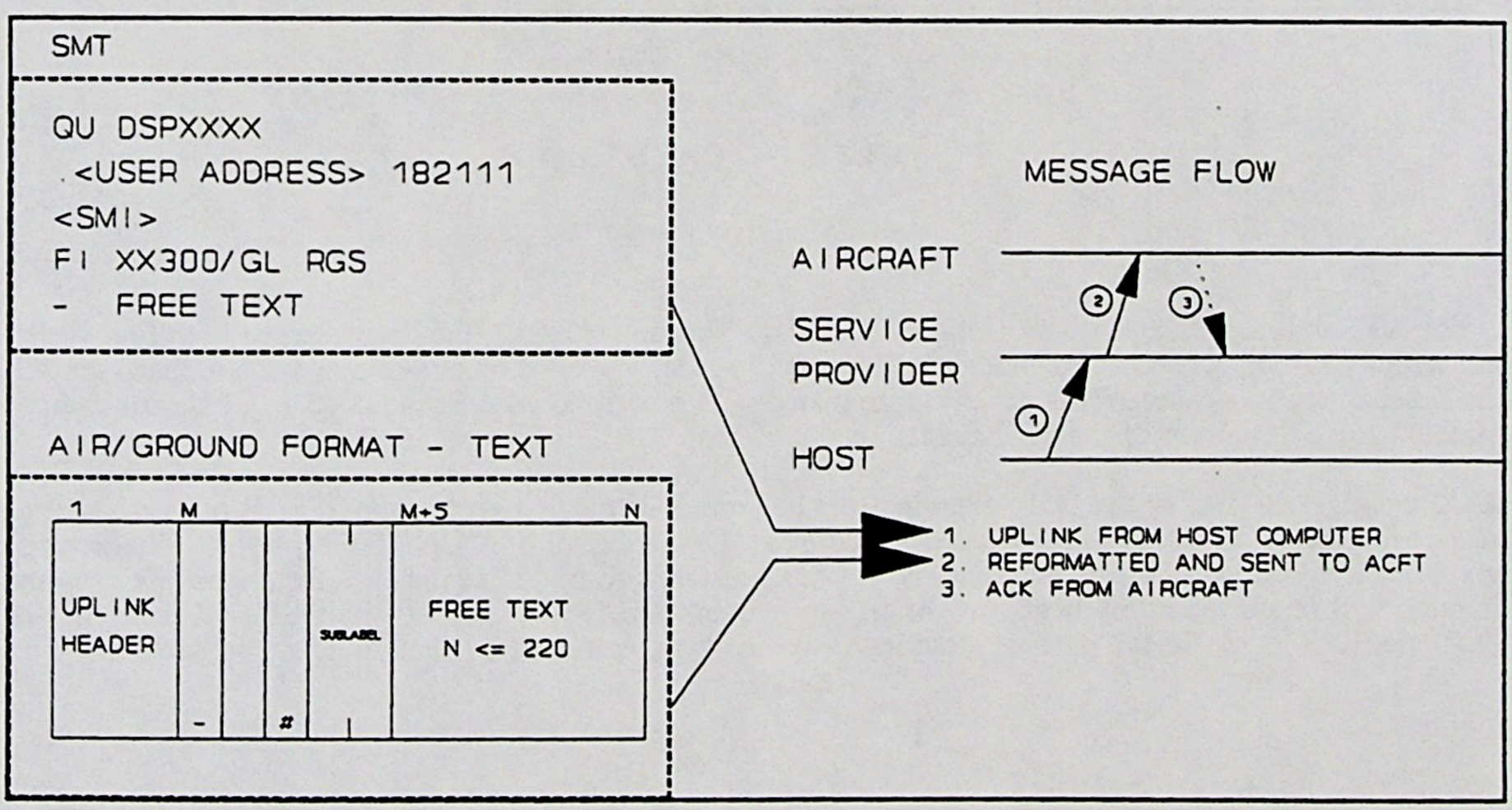
c-1

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.5.3 With Header: CFD, DFD, FCD, FCL, FCR, TXx, Mxx - Label H1

c-1 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.

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-3 of Appendix C.)
47-n	"Free Talk" where n $\leq$ 220



c-1 **Figure 4.3.5.3-1 Uplink Messages with SMT Header**

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.5.4 With No Header: DFX, CFX, FMD, FML, FMR, AUD, AUL, AUR TTx, Nxx - Label H1 | c-1

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.

Note: For ATS uplink messages to an ACARS peripheral, the beginning of the "Free Talk" 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

Character No.	Character Content
1	Dash Character <->
2	Space Character < >
3	Poundsign Character <#>
4-5	Sublabel Characters (See Table C-3 of Appendix C.)
6-n	"Free Talk" where n ≤ 220

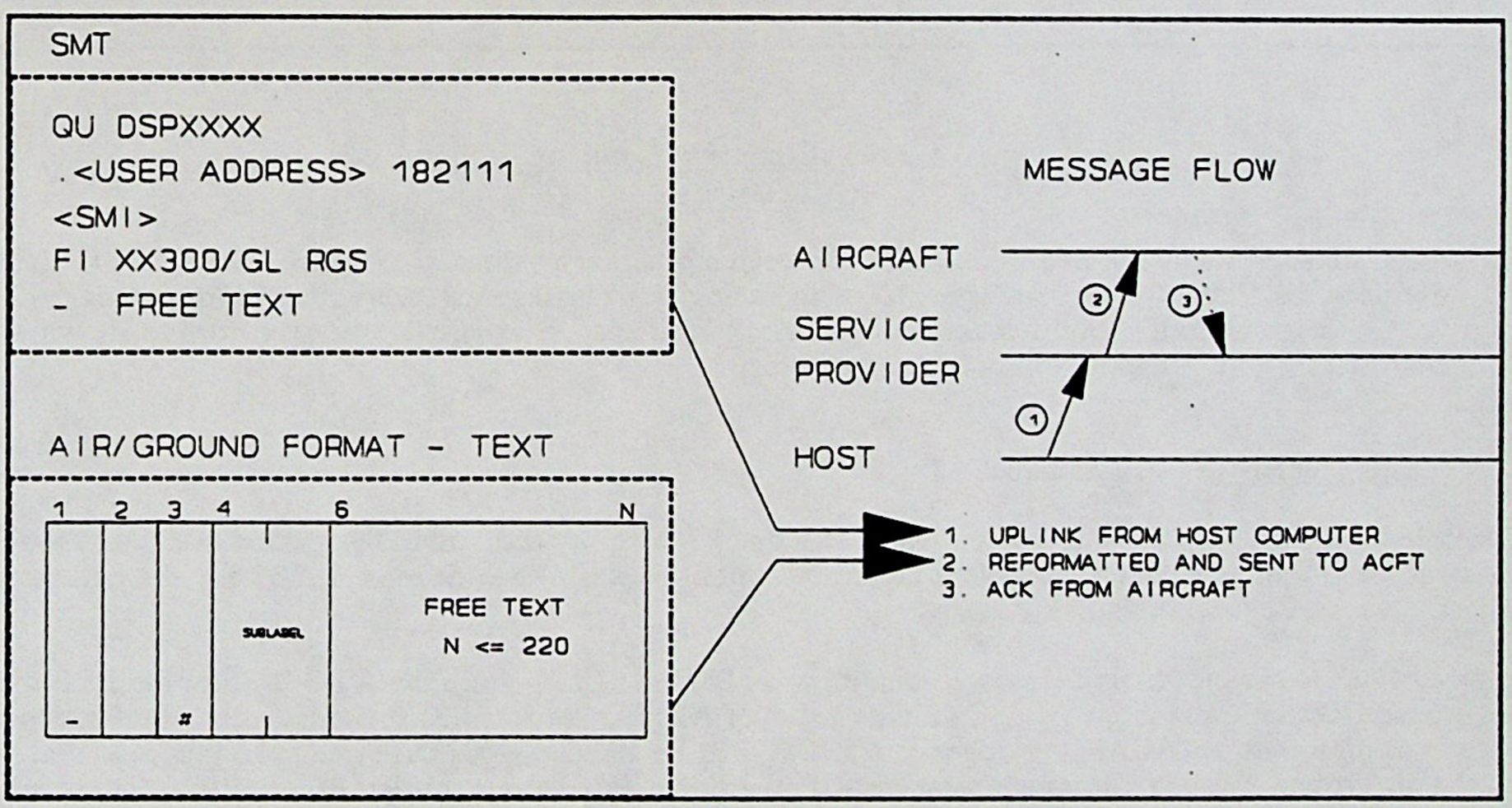


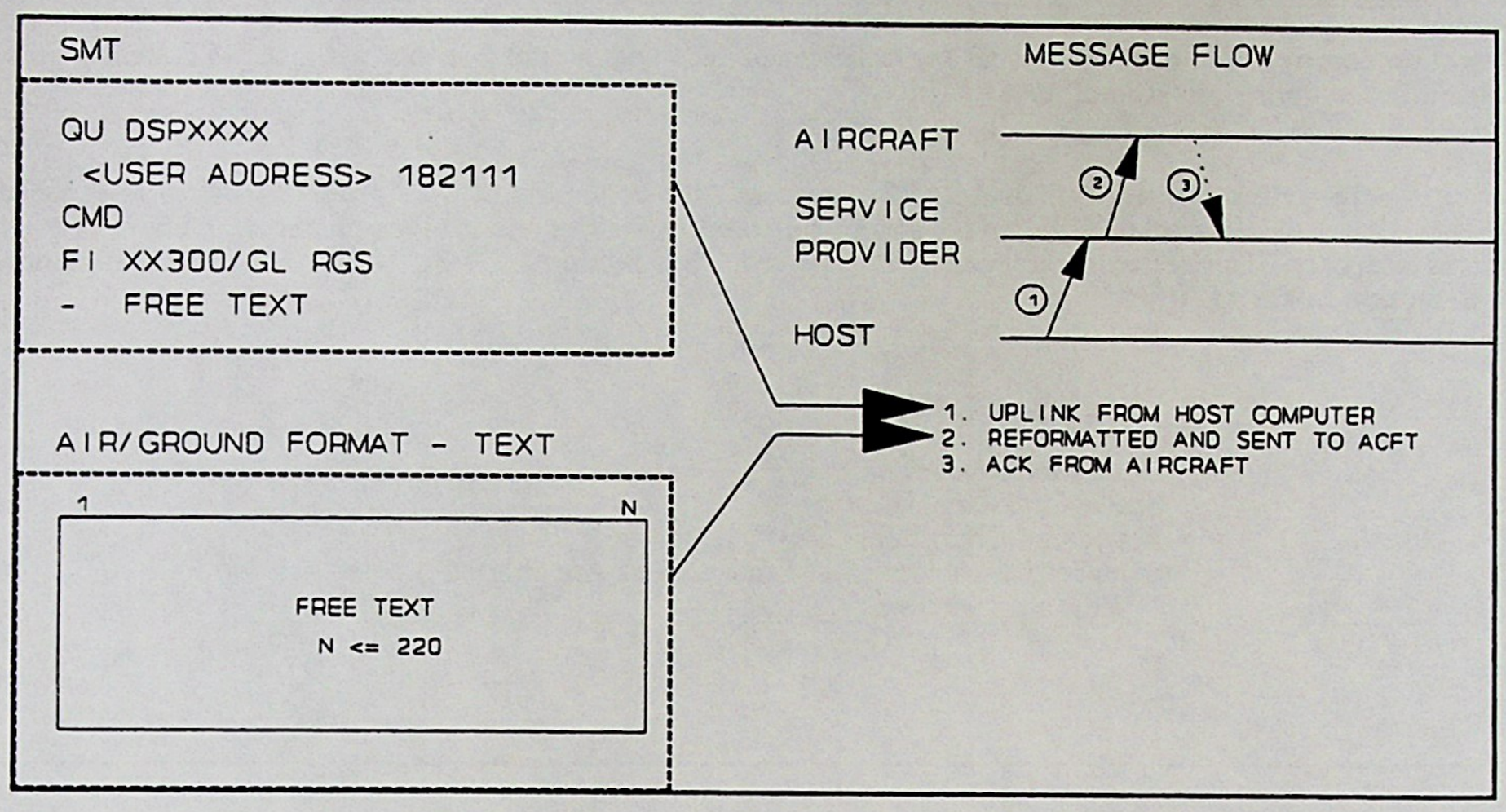
Figure 4.3.5.4-1 Uplink Messages Without SMT Header | c-1

4.3.6 Command/Response Uplink - Label RA

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 talk" where n ≤ 220

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.6 Command/Response Uplink - Label RA (cont'd)



C-1

Figure 4.3.6-1 Command/Response Uplink

NOTE: Since some user network interfaces with their service provider are limited to the baudot subset of ASCII, which excludes the tilda <~>, character 10 of incoming RA messages is overwritten with a tilda (~) prior to uplink to the aircraft. Multiblock messages are permitted. When used, the fixed format shown above for characters 1 thru 10 applies only to the first block.

4.3.7 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 5.3.39 for the definition of the Oceanic Clearance Request downlink message.

Upon receipt of the ground/ground message containing 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. 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 Free Text field.

C-1

The expected Acknowledge Oceanic Clearance downlink response by the aircraft is presented in Section 4.6.40 of this Specification.

Table 4.3.7-1A Oceanic Clearance Uplink to an MU - Ground/Ground Format

QU DSPxxxx .PIKCLXS ddhhmm CLX AN N1003x/GL MAN **or** FI xx1234/GL MAN - /PIKCLXS.OCx *application text* CRC

The format and content of the Message Text field is defined in Section 4.6.2 of ARINC Specification 622.

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Table 4.3.7-1B Oceanic Clearance Uplink to an MU - Air/Ground Format C-1

| | | |

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.9 Departure Clearance - MFI or Label A3 (cont'd)

c-1 | **Table 4.3.9-1A Departure Clearance Uplink to an MU - Ground/Ground Format**

```
QU DSPxxxx
.LAX05xx ddhhmm
CLD
AN N1003x/GL MAN or FI xx1234/GL MAN
-   /LAX05xx.DCx application text CRC
```

c-1 | **Table 4.3.9-1B Departure Clearance Uplink to an MU - Air/Ground Format**

AIRCRAFT ADDRESS	*LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	A3	/LAX05xx.	DCx *application text* CRC

c-1 | Figure 4.3.9-1 Reserved

c-1 | **Table 4.3.9-2A Departure Clearance Uplink to an Avionics Subsystem - Ground/Ground Format**

```
QU DSPxxxx
.LAX05xx ddhhmm
FMD
AN N1003x/GL MAN or FI xx1234/GL MAN
-   /A3 LAX05xx.DCx application text CRC
```

c-1 | **Table 4.3.9-2B Departure Clearance Uplink to an Avionics Subsystem - Air/Ground Format**

AIRCRAFT ADDRESS	*LABEL*	*SUB LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	MD	/A3 LAX05xx.	DCx *application text* CRC

c-1 | Figure 4.3.9-2 Reserved

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.10 Acknowledge Departure Clearance Request - MFI or Label A4

The Acknowledge Departure Clearance Request uplink message is a character-oriented message. The Acknowledge Departure Clearance Request 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 Acknowledge Departure Clearance Request uplink message is consistent with the general form described in Sections 4.3 and 4.3.5 of this Specification. See Section 4.9.2 of ARINC Specification 622 for the character-oriented Acknowledge Departure Clearance Request uplink Message Text format. The character-oriented message is received by the service provider with SMI 'RCA' and is translated to Label (or MFI) A4 in the air/ground uplink.

Table 4.3.10-1A Acknowledge Departure Clearance Request Uplink to an MU - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
RCA
AN N1003x/GL MAN or FI xx1234/GL MAN
- /LAX05xx.DCx application text CRC
```

Table 4.3.10-1B Acknowledge Departure Clearance Request Uplink to an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	A4	/LAX05xx.	DCx *application text* CRC

C-1

Figure 4.3.10-1 Reserved

Table 4.3.10-2A Acknowledge Departure Clearance Request Uplink to an Avionics Subsystem - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
FMD
AN N1003x/GL MAN or FI xx1234/GL MAN
- /A4 LAX05xx.DCx application text CRC
```

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.10 Acknowledge Departure Clearance Request - MFI or Label A4 (cont'd)

Table 4.3.10-2B Acknowledge Departure Clearance Uplink to an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*SUB LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	MD	/A4 LAX05xx.	DCx *application text* CRC

C-1

Figure 4.3.10-2 Reserved

4.3.11 Request Position Report - MFI or Label A5

The Request Position Report uplink message is not yet defined. When defined, this message will use the SMI 'RPR' and Label (or MFI) A5.

4.3.12 Request ADS Reports - MFI or Label A6

The Request for Automatic Dependent Surveillance (ADS) Reports uplink message is received by the service provider with SMI 'RAR' and is translated to Label A6 if the message is for the MU. If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used (See Appendix C) and, the MFI 'A6' is included at the beginning of the Free Text Field. See ARINC Characteristic 745 for the format of the ADS application text. See Section 2.4.1 of ARINC Specification 622 for information on processing of the ADS message for transfer across the ACARS network.

Table 4.3.12-1A ADS Request Uplink to an MU - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
RAR
AN N1003x/GL MAN or FI xx1234/GL MAN
- /LAX05xx.ADx application text CRC
```

C-1 | **Table 4.3.12-1B ADS Request Uplink to an MU - Air/Ground Format**

AIRCRAFT ADDRESS	*LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	A6	/LAX05xx.	ADx *application text* CRC

C-1 |

Figure 4.3.12-1 Reserved

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Table 4.3.12-2A ADS Request Uplink to an Avionics Subsystem - Ground/Ground Format |c-1

QU DSPxxxx
.LAX05xx ddhhmm
FMD
AN N1003x/GL MAN or FI xx1234/GL MAN
- /A6 LAX05xx.ADx *application text* CRC

Table 4.3.12-2B ADS Request Uplink to an Avionics Subsystem - Air/Ground Format |c-1

AIRCRAFT ADDRESS	*LABEL*	*SUB LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	MD	/A6 LAX05xx.	ADx *application text* CRC

Figure 4.3.12-2 Reserved

4.3.13 ATC Free Talk - MFI or Label A7

This message is received by the service provider with the SMI 'FTU' and is translated to Label A7 if the message is for the MU. If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used (See Appendix C). If used, the MFI 'A7' is included at the beginning of the Free Text Field. . This message is meant to provide an ATC agency with the ability to communicate directly with an aircraft without using voice communications. c-1

Table 4.3.13-1A Free Talk Uplink to an MU - Ground/Ground Format

QU DSPxxxx
.LAX05xx ddhhmm
FTU
AN N1003x/GL MAN or FI xx1234/GL MAN
- /LAX05xx.FTx *application text* CRC

Table 4.3.13-1B Free Talk Uplink to an MU - Air/Ground Format |c-1

AIRCRAFT ADDRESS	*LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	A7	/LAX05xx.	FTx *application text* CRC

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.13 ATC Free Talk - MFI or Label A7 (cont'd)

Figure 4.3.13-1 Reserved

C-1

Table 4.3.13-2A Free Talk Uplink to an Avionics Subsystem - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
FMD
AN N1003x/GL MAN or FI xx1234/GL MAN
-   /A7 LAX05xx.FTx application text CRC
```

C-1 Table 4.3.13-2B Free Talk Uplink to an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*SUB LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	MD	/A7 LAX05xx.	FTx *application text* CRC

Figure 4.3.13-2 Reserved

C-1 4.3.14 Deliver Departure Slot - MFI or Label A8

This message is received by the service provider with SMI 'DDS' and is translated to Label A8.

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.

Figure 4.3.14-1 Reserved

4.3.15 Deliver ATIS Information - MFI or Label A9

C-1

This message is received by the service provider with SMI 'DAI' and is translated to Label A9 if the message is for the MU. If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used (See Appendix C), and the MFI 'A9' is included at the beginning of the Free Text Field. . 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 Section 4.3 of ARINC Specification 622 for the format of the ATIS application text.

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Table 4.3.15-1A ATIS Uplink to an MU - Ground/Ground Format | c-1

```
QU DSPxxxx
.LAX05xx ddhhmm
DAI
AN N1003x/GL MAN or FI xx1234/GL MAN
-   /LAX05xx.TIx application text CRC
```

Table 4.3.15-1B ATIS Uplink to an MU - Air/Ground Format | c-1

AIRCRAFT ADDRESS	*LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	A9	/LAX05xx.	TIx *application text* CRC

Figure 4.3.15-1 Reserved | c-1

Table 4.3.15-2A ATIS Uplink to an Avionics Subsystem - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
FMD
AN N1003x/GL MAN or FI xx1234/GL MAN
-   /A9 LAX05xx.TIx application text CRC
```

Table 4.3.15-2B ATIS Uplink to an Avionics Subsystem - Air/Ground Format | c-1

AIRCRAFT ADDRESS	*LABEL*	*SUB LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	MD	/A9 LAX05xx.	TIx *application text* CRC

Figure 4.3.15-2 Reserved | c-1

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.16 ATS Facilities Notification (AFN) - MFI or Label A0

This message is received by the service provider with SMI 'AFU' and is translated to Label A0 if the message is for the MU. If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used (See Appendix C) and the MFI 'A0' is included at the beginning of the Free Text Field. See Chapter 3 of ARINC Specification 622 for the format of the ATS Facilities Notification (AFN) application text.

c-1

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.

Table 4.3.16-1A AFN Uplink to MU - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
AFU
AN N1003x/GL MAN or FI xx1234/GL MAN
-   /LAX05xx.AFx application text CRC
```

c-1 **Table 4.3.16-1B AFN Uplink to MU - Air/Ground Format**

AIRCRAFT ADDRESS	LABEL	SUPPL. ADDRESS	MESSAGE TEXT
.N1234x or .xx1234	A0	/LAX05xx.	AFx *application text* CRC

Figure 4.3.16-1 Reserved

c-1

Table 4.3.16-2A AFN Uplink to an Avionics Subsystem - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
FMD
AN N1003x/GL MAN or FI xx1234/GL MAN
-   /A0 LAX05xx.AFx application text CRC
```

c-1 **Table 4.3.16-2B AFN Uplink to an Avionics Subsystem - Ground/Ground Format**

AIRCRAFT ADDRESS	LABEL	SUB LABEL	SUPPL. ADDRESS	MESSAGE TEXT
.N1234x or .xx1234	H1	MD	/A0 LAX05xx.	AFx *application text* CRC

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Figure 4.3.16-2 Reserved

4.3.17 ATCComm - MFI or Label AA

The ATCComm (also known as Two Way Data Link) uplink message is received by the service provider with SMI 'ATC' and is translated to Label AA if the message is for the MU. If the message is for a peripheral, the appropriate SMI, Label and Sublabel are used (See Appendix C) and the MFI 'AA' is included at the beginning of the Free Text Field. See Section 2.4.2 of ARINC Specification 622 for the format of the ATCComm application interface and for the definition of how to transfer the ATCComm application text onto the ACARS network. See RTCA DO-219 for the format of the ATCComm application text.

Table 4.3.17-1A ATCComm Uplink to an MU - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
ATC
AN N1003x/GL MAN or FI xx1234/GL MAN
-    /LAX05xx.ATx application text CRC
```

Table 4.3.17-1B ATCComm Uplink to an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	AA	/LAX05xx.	ATx *application text* CRC

C-1

Figure 4.3.17-1 Reserved

Table 4.3.17-2A ATCComm Uplink to an Avionics Subsystem - Ground/Ground Format

```
QU DSPxxxx
.LAX05xx ddhhmm
FMD
AN N1003x/GL MAN or FI xx1234/GL MAN
-    /AA LAX05xx.ATx application text CRC
```

4.0 UPLINK MESSAGE TEXT FIELD FORMATS (cont'd)

4.3.17 ATCComm - MFI or Label AA (cont'd)

Table 4.3.17-2B ATCComm Uplink to an Avionics Subsystem - Ground/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*SUB LABEL*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	MD	/AA LAX05xx.	ATx *application text* CRC

C-1

Figure 4.3.17-2 Reserved

4.4 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:

Character No.	Character Content
1-n	"Free Talk" where n $\leq$ 220

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS

5.1 Introduction

This chapter contains a listing of the Message 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 Message 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 <NUL>s. C-1

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.

System-Control Downlinks

Message Title	SMI	Label	Section
General Response	N/A	_DEL	5.2.1
Aircrew Initiated Voice Contact Request	AVR, GVR	54	5.2.2
Temporary Suspension	N/A	5P	5.2.4
Unable to Deliver Uplinked Message	SVC	Q5	5.2.5
Voice-to-ACARS Channel Changeover	N/A	Q6	5.2.6
Intercept/Unable to Process	SVC	QX	5.2.7
Dedicated Transceiver Advisory	ARR	F3	5.2.8
Cockpit Printer	SVC	CA-CF	5.2.9

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 acknowledgement 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	
6	Airline Identifier - Alpha Character #2	
7	Flight Number - Alpha/Numeric Character #1 (MSC)	Flight Identifier See Section 2.332 of ARINC Specification 618
8	Flight Number - Alpha/Numeric Character #2	
9	Flight Number - Alpha/Numeric Character #3	
10	Flight Number - Alpha/Numeric Character #4 (LSC)	

C-1

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.2.1 General Response - Label _DEL (cont'd)

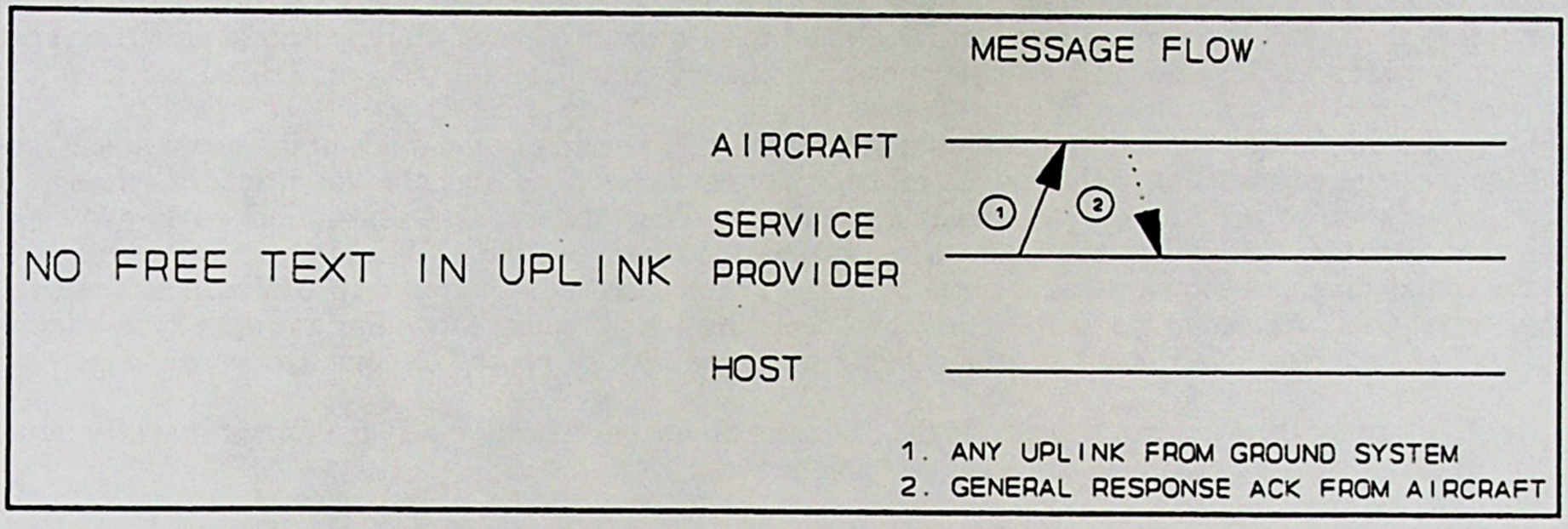


Figure 5.2.1-1 General Response Downlinks

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
2-3	Sequence [Message Number]	
4	Number [Block Sequence Character]	
5-10	Flight Identifier;	See Section 5.2.1
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 FIELD FORMATS (cont'd)

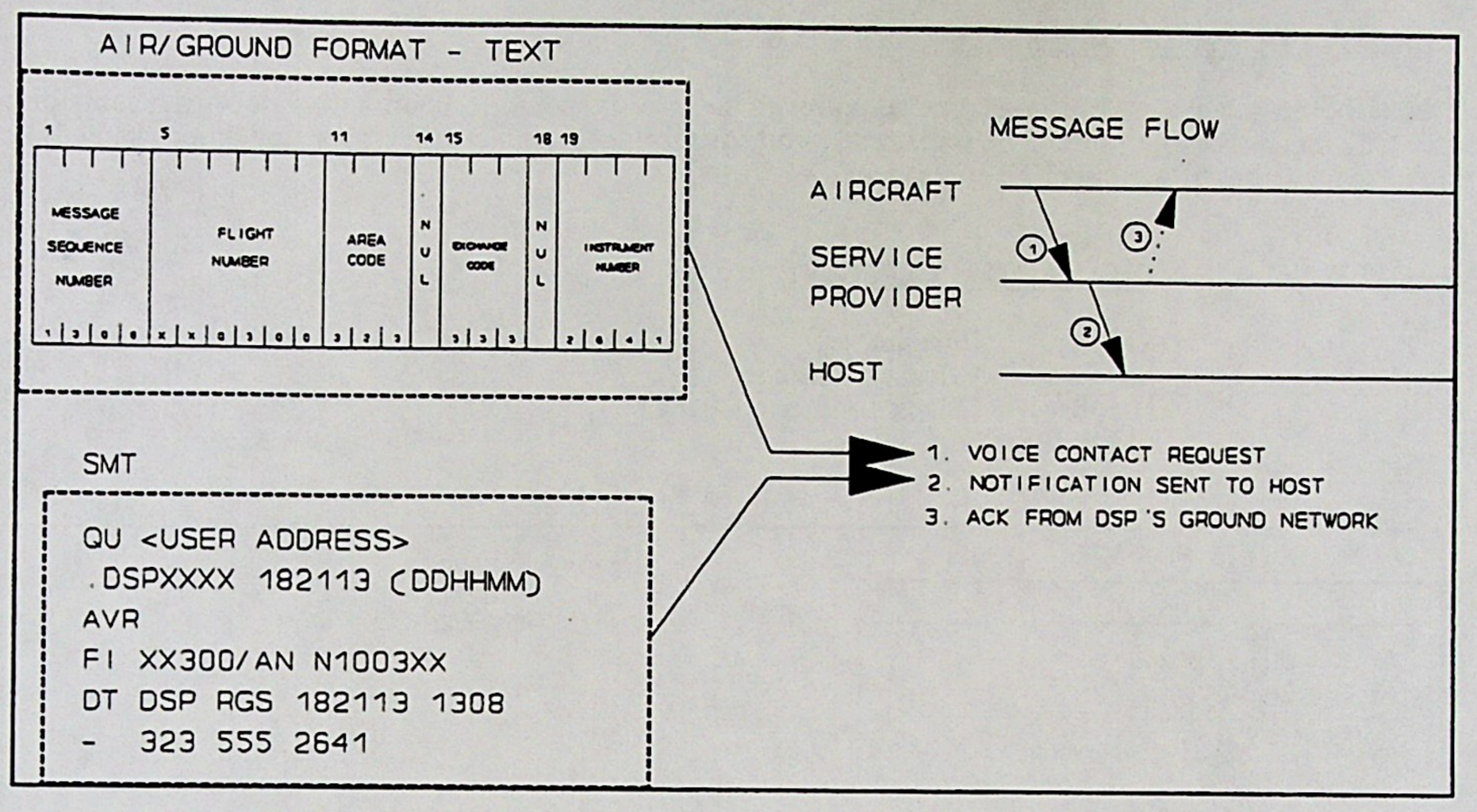


Figure 5.2.2-1 Voice Contact Request

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. C-1

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

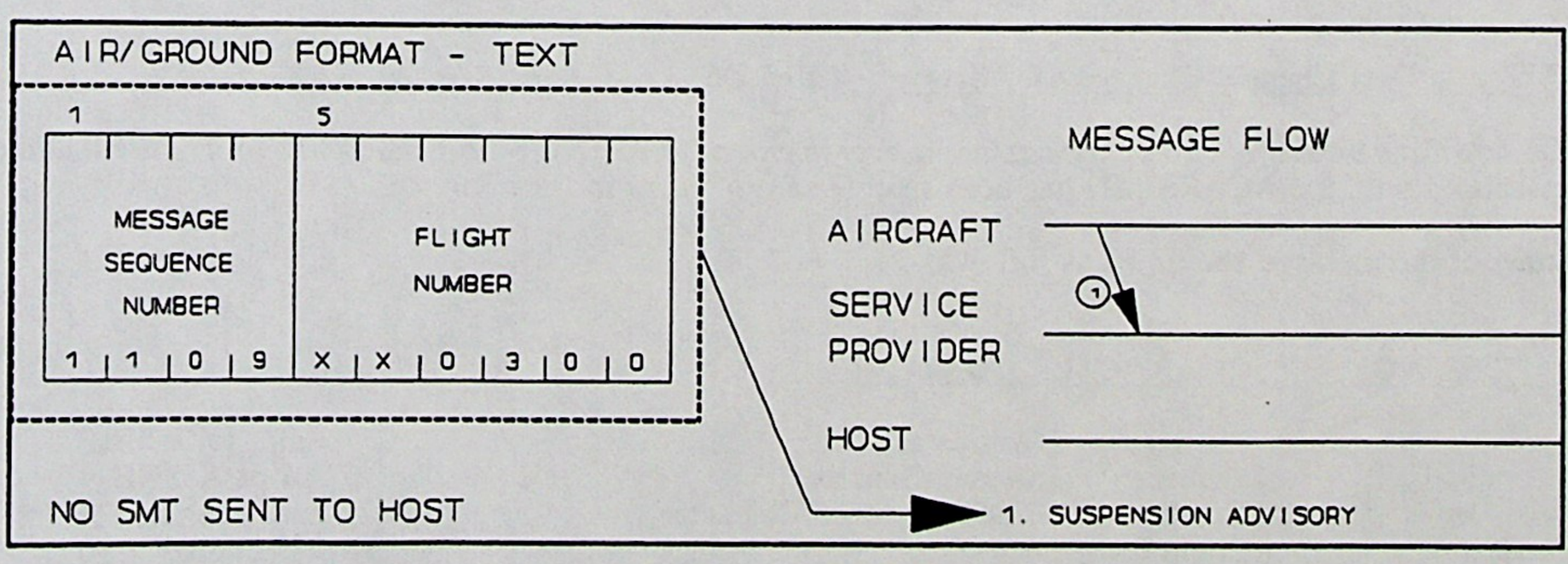


Figure 5.2.4-1 Temporary Suspension

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.2.5 Unable to Deliver Uplinked Message - Label Q5

When the airborne sub-system cannot accept an uplinked message it should respond with a downlink containing Label character 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 t o 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

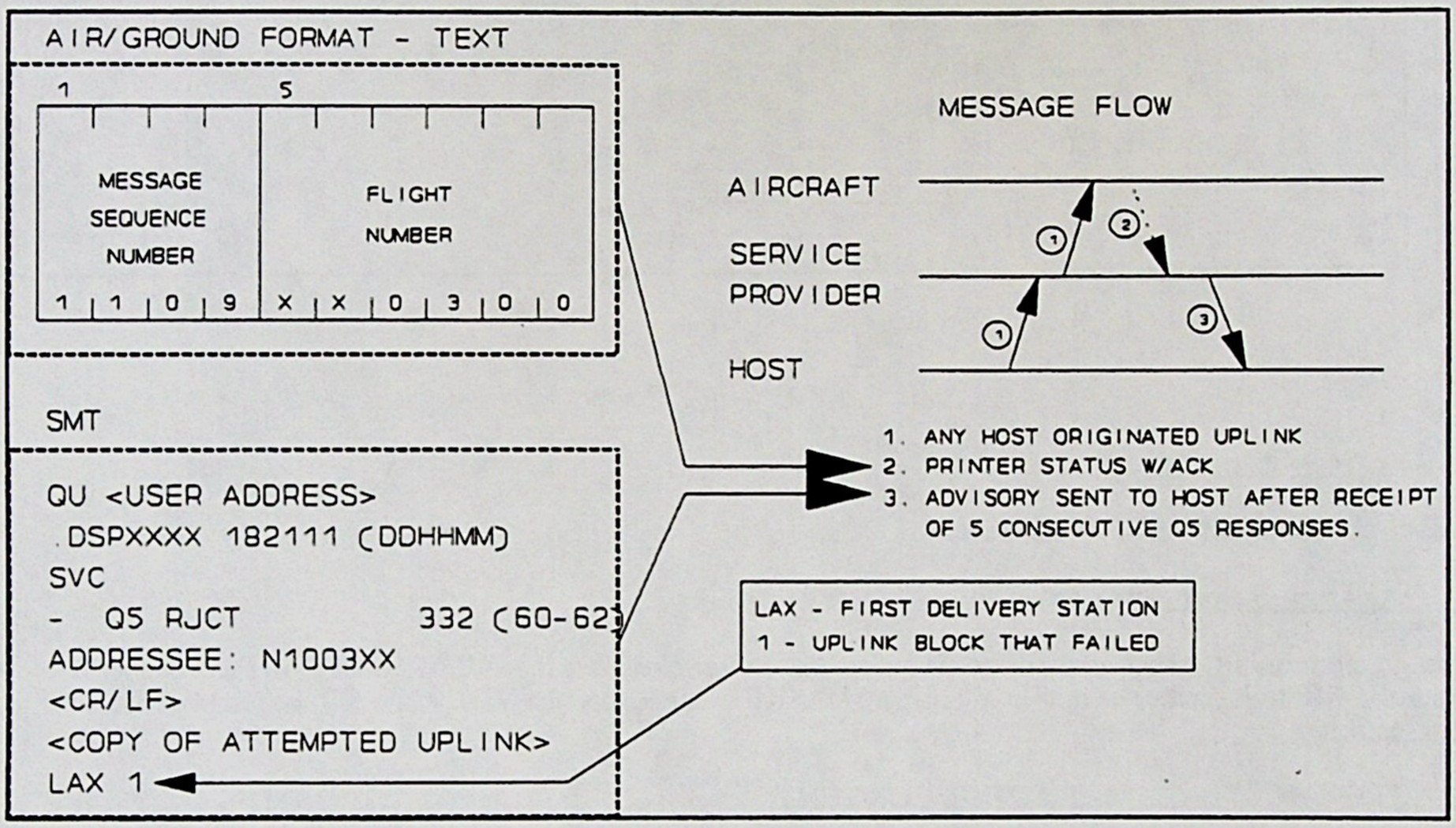


Figure 5.2.5-1 Unable to Deliver Uplink Message

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:

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

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

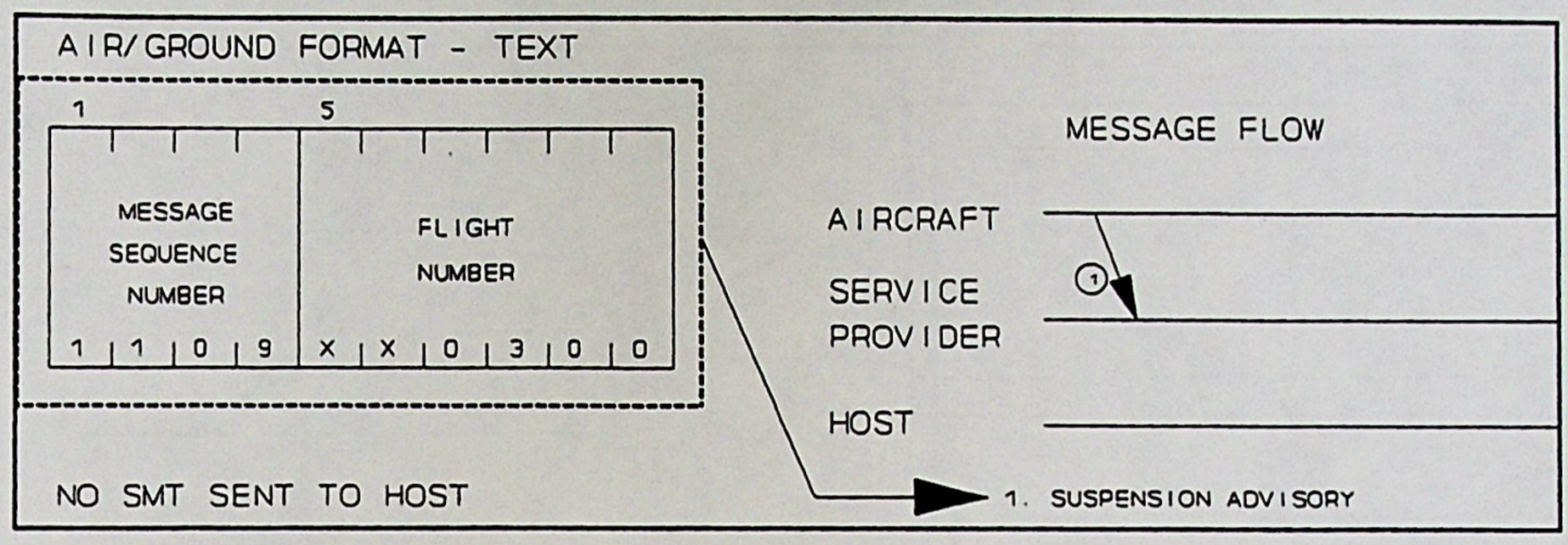


Figure 5.2.6-1 Channel Changeover Advisory

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.

c-1

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 ≤ 220	

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 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.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.2.7 Intercept/Unable to Process - Label QX (cont'd)

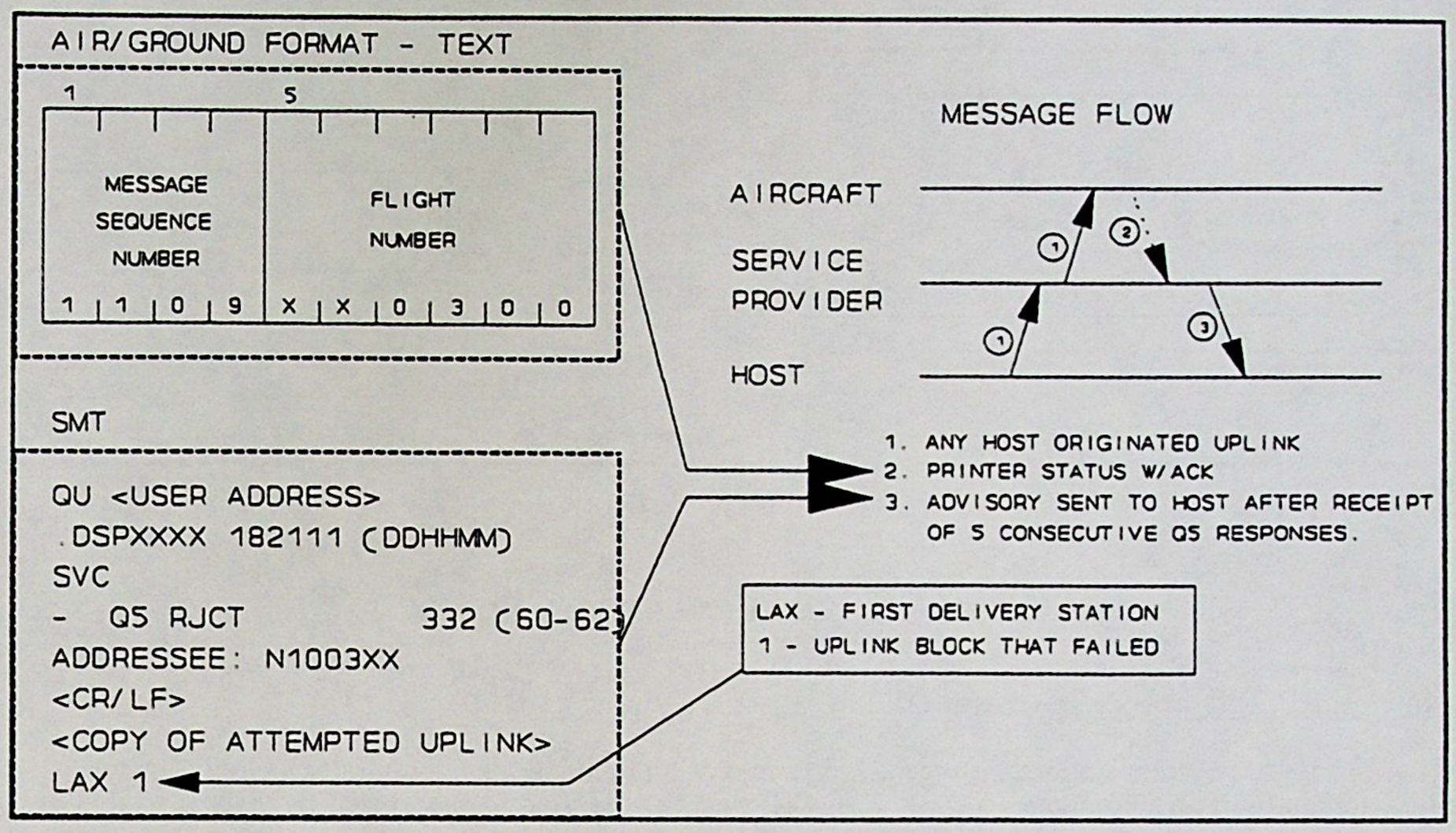


Figure 5.2.7-1 Unable to Deliver Uplink Message

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.

C-1

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

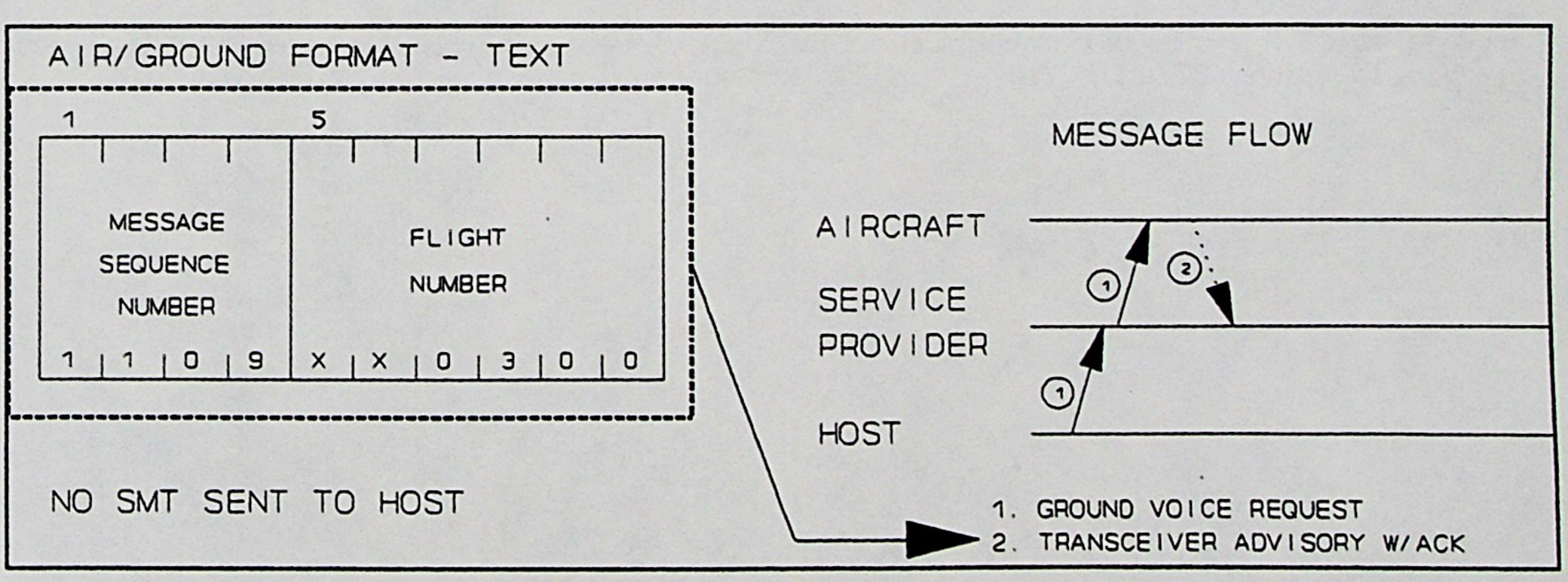


Figure 5.2.8-1 Dedicated Transceiver Advisory

5.0 DOWNLINK MESSAGE TEXT FIELD 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 acknowledgement of the uplinked message. Because the time taken by the crew to take the acknowledgement action, push a button on the printer, for example, will exceed the ACARS turn-around time, it will not be possible for the acknowledgement 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 acknowledgement 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
2-3	Sequence	[Message Number]	
4	Number	[Block Sequence Character]	
5-10	Flight Identifier		See Section 5.2.1

C-1

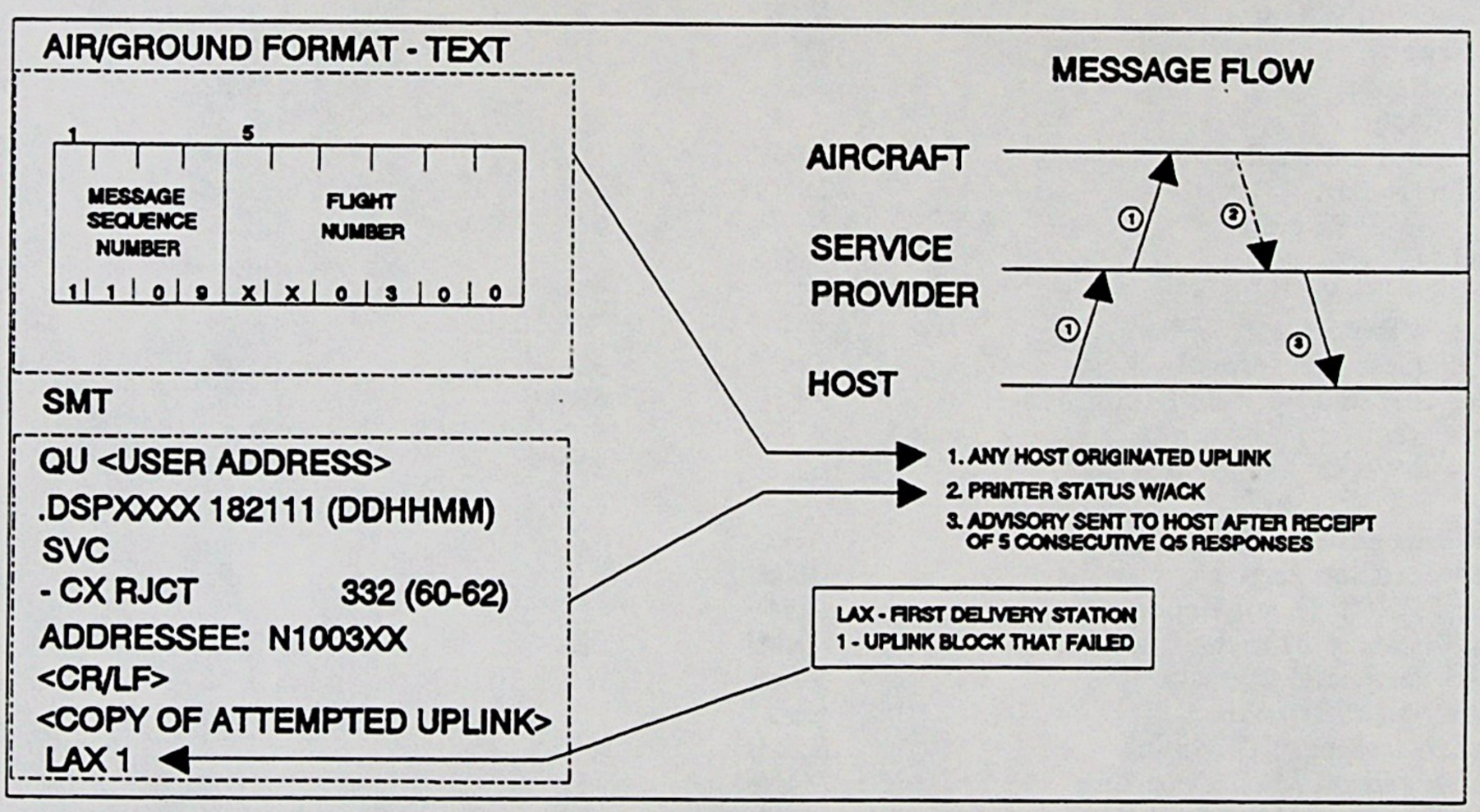


Figure 5.2.9-1 Cockpit Printer Status

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3 Service-Related Message Formats

The MU need only generate those service-related downlinks specified by the user to his suppler. 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.

Service Related Downlinks

Message Title	SMI	Label	Section	Notes
Emergency Situation Report	HJK	00	5.3.1	
Link Test	N/A	Q0	5.3.TBD	
Departure/Arrival Reports	ARR/DEP	Q1	5.3.16	
ETA Reports	ETA	Q2	5.3.17	
Clock Update Advisory	CLK	Q3	5.3.18	
Delay Message	DLA	Q7	5.3.21	
OUT/Fuel Report	DEP	QA	5.3.24	
OFF Report	DEP	QB	5.3.25	
ON Report	ARR	QC	5.3.26	
IN Report	ARR	QD	5.3.27	
OUT/Fuel/Destination Report	DEP	QE	5.3.28	
OFF/Destination Report	DEP	QF	5.3.29	
OUT/Return IN Report	RTN	QG	5.3.30	
OUT Report	DEP	QH	5.3.31	
Landing Report	ARR	QK	5.3.32	
Arrival Report	ARR	QL	5.3.33	
Arrival Information Report	ARR	QM	5.3.34	
Diversion Report	DIV	QN	5.3.35	
Ground GMT Request	N/A	51	5.3.2	
Ground UTC Request	AGM	52	5.3.3	
Alternate Aircrew Initiated Position Report	AEP	57	5.3.37	
ATIS Request (old format)	TIS	5D	5.3.4	
Aircrew Initiated Position Report	AEP	5R	5.3.5	
Weather Request	WXR	5U	5.3.6	
Aircrew Revision to Previous ETA or Diversion	ETA	5Y	5.3.8	
Airline Designated Downlink	AGM	5Z	5.3.7	
Aircrew Initiated Engine Data/Takeoff Thrust Report	ENG	7A	5.3.9	
Aircrew Entered Miscellaneous Message	ABM	7B	5.3.10	
ACARS Peripheral Message	Various	H1	5.3.38	
Meteorological Report	xxx	H2	5.3.13	
Command Response Downlink	RDO	RB	5.3.14	
IATA Movement Msg: Departure	MVA	M1	TBD	
IATA Movement Msg: Arrival	MVA	M2	TBD	
IATA Movement Msg: Return to Ramp	MVA	M3	TBD	
IATA Movement Msg: Return from Airborne	MVA	M4	TBD	
Request Oceanic Clearance	RCL	B1	5.3.39	1
Request Oceanic Readback	CLA	B2	5.3.40	1
Request Departure Clearance	RCD	B3	5.3.41	1
Acknowledge Departure Clearance		B4	5.3.42	1
Provide Position Report	PPR	B5	5.3.43	1
Provide ADS Report	PAR	B6	5.3.44	1
Forward Free Text to ATC	FTD	B7	5.3.45	1
Request Departure Slot	RDS	B8	5.3.46	1
Request ATIS Information	RAI	B9	5.3.47	1
ATC Facilities Notification	AFN	B0	5.3.48	1
Controller/Pilot Dialogue	ATC	BA	5.3.49	1
Aircrew Addressed Downlink	Ann	80 - 8~	5.3.11	
Undelivered Uplink Report	REJ	HX	5.3.36	

C-1

(1) See Appendix C for a list of SMIs, Labels and Sublabels for downlink messages from ACARS peripherals.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

The ACARS data link network will support the transfer of Air Traffic Service (ATS) Messages. ATS messages include an Imbedded Message Identifier (IMI) and a Cyclical Redundancy Check (CRC) as a part of Message Text field. The form of air-ground downlink messages destined for processing by the user host as an end system should have the following format. C-1

Table 5-3 Format for Air-Ground Downlink ATS Messages Generated by an MU

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*SUPPL. ADDRESS*	*MESSAGE TEXT*
.N1003x or .xx1234x	Bx	xx1234	/LAX05xx.	IMI *application text* CRC

The format and content of the data fields of the air/ground downlink message follows that defined for the general case specified in Section 3.6 with the following exceptions.

Label:
For downlink messages, the Label will be assigned from the block of labels B0 through BZ.

Message Text:
The Message Text field of ATS downlink messages are comprised of the IMI, Application Text and CRC fields. The Message Text field of ATS messages should be constructed in the format: 'IMI-----application text-----CRC'. The format of the Message Text field is defined in ARINC Specification 622.

Imbedded Message Identifier:
The 3 character Imbedded Message Identifier (IMI) field indicates the format and Version Number of the generated message. C-1

Application Text:
The contents of the Application text for the Request for ATS downlink messages are defined in ARINC Specification 622.

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 Section 2.3.1.2 of this Specification should be used to process the CRC. In its expanded form (See ARINC Specification 622), the CRC consumes 4 characters in the message text.

Air Traffic Service 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 ACARS Management Unit (MU). See Section 5.3.38 for a Label H1 downlink message definitions.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.1 Emergency Situation Report - Label 00

Emergency Situation Report should contain Label characters 00.

Character No.	Character Content	
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	

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.

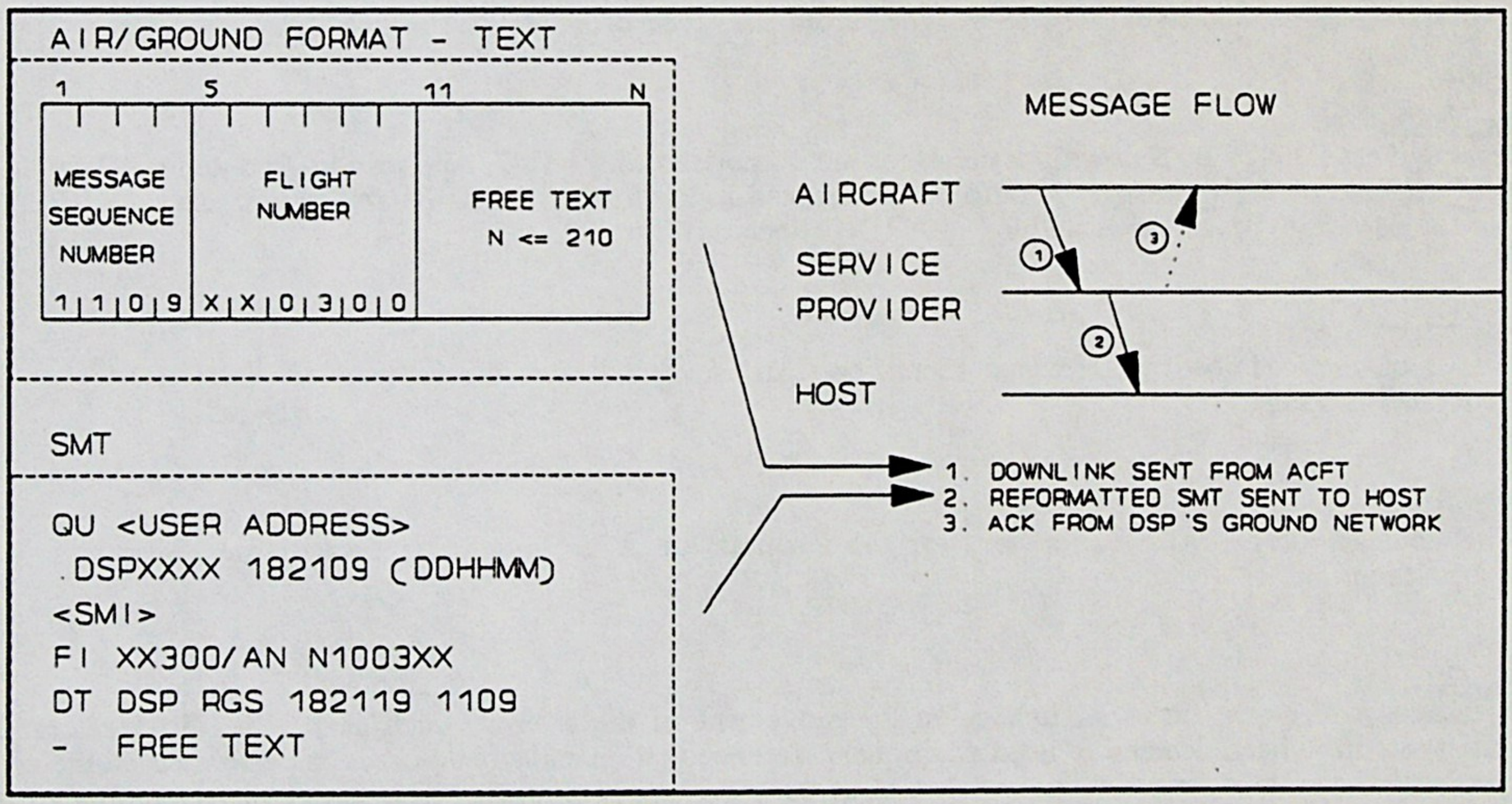


Figure 5.3.1-1 Emergency Situation Report

5.0 DOWNLINK MESSAGE TEXT FIELD 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.

Character No.	Character Content		
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

c-1

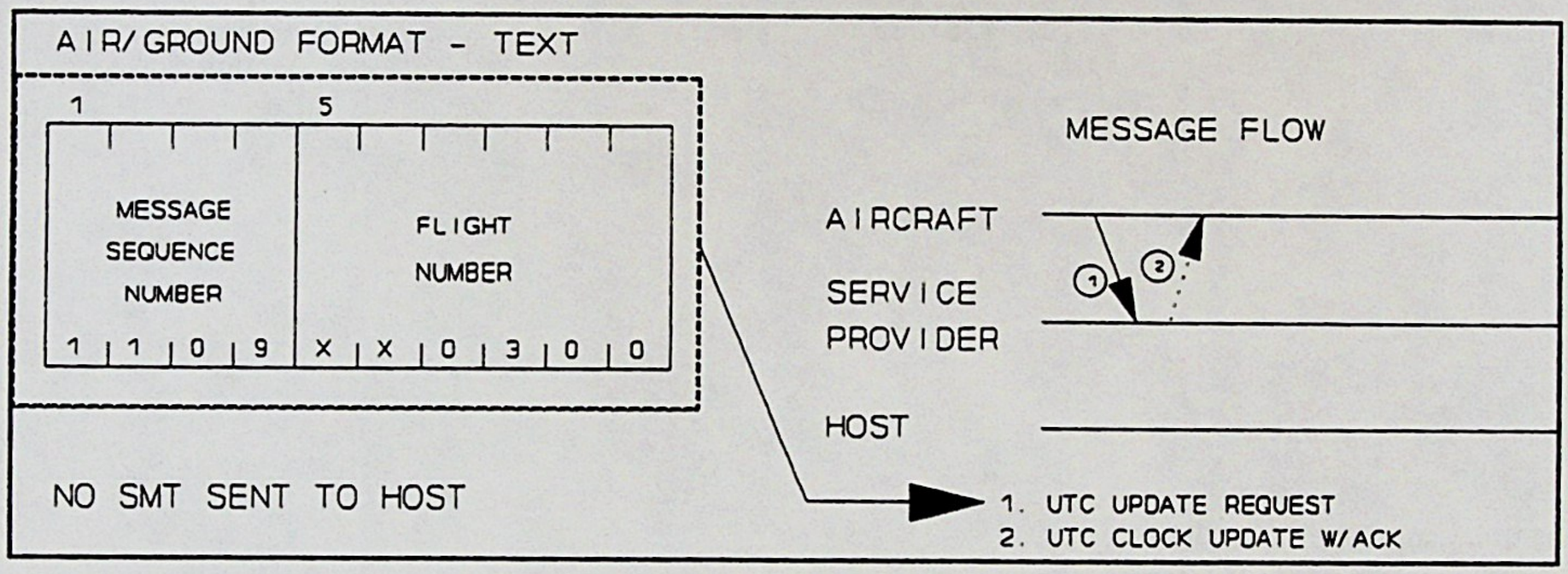


Figure 5.3.2-1 Clock Update Request

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.

Figure 5.3.3 Reserved

c-1

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

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. See Section 5.3.47 for a definition of B9.

Character No.	Character Content	
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	

¢-1

Diagram to be supplied by ARINC

Figure 5.3.4-1 ATIS Request

5.0 DOWNLINK MESSAGE TEXT FIELD 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:

Character No.	Character Content		
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	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		

C-1

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

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

Note 1: Fixed fields for which there is no data input should be filled with "Null" characters (O/O).

Note 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"!

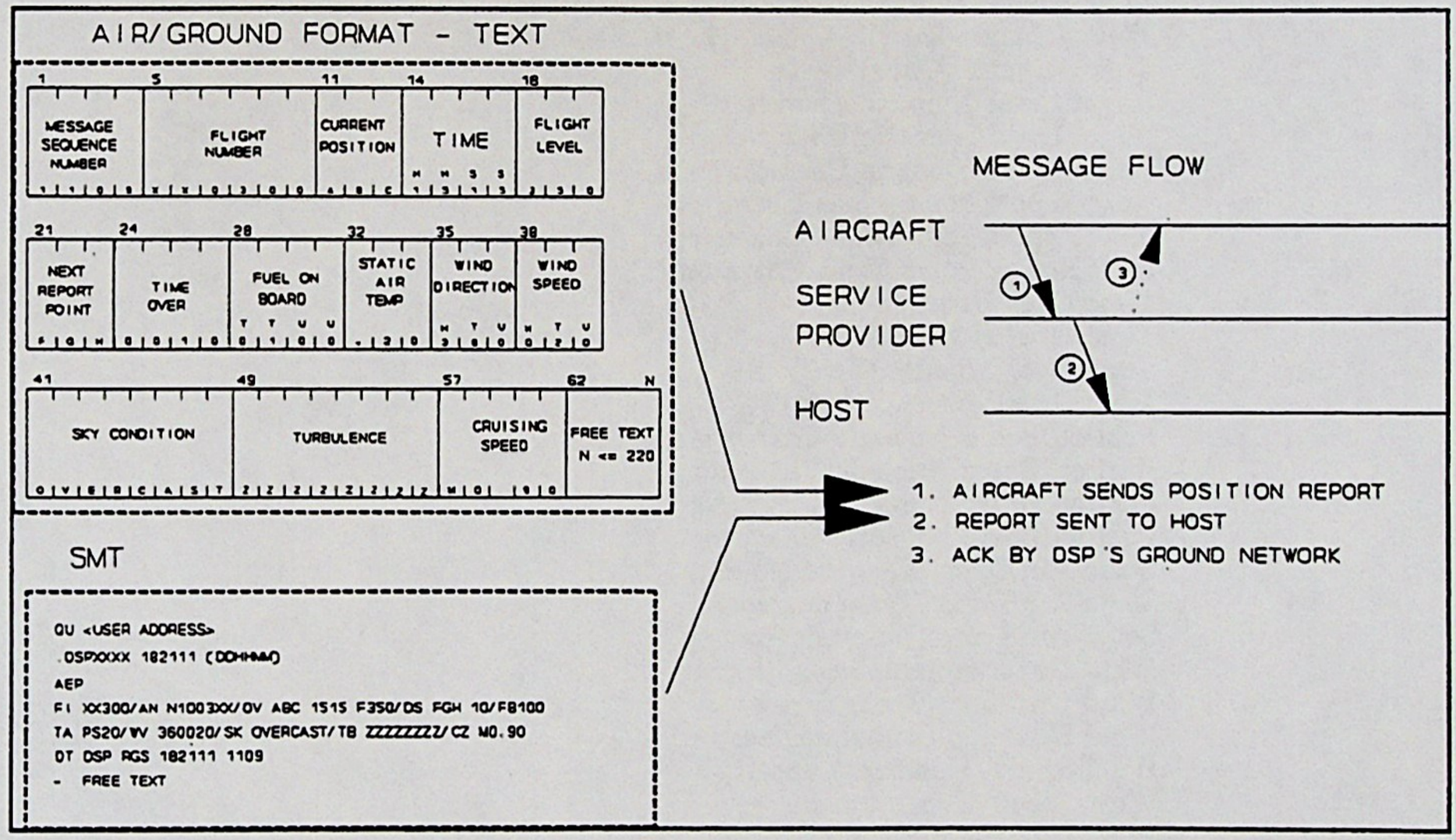


Figure 5.3.5-1 Aircrew-Initiated Position Report

5.3.6 Weather Request - Label 5U

Weather request downlinks should contain Label character 5U.

Character No.	Character Content	
1	Message	[Originator]
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	

Refer to Section 3.4 of ARINC Specification 618

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

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

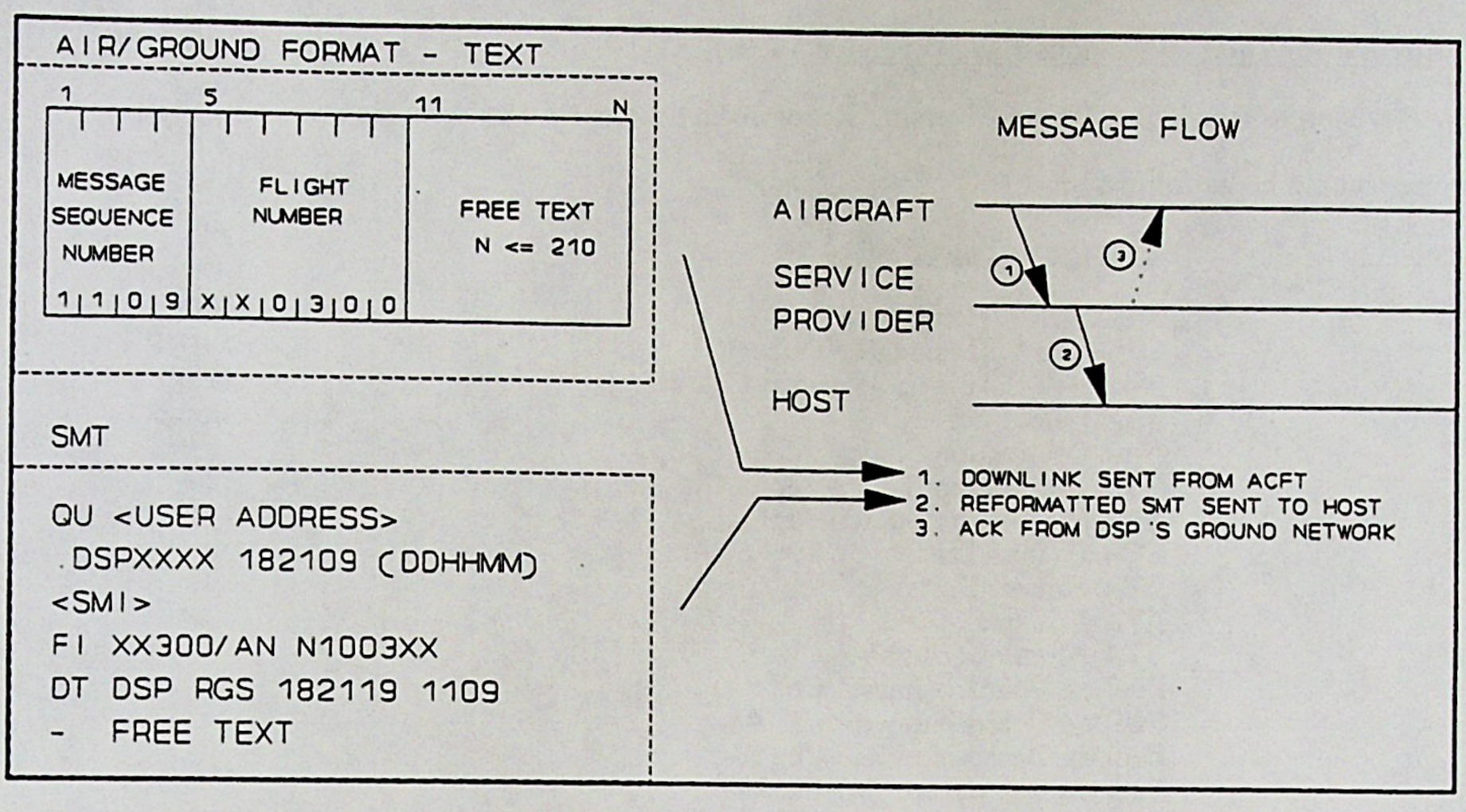


Figure 5.3.6-1 Weather Request

C-1

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	
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 talk	

C-1

Figure 5.3.7-1 Airline Designated Downlink

5.0 DOWNLINK MESSAGE TEXT FIELD 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:

Character No.	Character Content	
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	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

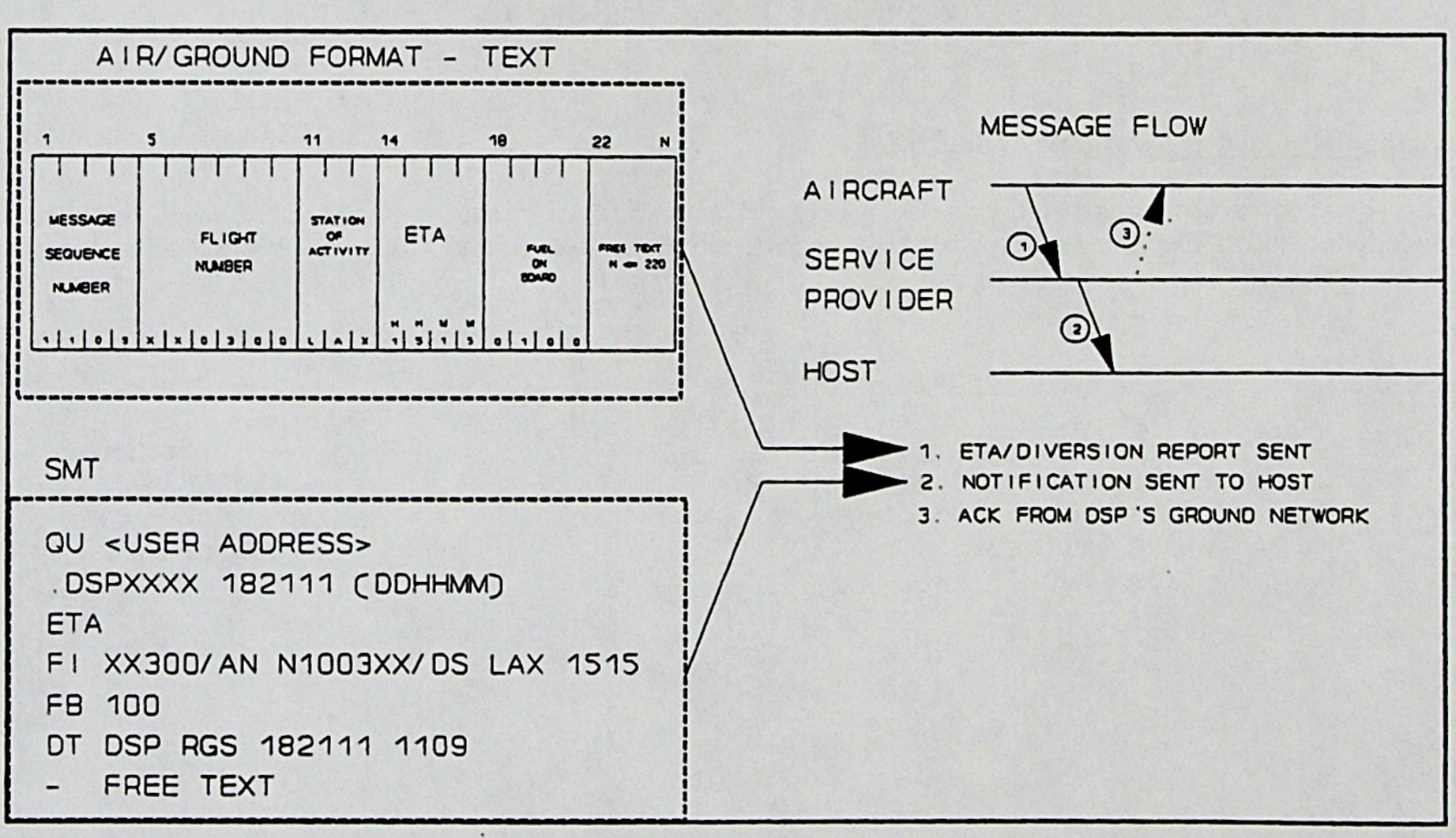


Figure 5.3.8 ETA/Diversion Report

5.3.9 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 talk" consisting of data manually entered by the crew. The format of the "free talk" field will be determined by the user. The format should be as follows:

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Character No.	Character Content		
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

Figure 5.3.9 Engine Data

c-1

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		
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

c-1

5.0 DOWNLINK MESSAGE TEXT FIELD 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~ and 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.

Aircrew-addressed downlinks contain labels selected from the range 80 through 8~ and 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:

	Character No.	Character Content	
c-1	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	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:

	Character No.	Character Content	
c-1	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	"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	

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

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

Character No.	Character Content	
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	"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	

C-1

Figure 5.3.11-1 Reserved

5.3.12 Not yet assigned

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

Figure 5.3.12-1 Reserved

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

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. The format of the Meteorological Report message should be as follows:

Character Number	# of Char	Character Content	Notes
1	1	Message [Originator]	Refer to Section 3.4 of ARINC Specification 618
2-3	2	Sequence [Message Number]	
4	1	Number [Block Sequence Character]	
5-6	2	Version Number	
7-13	7	Flight Identifier	See Note 1
14-20	7	Flight Number	
21-26	6	Tail Number	
27-31	5	Latitude	See Note 2
32-37	6	Longitude	See Note 2
38-43	6	Date/Time (UTC) of Observation	Format: ddhhmm
44-47	4	Flight Level	See Note 3
48-51	4	Static Air Temperature (Celsius)	See Note 4
52-54	3	Wind Direction (degrees)	Range: 000-359
55-57	3	Wind Speed (knots)	Range: 000-999
58-59	2	Roll Angle Flag	See Note 5
60-62	3	Humidity	Range: 0 to 100 percent

C-1

(1) The Flight Identifier is made up from the 3 letter IATA Airline code and the 4 digit (or) alpha character Flight Number.

(2) The format of latitude and longitude are with East/West (abbreviated E/W) and North/South (abbreviated N/S) following the values of latitude and longitude and a resolution in tenths of a degree. For example: 481N123W or 353S148E.

(3) The character "F" followed by 3 numerals. For example: F350

(4) The range of Static Air Temperature is from -99 to +99 Celsius. The format used is 4 digits. 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

(5) If the roll angle exceeds 5 degrees, then the characters "RA" are used, otherwise the field is filled with 2 space characters.

5.0 DOWNLINK MESSAGE TEXT FIELD 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	
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 19	Defined per one of the two tables below.	
20 thru n	"Free Text" where n $\leq$ 220	

c-1

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

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

* Currently supported by SITA only.

PRIORITY + ADDRESS	
Character	Content
11 - 12	'Qx' Priority
13 - 19	7-Letter IATA address

The 'x' in Qx may represent any assigned priority; i.e., QU, QK, QD, QN. c-1

Figure 5.3.14-1 Reserved c-1

5.0 DOWNLINK MESSAGE TEXT FIELD 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 control unit followed by the "SEND" key.

The Link Test message format should be as follows:

Character No.	Character Content		
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

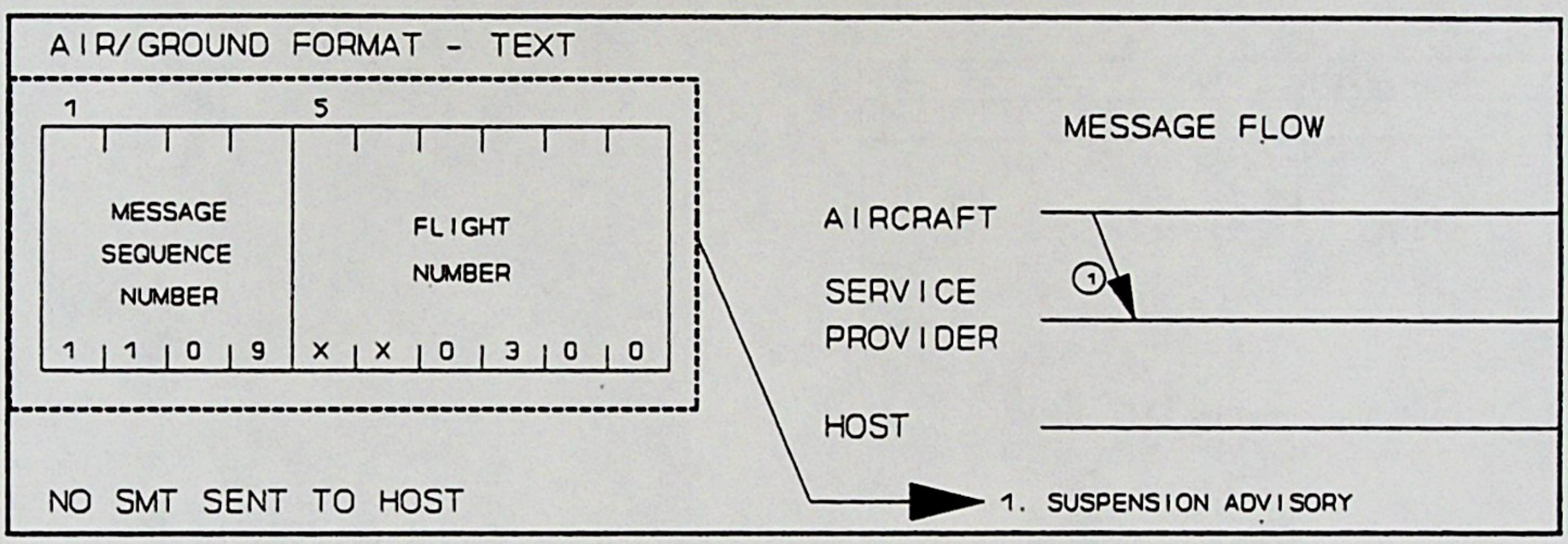


Figure 5.3.15-1 Link Test

5.3.16 Departure/Arrival Reports - 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.

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 Talk" out to the maximum system handling capability of 220 characters.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

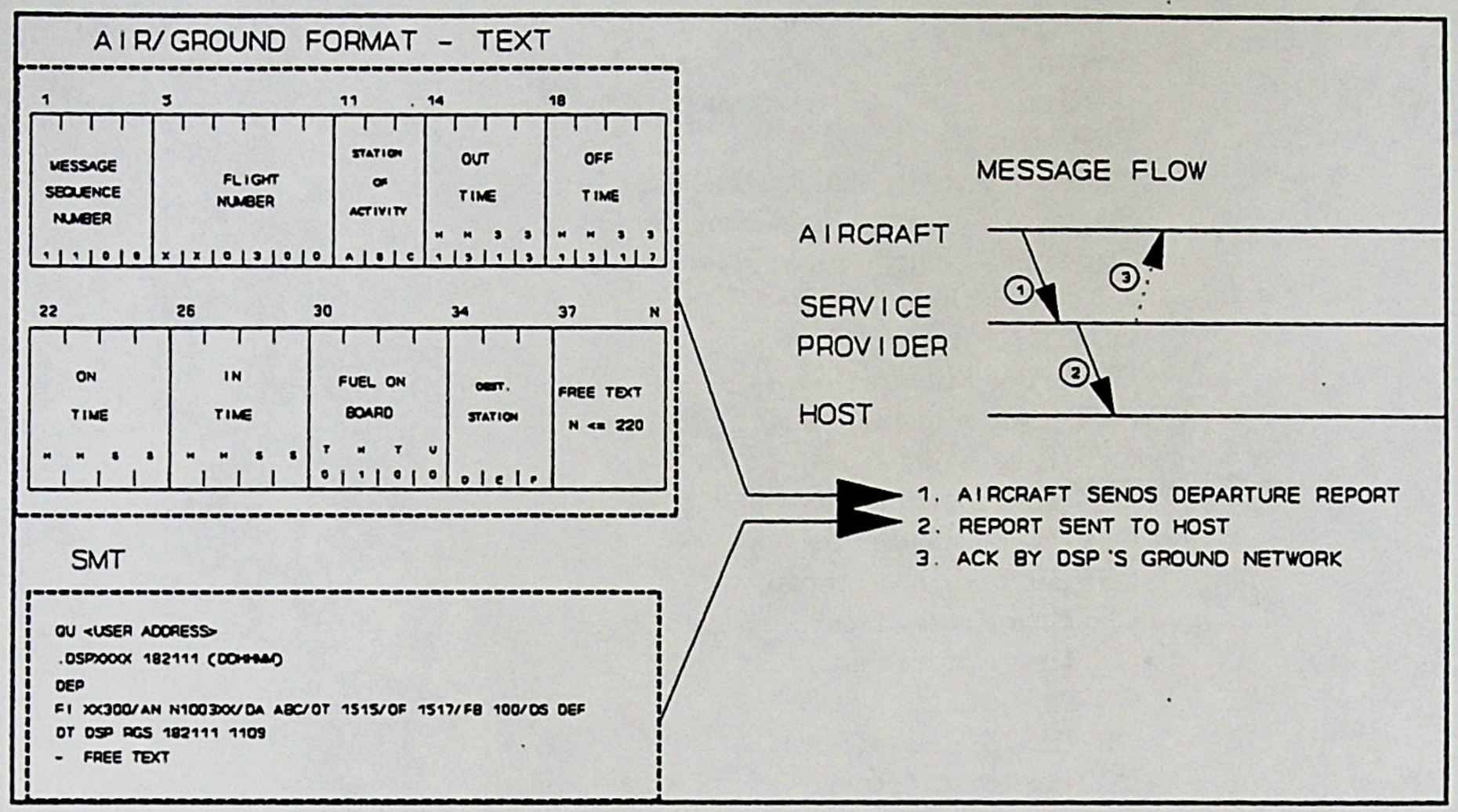
Character No.	Character Content			
1	Message	[Originator]	Refer to Section 3.4 of ARINC Specification 618 See Section 5.2.1	C-1
2-3	Sequence	[Message Number]		
4	Number	[Block Sequence Character]		
5-10	Flight Identifier;			
11	Station of Activity - Alpha/Numeric Character #1			
12	Station of Activity - Alpha/Numeric Character #2			
13	Station of Activity - 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 Talk" where n $\leq$ 220			

The complete text block, as described above, should be transmitted. Those fixed format fields for which information is not available, or not required, should be filled with "NULs". 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.

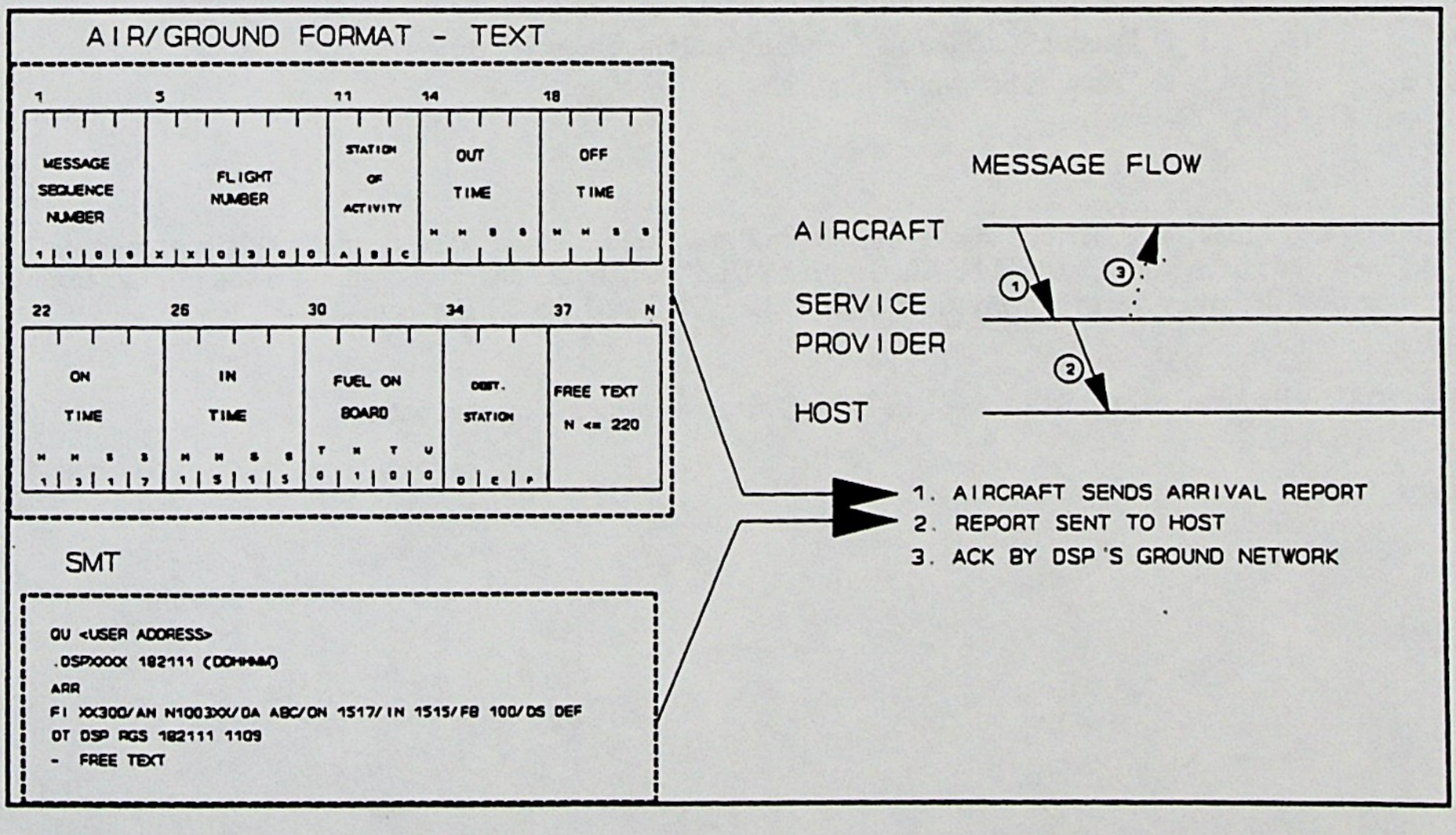
The Free Talk" will usually consist of Captain/First Officer identification information.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

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



C-1| **Figure 5.3.16-1 Departure Report (Q1)**



C-1| **Figure 5.3. 16-2 Arrival Reports (Q1)**

5.0 DOWNLINK MESSAGE TEXT FIELD 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 Talk" out to the maximum system handling capability of 220 characters. The "Free Talk" will consist of information derived from manual inputs.

Character No.	Character Content		
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	Station of Activity - Alpha/Numeric Character #1		
12	Station of Activity - Alpha/Numeric Character #2		
13	Station of Activity - 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 Talk" where n $\leq$ 220		

c-1

The comments in Section 4.1 concerning the Message Sequence Number, Flight Number, Station of Activity, and Fuel Quantity fields apply to ETA Reports also.

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 Reserved

c-1

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.

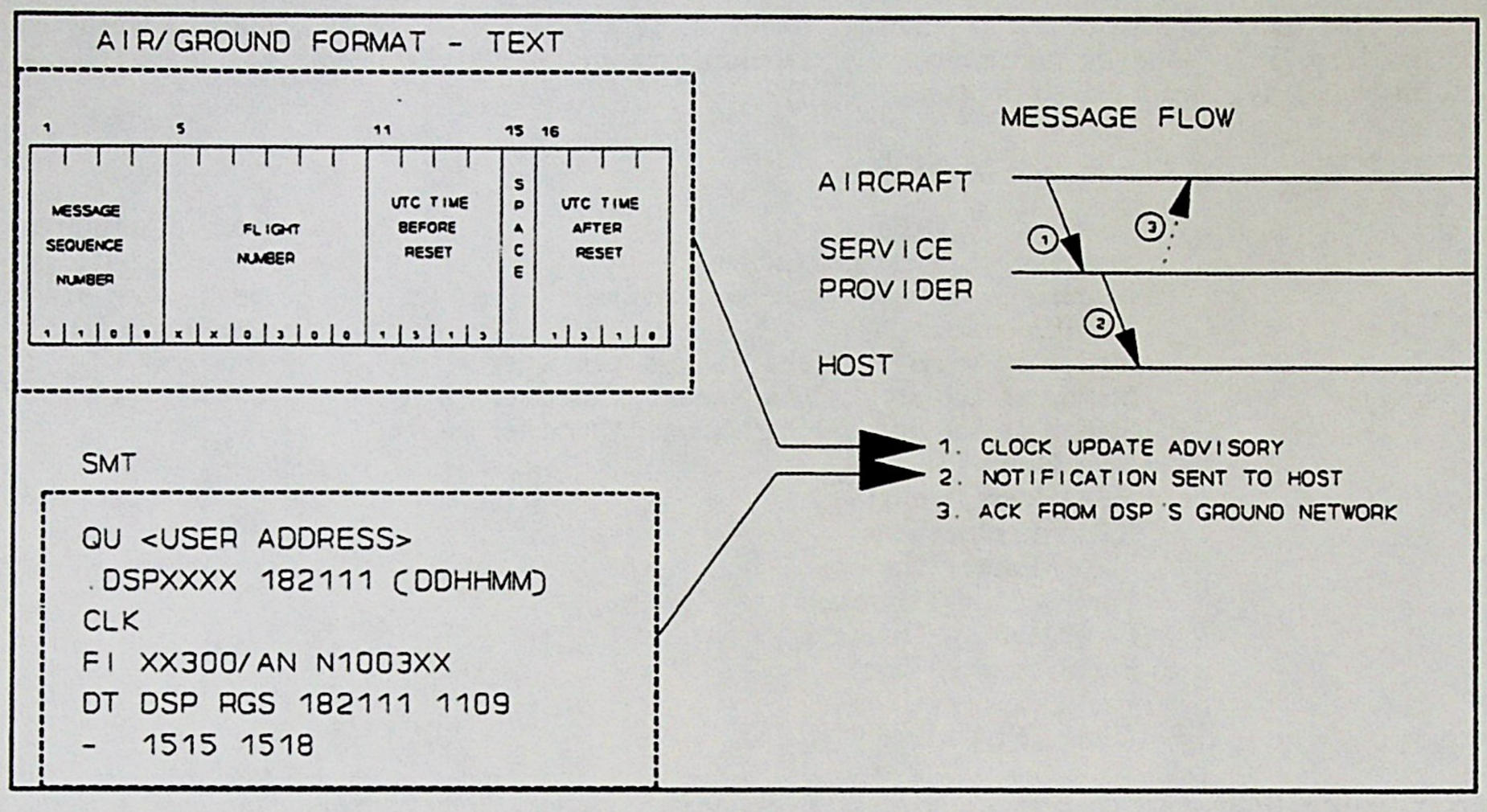
The Text field should consist of the 19-character fixed format sequence shown below.

Character No.	Character Content		
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	Hours (Tens)		} Clock time before reset
12	Hours (Units)		
13	Minutes (Tens)		
14	Minutes (Units)		
15	Space		
16	Hours (Tens)		} Clock time after reset
17	Hours (Units)		
18	Minutes (Tens)		
19	Minutes (Units)		

c-1

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.18 Clock Update Advisory - Label Q3 (cont'd)



C-1| Figure 5.3.18-1 Clock Update Advisory

5.3.19 Voice Circuit Busy - Label Q4

Not used in downlink messages.

C-1| ### 5.3.20 Unable to Deliver Uplink - Label Q5

When the airborne sub-system cannot accept an uplinked message it should respond with a downlink containing Label character 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	
C-1	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

C-1| Figure 5.3.29-1 Reserved

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:

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Character No.	Character Content		
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 Talk" where n $\leq$ 220		

c-1

Figure 5.3.21-1 Reserved

c-1

5.3.22 Reserved - Label Q8

Not used in downlink messages.

5.3.23 Reserved - Label Q9

Not used in downlink messages.

5.3.24 Out/Fuel Reports - QA

The Out/Fuel report should be transmitted automatically following the declaration of the OUT event. Should six attempts to communicate the message not produce an acknowledgement from the ground, it is possible that the aircraft is departing a station of which radio coverage on the ground is not provided. The MU should raise the "No Communications" alert so that the crew may report the OUT time and fuel data over a voice communications link if the capability to do so exists and the airline's procedures require it. The MU should hold the message for further attempts to communicate, ensuring that such transmissions take precedence over transmission of the Off Report. Note that Off Reports may be subject to programmed delay to better assure their transmission within radio coverage.

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

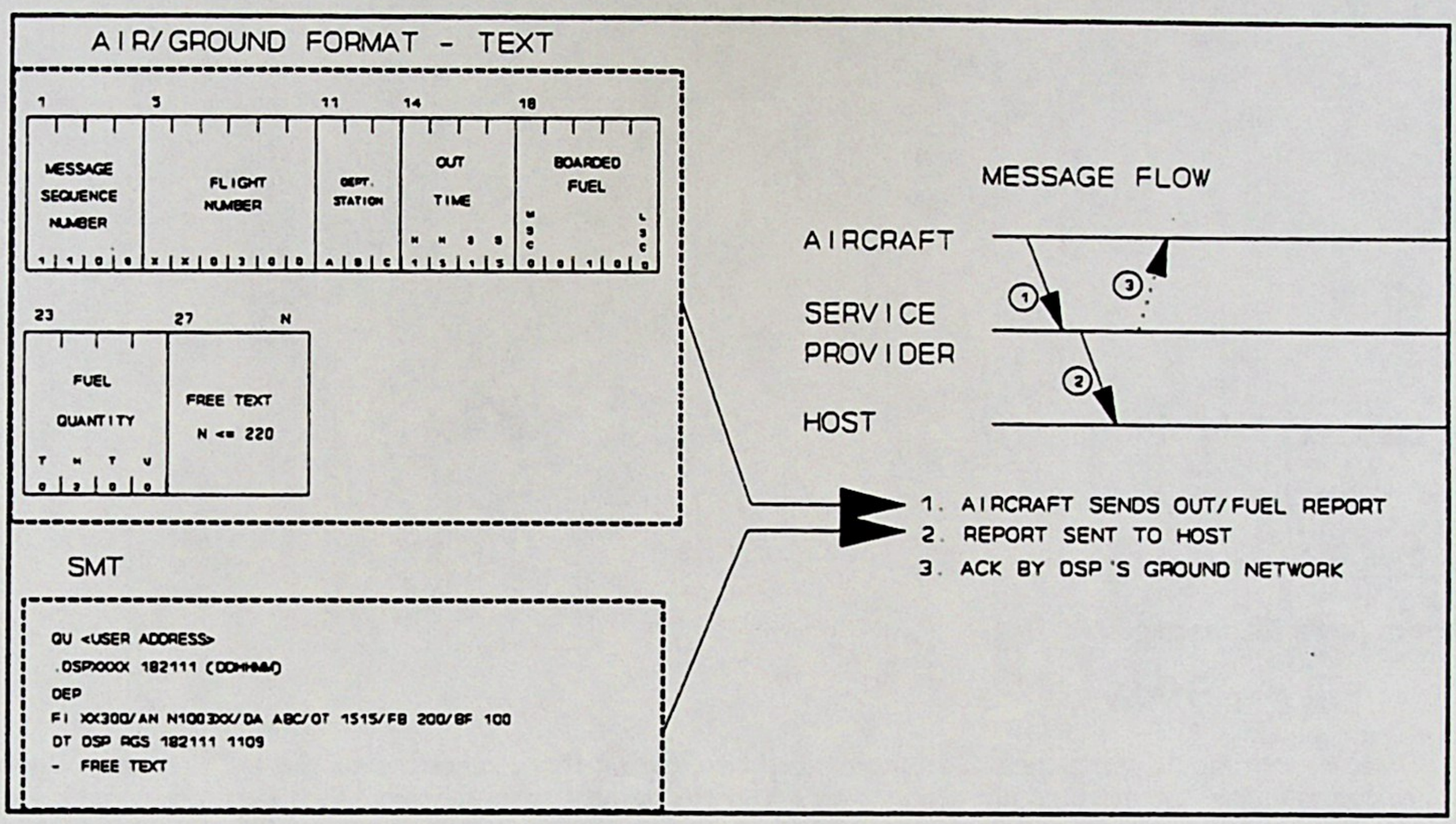
Character No.	Character Content		
1	Message	[Originator]	Refer to Section 3.4 of ARINC Specification 618
2-3	Sequence	[Message Number]	
4	Number	[Block Sequence Character]	
5-10	Flight Identifier;		See Section 5.2.1
11	Departure Station - Alpha/Numeric Character #1		
12	Departure Station - Alpha/Numeric 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		
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 Talk" where n $\leq$ 220		

c-1

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.24 Out/Fuel Reports - QA (cont'd)

The complete text block 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. If the "Free Talk" 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 Talk" character.



C-1| Figure 5.3.24-1 OUT/Fuel Reports

5.3.25 OFF Reports - QB

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 Talk" as already described.

Character No.	Character Content	
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	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 Talk" where n $\leq$ 220	

C-1|

The Station of Activity field should contain the Departure Station code.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

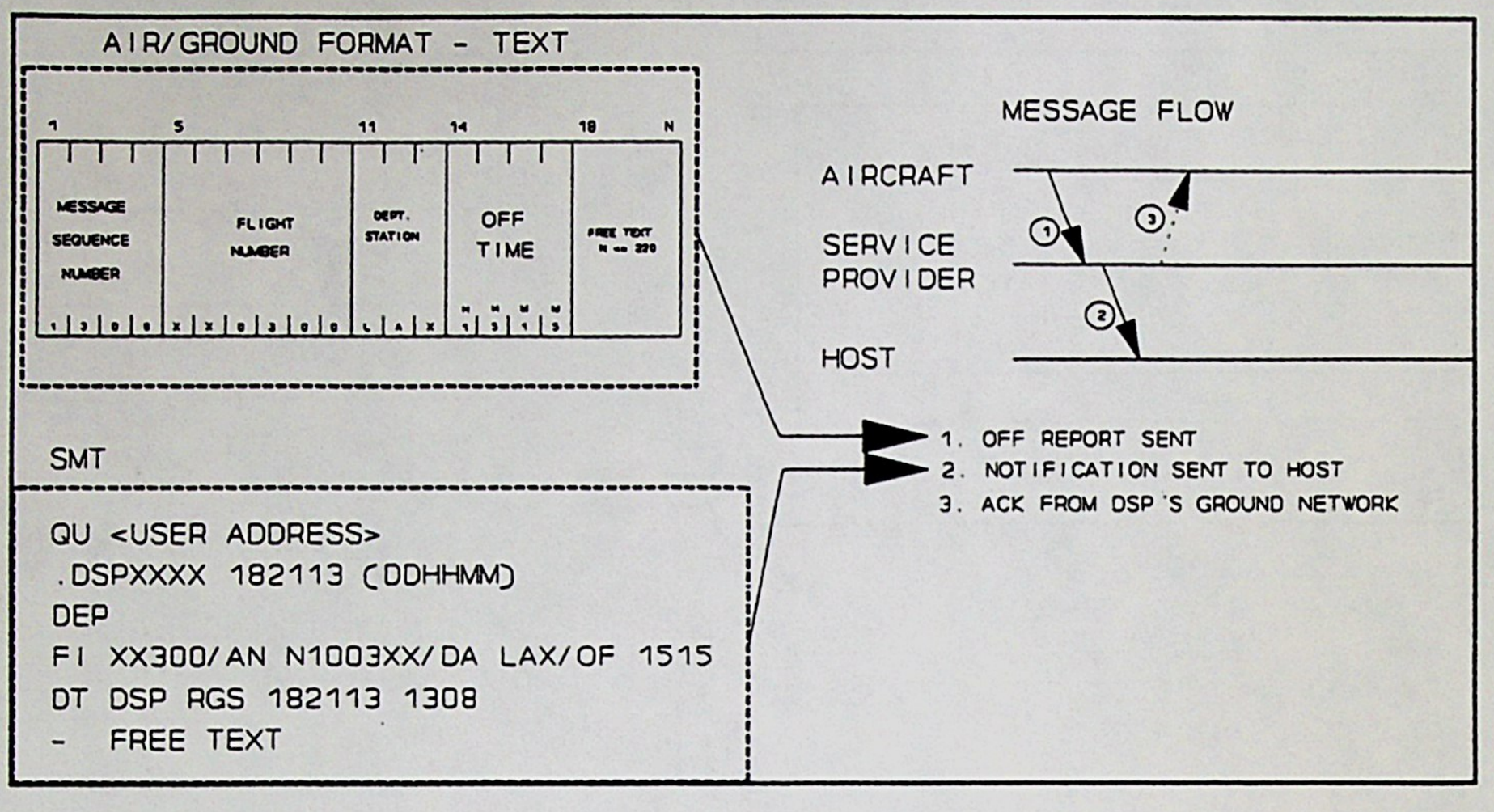


Figure 5.3.25-1 OFF Reports | C-1

5.3.26 ON Reports - QC

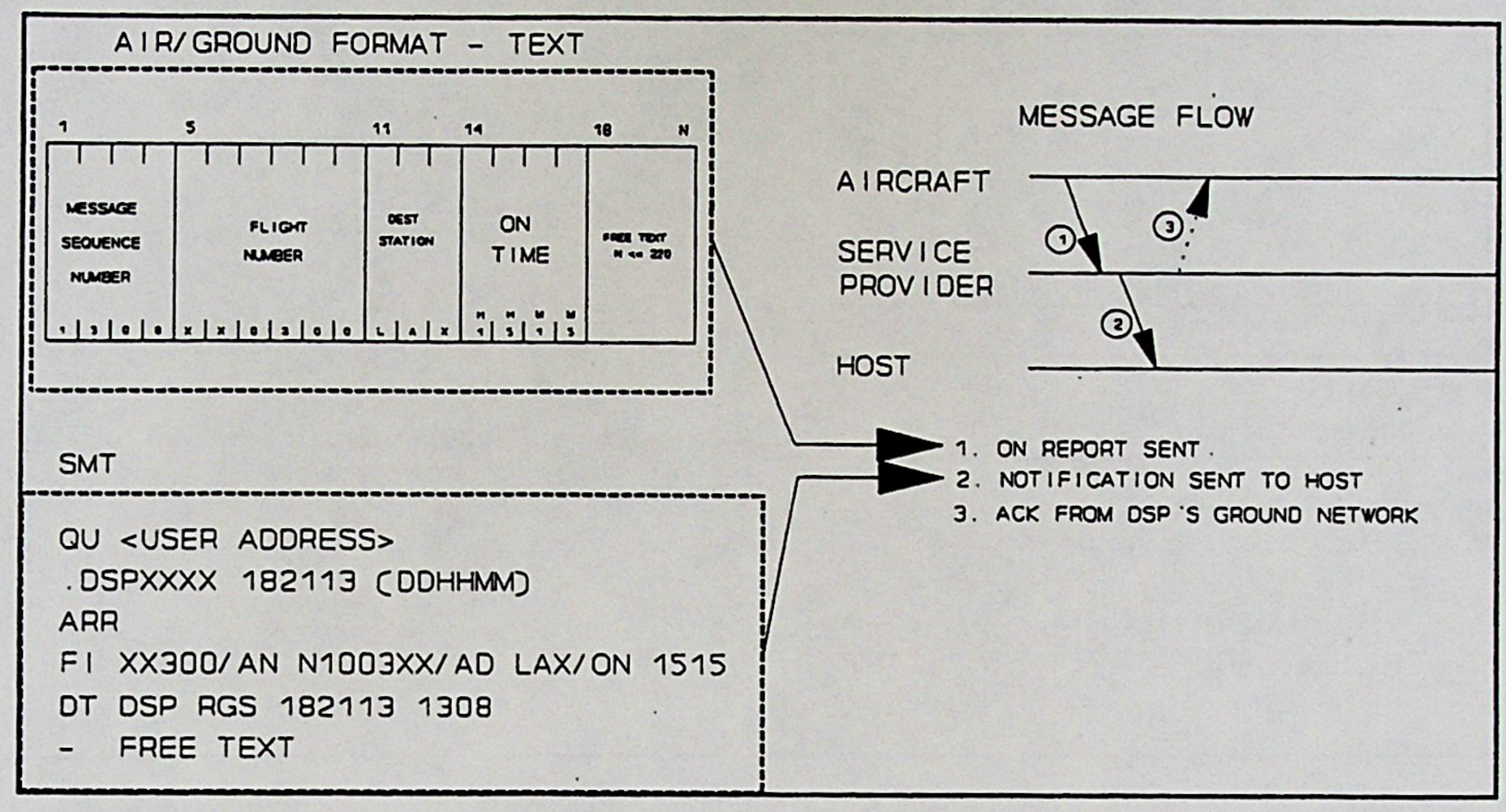
The Text field should consist of the 17-character fixed format section defined below, followed, as necessary, by "Free Talk" as already described.

Character No.	Character Content		
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	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 Talk" where n $\leq$ 220		

C-1

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.26 ON Reports - QC (cont'd)



C-1 Figure 5.3.26-1 ON Reports

5.3.27 IN/Fuel Report - QD

The Text field should consist of the 22-character fixed format section followed, as necessary, by "Free Talk" as already described.

Character No.	Character Content	
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	Destination Station Alpha/Numeric Character #1	
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	
23 thru n	"Free Talk" where n $\leq$ 220	

C-1

The Station of Activity field should contain the destination station code, and 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) should be transmitted in this position.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

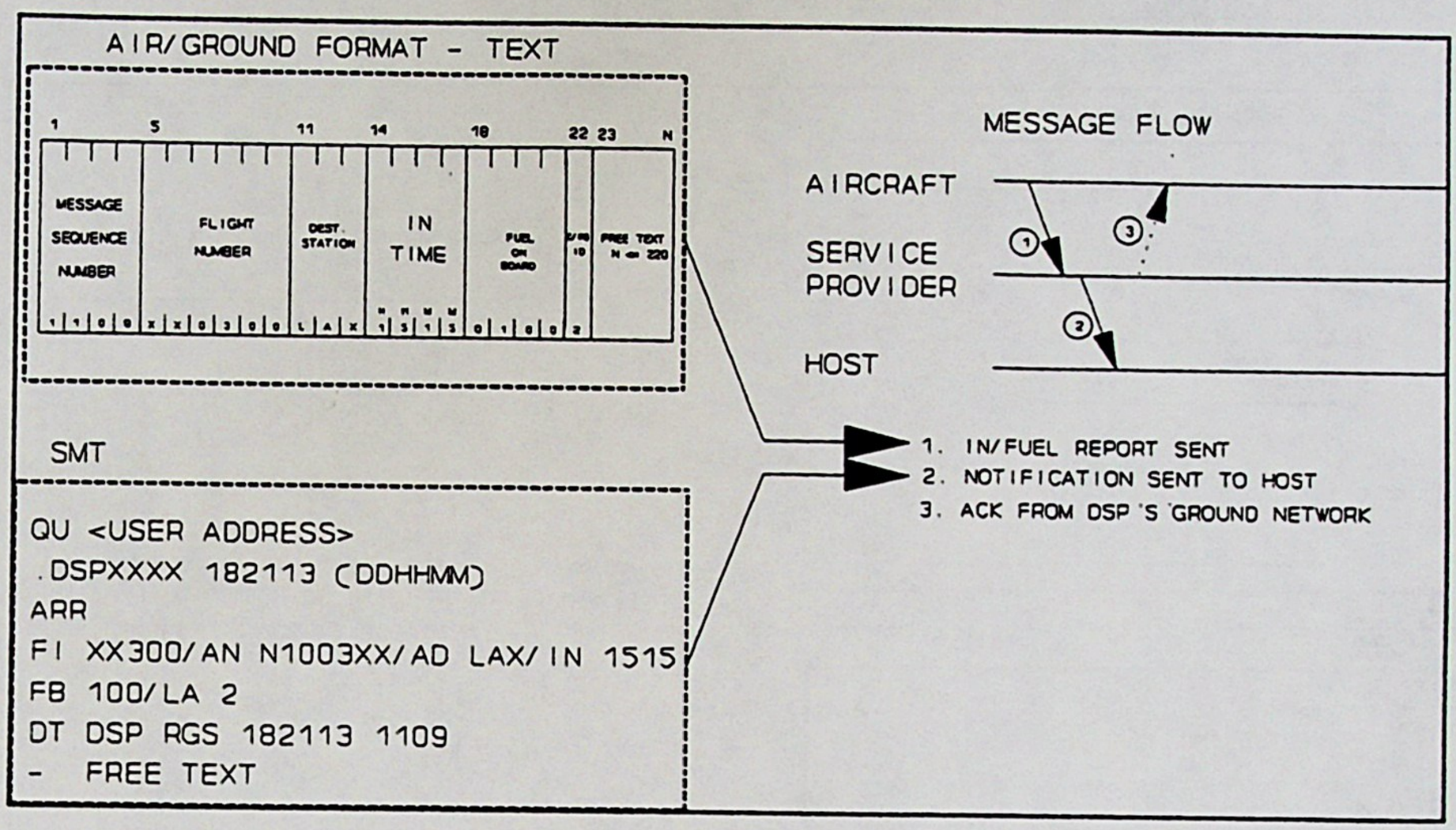


Figure 5.3.27-1 IN/Fuel Report | C-1

5.3.28 OUT/Fuel/Destination Report - Label QE

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

Character No.	Character Content		
1	Message [Originator]	Refer to Section 3.4 of ARINC Specification 618	C-1
2-3	Sequence [Message Number]		
4	Number [Block Sequence Character]		
5-10	Flight Identifier;	See Section 5.2.1	
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 MS)		
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)		
27	Destination Station - Alpha/Numeric Character #1		C-1
28	Destination Station - Alpha/Numeric Character #2		
29	Destination Station - Alpha/Numeric Character #3		
30 thru n	"Free Talk" where n $\leq$ 220		

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.28 OUT/Fuel/Destination Report - Label QE (cont'd)

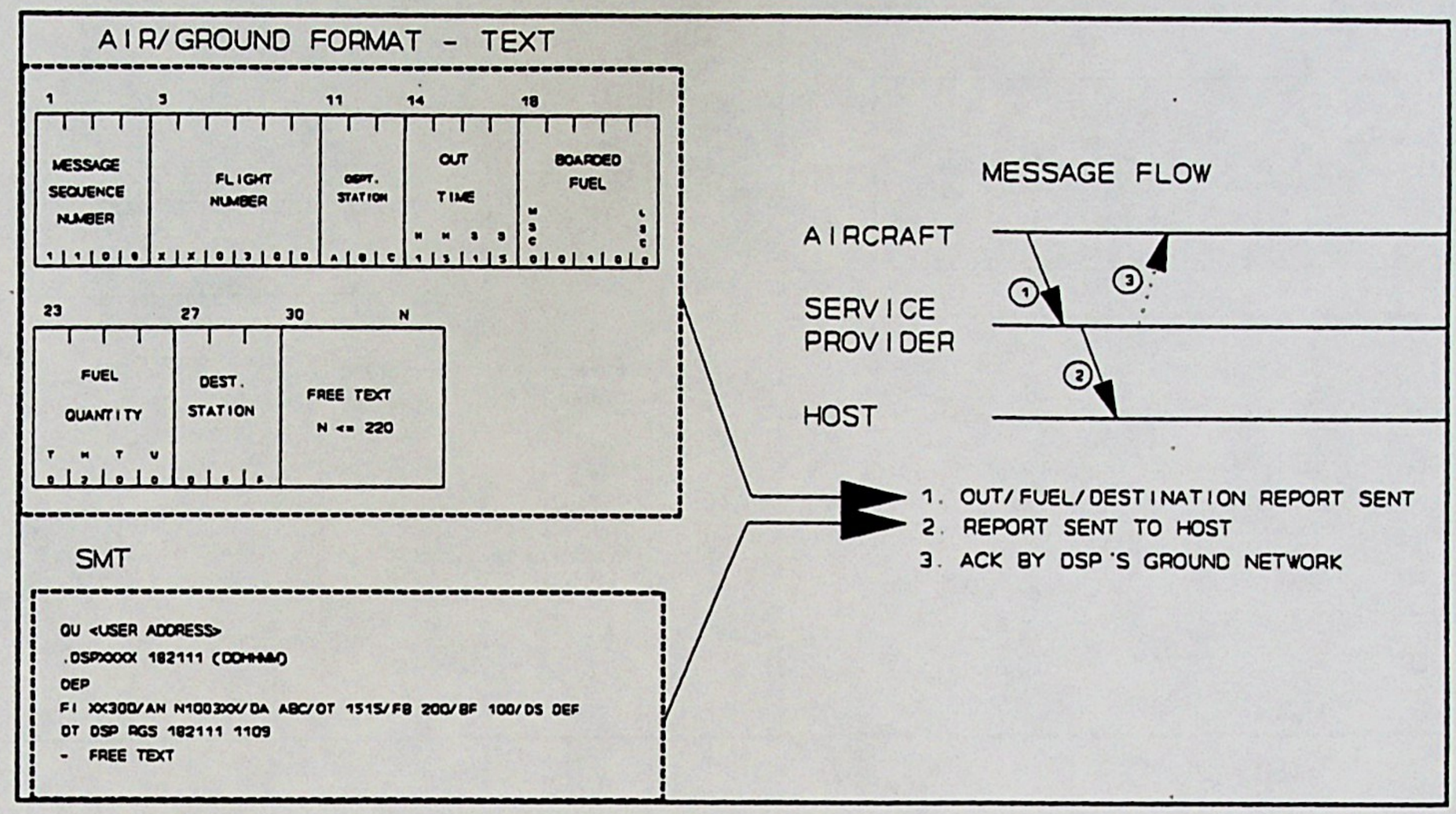


Figure 5.3.28-1 OUT/Fuel Destination Report

5.3.29 OFF/Destination Report - Label QF

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

	Character No.	Character Content		
	1	Message	[Originator]	Refer to Section 3.4 of ARINC Specification 618
	2-3	Sequence	[Message Number]	
C-1	4	Number	[Block Sequence Character]	
C-1	5-10	Flight Identifier;		See Section 5.2.1
	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	Destination Station - Alpha/Numeric Character #1		
C-1	19	Destination Station - Alpha/Numeric Character #2		
	20	Destination Station - Alpha/Numeric Character #3		
	21 thru n	"Free Talk" where n $\leq$ 220		

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

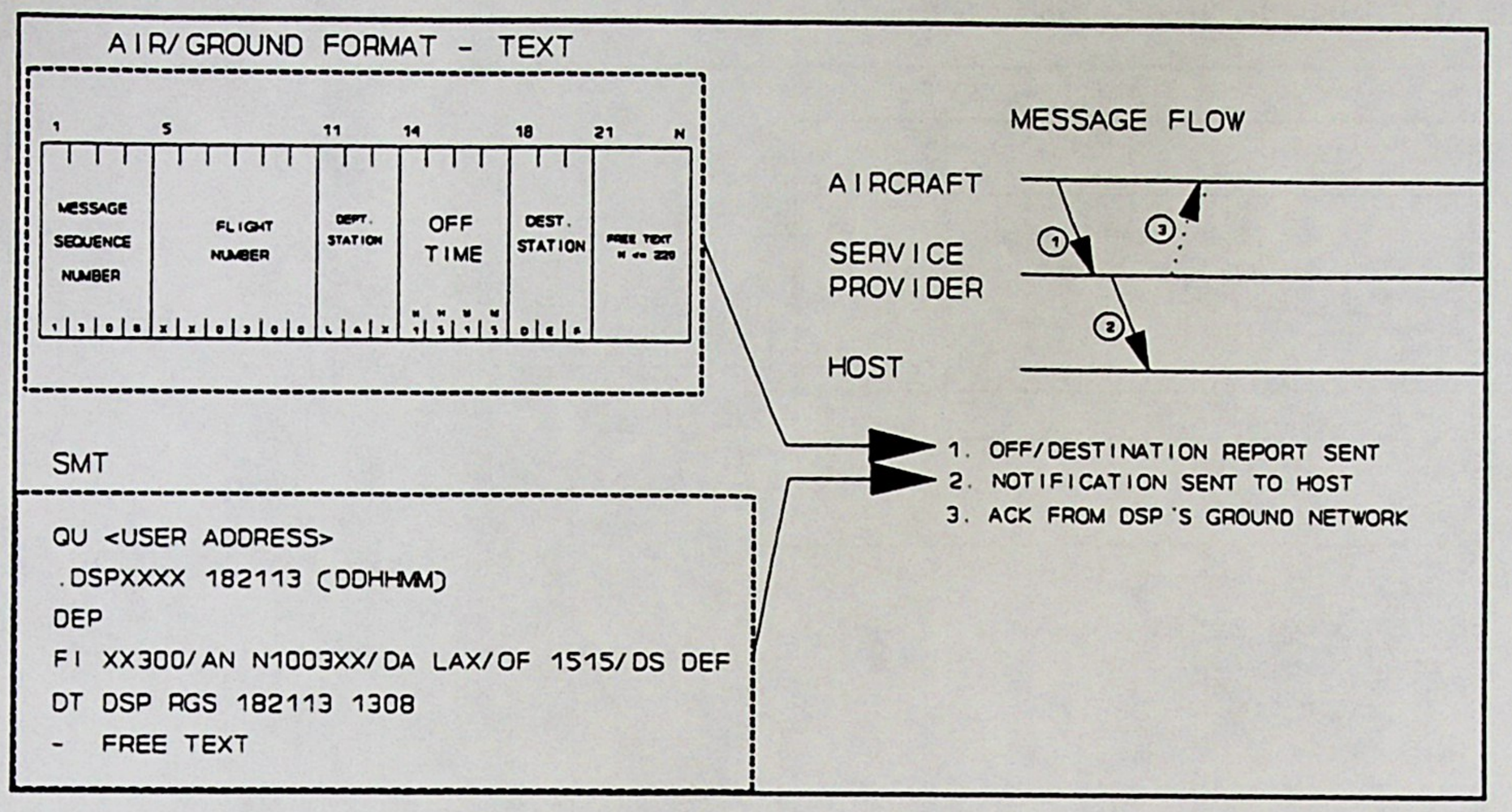


Figure 5.3.29-1 OFF/Destination Report | C-1

5.3.30 OUT/Return IN Report - Label QG

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 QG.

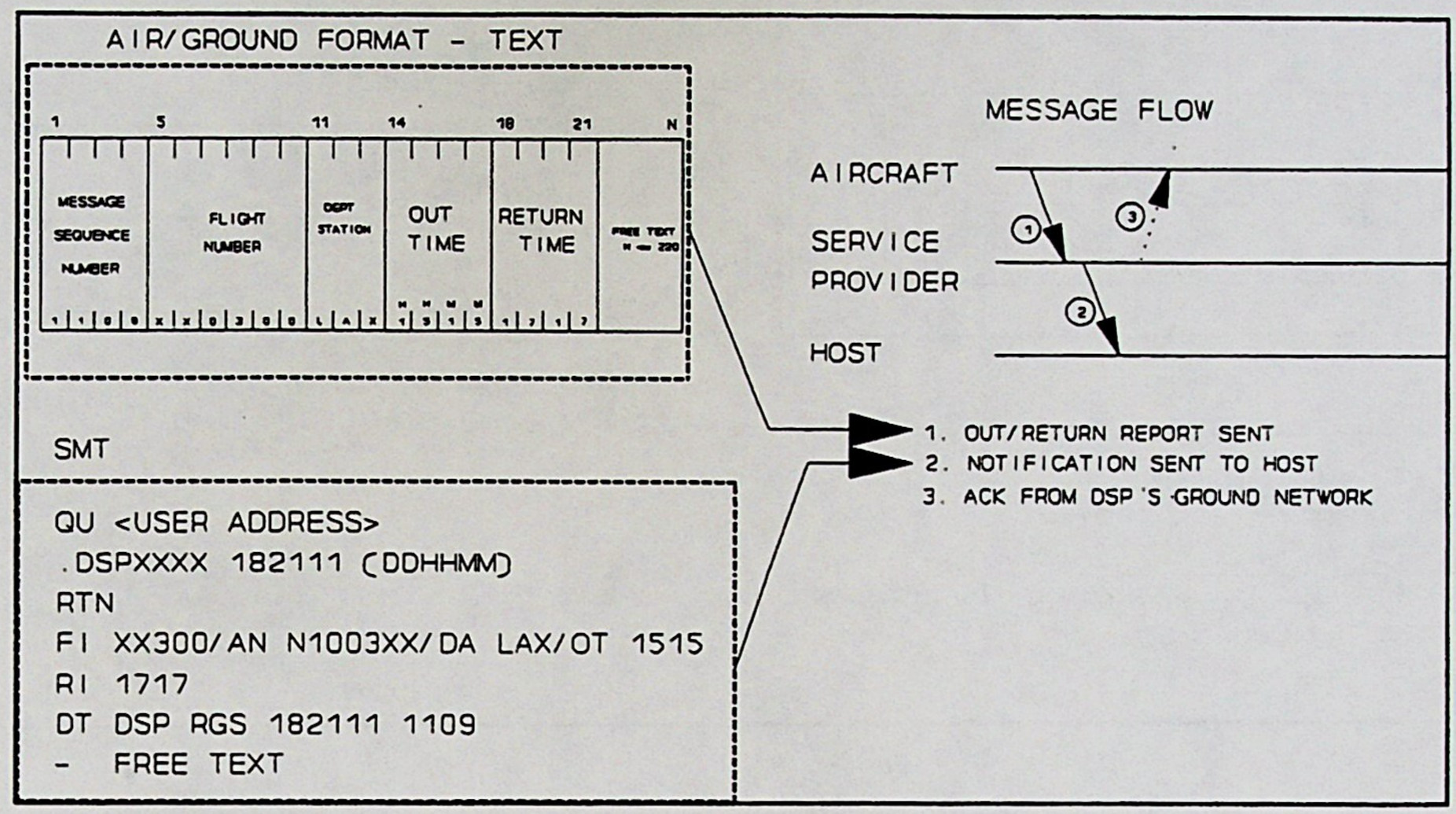
The format should be as follows:

Character No.	Character Content		
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	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 Talk" where n $\leq$ 220		

C-1

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.30 OUT/Return IN Report - Label QG (cont'd)



C-1 Figure 5.3.30-1 OUT/Return IN Report

5.3.31 OUT Report - Label QH

OUT reports should contain Label character QH.

The format should be as follows:

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

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

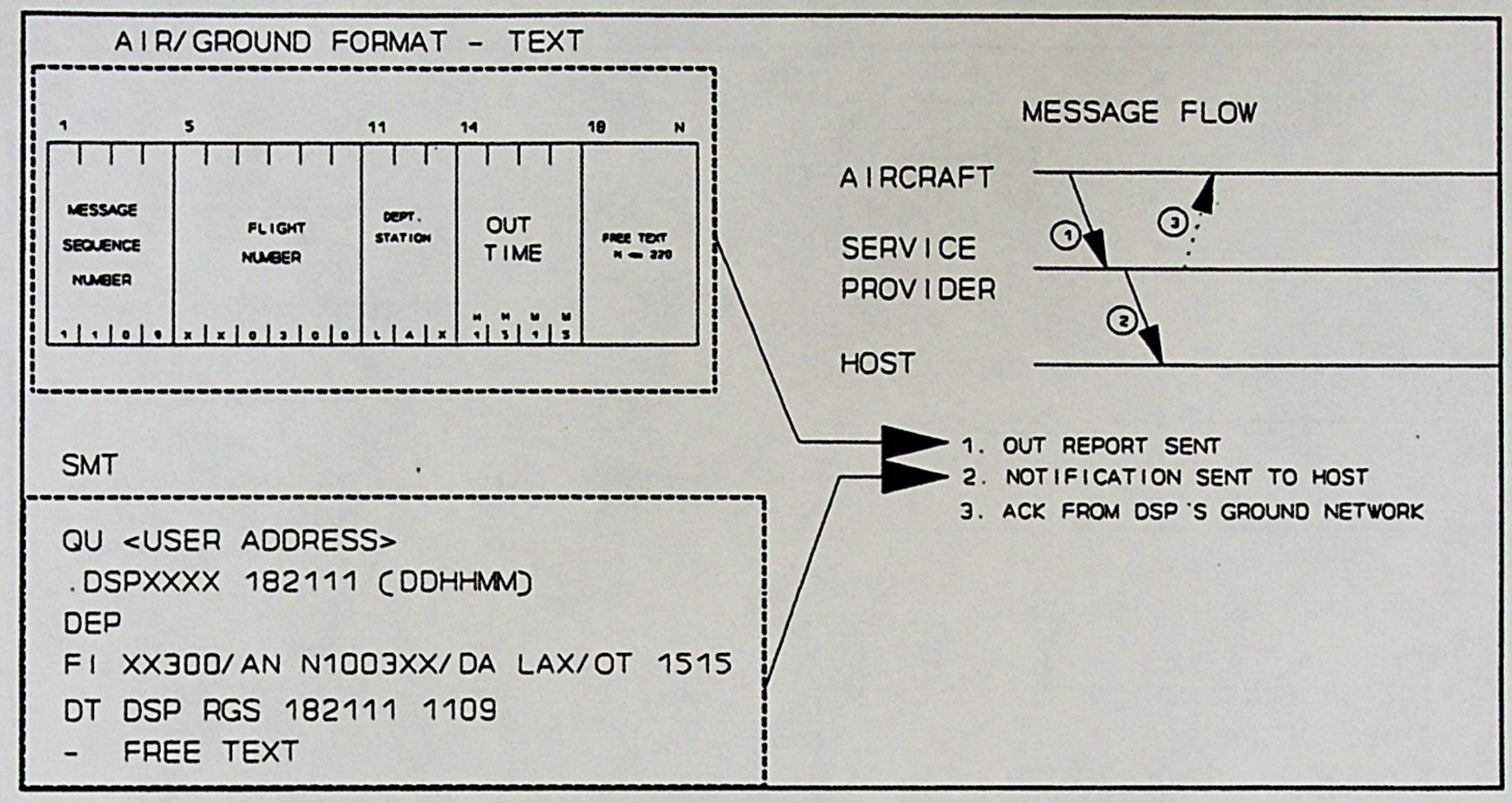


Figure 5.3.31-1 OUT Report | c-1

5.3.32 Landing Report - Label QK

Landing Reports should contain Label characters QK. The Landing report should be transmitted automatically following the declaration of the ON event. Previous comments concerning possible lack of ground radio coverage at the arrival station, and the resultant needs for the MU to delay transmission until after the next OUT event and to maintain the proper chronological sequence of such delayed transmissions apply.

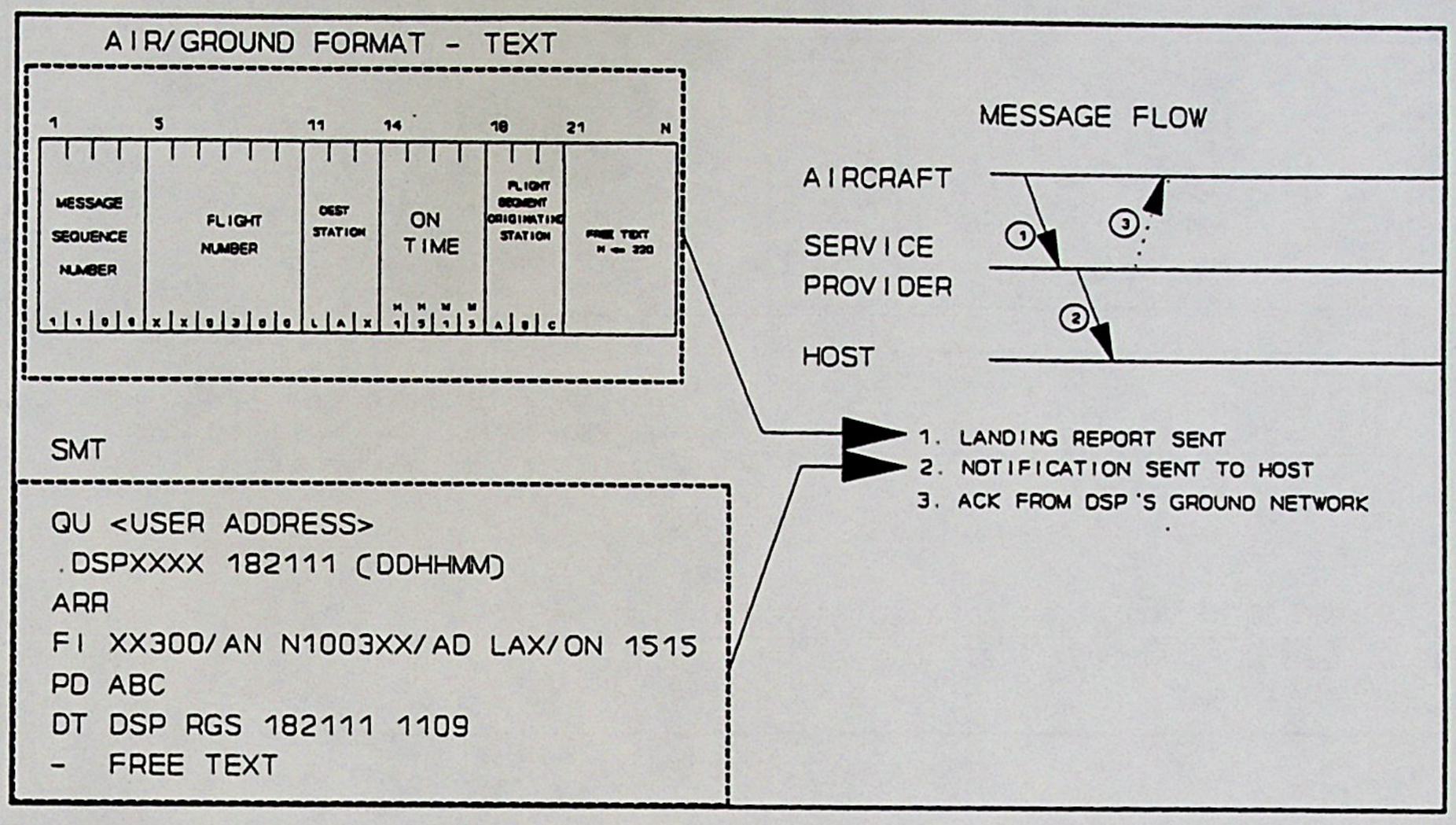
The Text field should consist of the 20-character fixed format section defined below followed, as necessary, by "Free Talk" as already described.

Character No.	Character Content			
1	Message	[Originator]	Refer to Section 3.4 of ARINC Specification 618	c-1
2-3	Sequence	[Message Number]		
4	Number	[Block Sequence Character]		
5-10	Flight Identifier;		See Section 5.2.1	
11	Station of Activity - Alpha/Numeric Character #1			
12	Station of Activity - Alpha/Numeric Character #2			
13	Station of Activity - 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	Flight Segment Originating Station - Alpha/Numeric Character #1			c-1
19	Flight Segment Originating Station - Alpha/Numeric Character #2			
20	Flight Segment Originating Station - Alpha/Numeric Character #3			
21 thru n	"Free Talk" where n $\leq$ 220			

The Station of Activity field (Character 11,12 and 13) should contain the arrival station code.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.32 Landing Report - Label QK (cont'd)



C-1 Figure 5.3.32-1 Landing Report

5.3.33 Arrival Report - Label QL

Arrival Reports should contain Label characters 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. Previous comments concerning the possible need to consider the effects of lack of ground radio coverage at the arrival station apply.

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

	Character No.	Character Content	
	1	Message [Originator]	Refer to Section
	2-3	Sequence [Message Number]	3.4 of ARINC
	4	Number [Block Sequence Character]	Specification 618
C-1	5-10	Flight Identifier;	See Section 5.2.1
	11	Station of Activity - Alpha/Numeric Character #1	
	12	Station of Activity - Alpha/Numeric Character #2	
	13	Station of Activity - 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	Flight Segment Originating Station - Alpha/Numeric Character #1	
C-1	24	Flight Segment Originating Station - Alpha/Numeric Character #2	
	25	Flight Segment Originating Station - Alpha/Numeric Character #3	
	26	Category of Landing	
	27 thru n	"Free Talk" where n $\leq$ 220	

The Station of Activity field (Characters 11, 12 and 13) should contain the arrival station code.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

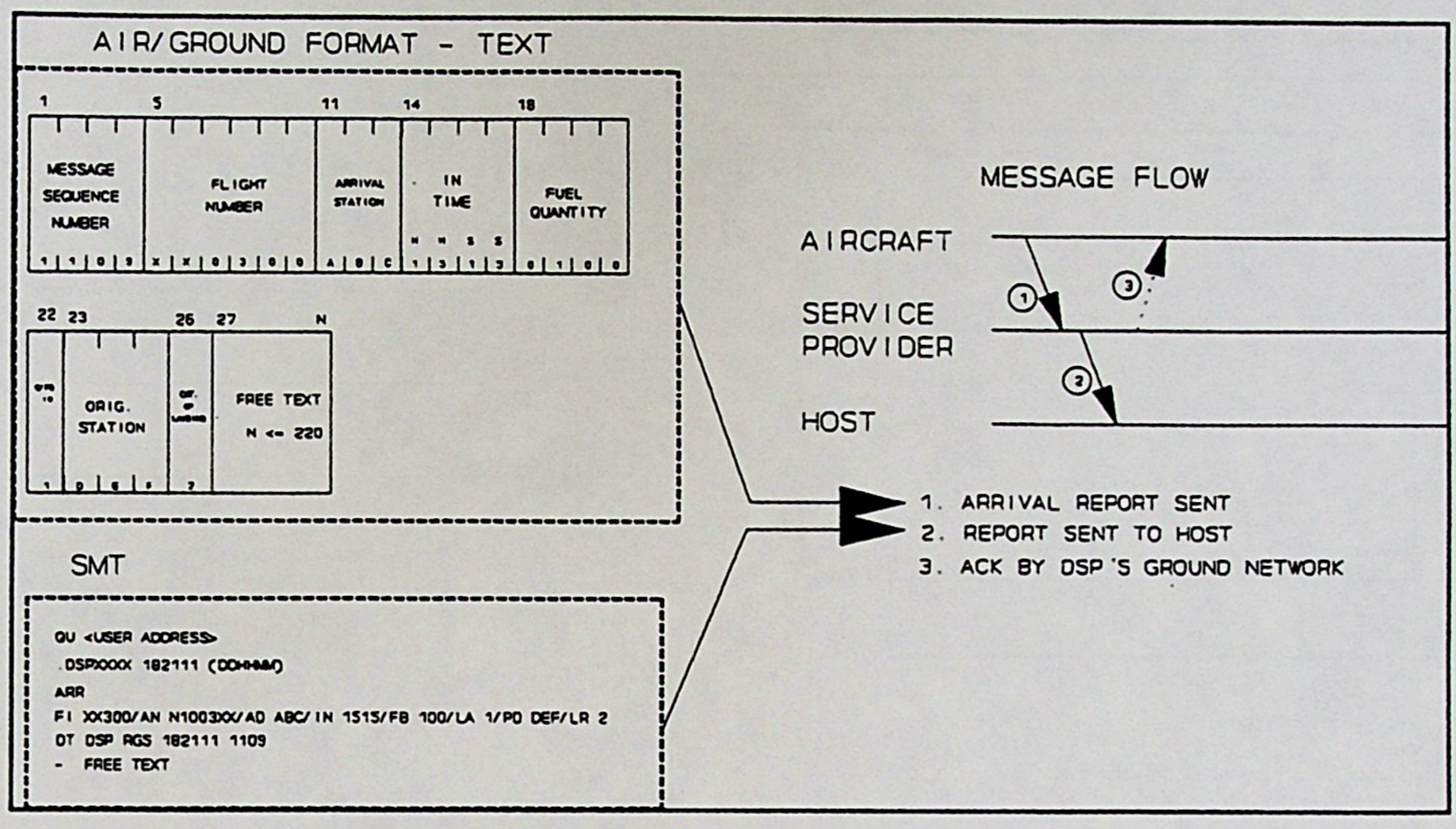


Figure 5.3.33-1 Arrival Report | C-1

5.3.34 Arrival Information Report - 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 Talk" as already described.

Character No.	Character Content		
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	Station of Activity - Alpha/Numeric Character #1		
12	Station of Activity - Alpha/Numeric Character #2		
13	Station of Activity - Alpha/Numeric Character #3		
14	Fuel Quantity (Thousands)		
15	Fuel Quantity (Hundreds)		
16	Fuel Quantity (Tens)		
17	Fuel Quantity (Units)		
18	Flight Segment Originating Station - Alpha/Numeric Character #1		
19	Flight Segment Originating Station - Alpha/Numeric Character #2		
20	Flight Segment Originating Station - Alpha/Numeric Character #3		
21	Category of Landing		
22 thru n	"Free Talk" where n $\leq$ 220		

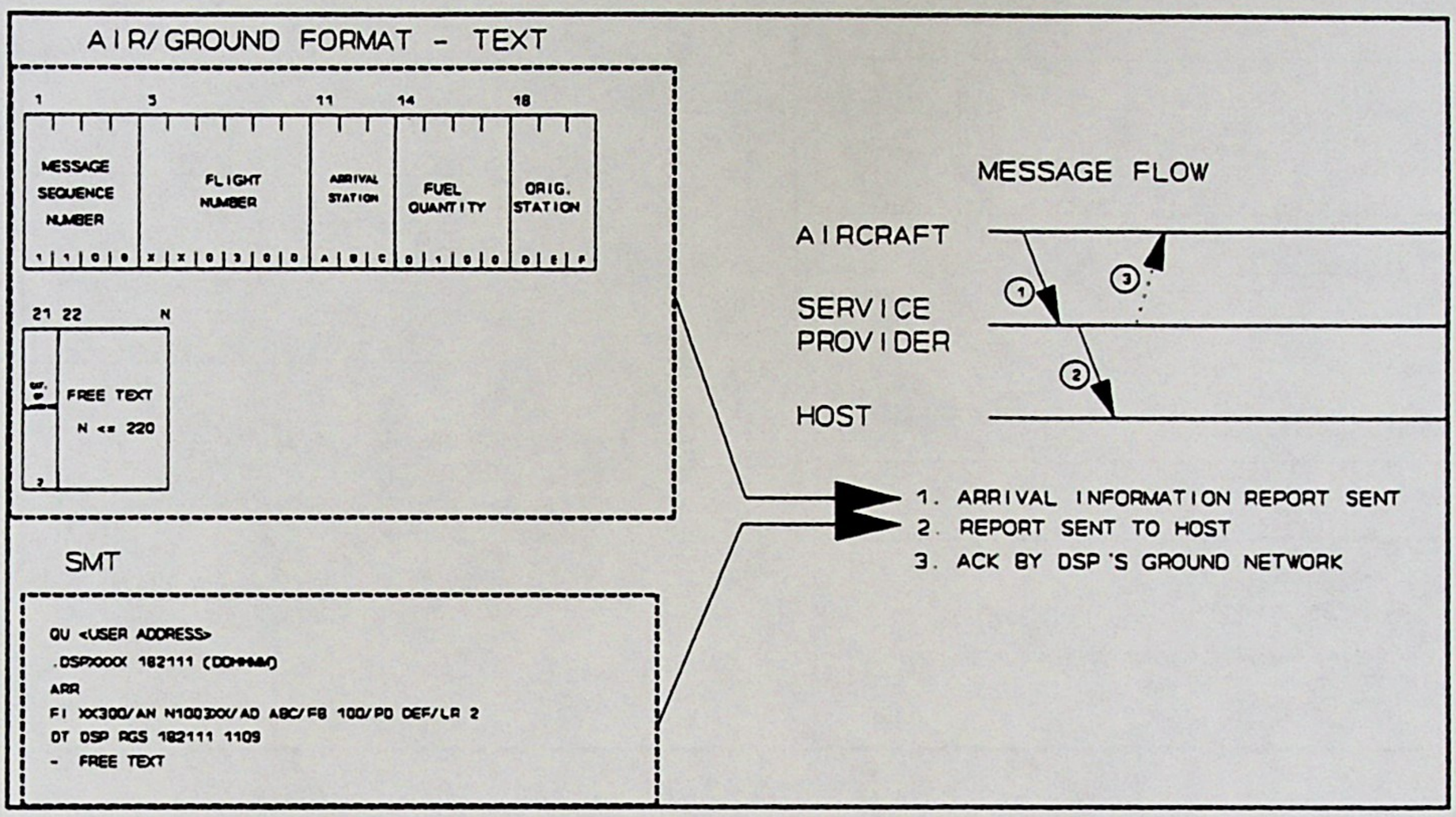
C-1

C-1

The Station of Activity field (Characters 11, 12 and 13) should contain the arrival station code and the message should be transmitted automatically following the IN event. Previous comments concerning the possible need to consider the effects of lack of ground radio coverage at the arrival station apply.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.34 Arrival Information Report - Label QM (cont'd)



C-1 Figure 5.3.34-1 Arrival Information Report

5.3.35 Diversion Report - Label QN

Diversion Reports should contain Label characters QN.

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

	Character No.	Character Content	
C-1	1	Message [Originator]	Refer to Section 3.4 of ARINC Specification 618
C-1	2-3	Sequence [Message Number]	
C-1	4	Number [Block Sequence Character]	
C-1	5-10	Flight Identifier;	See Section 5.2.1
C-1	11	Previous Destination Station - Alpha/Numeric Character #1	
C-1	12	Previous Destination Station - Alpha/Numeric Character #2	
C-1	13	Previous Destination Station - Alpha/Numeric Character #3	
	14	New Destination Station - Alpha/Numeric Character #1	
	15	New Destination Station - Alpha/Numeric Character #2	
	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)	
	20	ETA at Diversion Station Minutes (Tens)	
	21	ETA at Diversion Station Minutes (Units)	
	22	Fuel Quantity (Thousands)	
	23	Fuel Quantity (Hundreds)	
	24	Fuel Quantity (Tens)	
	25	Fuel Quantity (Units)	
C-1	26	Flight Segment Originating Station - Alpha/Numeric Character #1	
C-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 Talk" where n $\leq$ 220	

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

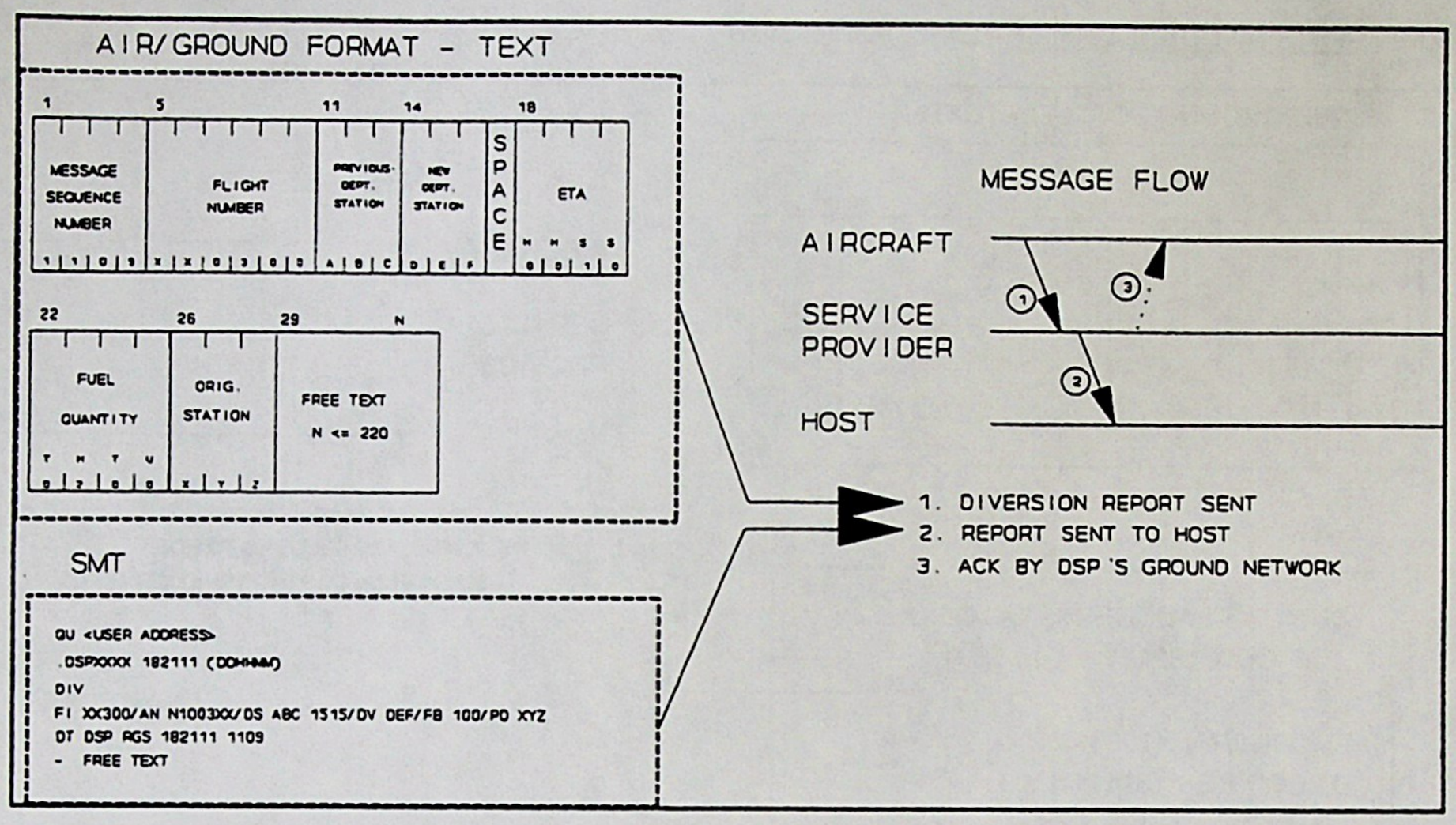


Figure 5.3.35-1 Diversion Report

5.3.36 Undelivered Uplink Report- Label HX

C-1

When the airborne system has acknowledged all the blocks 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.

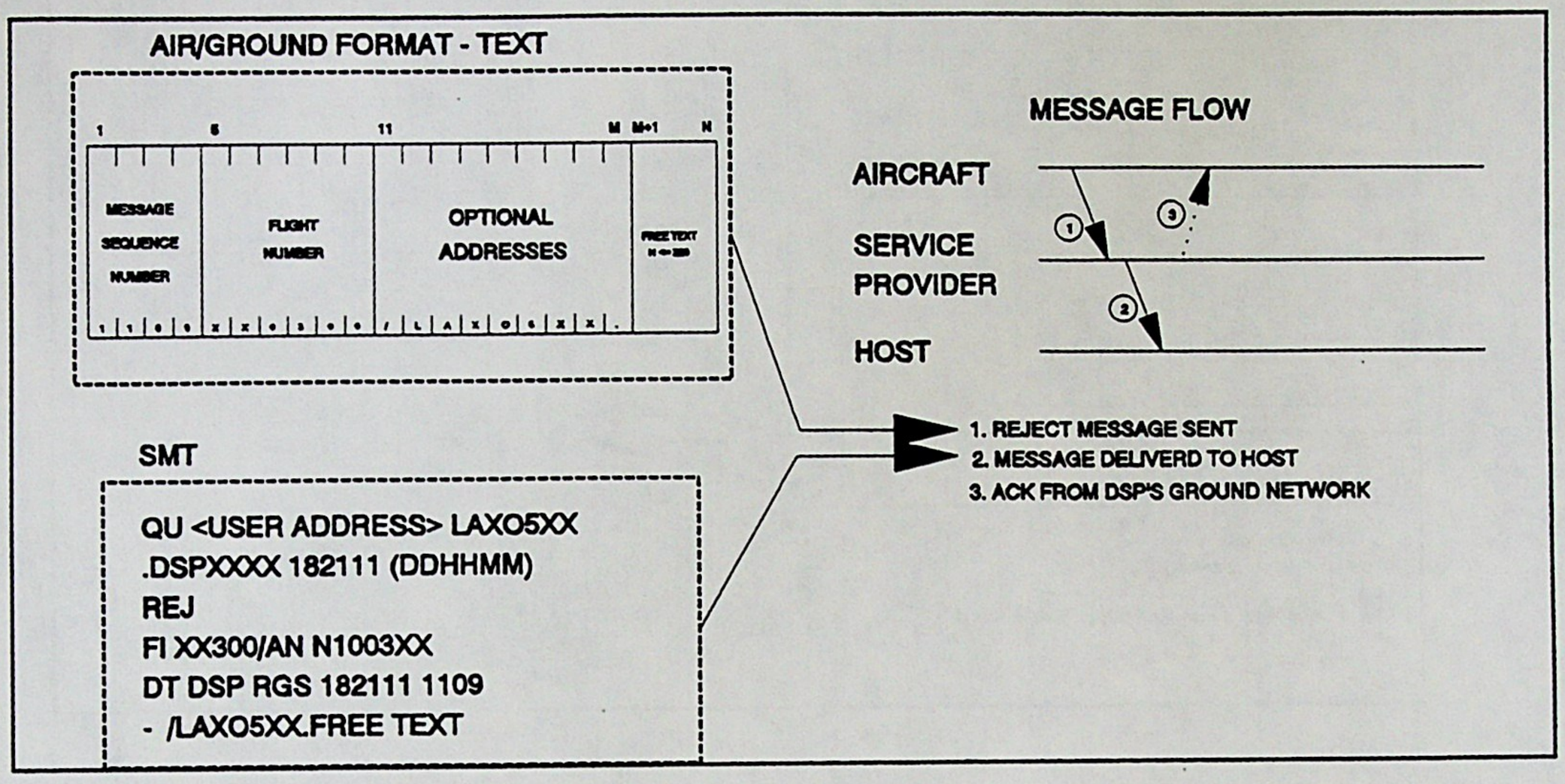
Note that the Label HX message is not a response to the DSP for the undelivered uplinked message, as are the Q5 and QX messages. It is queued and downlinked after the DSP has already assumed that the uplinked message was successfully delivered.

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

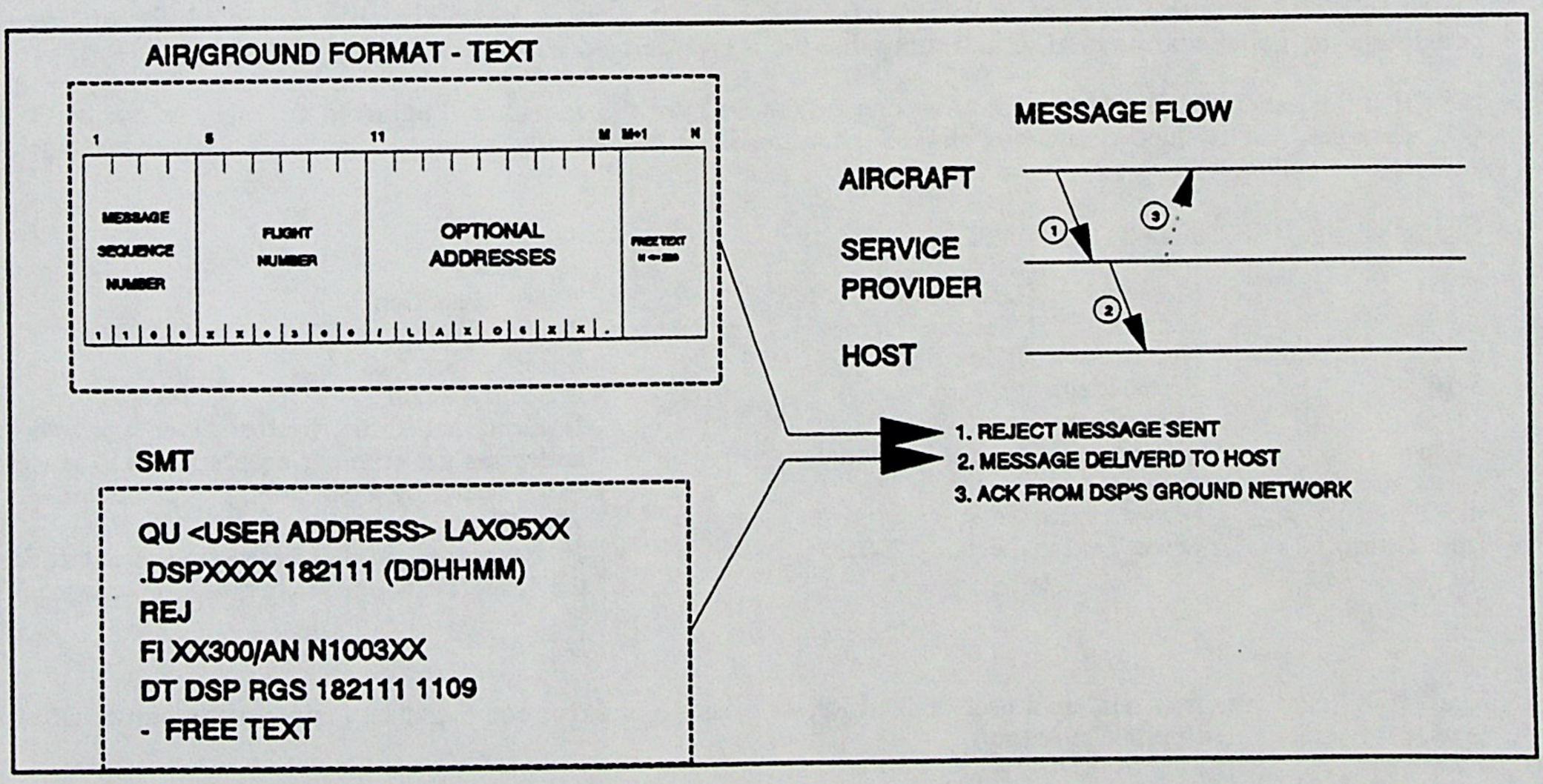
The "Free Text" area may contain a user defined Reject message or Error code, and may contain any part or all of the text of the undelivered uplink message.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.36 Undelivered Uplink Report- Label HX (cont'd)



C-1| Figure 5.3.36-1 Undelivered Uplink Report - ARINC Implementation



C-1| Figure 5.3.36-2 Undelivered Uplink Report - SITA Implementation

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.37 Alternate Aircrew Initiated Position Report - 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
1	Message [Originator]	Refer to Section 3.4 of ARINC Specification 618
2-3	Sequence [Message Number]	
4	Number [Block Sequence Char]	
5-10	Flight Identifier; See Section 5.2.1	
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 #52	
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 #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)	

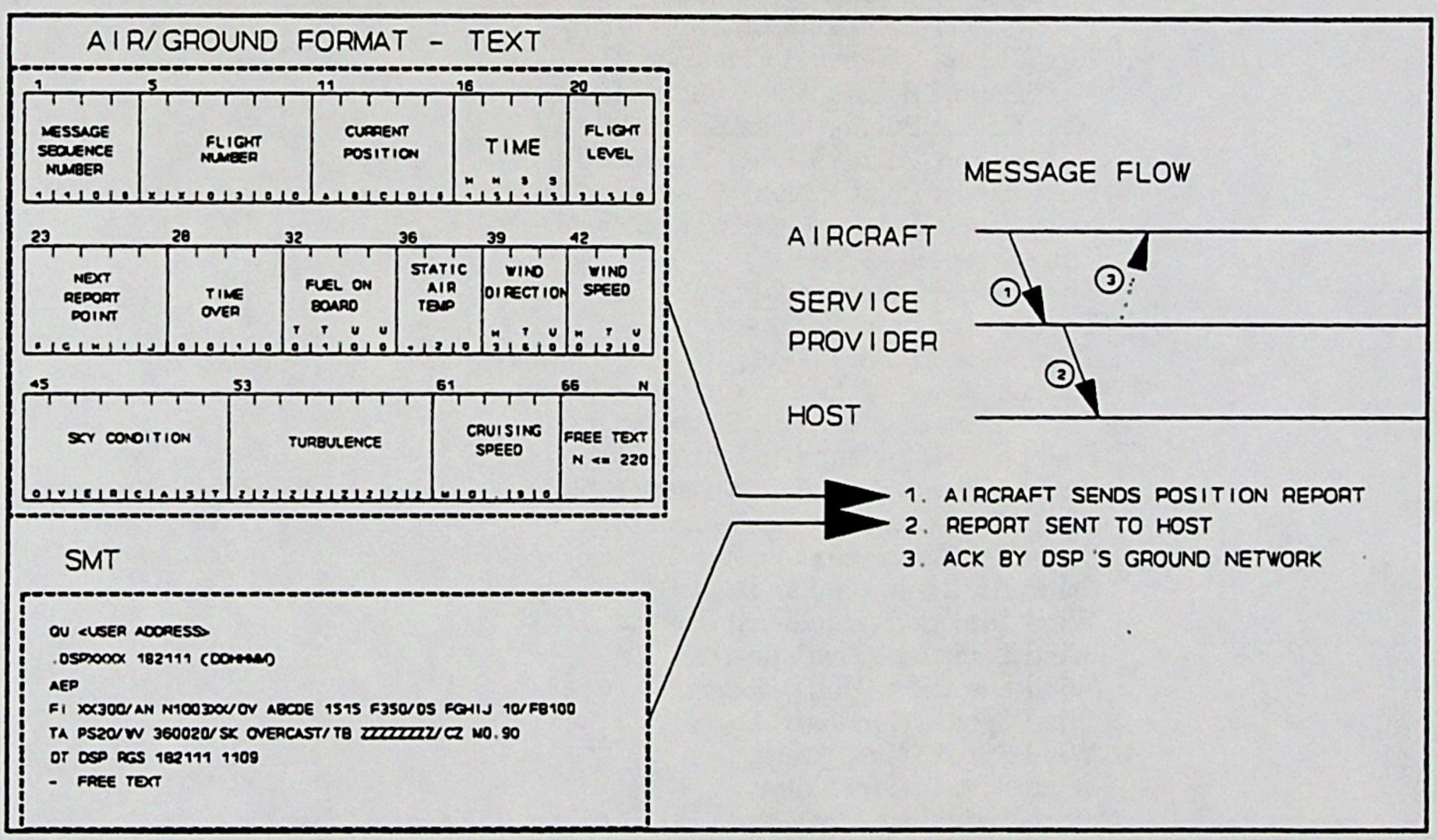
5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.37 Alternate Aircrew Initiated Position Report - Label 57 (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 $\leq$ 220	

Note 1: Fixed fields for which there is no data input should be filled with "Null" characters <O/O>.

Note 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.



c-1| Figure 5.3.37-1 Alternate Aircrew Initiated Position Report

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.38 Avionics Subsystem Acting as and ACARS Peripheral Messages - Label H1

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). A complete list of airborne subsystems that may generate messages is provided in Table C-3 of Appendix C. Downlink Messages from these designated on-board devices will contain Label characters H1 and text assembled at the source.

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. 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.

The differences in the two datalink subsystem configurations necessitate variations in the Text field format of some downlink messages. The Message Text field format used to downlink messages from airborne systems connected to an ARINC 597 ACARS MU is described in Section 5.3.38.1. The Message Text field format used to downlink messages from subsystems connected to an ARINC 724 ACARS MU is described in Section 5.3.38.2.

The message formats described in ARINC Characteristics 597 and 724 and 724B permit each H1-labeled message to be designated as either a Conversational (Type A) message or a Conventional (Type B) message. Currently, ACARS ground systems support only Type B messages.

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 Message Text field.

Table 5.3.38-1A General Format of Downlink Message Originating from an Avionic Subsystem C-1

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	xx1234	M1	/LAX05xx.	IMI *application text*

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. C-1

Table 5.3.38-1B Format for ATS Downlink Message Originating from an Avionic Subsystem

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	xx1234	M1	/Bx LAX05xx.	IMI *application text* CRC

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

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 multiblock message will contain the control character <ETX>.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

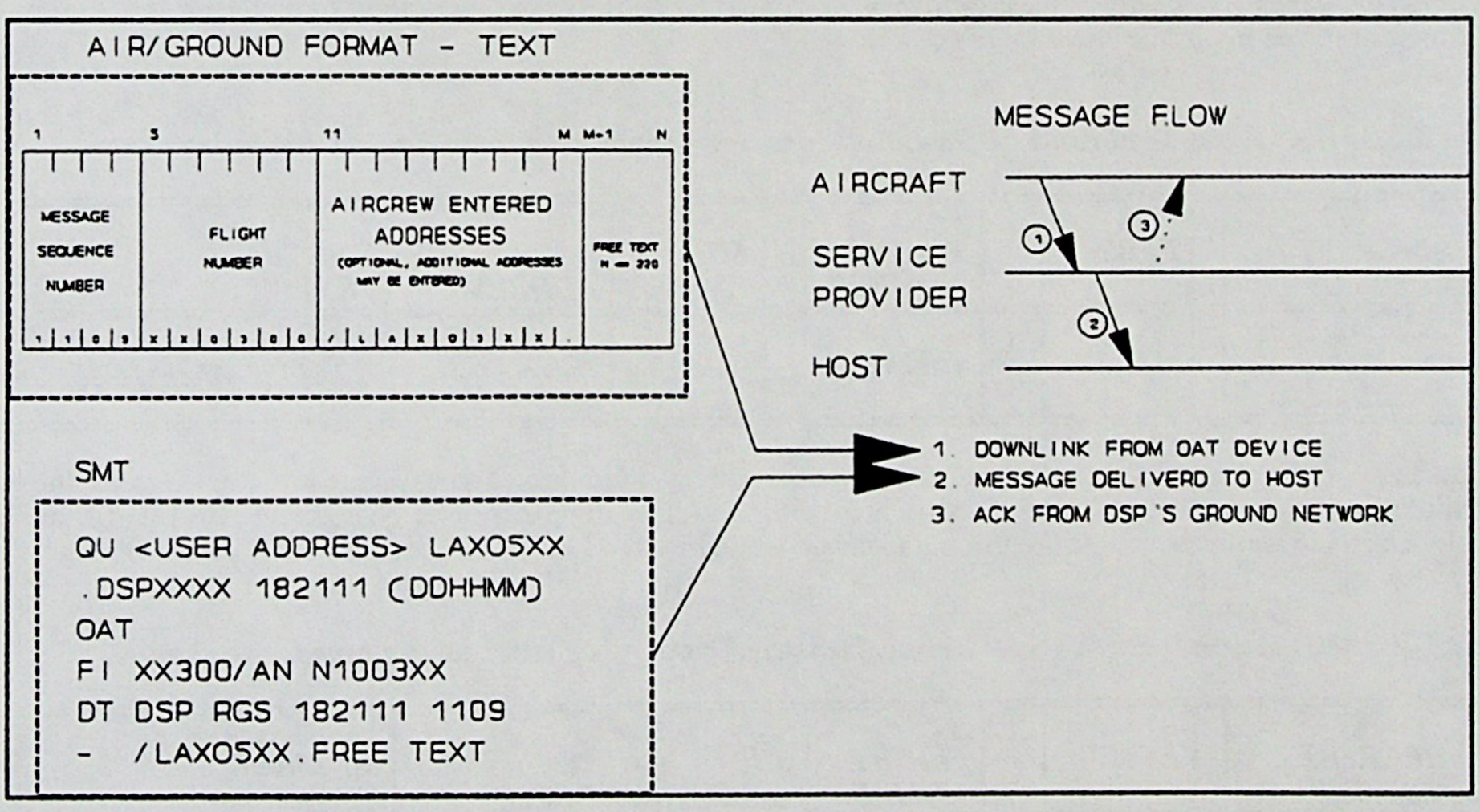
5.3.38 Avionics Subsystem Acting as and ACARS Peripheral Messages - Label H1 (cont'd)

c-1 ATS downlink messages are assigned the block of labels (and MFIs) B0 through BX. See Section 5.3.39 and above for the format of ATS downlink messages.

5.3.38.1 Messages from Airborne Subsystems: ARINC 597 ACARS - Label H1

c-1 The following Message 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.

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



c-1 **Figure 5.3.38.1-1 Downlink by Peripheral to ARINC 597 - ARINC Implementation**

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

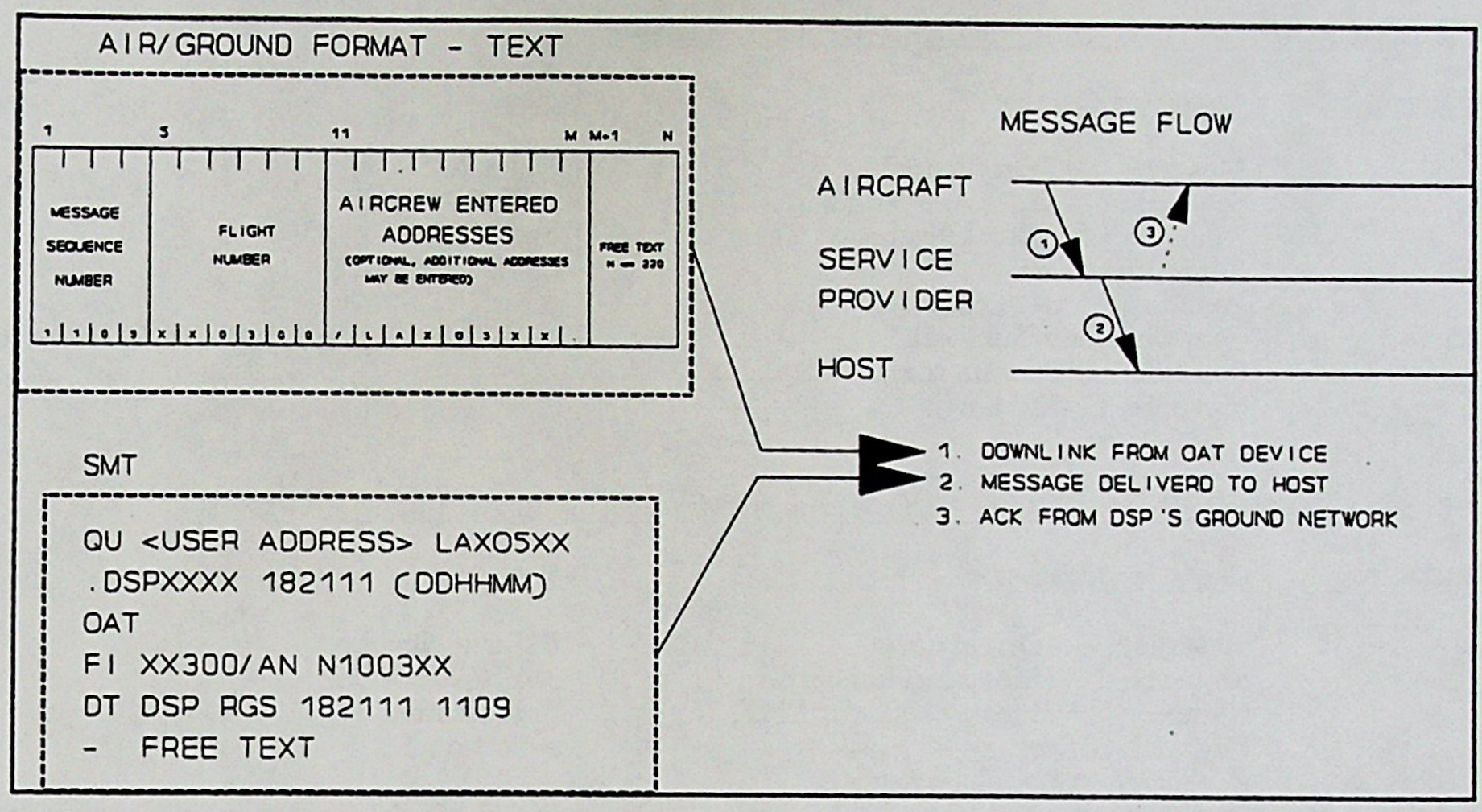


Figure 5.3.38.1-2 Downlink by Peripheral to ARINC 597 - SITA Implementation

5.3.38.2 Messages from Airborne Subsystems: ARINC 724 or 724B ACARS MU - Label H1

The Message Text fields of second and subsequent blocks of multi-block CFDIU, DFDAU, FMC and Cabin Terminal downlink messages will contain only the text portion of the message. The Message 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 a multiblock downlink will be terminated by the control character 'ETB'. The final block will be terminated with the control character 'ETX'. C-1

The variations of the possible formats of downlink messages generated by avionics subsystems are provided in the following subsections.

5.3.38.2.1 OAT - Simple H1 Message

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

5.3.38.2.2 OAT - H1 Message With Additional Addresses

Character No.	Character Content	Notes	
1	Message [Originator]	Refer to Section 3.4 of ARINC Specification 618	C-1
2-3	Sequence [Message Number]		
4	Number [Block Sequence Char]		
5-10	Flight Identifier;	See Section 5.2.1	
11	Slash Character </>		
12-m	Two character MFI and/or additional addresses. See Section 3.8.1.		
m+1	Period character <.>		
M+2-n	"Free Text" where n ≤ 220		

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

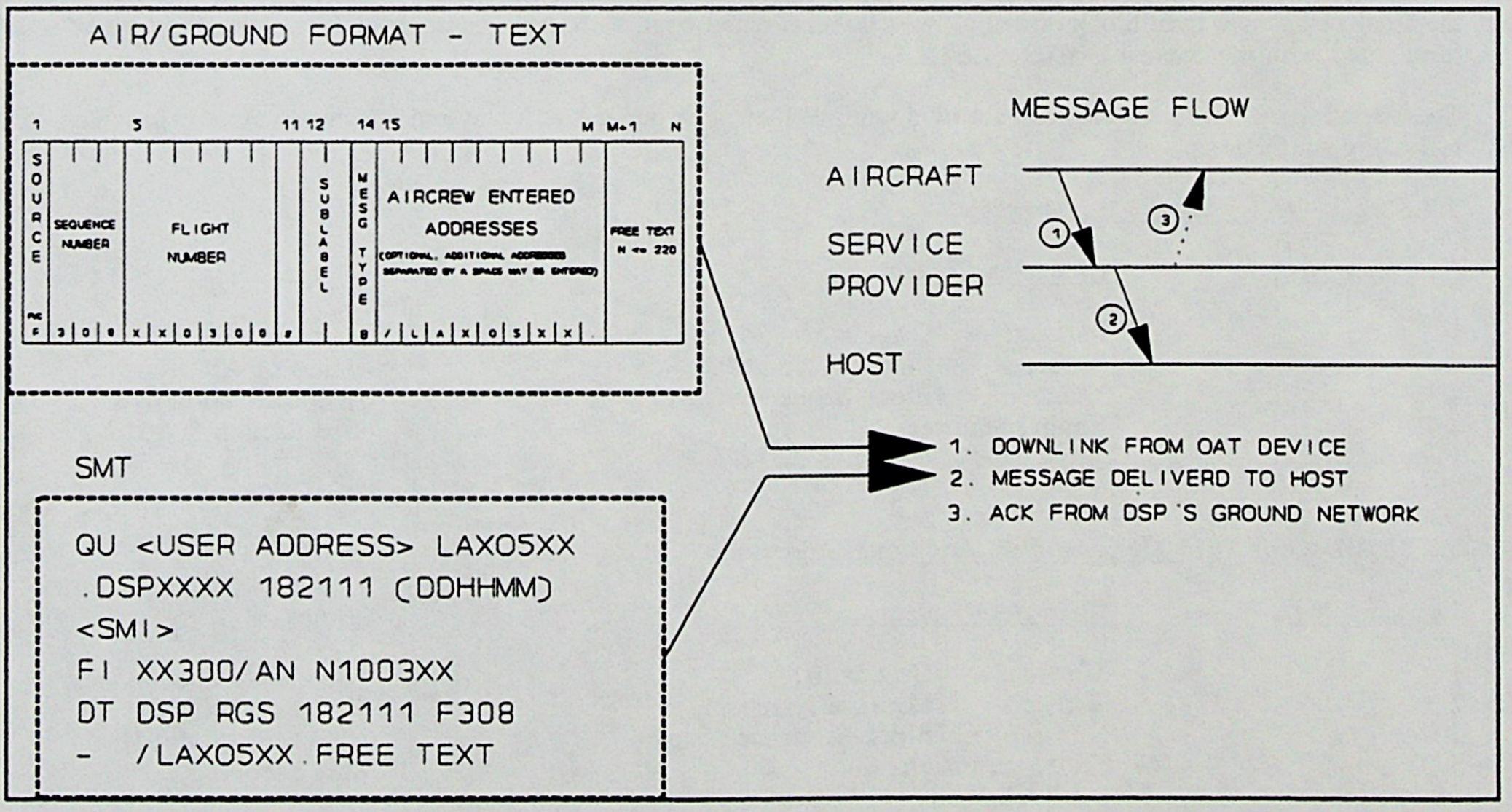
5.3.38.2.3 CFDIU, DFDAU, FMC or Cabin Terminal Messages

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 Char]	
5-10	Flight Identifier;	See Section 5.2.1
11	Pound sign <#> character	
12-13	Two Character Sublabel	See Table C-3 of Appendix C for assignments.
14	Reserved: Code with the character B	
15-n	"Free Text" where n ≤ 220	

C-1

5.3.38.2.4 CFDIU, DFDAU, FMC or Cabin Terminal Messages With Additional Addresses

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 Char]	
5-10	Flight Identifier;	See Section 5.2.1
11	Poundsign <#> character	
12-13	Two Character Sublabel	See Table C-3 of Appendix C for assignments.
14	Reserved:	Code with the character B
15	Slash Character </>	
16-m	Two-character MFI and/or additional seven-character addresses	The space character is used as a delimiter between the MFI and the addresses. The MFI applies to ATS messages only.
m+1	Period character <.>	
(m+2)-n	"Free Text" where n ≤ 220	



C-1

Figure 5.3.38.4-1 Messages to Avionics Subsystem - ARINC Implementation

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

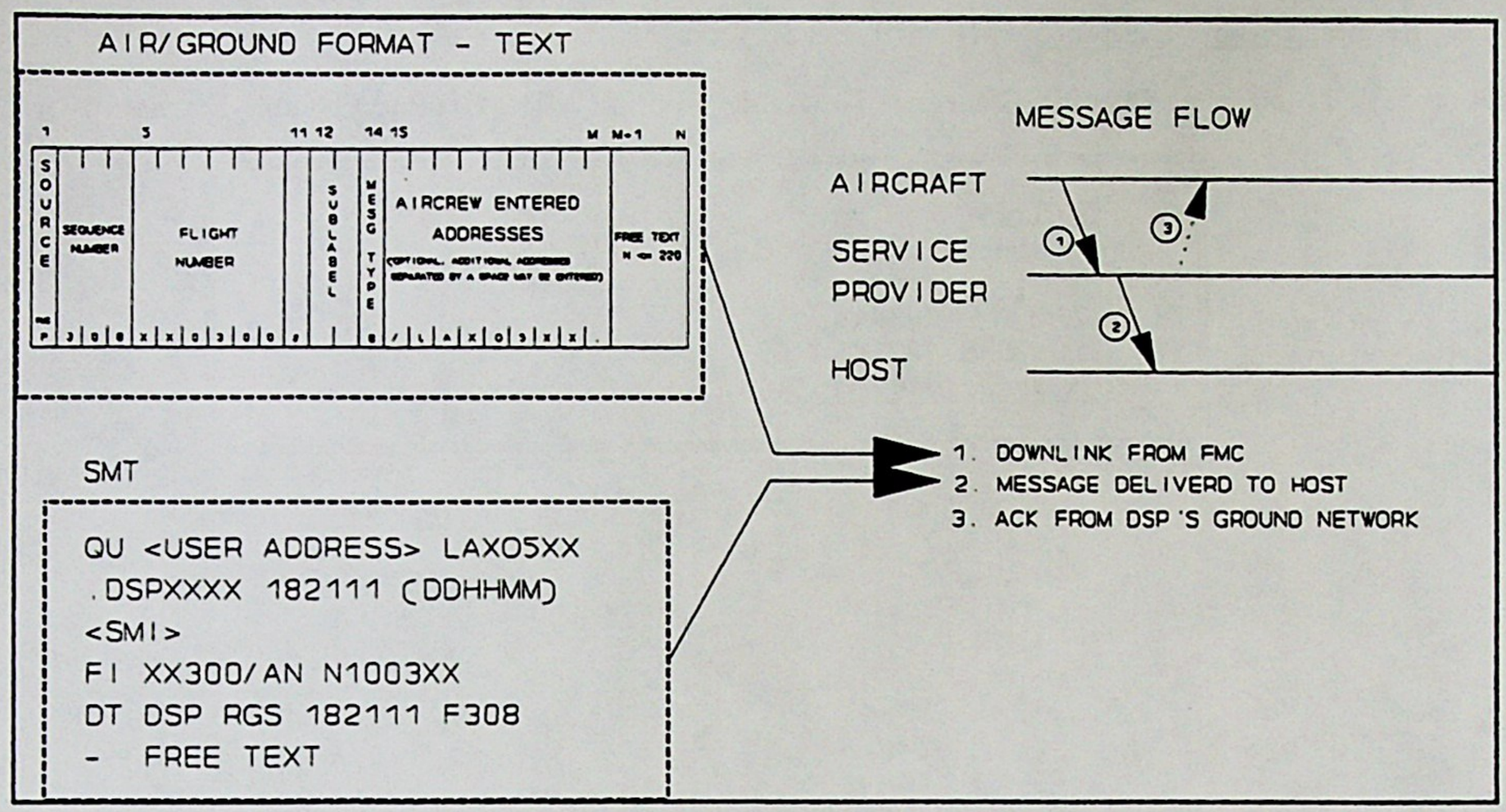


Figure 5.3.38.4-2 Messages to Avionics Subsystem - Implementation by Others

5.3.39 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 (or MFI) 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 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'. C-1

Refer to ARINC Specification 622 for the format of the character-oriented message and the definition of the process needed to transfer this message across the ACARS network. ARINC Specification 622 refers to RTCA DO-XXX for the format of the bit-oriented Request Oceanic Clearance application text.

Table 5.3.39-1A Request Oceanic Clearance Downlink from an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*MSN*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	B1	1109	xx1234	/PIKCLXS.	OCx *application text* CRC

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.39 Request Oceanic Clearance - MFI or Label B1 (cont'd)

Table 5.3.39-1B Request Oceanic Clearance Downlink from an MU - Ground/Ground Format

```
QU PIKCLXS
.DSPxxxx ddhhmm
RCL
FI xx1234/AN N1234x
DT  DSP  RGS  182111 1109
-    OCx application text CRC
```

Figure 5.3.39-1 Reserved

Table 5.3.39-2A Request Oceanic Clearance Downlink from an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*MSN*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	D10A	xx1234	DF	/B1 LAX05xx.	OCx *application text* CRC

Table 5.3.39-2B Request Oceanic Clearance Downlink from an Avionics Subsystem - Ground/Ground Format

```
QU PIKCLXS
.DSPxxxx ddhhmm
DFD
FI xx1234/AN N1234x
DT  DSP  RGS  182111 D10A
-    OCx application text CRC
```

Figure 5.3.39-2 Reserved

5.3.40 Acknowledge Oceanic Clearance - 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.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Following visual confirmation of an Oceanic Clearance uplink message, the Acknowledge Oceanic Clearance 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 Acknowledge Oceanic Clearance 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.

Refer to ARINC Specification 622 for the format of the Acknowledge Oceanic Clearance application text and for a definition of the process needed to transfer this message across the ACARS network. For the bit-oriented form of the Acknowledge Oceanic Clearance, ARINC Specification 622 refers to RTCA DO-xxx for the definition of the application text.

Table 5.3.40-1A Acknowledge Oceanic Clearance Downlink from an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*MSN*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	B2	1109	xx1234	/PIKCLXS.	OCx *application text* CRC

Table 5.3.40-1B Acknowledge Oceanic Clearance Downlink from an MU - Ground/Ground Format

```
QU PIKCLXS
.DSPxxxx ddhhmm
CLA
FI xx1234/AN N1234x
DT DSP RGS 182111 1109
- OCx application text CRC
```

C-1

Figure 5.3.40-1 Reserved

Table 5.3.40-2A Acknowledge Oceanic Clearance Downlink from an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*MSN*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	D10A	xx1234	DF	/B2 PIKCLXS.	OCx *application text* CRC

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.40 Acknowledge Oceanic Clearance - MFI or Label B2 (cont'd)

Table 5.3.40-2B Acknowledge Oceanic Clearance Downlink from an Avionics Subsystem - Ground/Ground Format

QU PIKCLXS .DSPxxxx ddhhmm DFD FI xx1234/AN N1234x DT DSP RGS 182111 D10A - OCx *application text* CRC

Figure 5.3.40-2 Reserved

C-1

5.3.41 Request Departure Clearance - MFI or Label B3

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.

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.

COMMENTARY

Please note that this message can be generated automatically by the ATC agency based on the planned departure time.

Refer to ARINC Specification 622 for the format of the application text and 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 below. The first set illustrate a Departure Clearance Request generated by the MU. The second set illustrate a Departure Clearance Request generated by an avionics subsystem.

Table 5.3.41-1A Request Departure Clearance Downlink from an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*MSN*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	B3	1109	xx1234	/LHRCLXS.	DCx *application text* CRC

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Table 5.3.41-1B Request Departure Clearance Downlink from an MU - Ground/Ground Format

```
QU LHRCLXS
.DSPxxxx ddhhmm
RCD
FI xx1234/AN N1234x
DT  DSP  RGS  182111 1109
-    DCx application text CRC
```

Table 5.3.41-2A Request Departure Clearance Downlink from an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	LABEL	MSN	FLIGHT NUMBER	SUB LABEL	USER ADDRESS	MESSAGE TEXT
.N1234x or .xx1234	H1	D10A	xx1234	M1	/B3 LHRCLXS.	DCx *application text* CRC

Table 5.3.41-2B Request Departure Clearance Downlink from an Avionics Subsystem - Ground/Ground Format

```
QU LHRCLXS
.DSPxxxx ddhhmm
FML
FI xx1234/AN N1234x
DT  DSP  RGS  182111 D10A
-    DCx application text CRC
```

C-1

Figure 5.3.41-1 Reserved

5.3.42 Acknowledge Departure Clearance Downlink - MFI or Label B4

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.

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.

Refer to ARINC Specification 622 for the format of the application text and 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 below. The first set illustrates an Acknowledge Departure Clearance downlink generated by the MU. The second set illustrates an Acknowledge Departure Clearance generated by an avionics subsystem.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.42 Acknowledge Departure Clearance Downlink - MFI or Label B4 (cont'd)

Table 5.3.42-1A Acknowledge Departure Clearance Downlink from an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*MSN*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	B4	1109	xx1234	/LAX05xx.	DCx *application text* CRC

Table 5.3.42-1B Acknowledge Departure Clearance Downlink from an MU - Ground/Ground Format

```
QU LAX05xx
.DSPxxxx ddhhmm
CDA
FI xx1234/AN N1234x
DT  DSP  RGS  182111 1109
-    DCx application text CRC
```

C-1

Figure 5.3.42-1 Reserved

Table 5.3.42-2A Acknowledge Departure Clearance Downlink from an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*MSN*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	D10A	xx1234	M1	/B4 LHRCLXS.	DCx *application text* CRC

Table 5.3.42-2B Acknowledge Departure Clearance Downlink from an Avionics Subsystem - Ground/Ground Format

```
QU LHRCLXS
.DSPxxxx ddhhmm
FML
FI xx1234/AN N1234x
DT  DSP  RGS  182111 D10A
-    DCx application text CRC
```

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Figure 5.3.42-2 Reserved

5.3.43 Provide Position Report - MFI or Label B5

This message may be generated by the MU or by an avionics subsystem onboard the aircraft. When received by the DSP as a downlink, this message is translated to the SMI 'PPR' in the ground/ground message if the message was generated by the MU. If the message was generated by a peripheral, an appropriate SMI is used. The processing is similar to the Label B1. The content of the message has not been defined yet to fit the normal ATC reporting. C-1

COMMENTARY

The "current/next position" and time are needed for oceanic position. Label 5R and 57 messages are not adequate for oceanic reporting because they do not contain this information.

Also, the proposed scheme of using the same definition as Labels 8x will cater to the requirement to forward oceanic position reports to many ATC centers. Finally, this message is generated either manually by the pilot or in reply to an A5 request.

Figure 5.3.43-1 Reserved

5.3.44 Provide ADS Reports - MFI or Label B6

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 from an MU, or the appropriate SMI if from a peripheral. The message is meant to be used by an aircraft operating in a non radar environment.

Refer to ARINC Specification 622 for the definition of the need for ADS and the process needed to transfer this message across the ACARS network. Refer to ARINC Characteristic 745 for the format of the application text. Both the air/ground and ground/ground form of the message are illustrated in the examples below. The first set illustrate an ADS downlink generated by the MU. The second set illustrate an ADS downlink generated by an avionics subsystem. C-1

Table 5.3.44-1A ADS Downlink Generated by an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	B6	xx1234	/PIKxxxx.	ADx *application text* CRC

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.44 Provide ADS Reports - MFI or Label B6 (cont'd)

Table 5.3.44-1B ADS Downlink Generated by an MU - Ground/Ground Format

```
QU PIKxxxx
.DSPxxxx ddhhmm
PAR
FI xx1234/AN N1234x
DT  DSP  RGS  182111 1109
-    ADx application text CRC
```

Figure 5.3.44-1 Reserved

Table 5.3.44-2A ADS Downlink Generated by an Avionics Subsystem - Air/Ground Format

C-1

		AIRCRAFT ADDRESS		*LABEL*			*MSN*	*FLIGHT NUMBER*		*SUB LABEL*		*USER ADDRESS*	*MESSAGE TEXT*
		.N1234x or .xx1234		H1			D10A	xx1234		M1		/B6 PIKxxxx.	ADx *application text* CRC

Table 5.3.44-2B ADS Downlink Generated by an Avionics Subsystem - Ground/Ground Format

```
QU PIKxxxx
.DSPxxxx ddhhmm
FML
FI xx1234/AN N1234x
DT  DSP  RGS  182111 D10A
-    ADx application text CRC
```

Figure 5.3.44-2 Reserved

5.3.45 Forward Free Text to ATC - MFI or Label B7

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. The Forward 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 5.3.49.).

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Figure 5.3.45-1 Reserved

C-1

5.3.46 Request Departure Slot - MFI or Label B8

This message, generated by the pilot, is translated to SMI 'RDS' by the service provider. The processing is similar to the label 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.

Figure 5.3.46-1 Reserved

5.3.47 Request ATIS Information - MFI or Label B9

This message, generated by the aircraft, is translated to SMI 'RAI' by the service provider if from an MU, or the appropriate SMI if from a peripheral. Refer to ARINC Specification 622 for the format of the application text. Both the air/ground and ground/ground form of the message are illustrated by the examples below. The first set illustrate an ATIS Request generated by the MU. The second set illustrate an ATIS Request generated by an avionics subsystem.

COMMENTARY

C-1

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.

Table 5.3.47-1A ATIS Request Downlink Generated by the MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	B9	xx1234	/LAX05xx.	TIx *application text* CRC

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.47 Request ATIS Information - MFI or Label B9 (cont'd)

Table 5.3.47-1B ATIS Request Downlink Generated by the MU - Ground/Ground Format

```
QU LAX05xx
.DSPxxxx ddhhmm
RAI
FI xx1234/AN N1234x
DT  DSP  RGS  182111 1109
-    TIx application text CRC
```

Figure 5.3.47-1 Reserved

Table 5.3.47-2A ATIS Downlink Generated by an Avionics System - Air/Ground Format

C-1

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	xx1234	M1	/B9 LAX05xx.	TIx *application text* CRC

Table 5.3.47-2B ATIS Request Downlink Generated by an Avionics System - Ground/Ground Format

```
QU LAX05xx
.DSPxxxx ddhhmm
FML
FI xx1234/AN N1234x
DT  DSP  RGS  182111 D10A
-    TIx application text CRC
```

Figure 5.3.47-2 Reserved

5.3.48 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. Refer to ARINC Specification 622 for the format of the AFN application text. 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.

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Table 5.3.48-1A AFN Downlink from an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	B0	xx1234	/LAX05xx.	AFx *application text* CRC

Table 5.3.48-1B AFN Downlink from an MU - Ground/Ground Format

```
QU LAX05xx
.DSPxxxx ddhhmm
AFD
FI xx1234/AN N1234x
DT  DSP  RGS  182111 1109
-    AFx application text CRC
```

C-1

Figure 5.3.48-1 Reserved

Table 5.3.48-2A AFN Downlink from an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	xx1234	M1	/B0 LAX05xx.	AFx *application text* CRC

Table 5.3.48-2B AFN Downlink from an Avionics Subsystem - Ground/Ground Format

```
QU LAX05xx
.DSPxxxx ddhhmm
FML
FI xx1234/AN N1234x
DT  DSP  RGS  182111 D10A
-    AFx application text CRC
```

Figure 5.3.48-2 Reserved

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

5.3.49 ATCComm - 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. This message type covers a list of at least 100 possible interactions between the controller and the pilot. Refer to RTCA DO-XXX for the format of the ATCComm application text. Refer to ARINC Specification 622 for information on processing of the ATCComm message for transfer across the ACARS network.

Both the air/ground and ground/ground forms of the message are illustrated by the examples below. The first set illustrate an ATCComm message downlink generated by the MU. The second set illustrate an ATCComm message generated by an avionics subsystem.

Table 5.3.49-1A ATCComm Downlink Generated by an MU - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	BA	xx1234	/LAX05xx.	ATx *application text* CRC

Table 5.3.49-1B ATCComm Downlink Generated by an MU - Ground/Ground Format

c-1

```
QU LAX05xx
.DSPxxxx ddhhmm
ATC
FI xx1234/AN N1234x
DT DSP RGS 182111 1109
- ATx application text CRC
```

Figure 5.3.49-1 Reserved

Table 5.3.49-2A ATCComm Downlink from an Avionics Subsystem - Air/Ground Format

AIRCRAFT ADDRESS	*LABEL*	*FLIGHT NUMBER*	*SUB LABEL*	*USER ADDRESS*	*MESSAGE TEXT*
.N1234x or .xx1234	H1	xx1234	M1	/BA LAX05xx.	ATx *application text* CRC

5.0 DOWNLINK MESSAGE TEXT FIELD FORMATS (cont'd)

Table 5.3.49-2B ATCComm Downlink from an Avionics Subsystem - Ground/Ground Format

```
QU LAX05xx
.DSPxxxx ddhhmm
FML
FI xx1234/AN N1234x
DT  DSP  RGS  182111 D10A
-   ATx application text CRC
```

C-1

Figure 5.3.49-1 Reserved

C-1

5.3.50 Reserved - MFI or Label BB

This Section is a placeholder for a future assignment.

5.3.51 Reserved - MFI or Label BC

This Section is a placeholder for a future assignment.

5.4 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
1	Message [Originator]	Refer to Section 3.4 of ARINC Specification 618
2-3	Sequence [Message Number]	
4	Number [Block Sequence Char]	
5-10	Flight Identifier;	See Section 5.2.1
11 thru n	"Free Text" where ≤220.	

C-1

6.0 SERVICE LEVEL STANDARDS

6.1 Introduction

The intent of this section is to describe some methods that datalink service providers may use to judge the performance of their datalink 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 datalink user and the datalink 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 datalink environment is critical to the daily operations of datalink service users. Therefore it is imperative to ensure that messages reach their ultimate destination in a timely fashion.

Note: The datalink ground system is currently defined without a priority scheme (although ARINC and SITA treats voice/data switchover messages with a higher priority than normal traffic).

Since datalink service providers may have varying network designs (ground networks size, multiple datalink processors, centralized versus distributed networks), datalink 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 following transit times are of great concern and will therefore be discussed in more detail in the sections below: uplink (Host-> SP-> 1st block to ACFT), multi-block uplink (Delays between uplink blocks), single block downlinks (ACFT-> SP-> Host), multi-block downlink (Delays between downlink blocks).

Note: Transit times for messages of any length can be derived from the information provided in the following sections.

6.2.1 First Block Uplink Message Transit Times

The uplink message transit time is the amount of time required for the first block of a message to be received by the aircraft after the entire message was sent by the datalink user (User-> Aircraft).

6.2.2 Multi-Block Uplink Transit Times

Multi-block uplink transit times include all retransmission and network delays from the time the Nth block is sent by the service provider until the time that the service provider sends out block N+1 (assuming an ack is sent by the aircraft and received by the SP, no channel congestion, and the aircraft response time is negligible).

6.2.3 Single Block Downlink Transit Times

Single block downlink transit times are measured from the time that the ground system receives the downlink message until the time that the datalink user (or airline host) receives the message.

6.2.4 Multi-Block Downlink Transit Times

Since the service provider waits until all blocks of a downlink message are received before forwarding to the end user, the air/ground transit time for each block must be taken into consideration to establish end-to-end transit times for downlink messages of any length. Please refer Appendix D and section 3.2.2 for details concerning missing air/ground blocks and time-out rules.

Multi-block downlink transit times are measured from the time that the aircraft sends the Nth downlink block until the aircraft sends the block N+1 (Assuming no congestion on the RF, the aircraft is in range of a ground station, and the aircraft response time is negligible). This time will include any network transit delays and built in system delays.

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 - (total time of outage)/(total operating time) times 100 percent.

Network availability is the most critical form of measurement a service provider will provide to its datalink 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 datalink processor(s) and the ground communications network.

The central datalink processor(s) is responsible for the management of all datalink system transactions. As a result, the availability requirement for the central datalink processor(s) is 100 percent.

The availability of the ground communications network is based on the interface with the central datalink processor(s) and the datalink ground users. The DSP is responsible for ensuring constant communications between the ground communications network and the central datalink processor(s). However, it is the ground users responsibility to supply redundant ground communications network connections.

6.3.2 Ground Stations

In terms of availability, a ground station is considered a VHF radio controller which manages a single channel.

6.0 SERVICE LEVEL STANDARDS (cont'd)

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:

1. Redundancy - In order to ensure maximum reliability, the critical airport consists of more that 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.

2. Power - In order to ensure continuous power, a system of uninterruptable power supplies can be installed.

3. 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.

4. 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 datalink 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

3. ARINC Characteristic 597-8 (February 1988), Aircraft Communications Addressing and Reporting System (ACARS)

4. ARINC Characteristic 724-8 (March 1989), Mark 2 Aircraft Communications Addressing and Reporting System (ACARS)

5. ARINC Characteristic 724B-1, (January 1991), Aircraft Communications Addressing and Reporting System (ACARS)

6. ARINC Specification 429-14, (March 1993), Mark 33 Digital Information Transfer System (DITS)

7. ARINC Characteristic 741P1-4, (June 1992), Aviation Satellite Communications System

8. ARINC Characteristic 741P2-1, (July 1992), Satellite Communications System

9. ATA/IATA Interline Communications Manual, Doc/Gen/1840 Rev 8, October 1, 1987

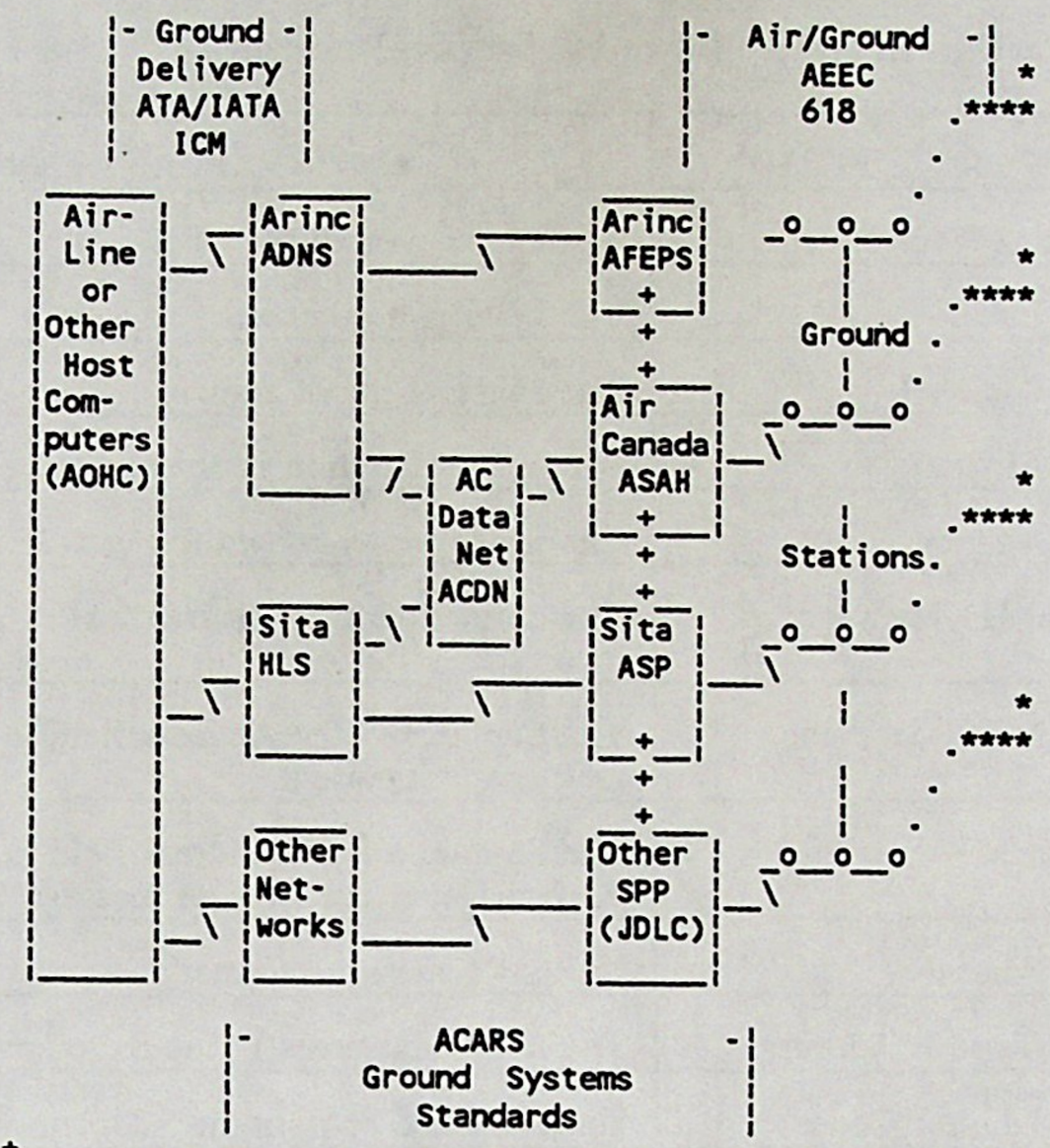
10. ARINC Specification 618 (January 1993), Air-Ground Character-Oriented Protocol Specification

11. ARINC Specification 619 (Adoption pending), ACARS Protocols for Avionic End Systems

12. ARINC Specification 622 (January 1993), Processes for ATS Data Link Applications Over ACARS Air-Ground Network

c-1 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. Although specific identification is used in the list above, 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



+

+ = Functional depiction only of internetworking concepts

+

ATTACHMENT 2
SERVICE MESSAGES - REASON CODES

c-1| **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
c-1| 115	Unknown Agency	The agency is unknown to the DSP	4
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 Letter Code	Unconfigured code in the Supplementary Address field	
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	

⟨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.

c-1| ⟨4⟩ Supported only by ARINC.

ATTACHMENT 2 (cont'd)
SERVICE MESSAGES - REASON CODES

Table 2-2 Reason codes for Untransmittable Uplink Services Messages |c-1

Untransmittable Uplink Service Messages		
Nr	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
241	Unable to process - Message too old	Message delayed in Ground Network

ATTACHMENT 2 (cont'd)
SERVICE MESSAGES - REASON CODES

c-1| **Table 2-3 Reason Code for Undeliverable Uplink Service Messages**

Untransmittable Uplink Service Messages		
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 Summ incorrect
332	Q5 RJCT	ACARS MU unable to deliver message to final airborne destination

APPENDIX A
GLOSSARY & ACRONYMS

ACARS	Aircraft Communication Addressing and Reporting System
ACDN	Air Canada Data Network
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
AOHC	Airline or Other Host Computer
ARA	ACARS Restoral Advisory
ARINC	Aeronautical Radio, Incorporated
ASA	ACARS Station Addition
ASD	ACARS Station Deletion
ASP	AIRCOM Service Processor
ATA	Air Transport Association
ICM	Interline Communications Manual
CFDIU	Central Fault Display Indicator Unit
CMU	Communicating Management Unit
CSMA	Carrier Sense/Multiple Access Protocol
DBI	Downlink Block Identifier
DFDAU	Digital Flight Data Acquisition Unit
DMU	Data Management Unit
DSP	Data Link Service Provider
DSU	Data Link Service User
FMC	Flight Management Computer
FMGC	Flight Management and Guidance Computer
FMS	Flight Management System
FWC	Flight Warning Computer
GSN	Ground Station Network
HLS	High Level System
IATA	International Air Transport Association
MCDU	Multi-Function-Control Display Unit
MFI	Message Function Identifier
MODE S	Mode Select Transponder
MTD	Message Text Delimiter
MU	Management Unit
OAT	Optional Auxiliary Terminal
RGS	Remote Ground Station
SDAC	System Data Acquisition Concentrator
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
TCAS	Traffic Alert/Collision Avoidance System
TEI	Text Element Identifier
UBI	Uplink Block Identifier
UDM	User Defined Message

APPENDIX B
SECTION B.1
SMI CODES

An SMI is a three-letter code used at the beginning of the SMT to uniquely identify the type of SMT. The following SMIs are approved for use in ground-to-ground, air-to-ground, and ground-to-air operations; flight plans; and meteorological messages:

Code	Title
Axx	Aircrew-addressed downlink message, where xx is the label of a user-defined function (80-8~)
AEP	Position report with weather
AGM	Miscellaneous air-ground message
AID	Airborne instrumentation data system
ALR	Alerting message
ARI	Fuel/close-out report
ARR	Arrival
AUD	ADS (Selected ADSU)
c-1 AUL	ADS (Left ADSU)
AUR	ADS (Right ADSU)
AVR	Aircrew-originated voice request
CFD	Centralized Fault Display System
CHO	Changeover or in-range report
CLA	Flight Clearance
CLK	Airborne GMT clock request
CLR	Flight clearance
CMD	ACARS avionics memory load or diagnostic function
CNL	Cancellation of flight
CPL	Current flight plan
c-1 CPn	Cockpit/Cabin Printer Message, where n is Printer Designator 0 thru 9.
DEP	Departure
DFD	Digital flight data acquisition unit
DIV	Aircraft diversion message
DLA	Flight delay
c-1 ECS	Engine Display System
ENG	Aircraft engine data
ETA	Estimated time of arrival
ETR	Aircrew-initiated revision to previously advised estimated time of arrival
FAM	Flight movement advisory
FML	Flight management computer--left
FMR	Flight management computer--right
FMD	Flight management computer--designated
FPL	Filed flight plan
FPR	Aircraft-originated request for flight plan update via ACARS
FPU	Ground-originated flight plan update to aircraft via ACARS
GVR	Ground-originated voice request
HJK	Aircraft hijacked
LIF	Ground-originated aircraft load information
MNT	Aircraft maintenance message
MVA	Aircraft-generated movement report
Mxx	Miscellaneous user-defined message, where xx is the label of a user-defined function (10-4~)
Nxx	Miscellaneous user-defined message, where xx is the sublabel of a user-defined function (10-4~)
OAT	Airborne optional auxiliary data terminal/device message starting with ATA/IATA address of the message originator
OAX	Airborne optional auxiliary data terminal/device message starting with free text
PDM	Possible duplicate message
POS	Position report without weather
PSN	Aircrew-initiated position report with/without weather information
RDO	ACARS avionics memory readout
c-1 REJ	Undelivered Uplink
RTN	ACARS-equipped aircraft return to gate
SPL	Supplemental flight plan
SVC	Communications service message
THR	Aircrew initiated or auto-sensed takeoff thrust
TIS	Airport terminal information service
WXO	Weather observation report
WXR	Weather observation request
QTB	Incomplete message

APPENDIX B (cont'd)
SECTION B.2
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:

Code	Title (Text Element Form)
-<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	Aerodome of concern or arrival (three or four alpha characters) ATA/IATA = three alpha characters ICAO = four alpha characters
AL	Altitude or flight level (four, five, or six alphanumeric characters) - Character "A" plus three numeric characters = altitude to nearest 100 feet - Character "F" plus three numeric characters = flight level to nearest 100 feet - Character "M" plus four numeric characters = altitude to nearest 10 meters - 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) - Character "A" plus three numeric characters = altitude to nearest 100 feet - Character "F" plus three numeric characters = flight level to nearest 100 feet - Character "M" plus four numeric characters = altitude to nearest 10 meters

APPENDIX B (cont'd)
SECTION B.2
TEI CODES

Code	Title (Text Element Form)
CZ	Cruising speed (six alphanumeric characters--speed in knots; five alphanumeric characters-speed stated in a MACH number) KTxxxx = knots Mx.xx = MACH number Where x is a numeric character
DA	Aerodrome of departure (three or four alpha characters) ATA/IATA = three alpha characters ICAO = four alpha characters
DP	Dew point (two numeric characters--degrees Celsius)(Downlink only)
DS	Destination station (three or four alpha characters and, optionally, a space character and four numeric characters--aerodrome of departure and, optionally, UTC hhmm) ATA/IATA = three alpha characters ICAO = Four alpha characters
DT	Communication service information (variable alphanumeric characters) ACARS message received and processed: DSP sit ddhhmm mmss

Where:

DSP	indicates DSP processed the message
sit	the airport or city designator of the ACARS site from which the message was received (three or four alpha characters)
ddhhmm	the date/time the message was received (six numeric characters where dd = day of the month and hhmm = time UTC)
mmss	message sequence number as received from the aircraft; if message is generated by the management unit, the sequence number consists of minutes and seconds

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) ATA/IATA = three alpha characters ICAO = four alpha characters
EN	Endurance (four numeric characters--fuel endurance in hours and minutes, hhmm)

APPENDIX B (cont'd)
SECTION B.2
TEI CODES

Code	Title (Text Element Form)
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	Time in (four numeric characters--UTC hhmm)
LA	Identification of officer landing aircraft (one numeric character)
LR	Identification landing category (one numeric character)
MA	Message assurance (three numeric characters and one alpha character--sequence number and function, nnn) Where nnn is a sequence number, 000-999, and a is an alpha character indicating the function of the text element: G = originator's go-ahead response L = return link acknowledgment O = originating message U = user's acknowledgment
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	Time off (four numeric characters--UTC hhmm
ON	Time on (four numeric characters--UTC hhmm)
OS	Other supplementary information (variable alphanumeric characters)

APPENDIX B (cont'd)
SECTION B.2
TEI CODES

Code	Title (Text Element Form)
OT	Time out (four numeric characters--UTC hhmm)
OV	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) - Character "A" plus three numeric characters = altitude to nearest 100 feet - Character "F" plus three numeric characters = flight level to nearest 100 feet - Character "M" plus four numeric characters = altitude to nearest 10 meters
PB	Number of persons on board (variable alphanumeric characters--ATA/IATA; variable numerics--ICAO)
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)
SA	Alternative aerodrome (three character sequence(s)-- ATA/IATA; four character sequence(s)-- ICAO) (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) MSxx = temperature in degrees below zero, Celsius (-xx C) PSxx = temperature in degrees above zero, Celsius (xx C) Where xx is two numeric characters.

APPENDIX B (cont'd)
SECTION B.2
TEI CODES

Code	Title (Text Element Form)
TB	Turbulence (variable alphanumeric characters)
TM	Surface air temperature (two alpha characters and two numeric characters) MSxx = temperature in degrees below zero, Celsius (-xx C) PSxx = temperature in degrees above zero, Celsius (xx C) Where xx is two numeric characters.
TO	Time over (variable number of alphanumeric characters, space character, and four numeric characters--location and UTC hhmm)
TP	Tramsission Path - Indicate to the DSP which service provider
VR	Runway visual range (up to three numeric characters--visualrange in 30- to 60-meter increments for ranges to 800 meters; three numeric characters--visual range in 100-meter increments for ranges greater than 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) 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)
ZW	Zero fuel weight (variable alphanumeric 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 MS29 indicates that the static air temperature is 29 below zero, Celsius.

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.

APPENDIX B (cont'd)
SECTION B.3
RULES FOR SMI/TEI APPLICATION

The rules listed in this section apply to the use of standard message identifiers and text element identifiers in standard message text.

Note: 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.

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 solidus character (/) without any intervening spaces as shown in the following example:

   FI XX110/AN N69740/DA IAH/OT 1936/FB 00000/FB 0268<CR><LF>

7. In the forming of messages, TEIs need not appear in any fixed order with the following exceptions:

   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 <CR><LF> sequence that ends the line containing the SMI.

   b. When present, the following TEIs must appear at the beginning of a line of structured text. That is, these TEIs must immediately follow a <CR><LF> sequence.

      TA static air temperature
      MA message assurance

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.

APPENDIX B (cont'd)
SECTION B.3
RULES FOR SMI/TEI APPLICATION

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.

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
SMI INFORMATION

Table C-1 SMI List by SMI

SMI	LABEL/ SUB-LABEL ①	UPLINK/ DOWNLINK	DESCRIPTION	SOURCE
A80	80	DN	Aircrew-Addressed Downlink Messages	A,S,C,J
to	to	DN	Aircrew-Addressed Downlink Messages	A,S,C,J
A8~	8~	DN	Aircrew-Addressed Downlink Messages	A,S,C,J
AAM	None	G/G	ACARS Station Advisory Messages	A
AEP	5R	DN	Aircrew Initiated Position Report	A,S
AEP	57	DN	Alternate Aircrew Initiated Pos. Report	S
AGM		U/D	Air/Ground Message (Command/Response)	A
AGM	5Z	DN	Airline Designated Downlink Report	S,J,C
AGM	52		Miscellaneous Air-Ground Message	C
AID		N/A	Airborne Instrumentation Data System	A
ALR		N/A	Alerting Message	A
ABM	7B	DN	Aircrew Entered Misc. Report	S,C,J
C-1 AFD	B0	DN	ATS Facility Notification	
AFU	A0	UP	ATS Facility Notification	
AGM	C1		Cockpit Printer Message	S,C,J
AOA		G/G	ACARS Station(s) Outage Advisory	A
AOS		G/G	ACARS Station(s) Outage Status Advisory	A
ARA		G/G	ACARS Station(s) Restoral Advisory	A
ARI		N/A	Fuel/Close-out Report	A
ARR	QL	DN	Arrival Information Report	S
ARR	Q1	DN	Departure/Arrival Report	S,J
ARR	QC	DN	ON Report	S,C,J
ARR	QD	DN	IN/Fuel Report	S,J
ARR	QK	DN	Landing Report	S
ARR	QM	DN	Arrival Information Report	S
ASA		G/G	ACARS Station(s) Addition	A
ASD		G/G	ACARS Station(s) Deletion	A
ATC	AA	UP	ATCComm	
C-1 ATC	BA	DN	ATCComm	
C-1 AUD	H1/AD	UP	ADS (To selected ADSU)	
AUL	H1/A1	UP	ADS (To left ADSU)	
AUR	H1/A2	UP	ADS (To right ADSU)	
AVR	54	DN	Aircrew Originated Voice Contract Request	A,S
CDA	B4	DN	Acknowledge Departure Clearance	S
CFD	H1/CF	U/D	Central Fault Display	A,S,C,J
CFX	H1/CF	UP	Central Fault Display (No Header)	A,S
CHO		UP	Changeover or In-Range Report	A,S
CLA		U/D	Flight Clearance	A
CLA	A2		Unassigned	
CLA	B2	DN	Readback Oceanic Clearance	S
CLD	A3	UP	Departure Clearance	S
CLK	Q3	DN	Clock Update Advisory	A,S
CLK	Q3	DN	Airborne GMT Clock Request	C,J
CLR		U/D	Flight Clearance	A
CLX	A1	UP	Deliver Oceanic Clearance	S
CMD	RA	UP	Avionics Memory Load or Diagnostic Function	A
CMD	RA		Command/Response Uplink	S,J,C
CMD	RA	UP	ACARS Avionics Memory Load/Diagnostic Function	C
CNL	None	N/A	Cancellation of Flight	A

LEGEND:

A = ARINC	DN = Downlink
C = AIR CANADA	UP = Uplink
J = AVICOM, JAPAN	G/G = Ground to Ground
S = SITA	N/A = Not Applicable

C-1 ① The 2-character sequences A0 thru AA and B0 thru BA are designated for ATS applications. These characters are used as labels for ATS messages to/from an ACARS MU, and as Message Function Identifiers (MFIs) for ATS messages to/from an ACARS peripheral.

APPENDIX C (cont'd)
SMI INFORMATION

Table C-1 SMI List by SMI (cont'd)

SMI	LABEL/ SUB-LABEL ①	UPLINK/ DOWNLINK	DESCRIPTION	SOURCE	
CPL	None	N/A	Current Flight Plan	A	
CP0	C0	UP	Cockpit/Cabin Printer Messages	A,S,C,J	
to	to	UP	Cockpit/Cabin Printer Messages	A,S,C,J	C-1
CP9	C9	UP	Cockpit/Cabin Printer Messages	A,S,C,J	
DAI	A9	UP	Deliver ATIS Information	S	
DDS	A8	UP	Deliver Departure Slot	S	
DEP		DN	Departure Report	A	
DEP	Q1	DN	Departure/Arrival Report	S,J	
DEP	QA	DN	OUT/Fuel Report	S,J	
DEP	QB	DN	OFF Report	S,J	
DEP	QE	DN	OUT/Fuel/Destination Report	S,J	
DEP	QF	DN	OFF/Destination Report	S,J	
DEP	QH	DN	OUT Report	S	
DEP	QA	DN	Departure	C	
DEP	Q1	DN	Departure	C	
DFD	H1/DF	U/D	Digital Flight Data Acquisition Unit	A,S,C,J	
DFX	H1/DF	UP	Digital Flight Data Acquisition Unit (No Header)	A,S	
DIV		DN	Aircraft Diversion Message (Load	A	
DIV	QN	DN	Diversion Report	S	
DLA	Q7	DN	Delay Report	A,S,C,J	
ECS	H1/EC	DN	Engine Display System	A,S,C,J	
ENG	H1/EI	DN	Engine Report	A,S,C,J	
ENG	7A	DN	Aircrew Initiated Engine Report	S,C,J	
ETA	Q2	DN	Estimated Time of Arrival Report	A,C,J	
ETA	5Y	DN	Revision to Previous ETA/DIV Report	S,J	
ETR		N/A	Aircrew-Initiated Revision to Previously Advised Estimated Time of Arrival	A	
FAM	H1/MD	N/A	Flight Movement Advisory	A	
FCD	H1/M1	UP	Flight Management Computer	A	
FCL	H1/M2	UP	Flight Management Computer Left	A	
FCR		UP	Flight Management Computer Right	A	
FMD	H1/MD	U	Selected Flight Management Computer (No Header)	A,S,C,J	
FML	H1/M1	U/D	Flight Management Computer Left (No Header)	A,S,C,J	
FMR	H1/M2	U/D	Flight Management Computer Right (No Header)	A,S,C,J	
FPL		N/A	Filed Flight Plan	A	
FPR		N/A	Aircrew-Originated Request for Flight Plan Update	A	
FPU		N/A	Ground-Originated Flight Plan Update to Aircraft	A	
FTD	B7	DN	Forward Free Test to ATC	S	
FTU	A7	UP	Forward Free Text to ACFT	S	
GVR	54	UP	Ground Voice Request	A	
GVR	54	UP	Voice Go-ahead	S,C,J	
GVR	54	DN	Ground Party Address	S,C,J	
HJK	00	DN	Emergency Situation Report (Aircraft Hijack)	A,S,C,J	
LIF		UP	Ground-Originated Aircraft Load Information	A	
MAS					C-1
MNT		N/A	Aircraft-Maintenance Message	A	
MVA		DN	Aircraft-Generated Movement Report	A	
MVA	M1	DN	IATA Movement Report: Departure	S	

LEGEND:

A = ARINC	DN = Downlink
C = AIR CANADA	UP = Uplink
J = AVICOM, JAPAN	G/G = Ground to Ground
S = SITA	N/A = Not Applicable

① The 2-character sequences A0 thru AA and B0 thru BA are designated for ATS applications. These characters are used as labels for ATS messages to/from an ACARS MU, and as Message Function Identifiers (MFIs) for ATS messages to/from an ACARS peripheral. C-1

APPENDIX C (cont'd)
SMI INFORMATION

Table C-1 SMI List by SMI (cont'd)

	SMI	LABEL/ SUB-LABEL	① UPLINK/ DOWNLINK	DESCRIPTION		SOURCE
	MVA	M2	DN	IATA Movement Report: Arrival		S
	MVA	M2	DN	User Defined Messages		A,S,C
C-1	MVA	M3	DN	IATA Movement Report: Rtn to Ramp		S
	MVA	M4	DN	IATA Movement Report: Rtn from Airborne		S
	M10	10/None	U/D	User Defined Messages		A,S,C,J
	to	to	U/D	User Defined Messages	Header	A,S,C,J
	M4~	4~	U/D	User Defined Messages		A,S,J
	MVT		DN	Flight Movement		A
	N10	H1/10		User Defined Messages		A,S,C,J
	to	to		User Defined Messages	No Header	A,S,C,J
	N4~	H1/4~		User Defined Messages		A,S,C,J
	NOA	H1/None		Meteorological Data		S,C,J
	OAT	H1/Any	U/D	Optional Auxiliary Terminal Message		A,S,C,J
	OAT	H1/PS	U/D	Keyboard/Display Unit		S,C
	OAT	H1/Any	U/D	Optional Auxiliary Terminal		S
	OAT	H1/None	UP	Optional Auxiliary Terminal		S
	OAX	H1/Any	UP	Optional Auxiliary Terminal Message (No Header)		A,S
	OAX	H1/None		Optional Auxiliary Terminal		S
	PAR	B6	DN	Provide ADS Reports		S
	PDM		G/G	Possible Duplicate Message		A
	POS		N/A	Position Report Without Weather		A
	PPR	B5	DN	Provide Position Report		S
	PSN		N/A	Aircrew-Initiated Position Report with/without Weather Information		A
	QTB		G/G	Incomplete Message		A
	RAI	B9	DN	Request ATIS Information		S
	RAR	A6	UP	Request ADS Reports		S
C-1	RCA	A4	UP	Acknowledge Departure Clearance Request		S
	RCD	B3	DN	Request Departure Clearance		S
	RCL	B1	DN	Request Oceanic Clearance		S
	RDO	RB/~1	DN	Command/Response Misc. Message Downlink		A
	RDO	RB/~2	DN	Command/Response Misc. Message Downlink		A
	RDO	RB/~3	DN	Command/Response Misc. Message Downlink		A
	RDO	RB/~4	DN	Command/Response Misc. Message Downlink		A
	RDO	RB	DN	Command Response Downlink		S,J,C
	RDO	RB	DN	ACARS Avionics Memory Readout		C
	RDO		DN	Out/Return Report		A
	RDS	B8	DN	Request Departure Slot		S
C-1	REJ	HX	DN	Uplink Message Undelivered		
	REM			Remark(s)		A
	RPR	A5	UP	Request Position Report		S
	RTN	QG	DN	Out Report		S
	RTN	QG	DN	Return Report		S,C,J
	RTN	QG	DN	In Report		S
C-1	SDD	H1/SD	U/D	SDU, Selected		
C-1	SDL	H1/S1	U/D	SDU, Left	No Header	
	SDR	H1/S2	U/D	SDU, Right		
	SPL	DN		Supplemental Flight Plan		A

LEGEND:
A = ARINC
C = AIR CANADA
J = AVICOM, JAPAN
S = SITA
DN = Downlink
UP = Uplink
G/G = Ground to Ground
N/A = Not Applicable

C-1 ① The 2-character sequences A0 thru AA and B0 thru BA are designated for ATS applications. These characters are used as labels for ATS messages to/from an ACARS MU, and as Message Function Identifiers (MFIs) for ATS messages to/from an ACARS peripheral.

APPENDIX C (cont'd)
SMI INFORMATION

Table C-1 SMI List by SMI (cont'd)

SMI	LABEL/ SUB-LABEL ⟨1⟩	UPLINK/ DOWNLINK	DESCRIPTION		SOURCE	
SVC		G/G	Communications Service Message		A	C-1
SVC	Q5	G/G	Unable to Deliver Uplink Message		S,J	
SVC	CA		Communication Service Message, Printer Status Annunciation - Error in Printer		C,J	
SVC	CB	G/G	Printer Busy		S,J	
SVC	CC	G/G	Printer in Local or Test Mode		S,J	
SVC	CD	G/G	Printer Out of Paper		S,J	
SVC	CE	G/G	Printer Buffer Overrun		S,J	
SVC	CF	G/G	Printer Initialized Before Completion		S,J	
SVC	F3	DN	Dedicated Data Transceiver Advisory		J	C-1
THR		N/A	Aircrew-Initiated or Auto-Sensed Takeoff Thrust		A	
TIS		DN	Automated Terminal Information Serv. Report. (ATIS)		A	
TIS	5D	DN	ATIS Report		S,C,J	
TT1	H1/T1	U/D	Cabin Terminal Messages		A,S	
to	to	U/D	Cabin Terminal Messages	No Header	A,S	
TT4	H1/T4	U/D	Cabin Terminal Messages		A,S	C-1
TT5	H1/T5	U/D	User Defined Terminal Messages		A,S	
to	to	U/D	User Defined Terminal Messages	No Header	A,S	
TT8	H1/T8	U/D	User Defined Terminal Messages		A,S	
TX1	H1/T1	UP	Cabin Terminal Messages		A,S	
to	to	UP	Cabin Terminal Messages	With	A,S	
TX4	H1/T4	UP	Cabin Terminal Messages	Header	A,S	C-1
TX5	H1/T5	U/D	User Defined Terminal Messages		A,S	
to	to	U/D	User Defined Terminal Messages	With	A,S	
TX8	H1/T8	U/D	User Defined Terminal Messages	Header	A,S	
WXM	H2	DN	Weather Report		A	C-1
WXO	H1/W0	N/A	Weather Observation Report		A,J	
WXR	5U	DN	Weather Observation Request		A,S,C,J	
N/A	_J		Reserved		S,J	
N/A	_DEL	U/D	General Response (Demand Mode)		S,J	
N/A	Q6	DN	Voice to ACARS Changeover		S,J	
N/A	5P	DN	Temporary Suspension		S,J	
N/A	QO		Link Test		S,J	
N/A	51		Ground GMT Request		S,J	
N/A	F3		Dedicated Transceiver Advisory		S,J	
N/A	Q4	UP	Voice Circuit Busy		S,J	
N/A	:;	UP	Data Transceiver Auto-Tune		S,J	

LEGEND:

A = ARINC	DN = Downlink
C = AIR CANADA	UP = Uplink
J = AVICOM, JAPAN	G/G = Ground to Ground
S = SITA	N/A = Not Applicable

⟨1⟩ The 2-character sequences A0 thru AA and B0 thru BA are designated for ATS applications. These characters are used as labels for ATS messages to/from an ACARS MU, and as Message Function Identifiers (MFIs) for ATS messages to/from an ACARS peripheral. C-1

APPENDIX C (cont'd)
SMI INFORMATION

Table C-2 SMI List by Label

	LABEL/ SUB-LABEL ⟨1⟩	SMI	UPLINK/ DOWNLINK	DESCRIPTION		SOURCE
	00	HJK	DN	Emergency Situation Report (Aircraft Hijack)		A,S,C,J
	10/None	M10	U/D	User Defined Messages		A,S,C,J
	to	to	U/D	User Defined Messages	Header	A,S,C,J
	4~	M4~	U/D	User Defined Messages		A,S,J
	51	N/A		Ground GMT Request		S,J
	52	AGM		Miscellaneous Air-Ground Message		C
c-1	53			Not yet assigned		
	54	AVR	DN	Aircrew Originated Voice Contract Request		A,S
	54	GVR	UP	Voice Go-ahead		S,C,J
	54	GVR	DN	Ground Party Address		S,C,J
	57	AEP	DN	Alternate Aircrew Initiated Pos. Report		S
	80	A80	DN	Aircrew-Addressed Downlink Messages		A,S,C,J
	to	to	DN	Aircrew-Addressed Downlink Messages		A,S,C,J
	8~	A8~	DN	Aircrew-Addressed Downlink Messages		A,S,C,J
	5D	TIS	DN	ATIS Report		S,C,J
	5P	N/A	DN	Temporary Suspension		S,J
	5R	AEP	DN	Aircrew Initiated Position Report		A,S
	5U	WXR	DN	Weather Observation Request		A,S,C,J
	5Y	ETA	DN	Revision to Previous ETA/DIV Report		S,J
	5Z	AGM	DN	Airline Designated Downlink Report		S,J,C
	7A	ENG	DN	Aircrew Initiated Engine Report		S,C,J
	7B	ABM	DN	Aircrew Entered Misc. Report		S,C,J
	A1	CLX	UP	Deliver Oceanic Clearance Unassigned		S
	A2	CLA		Unassigned		S
	A3	CLD	UP	Deliver Departure Clearance		S
c-1	A4	RCA	UP	Acknowledge Departure Clearance Request		
	A5	RPR	UP	Request Position Report		S
	A6	RAR	UP	Request ADS Reports		S
	A7	FTU	UP	Forward Free Text to ACFT		S
	A8	DDS	UP	Deliver Departure Slot		S
	A9	DAI	UP	Deliver ATIS Information		S
	A0	AFU	UP	ATS Facility Notification		
	AA	ATC	UP	ATCComm		
	B1	RCL	DN	Request Oceanic Clearance		S
	B2	CLA	DN	Readback Oceanic Clearance		S
	B3	RCD	DN	Request Departure Clearance		S
	B4	CDA	DN	Acknowledge Departure Clearance		S
	B5	PPR	DN	Provide Position Report		S
	B6	PAR	DN	Provide ADS Reports		S
	B7	FTD	DN	Forward Free Test to ATC		S
	B8	RDS	DN	Request Departure Slot		S
	B9	RAI	DN	Request ATIS Information		S
	B0	AFD	DN	ATS Facility Notification		
	BA	ATC	DN	ATCComm		
c-1	C0	CP0	UP	Undesignated Cockpit/Cabin Printer Message		A,S,C,J
	C1	CP1	UP	Designated Cockpit/Cabin Printer Messages		A,S,C,J
	to	to	UP	Designated Cockpit/Cabin Printer Messages		A,S,C,J
	C9	CP9	UP	Designated Cockpit/Cabin Printer Messages		A,S,C,J
	CA	SVC		Communication Service Message, Printer Status Annunciation - Error in Printer		C,J
	CB	SVC	G/G	Printer Busy		S,J
	CC	SVC	G/G	Printer in Local or Test Mode		S,J
	CD	SVC	G/G	Printer Out of Paper		S,J
	CE	SVC	G/G	Printer Buffer Overrun		S,J
	CF	SVC	G/G	Printer Initialized Before Completion		S,J

LEGEND:

A = ARINC	DN = Downlink
C = AIR CANADA	UP = Uplink
J = AVICOM, JAPAN	G/G = Ground to Ground
S = SITA	N/A = Not Applicable

c-1 ⟨1⟩ The 2-character sequences A0 thru AA and B0 thru BA are designated for ATS applications. These characters are used as labels for ATS messages to/from an ACARS MU, and as Message Function Identifiers (MFIs) for ATS messages to/from an ACARS peripheral.

APPENDIX C (cont'd)
SMI INFORMATION

Table C-2 SMI List by Label (cont'd)

LABEL/ SUB-LABEL ⟨1⟩	SMI	UPLINK/ DOWNLINK	DESCRIPTION	SOURCE	C-1
DEL	N/A	U/D	General Response (Demand Mode)	S,J	
F3	ARR	DN	Dedicated Transceiver Advisory	S,J	
H1/AD	AUD	UP	ADS (To selected ADSU)		
H1/A1	AUL	UP	ADS (To left ADSU)		C-1
H1/A2	AUR	UP	ADS (To right ADSU)		
H1/CF	CFD	U/D	Central Fault Display	A,S,C,J	
H1/CF	CFX	UP	Central Fault Display (No Header)	A,S	
H1/DF	DFD	U/D	Digital Flight Data Acquisition Unit	A,S,J	
H1/DF	DFX	UP	Digital Flight Data Acquisition Unit (No Header)	A,S	
H1/EC	ECS	DN	Engine Display System		C-1
H1/EI	ENG	DN	Engine Report	A,S,C,J	
H1/MD	FAM	N/A	Flight Movement Advisory	A	
H1/M1	FCD	UP	Flight Management Computer	A	
H1/M2	FCL	UP	Flight Management Computer Left	A	
H1/MD	FMD	UP	Selected Flight Management Computer (No Header)	A,S,C,J	
H1/M1	FML	U/D	Flight Management Computer Left (No Header)	A,S,C,J	
H1/M2	FMR	U/D	Flight Management Computer Right (No Header)	A,S,C,J	
H1/10	N10		User Defined Messages	A,S,C,J	
to	to		User Defined Messages — No Header	A,S,C,J	
H1/4~	N4~		User Defined Messages	A,S,C,J	
H1/None	NOA		Meteorological Data	S,C,J	
H1/Any	OAT	U/D	Optional Auxiliary Terminal Message	A,S,C,J	
H1/None	OAT	UP	Optional Auxiliary Terminal	S	
H1/PS	OAT	U/D	Keyboard/Display Unit	S,C	
H1/Any	OAX	UP	Optional Auxiliary Terminal Message (No Header)	A,S	
H1/None	OAX	U/D	Optional Auxiliary Terminal	S	
H1/SD	SDD	U/D	SDU, Selected		
H1/S1	SDL	U/D	SDU, Left — No Header		C-1
H1/S2	SDR	U/D	SDU, Right		
H1/T1	TT1	U/D	Cabin Terminal Messages	A,S	
to	to	U/D	Cabin Terminal Messages	A,S	
H1/T8	TT8	U/D	Cabin Terminal Messages — No Header	A,S	
H1/T1	TX1	UP	Cabin Terminal Messages	A,S	
to	to	UP	Cabin Terminal Messages	A,S	
H1/T8	TX8	UP	Cabin Terminal Messages	A,S	
H1/W0	WXO	N/A	Weather Observation Report	A,J	
H2	WXM	DN	Weather Report		C-1
HX	REJ	DN	Uplink Message Undelivered		
J	N/A	N/A	Reserved	S,J	
M1	MVA	DN	IATA Movement Report: Departure	S	
M2	MVA	DN	IATA Movement Report: Arrival	S	C-1
M2	MVA	DN	User Defined Messages	A,S,C	
M3	MVA	DN	IATA Movement Report: Rtn to Ramp	S	
M4	MVA	DN	IATA Movement Report: Rtn from Airborne	S	C-1
SQ	N/A	UP	Squitter Messages	S,C	
Q0	N/A		Link Test	S,J	
Q1	ARR	DN	Departure/Arrival Report	S,J	
Q1	DEP	DN	Departure/Arrival Report	S,J	
Q1	DEP	DN	Departure	C	
Q2	ETA	DN	Estimated Time of Arrival Report	A,C,J	
Q3	CLK	DN	Clock Update Advisory	A,S	
Q3	CLK	DN	Airborne GMT Clock Request	C,J	
Q4	N/A	UP	Voice Circuit Busy	S,J	
Q5	SVC	G/G	Unable to Deliver Uplink Message	S,J	

LEGEND:

A = ARINC	DN = Downlink
C = AIR CANADA	UP = Uplink
J = AVICOM, JAPAN	G/G = Ground to Ground
S = SITA	N/A = Not Applicable

⟨1⟩ The 2-character sequences A0 thru AA and B0 thru BA are designated for ATS applications. These characters are used as labels for ATS messages to/from an ACARS MU, and as Message Function Identifiers (MFIs) for ATS messages to/from an ACARS peripheral. C-1

APPENDIX C (cont'd)
SMI INFORMATION

Table C-2 SMI List by Label (cont'd)

	LABEL/ SUB-LABEL ①	SMI	UPLINK/ DOWNLINK	DESCRIPTION	SOURCE
	Q6	N/A	DN	Voice to ACARS Changeover	S,J
	Q7	DLA	DN	Delay Report	A,S,C,J
C-1	Q8			Not yet assigned	
C-1	Q9			Not yet assigned	
	QA	DEP	DN	OUT/Fuel Report	S,J
	QA	DEP	DN	Departure	C
	QB	DEP	DN	OFF Report	S,J
	QC	ARR	DN	ON Report	S,C,J
	QD	ARR	DN	IN/Fuel Report	S,J
	QE	DEP	DN	OUT/Fuel/Destination Report	S,J
	QF	DEP	DN	OFF/Destination Report	S,J
	QG	RTN	DN	Out Report	S
	QG	RTN	DN	Return Report	S,C,J
	QG	RTN	DN	In Report	S
	QH	DEP	DN	OUT Report	S
	QK	ARR	DN	Landing Report	S
	QL	ARR	DN	Arrival Information Report	S
	QM	ARR	DN	Arrival Information Report	S
	QN	DIV	DN	Diversion Report	S
C-1	QX		DN	Intercept	
	RA	CMD	UP	Avionics Memory Load or Diagnostic Function	A
	RA	CMD		Command/Response Uplink	S,J,C
	RB/~1	RDO	DN	Command/Response Misc. Message Downlink	A
	RB/~2	RDO	DN	Command/Response Misc. Message Downlink	A
	RB/~3	RDO	DN	Command/Response Misc. Message Downlink	A
	RB/~4	RDO	DN	Command/Response Misc. Message Downlink	A
	RB	RDO	DN	Command Response Downlink	S,J,C
	RB	RDO		ACARS Avionics Memory Readout	C
C-1	X1			Service Provider Defined	S
C-1	thru			Service Provider Defined	S
	X9			Service Provider Defined	S
	:;	N/A	UP	Data Transceiver Auto-Tune	S,J
	None	AAM	G/G	ACARS Station Advisory Messages	A
	None	AID	N/A	Airborne Instrumentation Data System	A
	None	ALR	N/A	Alerting Message	A
	None	AOA	G/G	ACARS Station(s) Outage Advisory	A
	None	AOS	G/G	ACARS Station(s) Outage Status Advisory	A
	None	ARA	G/G	ACARS Station(s) Restoral Advisory	A
	None	ARI	G/G	Fuel/Close-out Report	A
	None	ASA	G/G	ACARS Station(s) Addition	A
	None	ASD	G/G	ACARS Station(s) Deletion	A
	None	CNL	N/A	Cancellation of Flight	A
	None	CPL	N/A	Current Flight Plan	A
	None	ETR	N/A	Aircrew-Initiated Revision to Previously Advised Estimated Time of Arrival	A
	None	FPL	N/A	Filed Flight Plan	A
	None	FPR	N/A	Aircrew-Originated Request for Flight Plan Update	A
	None	FPU	N/A	Ground-Originated Flight Plan Update to Aircraft	A
	None	PDM	G/G	Possible Duplicate Message	A
	None	PSN	N/A	Aircrew-Initiated Position Report with/without Weather Information	A
	None	QTB	G/G	Incomplete Message	A
	None	RDO	DN	Out/Return Report	A
	None	REM		Remark(s)	A
	None	SPL	DN	Supplemental Flight Plan	A
	None	SVC	G/G	Communications Service Message	A
	None	THR	N/A	Aircrew-Initiated or Auto-Sensed Takeoff Thrust	A
	None	TIS	DN	Automated Terminal Information Serv. Report (ATIS)	A

LEGEND:

A = ARINC	DN = Downlink
C = AIR CANADA	UP = Uplink
J = AVICOM, JAPAN	G/G = Ground to Ground
S = SITA	N/A = Not Applicable

C-1 ① The 2-character sequences A0 thru AA and B0 thru BA are designated for ATS applications. These characters are used as labels for ATS messages to/from an ACARS MU, and as Message Function Identifiers (MFIs) for ATS messages to/from an ACARS peripheral.

APPENDIX C (cont'd)
SMI INFORMATION

Table C-3 ACARS Peripherals: Sub-label Assignments

DESCRIPTION	SUBLABEL
ADS Unit (ADSU), Left	A1
ADS Unit (ADSU), Right	A2
ADS Unit (ADSU), Selected	AD
All Cabin Terminals	T0
Cabin Terminal 1 through 4 respectively	T1-T4
User Defined Cabin Terminal 5 through 8 respectively	T5-T8
Centralized Fault Display Unit (CFDIU) also known as Central Maintenance Computer (CMC)	CF
Digital Flight Data Acquisition Unit (DFDAU)	DF
Flight Management Computer (FMC), Left	M1
Flight Management Computer (FMC), Right	M2
Flight Management Computer (FMC), Selected	MD
Optional Auxiliary Terminal (OAT)	None
Satellite Data Unit (SDU), Left	S1
Satellite Data Unit (SDU), Right	S2
Satellite Data Unit (SDU), Selected	SD

Table C-4 ATS Uplinks to an MU (as end system)

UPLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI ("x" is version no.)
Oceanic Clearance Uplink	A1	--	CLX	--	OCx
Unassigned	A2	--		--	
Deliver Departure Clearance Uplink	A3	--	CLD	--	DCx
ACK Departure Clearance Request	A4	--	RCA	--	DCx
Request Position Report	A5	--	RPR	--	---
Request ADS Reports	A6	--	RAR	--	ADx
Free Text to Aircraft	A7	--	FTU	--	FTx
Deliver Departure Slot	A8	--	DDS	--	---
Deliver ATIS Information	A9	--	DAI	--	TIx
ATS Facility Notification	A0	--	AFU	--	AFx
ATCComm	AA	--	ATC	--	ATx

APPENDIX C (cont'd)
SMI INFORMATION

Table C-5 ATS Uplinks to a ("designated") ADSU

UPLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI ("x" is version no.)
Oceanic Clearance Uplink	H1	AD	AUD	A1	OCx
Unassigned	H1	AD	AUD	A2	
Departure Clearance Uplink	H1	AD	AUD	A3	DCx
ACK Departure Clearance Request	H1	AD	AUD	A4	DCx
Request Position Report	H1	AD	AUD	A5	---
Request ADS Reports	H1	AD	AUD	A6	ADx
Free Text to Aircraft	H1	AD	AUD	A7	FTx
Deliver Departure Slot	H1	AD	AUD	A8	---
Deliver ATIS Information	H1	AD	AUD	A9	TIx
ATS Facility Notification	H1	AD	AUD	A0	AFx
ATCComm	H1	AD	AUD	AA	ATx

Table C-6 ATS Uplinks to a DFDAU (ACMS)

C-1

UPLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI ("x" is version no.)
Oceanic Clearance Uplink	H1	DF	DFD	A1	OCx
Unassigned	H1	DF	DFD	A2	
Departure Clearance Uplink	H1	DF	DFD	A3	DCx
ACK Departure Clearance Request	H1	DF	DFD	A4	DCx
Request Position Report	H1	DF	DFD	A5	---
Request ADS Reports	H1	DF	DFD	A6	ADx
Free Text to Aircraft	H1	DF	DFD	A7	FTx
Deliver Departure Slot	H1	DF	DFD	A8	---
Deliver ATIS Information	H1	DF	DFD	A9	TIx
ATS Facility Notification	H1	DF	DFD	A0	AFx
ATCComm	H1	DF	DFD	AA	ATx

Table C-7 ATS Uplinks TO A ("Designated") FMC

UPLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI ("x" is version no.)
Oceanic Clearance Uplink	H1	MD	FMD	A1	OCx
Unassigned	H1	MD	FMD	A2	
Departure Clearance Uplink	H1	MD	FMD	A3	DCx
ACK Departure Clearance Request	H1	MD	FMD	A4	DCx
Request Position Report	H1	MD	FMD	A5	---
Request ADS Reports	H1	MD	FMD	A6	ADx
Free Text to Aircraft	H1	MD	FMD	A7	FTx
Deliver Departure Slot	H1	MD	FMD	A8	---
Deliver ATIS Information	H1	MD	FMD	A9	TIx
ATS Facility Notification	H1	MD	FMD	A0	AFx
ATCComm	H1	MD	FMD	AA	ATx

APPENDIX C (cont'd)
SMI INFORMATION

Table C-8 ATS Uplinks to an OAT

UPLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI ("x" is version no.)
Oceanic Clearance Uplink	H1	any	OAT	A1	OCx
Unassigned	H1	any	OAT	A2	
Departure Clearance Uplink	H1	any	OAT	A3	DCx
ACK Departure Clearance Request	H1	any	OAT	A4	DCx
Request Position Report	H1	any	OAT	A5	---
Request ADS Reports	H1	any	OAT	A6	ADx
Free Text to Aircraft	H1	any	OAT	A7	FTx
Deliver Departure Slot	H1	any	OAT	A8	---
Deliver ATIS Information	H1	any	OAT	A9	TIx
ATS Facility Notification	H1	any	OAT	A0	AFx
ATCComm	H1	any	OAT	AA	ATx

Table C-9 ATS Downlinks from an MU (as end system)

DOWNLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI
Request Oceanic Clearance	B1	--	RCL	--	OCx
Acknowledge Oceanic Clearance	B2	--	CLA	--	OCx
Request Departure Clearance	B3	--	RCD	--	DCx
Acknowledge Departure Clearance	B4	--	CDA	--	DCx
Provide Position Report	B5	--	PPR	--	---
Provide ADS Report	B6	--	PAR	--	ADx
Forward Free Text to ATC	B7	--	FTD	--	---
Request Departure Slot	B8	--	RDS	--	---
ATIS Request	B9	--	RAI	--	TIx
ATS Facility Notification	B0	--	AFD	--	AFx
ATCComm	BA	--	ATC	--	ATx

C-1

Table C-10 ATS Downlinks from (left) ADSU

DOWNLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI
Request Oceanic Clearance	H1	AD	AUL	B1	OCx
Acknowledge Oceanic Clearance	H1	AD	AUL	B2	OCx
Request Departure Clearance	H1	AD	AUL	B3	DCx
Acknowledge Departure Clearance	H1	AD	AUL	B4	DCx
Provide Position Report	H1	AD	AUL	B5	---
Provide ADS Report	H1	AD	AUL	B6	ADx
Forward Free Text to ATC	H1	AD	AUL	B7	---
Request Departure Slot	H1	AD	AUL	B8	---
ATIS Request	H1	AD	AUL	B9	TIx
ATS Facility Notification	H1	AD	AUL	B0	AFx
ATCComm	H1	AD	AUL	BA	ATx

APPENDIX C (cont'd)
SMI INFORMATION

Table C-11 ATS Downlinks from DFDAU (ACMS)

DOWNLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI
Request Oceanic Clearance	H1	DF	DFD	B1	OCx
Acknowledge Oceanic Clearance	H1	DF	DFD	B2	OCx
Request Departure Clearance	H1	DF	DFD	B3	DCx
Acknowledge Departure Clearance	H1	DF	DFD	B4	DCx
Provide Position Report	H1	DF	DFD	B5	---
Provide ADS Report	H1	DF	DFD	B6	ADx
Forward Free Text to ATC	H1	DF	DFD	B7	---
Request Departure Slot	H1	DF	DFD	B8	---
ATIS Request	H1	DF	DFD	B9	TIx
ATS Facility Notification	H1	DF	DFD	B0	AFx
ATCComm	H1	DF	DFD	BA	ATx

Table C-12 ATS Downlinks from (left) FMC

C-1

DOWLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI
Request Oceanic Clearance	H1	M1	FML	B1	OCx
Acknowledge Oceanic Clearance	H1	M1	FML	B2	OCx
Request Departure Clearance	H1	M1	FML	B3	DCx
Acknowledge Departure Clearance	H1	M1	FML	B4	DCx
Provide Position Report	H1	M1	FML	B5	---
Provide ADS Report	H1	M1	FML	B6	ADx
Forward Free Text to ATC	H1	M1	FML	B7	---
Request Departure Slot	H1	M1	FML	B8	---
ATIS Request	H1	M1	FML	B9	TIx
ATS Facility Notification	H1	M1	FML	B0	AFx
ATCComm	H1	M1	FML	BA	ATx

Table C-13 ATS Downlinks from OAT

DOWLINK MESSAGE DEFINITION	LABEL	SUBLABEL	SMI	MFI	IMI
Request Oceanic Clearance	H1	any	OAT	B1	OCx
Acknowledge Oceanic Clearance	H1	any	OAT	B2	OCx
Request Departure Clearance	H1	any	OAT	B3	DCx
Acknowledge Departure Clearance	H1	any	OAT	B4	DCx
Provide Position Report	H1	any	OAT	B5	---
Provide ADS Report	H1	any	OAT	B6	ADx
Forward Free Text to ATC	H1	any	OAT	B7	---
Request Departure Slot	H1	any	OAT	B8	---
ATIS Request	H1	any	OAT	B9	TIx
ATS Facility Notification	H1	any	OAT	B0	AFx
ATCComm	H1	any	OAT	BA	ATx

APPENDIX D
BLOCKING MULTIBLOCK MESSAGES

|C-1

D.1 Addressing

The Address field of both uplink and downlink ACARS blocks contains the address of the aircraft. The aircraft must provide its identification information in the Address field of all downlink blocks. The address of the aircraft will normally be the aircraft Registration Mark. In the case of uplink messages, when the registration mark is unknown by the DSP's Data Link Service Processor, the Flight Identifier is entered in the Address field. In this case, the ACARS MU is required to recognize its own Flight Identifier and respond to the uplink with a downlink containing its Registration Mark in the Address field. For this purpose, the Flight Identifier supplied by the user must be unique. Otherwise multiple aircraft may recognize the message as being addressed to them.

D.1.1 Aircraft Identification

In order to establish and maintain contact with an aircraft and service messages to/from the aircraft, the Data Link Service Processor needs to recognize which user owns the aircraft. This is because the information concerning the delivery of downlink messages by the Data Link Service Processor is based on user identification. The DSP configures the Data Link Service Processor, allocating a unique two letter identification code (normally its agency code) to each user.

There are two methods of configuring an aircraft as belonging to a given user, static configuration and dynamic configuration. In static configuration, the aircraft's registration mark is identified by an Data Link Service Processor operator as belonging to a given user code. If however dynamic configuration is used, the Data Link Service Processor will dynamically configure any aircraft that report the user's code in the Agency Code field of their messages. In one DSP implementation, aircraft in the register are cleared from the dynamic configuration file at 0000 hours UTC if there has been no communication with them during the preceding 24 hours. To use the dynamic configuration facility, users must ensure that their agency code is not used by other operators.

D.1.2 System Access Area Function

In ground networks utilizing Category B operation, the System Access Area (SAA) function allows an aircraft to designate which ground station it wants to use. This function is an extension to the original ACARS definition. The SAA function is achieved by allocating an SAA code to each RGS. The SAA code is configured in the Ground Terminal Computer (GTC) of the RGS, and it will only relay downlink messages containing its SAA code or a '2' in the Mode Character position. Each GTC is configured with a squitter interval of approximately 120 seconds. The interval is not precisely the same for any two RGS because the squitters could overlap and collide. The squitters are generated and transmitted at the squitters interval by the GTC (and not by the Data Link Service Processor) in the absence of any other traffic in order to make aircraft within range aware of the presence of the RGS. |C-1

Both the Data Link Service Processor and the Remote Ground Station (RSG) play a part in the SAA function. The aircraft configuration tables in the Data Link Service Processor indicate that a given aircraft is equipped with the SAA function. For uplinks to SAA equipped aircraft, the Data Link Service Processor places a code in the Mode Character field to indicate to the GTC that it should place its SAA code in the message before transmission on the Radio Frequency. Thus, all uplinks to such aircraft will automatically contain the RGS's SAA code (even if the aircraft has not previously designated the RGS). The Data Link Service Processor does not validate the SAA character in downlink messages. It will accept multiblock messages with blocks that arrive through multiple RGS with different SAA characters.

D.2 Block Identification

In the original ACARS definition, which is still used in some aircraft, the Block Identifier field is only present in uplink ACARS blocks. The function of the Uplink Block Identifier (UBI) was to enable the ACARS MU to detect a duplicate uplink block i.e., one that had already been received. A secondary benefit was that it enabled ground stations to recognize blocks sent by other ground stations as uplinks so that they could be discarded and ignored. As a result of modification to the ACARS RF protocol definition, a Downlink Block Identifier (DBI) was added to improve duplicate detection by ground systems. The DBI field is also used in the acknowledgement process as described in Section D.3 below. The range of possible Uplink Block Identifiers sent by the Data Link Service Processor is limited to "A" (41 Hexadecimal) to "Z" (%A Hexadecimal). The range of Downlink Block Identifiers sent by the ACARS MU is limited to "0" (30 Hexadecimal) to "9" (39 Hexadecimal). The Block Identifier must be incremented with each new block successfully sent. The Data Link Service Processor uses a combination of the DBI and the Message Sequence Number (MSN) to detect retransmitted downlink blocks. For example, in one DSP implementation, if the DBI and MSN of a received block are the same as those of either of the two preceding blocks from that aircraft, the block is considered a duplicate.

APPENDIX D (cont'd)
BLOCKING MULTIBLOCK MESSAGES

c-1|

D.3 ACARS Acknowledgement

The ACARS protocol requires that each block sent across the RF by the sender be acknowledged by the recipient. In the aircraft, the acknowledgement protocol is administered by the ACARS Management Unit (MU).

In the original definition of the ACARS protocol, which is still used in some aircraft, only one field of the ACARS block is used in the acknowledgement process, the Technical Acknowledgement field. In a block which does not acknowledge another block, the Technical Acknowledgement field contains the character <NAK> which has the 7-Bit code '15' Hexadecimal. In a block which does acknowledge another block, the Technical Acknowledgement field contains the character <ACK> which has the 7-Bit code '06' Hexadecimal. The protocol also allows for a negative acknowledgement (NAK) in the case where a message is received but the Block Check Sequence (BCS) checksum is found to be incorrect. The receipt of a negative acknowledgement (NAK) prompts the immediate retransmission of the negatively acknowledged block.

The process described above has the disadvantage that an acknowledgement does not explicitly acknowledge a specific block. As described in Section D.2, the ACARS definition was upgraded to improve the acknowledgement procedure by allowing an explicit acknowledgement. The method chosen to achieve this was to add a downlink block identifier to the format of downlink blocks and to specify that an acknowledgement should contain the block identifier of the block being acknowledged in its Technical Acknowledgement field. The negative acknowledgement process was not altered.

The ACARS protocol is half duplex protocol. A half duplex protocol does not allow communications in both directions at the same time. In both the VHF and Satellite systems, it is possible for an uplink and a downlink block to be sent at more or less the same time and to cross over. The ACARS MU and the Data Link Service Processor will both be waiting for an acknowledgement for the block they have sent and will instead receive a block which does not contain an acknowledgement. Receiving a response with a NAK to a message is defined to mean that the block should be retransmitted, but if each sender were simply to repeat the block which appears to have been negatively acknowledged, the retransmissions would fall into the cross over pattern as well and the communication could be continue indefinitely (locked up). The convention chosen to resolve this situation is that if an ACARS MU is expecting an acknowledgement for a previously transmitted block but instead receives a block which does not contain an acknowledgement, it should accept the received block and immediately retransmit the previously transmitted block including an acknowledgement for the received block. On the ground side, if the Data Link Service Processor is expecting an acknowledgement for a previously transmitted block but instead receives a block which does not contain an acknowledgement, it discards the block and continues to wait for the acknowledgement from the ACARS MU of the original uplink. On receiving the acknowledgement, the Data Link Service Processor will acknowledge the downlink block.

A block acknowledgement may be contained in any ACARS message type but, if no message is waiting to be sent and a block requires acknowledgement, the following label can be used:

ACARS BLOCK LABEL	RELATED FUNCTION
DEL	General response

An ACARS MU will acknowledge all ACARS message types except General Response. The Data Link Service Processor will acknowledge all ACARS message types except General Response, certain service messages (such as Labels Q5 and CA-CF), and the Temporary Suspension (Label 5P) message.

D.4 Multiblock Messages

The protocol defined for ground/ground communications between the Data Link Service Processor and user ground systems in Chapter 3 is capable of transporting 3840 characters in a single packet. The ACARS protocol is capable of transporting only 220 characters of text in each block. In order to avoid restricting message length to the length of the ACARS block text field, the ACARS protocol allows for multiblock messages.

The Block Terminator field of all messages is coded with the ASCII character <ETX>. The first and intermediate blocks of multiblock messages are coded with <ETB> in their Block Terminator field. Thus, the Block Terminator field of all single block messages and the final block of multiblock messages are coded with <ETX>.

D.4.1 Multiblock Uplink

The Data Link Service Processor automatically divides messages received from user ground systems into as many ACARS blocks as necessary and sends them block by block to the airborne avionics. The maximum length of an uplink message is not limited by the Data Link Service Processor but by the maximum length of a message permitted by the communication link from the user to the Data Link Service Processor. Assuming proper format and addressing, any uplink message received by the Data Link Service Processor will be transmitted across the RF link. A maximum length
c-1| message will result in an ACARS message consisting of 16 (occasionally 17) ACARS blocks.

APPENDIX D (cont'd)
BLOCKING MULTIBLOCK MESSAGES

| C-1

D.4.2 Multiblock Downlink

Multiblock downlink ACARS messages are reassembled by the Data Link Service Processor before being passed to the message processing functions. A reassembly session is closed by one of the following events:

- The last ACARS block of the message is received.
- No ACARS block received for at least 11 minutes.
- A fifteenth ACARS block ended by ETB suffix is received.

The third criterion dictates that, for multiblock downlink messages, a maximum of 15 ACARS blocks of the same message are reassembled in the Data Link Service Processor. If a downlink message contains more than 15 blocks, the Data Link Service Processor will send two messages to the user users host system, the first containing the first fifteen blocks and then a second message containing the remaining blocks.

The transmission of multiblock messages was not foreseen in the initial ACARS definition and multiblock early attempts at reassembly were prone to error. A recent development in the protocol definition of the Message Sequence Number (MSN) will, on implementation, make multiblock reassembly more precise. Using the new MSN definition, the Data Link Service Processor is able to recognize when a new message is being sent and when a block is missing in a sequence.

APPENDIX E

Table E-1 BAUDOT LIMITS TO ASC II CODE SET

b_4 b_3 b_2 b_1	b_7 0	0	0	0	1	1	1	1
	b_6 0	0	1	1	0	0	1	1
	b_5 0	1	0	1	0	1	0	1
0 0 0 0	00 NUL	10 DLE	20 SP	30 0	40 @	50 P	60 `	70 p
0 0 0 1	01 SOH	11 DC1	21 !	31 1	41 A	51 Q	61 a	71 q
0 0 1 0	02 STX	12 DC2	22 "	32 2	42 B	52 R	62 b	72 r
0 0 1 1	03 ETX	13 DC3	23 #	33 3	43 C	53 S	63 c	73 s
0 1 0 0	04 EOT	14 DC4	24 $	34 4	44 D	54 T	64 d	74 t
0 1 0 1	05 ENQ	15 NAK	25 %	35 5	45 E	55 U	65 e	75 u
0 1 1 0	06 ACK	16 SYN	26 &	36 6	46 F	56 V	66 f	76 v
0 1 1 1	07 BEL	17 ETB	27 '	37 7	47 G	57 W	67 g	77 w
1 0 0 0	08 BS	18 CAN	28 (	38 8	48 H	58 X	68 h	78 x
1 0 0 1	09 HT	19 EM	29)	39 9	49 I	59 Y	69 i	79 y
1 0 1 0	0A LF	1A SUB	2A *	3A :	4A J	5A Z	6A j	7A z
1 0 1 1	0B VT	1B ESC	2B +	3B ;	4B K	5B [	6B k	7B {
1 1 0 0	0C FF	1C FS	2C ,	3C <	4C L	5C \	6C l	7C |
1 1 0 1	0D CR	1D GS	2D -	3D =	4D M	5D]	6D m	7D }
1 1 1 0	0E SO	1E RS	2E . [1]	3E >	4E N	5E ^	6E n	7E ~
1 1 1 1	0F SI	1F US	2F / [1]	3F ?	4F O	5F _	6F o	7F DEL

Hex value →

Character → 04 EOT

Character not allowed in Uplink or Downlink Messages.

[1] Refer to ARINC Characteristic 597 for special uses of these characters.

APPENDIX E (cont'd)

Table E-2 ASCII CODE SET

b_4 b_3 b_2 b_1	b_7 0	0	0	0	1	1	1	1
	b_6 0	0	1	1	0	0	1	1
	b_5 0	1	0	1	0	1	0	1
0 0 0 0	00 NUL	10 DLE	20 SP	30 0	40 @	50 P	60 `	70 p
0 0 0 1	01 SOH	11 DC1	21 !	31 1	41 A	51 Q	61 a	71 q
0 0 1 0	02 STX	12 DC2	22 "	32 2	42 B	52 R	62 b	72 r
0 0 1 1	03 ETX	13 DC3	23 #	33 3	43 C	53 S	63 c	73 s
0 1 0 0	04 EOT	14 DC4	24 $	34 4	44 D	54 T	64 d	74 t
0 1 0 1	05 ENQ	15 NAK	25 %	35 5	45 E	55 U	65 e	75 u
0 1 1 0	06 ACK	16 SYN	26 &	36 6	46 F	56 V	66 f	76 v
0 1 1 1	07 BEL	17 ETB	27 '	37 7	47 G	57 W	67 g	77 w
1 0 0 0	08 BS	18 CAN	28 (	38 8	48 H	58 X	68 h	78 x
1 0 0 1	09 HT	19 EM	29)	39 9	49 I	59 Y	69 i	79 y
1 0 1 0	0A LF	1A SUB	2A *	3A :	4A J	5A Z	6A j	7A z
1 0 1 1	0B VT	1B ESC	2B +	3B ;	4B K	5B [	6B k	7B {
1 1 0 0	0C FF	1C FS	2C ,	3C <	4C L	5C \	6C l	7C |
1 1 0 1	0D CR	1D GS	2D -	3D =	4D M	5D]	6D m	7D }
1 1 1 0	0E SO	1E RS	2E . [1]	3E >	4E N	5E ^	6E n	7E ~
1 1 1 1	0F SI	1F US	2F / [1]	3F ?	4F O	5F _	6F o	7F DEL

Hex value → 04 EOT ← Character

Character not allowed in Uplink or Downlink Messages.

[1] Refer to ARINC Characteristic 597 for special uses of these characters.

APPENDIX F

Table F-1 FUNCTIONS SUPPORTED BY SERVICE PROVIDERS

FUNCTION GROUP	SPECIFIC FUNCTION	DATALINK SERVICE PROVIDER			
		ARINC	SITA	AC	AVICOM
Message Handling	1. U/L Delivery 2. D/L Delivery 3. Message Processing 4. Message Accountability 5. Prioritization 6. Intercept				
Channel Management	1. Mult-Freq. Mgt. 2. Frontier Crossing 3. Shared Frequency Use				
Flight Following	1. Aircraft Tracking 2. Optional G/L				
System Management	1. System Essential Messages 2. Advisory Messages				
Internetworking	1. ATN Connectivity 2. Flight Following				
Data Transparency	1. End-to-End Checksum 2. File Transfer 3. Data Compression				

APPENDIX Z
OUTSTANDING ISSUES/STANDARDS DEVIATIONS

A. Handling RA labels uplinks.
Handling of RB label downlinks.

B. Describe use/non-use of AP/GL by various datalink service providers. DSPs first transmit the uplink message through the station specified. If the message is not acknowledged, DSPs then transmit the uplink message through the stations recorded in their tracking tables for the aircraft concerned. If AP is used in the uplink message, only the specified location is tried. If neither GL nor AP are used, DSPs use their tracking tables only. Tracking tables contain the last two ground stations through which downlink messages were received from the aircraft.

| C-1

C. Implementations that are unique to the network design used by Air Canada.

Copyright© 1994 by
AERONAUTICAL RADIO, INC.
2551 Riva Road
Annapolis, Maryland 21401-7465 USA

SUPPLEMENT 1©
TO
ARINC SPECIFICATION 620
DATA LINK GROUND SYSTEM STANDARD AND INTERFACE SPECIFICATION

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 draft 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.

Old	New
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

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:

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.

4.3.12 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

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.