NEC

NEAX 2000
INTEGRATED VOICE SERVER

NEAX 7400 ICS M100MX
Integrated Multimedia eXchange

SMDR/MCI/PMS Interface Specifications

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SMDR/MCI/PMS Interface Specifications

Revision Sheet 1/2

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NEAX 2000 IVS^2/NEAX 2000/NEAX 7400 ICS M100MX
SMDR/MCI/PMS Interface Specifications

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SMDR/MCI/PMS Interface Specifications

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INTRODUCTION

PURPOSE

This manual describes the interface specifications for Station Message Detail Recording (SM-DR), Message Center Interface (MCI) and Property Management System (PMS) Interface and PMS operation on the NEAX 2000 IVS^2/NEAX 7400 ICS M100MX/NEAX 2000 INTEGRATED VOICE SERVER.

OUTLINE OF THIS MANUAL

This manual consists of the following chapters.

SMDR SPECIFICATIONS:
This chapter explains the call information, the SMDR terminal interface and the data transmission format.

MCI SPECIFICATIONS:
This chapter explains the line control characteristics of the Message Center Interface (MCI) and the data transmission protocol.

PMS INTERFACE SPECIFICATIONS:
This chapter explains the line control characteristics of the Property Message System (PMS) interface and the data transmission protocol.

PMS OPERATION:
This chapter explains the operations associated with each PMS feature message. The set of feature messages used can vary from one PMS to another, depending on system applications. For each feature message, general operations and PBX and/or PMS function will be discussed, and function codes and their uses will be defined.

REFERENCE MANUAL

During installation, refer also to the manuals below.

Command Manual:
Describes Customer Administration Terminal (CAT) operation, command function and setting data required for programming the system, and Resident System Program.

Office Data Programming Manual:
Contains the Customer Specifications Sheets and Office Data Programming Sheets.

Feature Programming Manual:
Describes procedure for each business and hotel feature programming.

Installation Procedure Manual:
Describes the installation procedure for the PBX system.

SMDR SPECIFICATIONS

This chapter explains the call information, the SMDR terminal interface and the data transmission format.

CALL INFORMATION

The PBX provides three kinds of SMDR (Station Message Detail Recording) format;
NEAX 2400 IMS Format and NEAX 1400 IMS Format, which is selectable by CMD001>82/102/122/142, and MP built-in SMDR.

The following call information is provided to the SMDR terminal upon completion of each outgoing/incoming C.O. call.

NEAX 2400 IMS Format

- Type of Record
- Trunk Number (000-255)
- Trunk Route Number (00-63)
- Calling/Called Party Information
  - Calling/Called Party I.D.
  - Tenant Number (01-63)
  - Station Number (Max. 5 digits)
  - Attendant Number (00-07)
  - Trunk Route (00-63) + Trunk Number (000-255)
- Time of Start Conversation-Month, Day, Hour, Minute, Second
- Time of Call Completion-Month, Day, Hour, Minute, Second
- Account Code (Max. 10 digits)
- Condition Code
- Route Advance Information
- Called Number (Max. 24 digits)*
- Call Metering Information*
- Area Code for Calling Party (Max. 4 digits)**
- Area Code for Billing Office (Max. 4 digits)**
- Authorization Code (Max. 10 digits)*
- Condition Code for Advice of Charge (AOC)*
- Advice of Charge (AOC)*

NOTE: The information marked by "*" is only for outgoing C.O. calls.
The information marked by "**" is only for incoming calls.

NEAX 1400 IMS Format

- Serial Number of SMDR record
- Condition Code
- Calling Party
  - Station Number (Max. 4 digits)

    or
  - Attendant Number (00-07)
- Time of Start Conversation-Month, Day, Hour, Minute, Second
- Call Duration-Hour, Minutes, Seconds
- Access Code, if used. (Max. 2 digits)
- Called Number (Max. 26 digits)
- Trunk Number (000-255)
- Route Number (00-63)
- Account Code (Max. 16 digits)
- Authorization Code/DISA (Remote Access to System) Code (Max. 16 digits)

Built-in SMDR

- Type of Record
- Trunk Route Number (00-63)
- Trunk Number (000-255)
- Calling/Called Party Information
  - Calling/Called Party I.D.
  - Tenant Number (01-63)
  - Station Number (Max. 6 digits)
  - Attendant Number (00-07)
  - Trunk Route (00-63) + Trunk Number (000-255)
- Time of Start Conversation-Month, Day, Hour, Minute, Second
- Time of Call Completion-Month, Day, Hour, Minute, Second
- Account Code (Max. 10 digits)
- Condition Code
- Route Advance Information*
- Called Number (Max. 32 digits)*
- Call Metering Information*
- Area Code for Calling Party (Max. 4 digits)**
- Area Code for Billing Office (Max. 4 digits)**
- Authorization Code (Max. 10 digits)*
- Call Start Year
- Call End Year
- Condition Code for Advice of Charge (AOC)*
- Advice of Charge (AOC)*

NOTE: The information marked by "*" is only for outgoing C.O. calls.
The information marked by "**" is only for incoming C.O. calls.

SMDR TERMINAL INTERFACE

The interface specification of the SMDR terminal is as follows:

- Procedure: Non Protocol (Free Wheel)
- Direction: One-way (to SMDR terminal)
- Synchronization: Asynchronous
- Transmission Speed: 1200/2400/4800/9600 bps (Async via No. 0-3 Ports for SMDR with AP00)
- Stop Bit: 1/1.5/2 bits
- Terminal Busy Detecting Method: Data Carrier Detect (DCD) Signal ON/OFF (Terminal Ready/Busy)

NOTE 1: For the Port 1 and Port 3, data speed 9600 bps cannot be set.

NOTE 2: Upon confirming that the status of the DCD signal from the SMDR terminal is ON, the system sends out call information to the SMDR terminal.

When the status of the DCD signal is OFF, the system does not send out call information but temporarily stores the information until the SMDR terminal becomes ready to receive call information (in other words, until the status of the DCD signal changes to ON). If the status of the DCD signal has changed from ON to OFF while transmission of a specific call information is in progress, the next call information is not sent out but stored into the system temporarily.
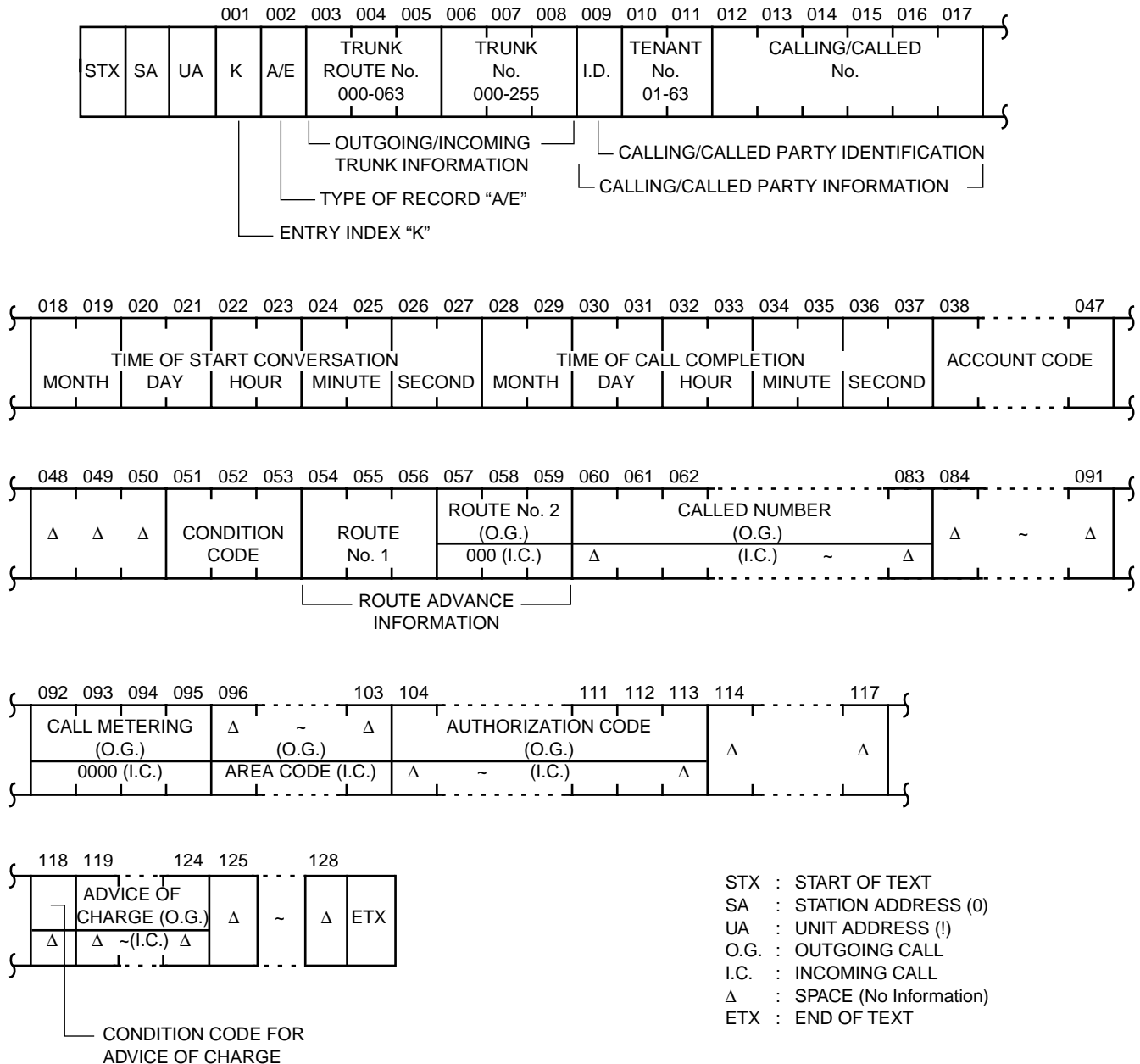The same applies to the CTS and DSR signals.

DATA TRANSMISSION FORMAT

This section describes the format for data exchange between the PBX and the SMDR terminal.

NEAX 2400 IMS Format

NEAX 2400 IMS Format

						001	002	003 004 005		006 007 008		009	010 011		012 013 014 015 016 017		
STX	SA	UA	K	A/E		TRUNK ROUTE No. 000-063			TRUNK No. 000-255			I.D.	TENANT No. 01-63		CALLING/CALLED No.	

OUTGOING/INCOMING TRUNK INFORMATION
TYPE OF RECORD "A/E"
ENTRY INDEX "K"
CALLING/CALLED PARTY IDENTIFICATION
CALLING/CALLED PARTY INFORMATION

018 019 020	021 022 023	024 025 026	027	028 029 030	031 032 033	034 035 036	037	038 — 047
MONTH	DAY	HOUR	MINUTE	SECOND				

TIME OF START CONVERSATION — TIME OF CALL COMPLETION — ACCOUNT CODE

(MONTH, DAY, HOUR, MINUTE, SECOND | MONTH, DAY, HOUR, MINUTE, SECOND | ACCOUNT CODE)

048 049 050	051 052 053	054 055 056	057 058 059	060 061 062 — 083	084 — 091
Δ Δ Δ	CONDITION CODE	ROUTE No. 1	ROUTE No. 2 (O.G.) / 000 (I.C.)	CALLED NUMBER (O.G.) / Δ (I.C.) ~ Δ	Δ ~ Δ

ROUTE ADVANCE INFORMATION

092 093 094 095	096 — 103	104 — 111 112 113	114 — 117
CALL METERING (O.G.) / 0000 (I.C.)	Δ ~ Δ (O.G.) / AREA CODE (I.C.)	AUTHORIZATION CODE (O.G.) / Δ ~ (I.C.) Δ	Δ Δ

118	119 — 124	125 — 128
	ADVICE OF CHARGE (O.G.)	Δ ~ Δ	ETX
Δ	Δ ~(I.C.) Δ	

CONDITION CODE FOR ADVICE OF CHARGE

STX : START OF TEXT
SA : STATION ADDRESS (0)
UA : UNIT ADDRESS (!)
O.G. : OUTGOING CALL
I.C. : INCOMING CALL
Δ : SPACE (No Information)
ETX : END OF TEXT

CALL RECORD DESCRIPTION FOR OUTGOING CALLS

The elements of a call record for outgoing calls are illustrated and described in followings.

Character		Description
	STX	START OF TEXT: Indication of start of text.
	SA	STATION ADDRESS (0)
	UA	UNIT ADDRESS (!)
001	ENTRY INDEX "K"	ENTRY INDEX: "K" indicates that SMDR call record will follow.
002	TYPE OF RECORD "A"	TYPE OF RECORD: "A" indicates that the call record is an outgoing call record.
003	ROUTE No.-HUNDREDS	
004	ROUTE No.-TENS	OUTGOING TRUNK INFORMATION:
005	ROUTE No.-UNITS	The Outgoing Trunk Information indicates the actual trunk seized on an outgoing call as a route number and trunk number.
006	TRUNK No.-HUNDREDS	
007	TRUNK No.-TENS	
008	TRUNK No.-UNITS	
009	CALLING PARTY I.D.	All fields would be filled with characters, even if the number of digits of the route number/trunk number is smaller than that of the fields to be filled.
010	TENANT No.-TENS	(Route number 01 is expressed as 001)
011	TENANT No.-UNITS	
012	CALLING No.-1	CALLING PARTY INFORMATION:
013	CALLING No.-2	The Calling Party Information consists of a maximum of nine characters, indicating the calling party information as follows.
014	CALLING No.-3	
015	CALLING No.-4	
016	CALLING No.-5	
017	CALLING No.-6	

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- Calling Party Identification (Character 009)
  0=PBX/Centrex Station
  1=Attendant (Operator)
  2=Trunk Route Number + Trunk Number

- Tenant Number 01-63 (Character 010-011)

- Calling Number (Character 012-017)
  Station Number, if Calling Party Identification is 0
  Attendant Number, if Calling Party Identification is 1
  Outgoing Trunk Route Number and Trunk Number on Tandem Switching, if Calling Party Identification is 2

  The spaces will follow the Station Number, Attendant Number, Trunk Route Number and Trunk Number.

Character		
018	MONTH	-TENS
019	MONTH	-UNITS
020	DAY	-TENS
021	DAY	-UNITS
022	HOUR	-TENS
023	HOUR	-UNITS
024	MINUTE	-TENS
025	MINUTE	-UNITS
026	SECOND	-TENS
027	SECOND	-UNITS
028	MONTH	-TENS
029	MONTH	-UNITS
030	DAY	-TENS
031	DAY	-UNITS
032	HOUR	-TENS
033	HOUR	-UNITS
034	MINUTE	-TENS
035	MINUTE	-UNITS
036	SECOND	-TENS
037	SECOND	-UNITS

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TIME OF START CONVERSATION:
   The Time of Start Conversation indicates when the called party answered a call in terms of months, days, hours, minutes and seconds.

   Called party answered time is actually entered 18-24 seconds after the last digit is dialed, assuming no answer signal is given from the Central Office.

TIME OF CALL COMPLETION:
   The Time of Call Completion indicates when the trunk is disconnected or a call is transferred in terms of months, days, hours, minutes and seconds.

Character	
038	ACCOUNT CODE-1
039	ACCOUNT CODE-2
040	ACCOUNT CODE-3
041	ACCOUNT CODE-4
042	ACCOUNT CODE-5
043	ACCOUNT CODE-6
044	ACCOUNT CODE-7
045	ACCOUNT CODE-8
046	ACCOUNT CODE-9
047	ACCOUNT CODE-10
048	SPACE
049	SPACE
050	SPACE
051	CONDITION CODE-1
052	CONDITION CODE-2
053	CONDITION CODE-3
054	ROUTE NUMBER 1
055	ROUTE NUMBER 1
056	ROUTE NUMBER 1
057	ROUTE NUMBER 2
058	ROUTE NUMBER 2
059	ROUTE NUMBER 2

CONTINUED ON
NEXT PAGE

ACCOUNT CODE:
In case the Account Code provided (Condition Code= 020), the Account Code entered by a calling station is shown. Account code consists of a maximum of ten characters.

CONDITION CODE:
The Condition Code consists of three characters, indicating the type of methods used for setting up a call. Individual characters indicate the following information.

- Condition Code-1 (Character 051)
  0=Ordinarily originated call
  1=Transferred call

- Condition Code-2 (Character 052)
  0=A call without Account Code
  2=Account Code has been entered

- Condition Code-3 (Character 053)
  0=Station originated call
  1=Attendant assisted call

ROUTE ADVANCE INFORMATION:
The route number l and 2 fields record the route number actually selected. These will be identical with the route number in the characters 3 through 5 in the outgoing trunk route information characters fields.

Character		
060	CALLED NUMBER-1	
061	CALLED NUMBER-2	
062	CALLED NUMBER-3	CALLED NUMBER:
:	:	The Called Number Information consists of a maximum
:	:	of 24 characters. The spaces will follow the number.
082	CALLED NUMBER-23	
083	CALLED NUMBER-24	
084	SPACE	
:	:	
091	SPACE	
092	CALL METERING-1	CALL METERING:
093	CALL METERING-2	Metering pulse is counted if the metering pulse are pro-
094	CALL METERING-3	vided from the public exchange.
095	CALL METERING-4	All fields would be filled with characters, even if the num-
096	SPACE	ber of digits of the Call Metering is smaller than that of
:	:	the fields to be filled (such as 001).
103	SPACE	
104	AUTHORIZATION CODE-1	
105	AUTHORIZATION CODE-2	
106	AUTHORIZATION CODE-3	
107	AUTHORIZATION CODE-4	
108	AUTHORIZATION CODE-5	AUTHORIZATION CODE:
109	AUTHORIZATION CODE-6	Authorization Code consists of a maximum of ten charac-
110	AUTHORIZATION CODE-7	ters. The spaces will follow the Authorization Code.
111	AUTHORIZATION CODE-8	
112	AUTHORIZATION CODE-9	
113	AUTHORIZATION CODE-10	
114	SPACE	
:	:	
117	SPACE	
118	CONDITION CODE	CONDITION CODE FOR ADVICE OF CHARGE:
119	A.O.C	The Condition Code indicates the following charging
:	:	information of the Advice of Charge.
124	A.O.C	0: No charging (CM08>404=0)
		1: Charge by 0.1 cent
125	SPACE	2: Charge by 1 cent
:	:	
128	SPACE	ADVICE OF CHARGE:
	ETX	The Advice of Charge consists of six characters, indicat-

ADVICE OF CHARGE:
The Advice of Charge consists of six characters, indicat-
ing the Advice of Charge from the public exchange.
• When Condition Code is 2:
000000-999999=$0.000-$999.999
• When Condition Code is 1:
100000-999999=$1000.00-$9999.99
END OF TEXT: Indication of end of text

CALL RECORD DESCRIPTION FOR INCOMING CALLS

The elements of a call record for incoming calls are illustrated and described in followings.

Character		
	STX	START OF TEXT: Indication of start of text
	SA	STATION ADDRESS (0)
	UA	UNIT ADDRESS (!)
001	ENTRY INDEX "K"	ENTRY INDEX: "K" indicates that SMDR call record will follow.
002	TYPE OF RECORD "E"	TYPE OF RECORD: "E" indicates that the call record is an outgoing call record.
003	ROUTE No.-HUNDREDS	
004	ROUTE No.-TENS	
005	ROUTE No.-UNITS	INCOMING TRUNK INFORMATION:
006	TRUNK No.-HUNDREDS	The Incoming Trunk Information indicates the actual trunk seized on an incoming call as a route number and trunk number.
007	TRUNK No.-TENS	
008	TRUNK No.-UNITS	
009	CALLED PARTY I.D.	All fields would be filled with characters, even if the number of digits of the route number/trunk number is smaller than that of the fields to be filled.
010	TENANT No.-TENS	(Route number 01 is expressed as 001)
011	TENANT No.-UNITS	
012	CALLED No.-1	CALLED PARTY INFORMATION:
013	CALLED No.-2	The Called Party Information consists of a maximum of nine characters, indicating the call destination information as follows.
014	CALLED No.-3	
015	CALLED No.-4	
016	CALLED No.-5	
017	CALLED No.-6	

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INCOMING TRUNK INFORMATION:

The Incoming Trunk Information indicates the actual trunk seized on an incoming call as a route number and trunk number.

All fields would be filled with characters, even if the number of digits of the route number/trunk number is smaller than that of the fields to be filled.
(Route number 01 is expressed as 001)

CALLED PARTY INFORMATION:

The Called Party Information consists of a maximum of nine characters, indicating the call destination information as follows.

• Called Party Identification (Character 009)
0=PBX/Centrex Station
1=Attendant (Operator)
2=Trunk Route Number + Trunk Number

• Tenant Number 01-63 (Character 010-011)

• Called Number (Character 012-017)
Station Number, if Called Party Identification is 0
Attendant Number, if Called Party Identification is 1
Incoming Trunk Route Number and Trunk Number on Tandem Switching, if Called Party Identification is 2

The spaces will follow the Station Number, Attendant Number, Trunk Route Number and Trunk Number.

Character		
018	MONTH	-TENS
019	MONTH	-UNITS
020	DAY	-TENS
021	DAY	-UNITS
022	HOUR	-TENS
023	HOUR	-UNITS
024	MINUTE	-TENS
025	MINUTE	-UNITS
026	SECOND	-TENS
027	SECOND	-UNITS
028	MONTH	-TENS
029	MONTH	-UNITS
030	DAY	-TENS
031	DAY	-UNITS
032	HOUR	-TENS
033	HOUR	-UNITS
034	MINUTE	-TENS
035	MINUTE	-UNITS
036	SECOND	-TENS
037	SECOND	-UNITS

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TIME OF START CONVERSATION:
The Time of Start Conversation indicates when the called party answered a call in terms of months, days, hours, minutes and seconds.

Called party answered time is actually entered 18-24 seconds after the last digit is dialed, assuming no answer signal is given from the Central Office.

TIME OF CALL COMPLETION:
The Time of Call Completion indicates when the trunk is disconnected or a call is transferred in terms of months, days, hours, minutes and seconds.

Character		
038	ACCOUNT CODE-1	
039	ACCOUNT CODE-2	
040	ACCOUNT CODE-3	
041	ACCOUNT CODE-4	
042	ACCOUNT CODE-5	
043	ACCOUNT CODE-6	
044	ACCOUNT CODE-7	
045	ACCOUNT CODE-8	
046	ACCOUNT CODE-9	
047	ACCOUNT CODE-10	
048	SPACE	
049	SPACE	
050	SPACE	
051	CONDITION CODE-1	
052	CONDITION CODE-2	
053	CONDITION CODE-3	
054	ROUTE NUMBER 1	
055	ROUTE NUMBER 1	
056	ROUTE NUMBER 1	
057	ROUTE NUMBER 2	
058	ROUTE NUMBER 2	
059	ROUTE NUMBER 2	

CONTINUED ON
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ACCOUNT CODE:
In case the Account Code provided (Condition Code= 020), the Account Code entered by a calling station is shown. Account code consists of a maximum of ten characters.

CONDITION CODE:
The Condition Code consists of three characters, indicating the type of methods used for setting up a call. Individual characters indicate the following information.

- Condition Code-1 (Character 051)
  0=Ordinarily originated call
  1=Transferred call

- Condition Code-2 (Character 052)
  0=A call without Account Code
  2=Account Code has been entered

- Condition Code-3 (Character 053)
  0=Station originated call
  1=Attendant assisted call

ROUTE ADVANCE INFORAMTION:
The route number 1 fields record the route number actually selected. These will be identical with the route number in the characters 3 through 5 in the incoming trunk route information characters fields.

The route number 2 fields are fixed to "000".

Character		
060	SPACE	
:	:	NO INFORMATION
091	SPACE	
092	0	
:	:	
095	0	
096	AREA CODE-1	
097	AREA CODE-2	AREA CODE FOR CALLING PARTY
098	AREA CODE-3	
099	AREA CODE-4	
100	AREA CODE-1	
101	AREA CODE-2	AREA CODE FOR BILLING OFFICE
102	AREA CODE-3	
103	AREA CODE-4	
104	AUTHORIZATION CODE-1	
105	AUTHORIZATION CODE-2	
106	AUTHORIZATION CODE-3	
107	AUTHORIZATION CODE-4	AUTHORIZATION CODE:
108	AUTHORIZATION CODE-5	Authorization Code consists of a maximum of ten charac-
109	AUTHORIZATION CODE-6	ters. The spaces will follow the Authorization Code.
110	AUTHORIZATION CODE-7	
111	AUTHORIZATION CODE-8	
112	AUTHORIZATION CODE-9	
113	AUTHORIZATION CODE-10	
114	SPACE	
115	:	
116	:	
117	SPACE	
118	SPACE	
:	:	NO INFORMATION
:	:	
127	SPACE	
128	SPACE	
	ETX	END OF TEXT: Indication of end of text

EXAMPLE OF VARIOUS RECORD IN CALLING PARTY INFORMATION

• Station Number Recording in Calling Party Information

Character	
009	0
010	1
011	1
012	4
013	5
014	6
015	5
016	Δ
017	Δ

Δ: SPACE

EXAMPLE:
Calling Party Identification 0=Station
Tenant Number: 11
Station Number: 4565

This information is generated by the following calls.
Outgoing/Incoming Call from/to a station
Outgoing/Incoming Call from/to a station with an attendant assistance
Transferred Call

• Attendant Number Recording in Calling Party Information

Character	
009	1
010	0
011	0
012	1
013	1
014	Δ
015	Δ
016	Δ
017	Δ

Δ: SPACE

EXAMPLE:
Calling Party Identification 1=Attendant
Tenant Number: 00
Attendant Number: 11

This information is generated by Outgoing/Incoming Call from/to an attendant.

• Trunk Route and Trunk Number Recording in Calling Party Information

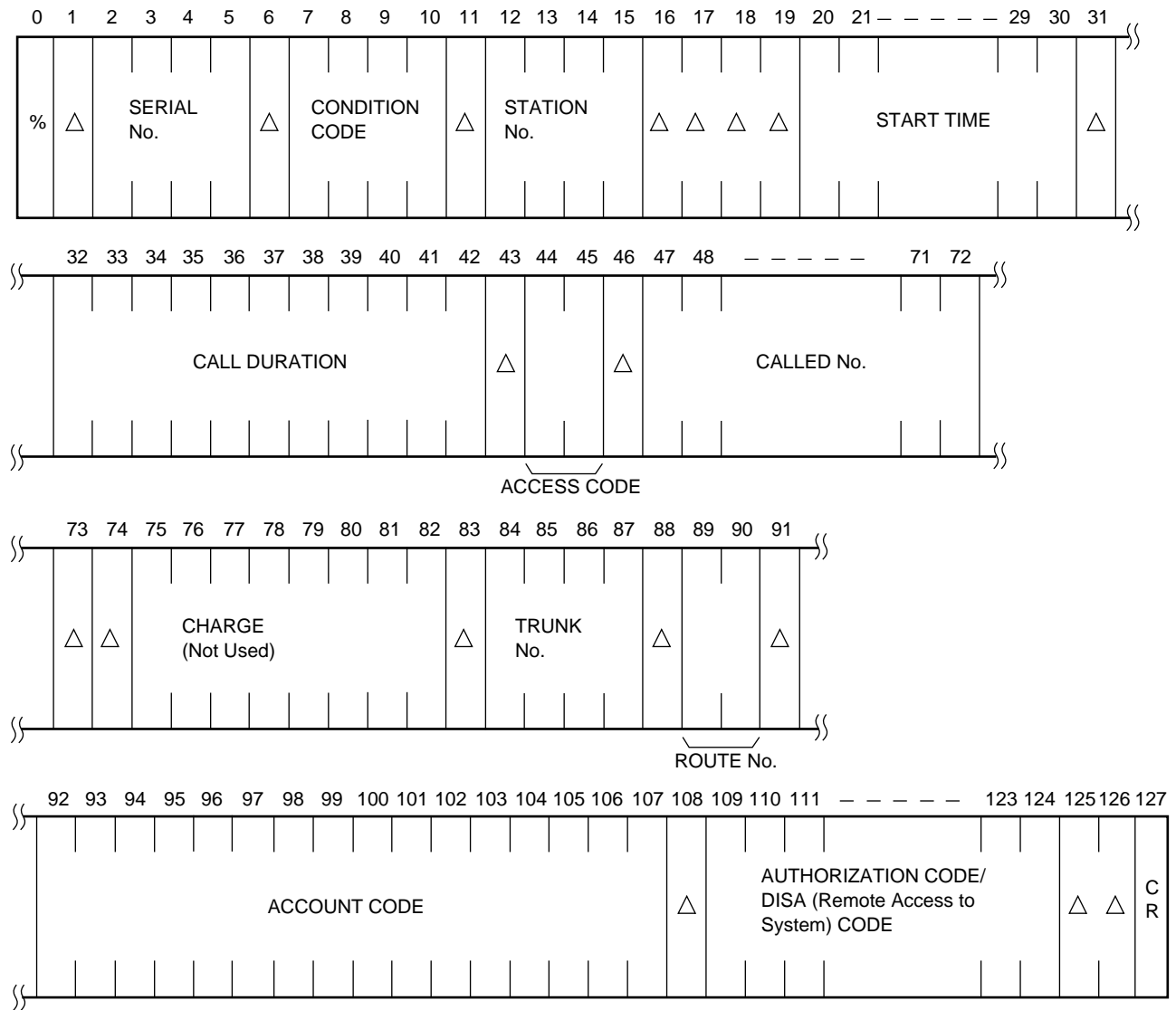| Character	
009	2
010	0
011	0
012	0
013	0
014	7
015	0
016	0
017	4

EXAMPLE:
Calling Party Identification 2=Trunk Route + Trunk
Tenant Number: 00
Trunk Route Number: 007
Trunk Number: 004

This information is generated by the following calls.
Direct Tandem Call
Tandem Call with attendant assistance
Trunk to Trunk Connection Call with station assistance

NEAX 1400 IMS Format

NEAX 1400 IMS Format

△ : SPACE (20H)

Start Character

0

| % |

Each call record begins with a start character-% (percent sign).

Serial No.

2 3 4 5

| X | X | X | X |

Each call record is provided with a serial number from 0000 to 9999. After 9999, the counter is reset to 0000.

Condition Code

7 8 9 10

| X | X | X | X |

The Condition Code provides the type of call recorded, e.g. Trunk Queuing-Outgoing, IC-Incoming, TM-Tandem, etc.

(Example)

| 7 | 8 | 9 | 10 | | 7 | 8 | 9 | 10 | | 7 | 8 | 9 | 10 | | 7 | 8 | 9 | 10 | | 7 | 8 | 9 | 10 |
| $\overline{O}$ | G | △ | △ | | I | C | △ | △ | | T | M | △ | △ | | $\overline{O}$ | G | – | Q | | $\overline{O}$ | G | – | T |

Condition Code

CONDITION CODE				MEANING
7	**8**	**9**	**10**	
O	G			Outgoing Call
I	C			Incoming Call
T	M			Tandem Call
		△	△	Normal IC/OG Call
		—	A	The call transferred by Attendant
		—	T	The call transferred by another station
		—	S	The call transferred by Serial Call
		—	Q	The call originated by Trunk Queuing-Outgoing

Station No.

- On station to trunk calls, the station number is provided in this area.
- Valid digits are 0-9, *, and #.
- For station numbers that are less than 4 digits, a space is inserted, as shown below.

(Example)

Route No.

Trunk No.

- If both originating and outgoing connections are trunks (tandem switching), then the trunk number and trunk route are provided in 12-18, for the originating trunk (Condition Code: TM △ △)/outgoing trunk (Condition Code: IC △ △).

- Character 12 shows a "T".
- Characters 13-15 show the originating/outgoing trunk number (000-255).
- Character 16 is a space.
- Characters 17 and 18 show the trunk route number (00-63).

Start Time

20	21	22	23	24	25	26	27	28	29	30
X	X	/	X	X	△	X	X	:	X	X

MONTH   DAY   HOUR   MINUTES

- The start time of the call will be provided in characters 20-30. Month, day, hour and minutes are provided. The time is in 24 hour format (00:00 to 23:59) as shown below.

(Example)

20	21	22	23	24	25	26	27	28	29	30
0	1	/	0	1	△	0	0	:	0	0

20	21	22	23	24	25	26	27	28	29	30
1	2	/	3	1	△	2	3	:	5	9

- Character 22 is a slash (/) mark.
- Character 25 is a space.
- Character 28 is a colon (:).

Call Duration

32	33	34	35	36	37	38	39	40	41	42
X	X	:	X	X	'	X	X	.	X	"

- The call duration is provided in characters 32-42.
- Character 37 is the symbol (') for minutes.
- Character 42 is the symbol (") for seconds.
- Duration is provided in hours, minutes and seconds. (Seconds are provided to the nearest 0.5 seconds.)

(Example)

20	21	22	23	24	25	26	27	28	29	30
0	0	:	0	0	'	0	1	"	△	△

In the case of 1 second
(minimum)

20	21	22	23	24	25	26	27	28	29	30
9	9	:	5	9	'	5	9	.	5	"

In the case of maximum time
(99 hours, 59 minutes and 59.5 seconds.)

Access Code

44	45
X	X

- Characters 44 and 45 provide the dialed trunk access code.
- Single digit access codes are provided in character 44. In this case, 45 is a space.
- Valid digits are 0-9, * and # for both (or either) characters 44 and 45.

Called No.

47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

(Digit Count)

- Characters 47-72 provide the dialed number sent out on the trunk.
- Valid digits are 0-9, * and #.
- Maximum number of digits is 26. The number is displayed from left to right, starting at character 47. For dialed numbers less than 26 digits, spaces are used to fill in, after the number dialed.

Charge

75	76	77	78	79	80	81	82
$	X	X	X	X	.	X	X

- Characters 75 to 82 are used to provide the charge for the call.
- Normally this area is filled in with spaces, as shown below.

(Example)

75	76	77	78	79	80	81	82
△	△	△	△	△	△	△	△

Trunk No.

84	85	86	87
T	X	X	X

- Characters 84 through 87 are used to provide the numbers of the accessed trunks (T000-T255).
- Character 84 is a "T" for trunk.

Route No.

89	90
X	X

- Characters 89 and 90 provide the trunk route number (00-63) of the accessed trunk.

Account Code

92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

(Digit Count)   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16

- Characters 92-107 provide the account code, when dialed, up to a maximum of 16 digits. When not dialed, this area is full of spaces.
- The account code is displayed starting from character 92.
  If less than 16 digits are used, spaces will fill in after the number.
- For the tandem call, this area is full of spaces.

Authorization Code/DISA (Remote Access to System) Code

109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

(Digit Count)   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16

- Characters 109-124 provide the dialed authorization code/DISA code, up to a maximum of 16 digits.
- The authorization code/DISA code is displayed starting from character 109. If less than 16 digits are used, the remaining character locations are filled in with spaces.

End of Information

125	126	127
△	△	CR

- Characters 125-127 terminate information of the call record, by default programming.
- Characters 125 and 126 are spaces (20H). Character 127 is a carriage return (CR). See next page.

The following characters can be changed by CMD001>176.

CMD001>176 2nd Data	73 74	125 126 127	Purpose
0	△ △	△ △ CR	For a printer using 136 characters per line with automatic line feed.
1	△ △	△ CR LF	For a printer using 136 characters per line without automatic line feed.
2	△ △	CR LF LF	For providing a line space between call records on a 136 character printer.
3	△ CR	△ △ CR	For a printer using 80 characters per line with automatic line feed.
4	CR LF	△ CR LF	For a printer using 80 characters, without automatic line feed.
5	CR LF	CR LF LF	For a printer using 80 characters per line without automatic line feed and providing a line space between call records.

"△" = Space.
"CR" = Space.
"LF" = Space.

Built-in SMDR

The MP Built-in SMDR provides the NEAX 2400 IMS Format.
The figure below outlines the NEAX 2400 IMS Format on the Built-in SMDR.

Built-in SMDR (NEAX 2400 IMS Format)

			001	002	003 004 005	006 007 008	009	010 011	012 013 014 015 016 017
STX	SA	UA	K	A/E	TRUNK ROUTE No. 000-063	TRUNK No. 000-255	I.D.	TENANT No. 01-63	CALLING/CALLED No.

- OUTGOING/INCOMING TRUNK INFORMATION
- TYPE OF RECORD "A/E"
- ENTRY INDEX "K"
- CALLING/CALLED PARTY IDENTIFICATION
- CALLING/CALLED PARTY INFORMATION

018 019	020 021	022 023	024 025 026 027	028 029	030 031	032 033	034 035 036 037	038 047
MONTH	DAY	HOUR	MINUTE / SECOND	MONTH	DAY	HOUR	MINUTE / SECOND	ACCOUNT CODE

TIME OF START CONVERSATION — TIME OF CALL COMPLETION

048 049 050	051 052 053	054 055 056	057 058 059	060 091
Δ Δ Δ	CONDITION CODE	ROUTE No. 1	ROUTE No. 2 (O.G.) / 000 (I.C.)	CALLED NUMBER (O.G.) / Δ ~ (I.C.) ~ Δ

- ROUTE ADVANCE INFORMATION

092 093 094 095	096 097 098 099	100 101 102 103	104 .... 111 112 113	114 115	116 117
CALL METERING (O.G.) / 0000 (I.C.)	CALLING OFFICE No. (O.G.) / AREA CODE (I.C.)	BILLING OFFICE No. (O.G.)	AUTHORIZATION CODE (O.G.) / Δ ~ (I.C.) Δ	CALL START YEAR	CALL END YEAR

118	119 124	125	...	128
Δ	ADVICE OF CHARGE (O.G.) / Δ ~(I.C.) Δ	Δ	~	Δ ETX

- CONDITION CODE FOR ADVICE OF CHARGE

STX : START OF TEXT
SA : STATION ADDRESS (0)
UA : UNIT ADDRESS (!)
O.G. : OUTGOING CALL
I.C. : INCOMING CALL
Δ : SPACE (No Information)
ETX : END OF TEXT

CALL RECORD DESCRIPTION FOR OUTGOING CALLS

The elements of a call record for outgoing calls are illustrated and described in followings.

Character

	STX
	SA
	UA
001	ENTRY INDEX "K"
002	TYPE OF RECORD "A"
003	ROUTE No.-HUNDREDS
004	ROUTE No.-TENS
005	ROUTE No.-UNITS
006	TRUNK No.-HUNDREDS
007	TRUNK No.-TENS
008	TRUNK No.-UNITS
009	CALLING PARTY I.D.
010	TENANT No.-TENS
011	TENANT No.-UNITS
012	CALLING No.-1
013	CALLING No.-2
014	CALLING No.-3
015	CALLING No.-4
016	CALLING No.-5
017	CALLING No.-6

CONTINUED ON
NEXT PAGE

START OF TEXT: Indication of start of text.
STATION ADDRESS (0)
UNIT ADDRESS (!)
ENTRY INDEX: "K" indicates that SMDR call record will follow.
TYPE OF RECORD: "A" indicates that the call record is an outgoing call record.

OUTGOING TRUNK INFORMATION:
The Outgoing Trunk Information indicates the actual trunk seized on an outgoing call as a route number and trunk number.

All fields would be filled with characters, even if the number of digits of the route number/trunk number is smaller than that of the fields to be filled.
(Route number 01 is expressed as 001)

CALLING PARTY INFORMATION:
The Calling Party Information consists of a maximum of nine characters, indicating the calling party information as follows.
- Calling Party Identification (Character 009)
  0=PBX/Centrex Station
  1=Attendant (Operator)
  2=Trunk Route Number + Trunk Number
- Tenant Number 01-63 (Character 010-011)
- Calling Number (Character 012-017)
  Station Number, if Calling Party Identification is 0
    When the calling station number is 6 digits, the last 6 digits will be indicated. The first 2 digits will be indicated in Character 096-097.
  Attendant Number, if Calling Party Identification is 1
  Outgoing Trunk Route Number and Trunk Number on Tandem Switching, if Calling Party Identification is 2

The spaces will follow the Station Number, Attendant Number, Trunk Route Number and Trunk Number.

Character		
018	MONTH	-TENS
019	MONTH	-UNITS
020	DAY	-TENS
021	DAY	-UNITS
022	HOUR	-TENS
023	HOUR	-UNITS
024	MINUTE	-TENS
025	MINUTE	-UNITS
026	SECOND	-TENS
027	SECOND	-UNITS
028	MONTH	-TENS
029	MONTH	-UNITS
030	DAY	-TENS
031	DAY	-UNITS
032	HOUR	-TENS
033	HOUR	-UNITS
034	MINUTE	-TENS
035	MINUTE	-UNITS
036	SECOND	-TENS
037	SECOND	-UNITS

TIME OF START CONVERSATION:
The Time of Start Conversation indicates when the called party answered a call in terms of months, days, hours, minutes and seconds.

Called party answered time is actually entered 18-24 seconds after the last digit is dialed, assuming no answer signal is given from the Central Office.

TIME OF CALL COMPLETION:
The Time of Call Completion indicates when the trunk is disconnected or a call is transferred in terms of months, days, hours, minutes and seconds.

CONTINUED ON
NEXT PAGE

Character	
038	ACCOUNT CODE-1
039	ACCOUNT CODE-2
040	ACCOUNT CODE-3
041	ACCOUNT CODE-4
042	ACCOUNT CODE-5
043	ACCOUNT CODE-6
044	ACCOUNT CODE-7
045	ACCOUNT CODE-8
046	ACCOUNT CODE-9
047	ACCOUNT CODE-10
048	SPACE
049	SPACE
050	SPACE
051	CONDITION CODE-1
052	CONDITION CODE-2
053	CONDITION CODE-3
054	ROUTE NUMBER 1
055	ROUTE NUMBER 1
056	ROUTE NUMBER 1
057	ROUTE NUMBER 2
058	ROUTE NUMBER 2
059	ROUTE NUMBER 2

CONTINUED ON
NEXT PAGE

ACCOUNT CODE:
   In case the Account Code provided (Condition Code= 020), the Account Code entered by a calling station is shown. Account code consists of a maximum of ten characters.

CONDITION CODE:
   The Condition Code consists of three characters, indicating the type of methods used for setting up a call. Individual characters indicate the following information.

   • Condition Code-1 (Character 051)
     0=Ordinarily originated call
     1=Transferred call

   • Condition Code-2 (Character 052)
     0=A call without Account Code
     2=Account Code has been entered

   • Condition Code-3 (Character 053)
     0=Station originated call
     1=Attendant assisted call

ROUTE ADVANCE INFORMATION:
   The route number 1 and 2 fields record the route number actually selected. These will be identical with the route number in the characters 3 through 5 in the outgoing trunk route information characters fields.

Character		
060	CALLED NUMBER-1	
061	CALLED NUMBER-2	
062	CALLED NUMBER-3	
:	:	
:	:	
090	CALLED NUMBER-31	
091	CALLED NUMBER-32	
092	CALL METERING-1	
093	CALL METERING-2	
094	CALL METERING-3	
095	CALL METERING-4	
096	CALLING OFFICE No.-1	
097	CALLING OFFICE No.-2	
098	CALLING OFFICE No.-3	
099	CALLING OFFICE No.-4	
100	BILLING OFFICE No.-1	
101	BILLING OFFICE No.-2	
102	BILLING OFFICE No.-3	
103	BILLING OFFICE No.-4	
104	AUTHORIZATION CODE-1	
105	AUTHORIZATION CODE-2	
106	AUTHORIZATION CODE-3	
107	AUTHORIZATION CODE-4	
108	AUTHORIZATION CODE-5	
109	AUTHORIZATION CODE-6	
110	AUTHORIZATION CODE-7	
111	AUTHORIZATION CODE-8	
112	AUTHORIZATION CODE-9	
113	AUTHORIZATION CODE-10	
114	YEAR	-TENS
115	YEAR	-UNITS
116	YEAR	-TENS
117	YEAR	-UNITS
118	CONDITION CODE	
119	A.O.C.	
:	:	
124	A.O.C.	
125	SPACE	
:	:	
128	SPACE	
	ETX	

CALLED NUMBER:
The Called Number Information consists of a maximum of 32 characters. The spaces will follow the number.

CALL METERING:
Metering pulse is counted if the metering pulse are provided from the public exchange.
All fields would be filled with characters, even if the number of digits of the Call Metering is smaller than that of the fields to be filled (such as 001).

CALLING OFFICE NUMBER ON TANDEM CALL/
CALLING STATION NUMBER (FIRST 2 DIGITS):
Calling office number on tandem call consists of a maximum of 4 characters.
Or, the first 2 digits of the calling station number (Character 096-097), if the station number is more than 6 digits. In this case, the calling office number is not indicated.

BILLING OFFICE NUMBER ON TANDEM CALL:
Billing office number on tandem call consists of a maximum of 4 characters.

AUTHORIZATION CODE:
Authorization Code consists of a maximum of ten characters. The spaces will follow the Authorization Code.

YEAR OF START CONVERSATION

YEAR OF CALL COMPLETION

CONDITION CODE FOR ADVICE OF CHARGE:
The Condition Code indicates the following charging information of the Advice of Charge.
0: No charging (CM08>404=0)
1: Charge by 0.1 cent
2: Charge by 1 cent

ADVICE OF CHARGE:
The Advice of Charge consists of six characters, indicating the Advice of Charge from the public exchange.
• When Condition Code is 2:
  000000-999999=$0.000-$999.999
• When Condition Code is 1:
  100000-999999=$1000.00-$9999.99

END OF TEXT: Indication of end of text

CALL RECORD DESCRIPTION FOR INCOMING CALLS

The elements of a call record for incoming calls are illustrated and described in followings.

Character		
	STX	START OF TEXT: Indication of start of text
	SA	STATION ADDRESS (0)
	UA	UNIT ADDRESS (!)
001	ENTRY INDEX "K"	ENTRY INDEX: "K" indicates that SMDR call record will follow.
002	TYPE OF RECORD "E"	TYPE OF RECORD: "E" indicates that the call record is an outgoing call record.
003	ROUTE No.-HUNDREDS	
004	ROUTE No.-TENS	
005	ROUTE No.-UNITS	
006	TRUNK No.-HUNDREDS	
007	TRUNK No.-TENS	
008	TRUNK No.-UNITS	
009	CALLED PARTY I.D.	
010	TENANT No.-TENS	
011	TENANT No.-UNITS	
012	CALLED No.-1	
013	CALLED No.-2	
014	CALLED No.-3	
015	CALLED No.-4	
016	CALLED No.-5	
017	CALLED No.-6	

CONTINUED ON
NEXT PAGE

INCOMING TRUNK INFORMATION:

The Incoming Trunk Information indicates the actual trunk seized on an incoming call as a route number and trunk number.

All fields would be filled with characters, even if the number of digits of the route number/trunk number is smaller than that of the fields to be filled.
(Route number 01 is expressed as 001)

CALLED PARTY INFORMATION:

The Called Party Information consists of a maximum of nine characters, indicating the call destination information as follows.

- Called Party Identification (Character 009)
  0=PBX/Centrex Station
  1=Attendant (Operator)
  2=Trunk Route Number + Trunk Number

- Tenant Number 01-63 (Character 010-011)

- Called Number (Character 012-017)
  Station Number, if Called Party Identification is 0
  Attendant Number, if Called Party Identification is 1
  Incoming Trunk Route Number and Trunk Number on Tandem Switching, if Called Party Identification is 2

  The spaces will follow the Station Number, Attendant Number, Trunk Route Number and Trunk Number.

Character		
018	MONTH	-TENS
019	MONTH	-UNITS
020	DAY	-TENS
021	DAY	-UNITS
022	HOUR	-TENS
023	HOUR	-UNITS
024	MINUTE	-TENS
025	MINUTE	-UNITS
026	SECOND	-TENS
027	SECOND	-UNITS
028	MONTH	-TENS
029	MONTH	-UNITS
030	DAY	-TENS
031	DAY	-UNITS
032	HOUR	-TENS
033	HOUR	-UNITS
034	MINUTE	-TENS
035	MINUTE	-UNITS
036	SECOND	-TENS
037	SECOND	-UNITS

TIME OF START CONVERSATION:

The Time of Start Conversation indicates when the called party answered a call in terms of months, days, hours, minutes and seconds.

Called party answered time is actually entered 18-24 seconds after the last digit is dialed, assuming no answer signal is given from the Central Office.

TIME OF CALL COMPLETION:

The Time of Call Completion indicates when the trunk is disconnected or a call is transferred in terms of months, days, hours, minutes and seconds.

Character		
038	ACCOUNT CODE-1	
039	ACCOUNT CODE-2	
040	ACCOUNT CODE-3	
041	ACCOUNT CODE-4	
042	ACCOUNT CODE-5	
043	ACCOUNT CODE-6	
044	ACCOUNT CODE-7	
045	ACCOUNT CODE-8	
046	ACCOUNT CODE-9	
047	ACCOUNT CODE-10	
048	SPACE	
049	SPACE	
050	SPACE	
051	CONDITION CODE-1	
052	CONDITION CODE-2	
053	CONDITION CODE-3	
054	ROUTE NUMBER 1	
055	ROUTE NUMBER 1	
056	ROUTE NUMBER 1	
057	ROUTE NUMBER 2	
058	ROUTE NUMBER 2	
059	ROUTE NUMBER 2	

CONTINUED ON
NEXT PAGE

ACCOUNT CODE:
In case the Account Code provided (Condition Code=020), the Account Code entered by a calling station is shown. Account code consists of a maximum of ten characters.

CONDITION CODE:
The Condition Code consists of three characters, indicating the type of methods used for setting up a call. Individual characters indicate the following information.

- Condition Code-1 (Character 051)
  0=Ordinarily originated call
  1=Transferred call

- Condition Code-2 (Character 052)
  0=A call without Account Code
  2=Account Code has been entered

- Condition Code-3 (Character 053)
  0=Station originated call
  1=Attendant assisted call

ROUTE ADVANCE INFORAMTION:
The route number 1 fields record the route number actually selected. These will be identical with the route number in the characters 3 through 5 in the incoming trunk route information characters fields.

The route number 2 fields are fixed to "000".

Character		
060	SPACE	
:	:	NO INFORMATION
091	SPACE	
092	0	
:	:	
095	0	
096	AREA CODE-1	
097	AREA CODE-2	AREA CODE FOR CALLNG PARTY
098	AREA CODE-3	
099	AREA CODE-4	
100	AREA CODE-1	
101	AREA CODE-2	AREA CODE FOR BILLING OFFICE
102	AREA CODE-3	
103	AREA CODE-4	
104	AUTHORIZATION CODE-1	
105	AUTHORIZATION CODE-2	
106	AUTHORIZATION CODE-3	AUTHORIZATION CODE:
107	AUTHORIZATION CODE-4	Authorization Code consists of a maximum of ten charac-
108	AUTHORIZATION CODE-5	ters. The spaces will follow the Authorization Code.
109	AUTHORIZATION CODE-6	
110	AUTHORIZATION CODE-7	
111	AUTHORIZATION CODE-8	
112	AUTHORIZATION CODE-9	
113	AUTHORIZATION CODE-10	
114	YEAR -TENS	YEAR OF START CONVERSATION
115	YEAR -UNITS	
116	YEAR -TENS	YEAR OF CALL COMPLETION
117	YEAR -UNITS	
118	SPACE	
119	SPACE	
:	:	NO INFORMATION
:	:	
127	SPACE	
128	SPACE	
	ETX	END OF TEXT: Indication of end of text

EXAMPLE OF VARIOUS RECORD IN CALLING PARTY INFORMATION

- Station Number Recording in Calling Party Information

Character	
009	0
010	1
011	1
012	4
013	5
014	6
015	5
016	Δ
017	Δ

Δ: SPACE

EXAMPLE:
Calling Party Identification 0=Station
Tenant Number: 11
Station Number: 4565

This information is generated by the following calls.
Outgoing/Incoming Call from/to a station
Outgoing/Incoming Call from/to a station with an attendant assistance
Transferred Call

- Attendant Number Recording in Calling Party Information

Character	
009	1
010	0
011	0
012	1
013	1
014	Δ
015	Δ
016	Δ
017	Δ

Δ: SPACE

EXAMPLE:
Calling Party Identification 1=Attendant
Tenant Number: 00
Attendant Number: 11

This information is generated by Outgoing/Incoming Call from/to an attendant.

- Trunk Route and Trunk Number Recording in Calling Party Information

Character	
009	2
010	0
011	0
012	0
013	0
014	7
015	0
016	0
017	4

EXAMPLE:
Calling Party Identification 2=Trunk Route + Trunk
Tenant Number: 00
Trunk Route Number: 007
Trunk Number: 004

This information is generated by the following calls.
Direct Tandem call
Tandem call with attendant assistance
Trunk to Trunk Connection Call with station assistance

MCI SPECIFICATIONS

This chapter explains the line control characteristics of the Message Center Interface (MCI) and the data transmission protocol.

LINE CONTROL CHARACTERISTICS

The PBX provides two kinds of MCI (Message Center Interface); MCI with AP00 card and MCI with MP card.
The data link hardware consists of an RS-232C serial interface to the PBX.

Line Control Characteristics (MCI with AP00)

ITEM	DESCRIPTION
Data Rate	1200, 2400, 4800, 9600 bps asynchronous, software selectable **NOTE:** For the Port 1 and Port 3, data speed 9600 bps can not be set.
Operating Mode	Half duplex
Electrical Interface Characteristic	EIA RS-232C electrical standard interface
Signal Form	EIA RS-404
Interface Distance	Max. 15 m (49.2 ft.) between PBX and VMS (without modem) **NOTE:** When modems are used, full duplex asynchronous type modems are required.
Word Framing	10 bits (1 start, 7 data, 2 stop)
Parity* VRC	No parity, even parity, odd parity; selected by PBX system data
Frame Contents	US ASCII 7-bit codes
Control	Contention
Priority Sequence	Primary station: PBX Secondary station: VMS

*VRC: Vertical Redundancy Check

Line Control Characteristics (MCI with MP)

ITEM	DESCRIPTION
Data Rate	1200, 2400, 4800, 9600 bps asynchronous, software selectable
Operating Mode	Full duplex
Electrical Interface Characteristic	EIA RS-232C electrical standard interface
Signal Form	EIA RS-404
Interface Distance	Max. 15 m (49.2 ft.) between PBX and VMS (without modem) **NOTE:** When modems are used, full duplex asynchronous type modems are required.
Word Framing	10 bit (1 start, 7 data, 2 stop)
Parity* VRC	No parity
Frame Contents	US ASCII 7-bit codes
Protocol	Free Wheel
Error control	None
Control	Contention
Priority Sequence	Primary station: PBX Secondary station: VMS

*VRC: Vertical Redundancy Check

DATA TRANSMISSION PROTOCOL

The MCI with AP00 and the MCI with MP have the same data transmission protocol.
The table below shows the transmission control codes used for the data exchange between the PBX and the VMS.

MCI Data Transmission Protocol

CODE	DESCRIPTION
SA	System Address: ASCII code 31_{16} (digit "1")
UA	Unit Address: ASCII code 21_{16} (exclamation point "!")
STX	Indication of the start of message text
ETX	Indication of the end of message text
EI	Entry Index. Describes the type of message sent

General Message Format

The figure below shows the MCI general message format.

MCI General Message Format

S T X	S A	U A	E I	Message Text	E T X

Key: STX   Start of Text
      SA   System Address
      UA   Unit Address
      EI   Entry Index
      ETX   End of Text

Connecting Pattern Message Format (PBX to VMS)

This message format is used to identify the connecting pattern for Message Waiting control.
The data is sent to a VMS when terminating a call to the VMS.
The figures below show the case that the maximum number of digits for station number in the message format is 6 digits (CMD000>137=0 for MCI with AP00, CM08>708 for MCI with MP).

Connecting Pattern Message Format (PBX to VMS)

• Basic Format (without ANI)
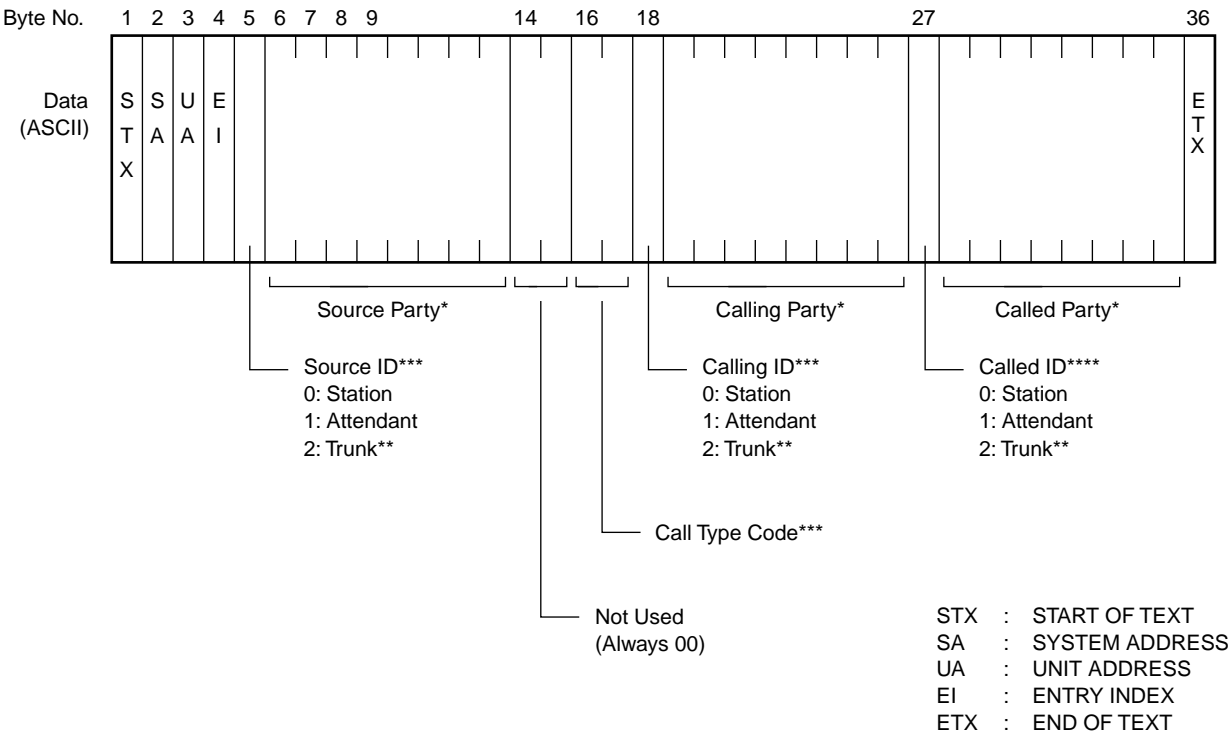
* This contains the station number, trunk number, or attendant number. The information in this field is left-justified.
** Trunk can be COT, DIT, DID.
*** See "Call Type Code". ☞ *page 41*
**** See "Example of Source ID/Calling ID/Called ID/Expanded Calling ID". ☞ *page 42*

Connecting Pattern Message Format (PBX to VMS)

- Expanded Format (with ANI)
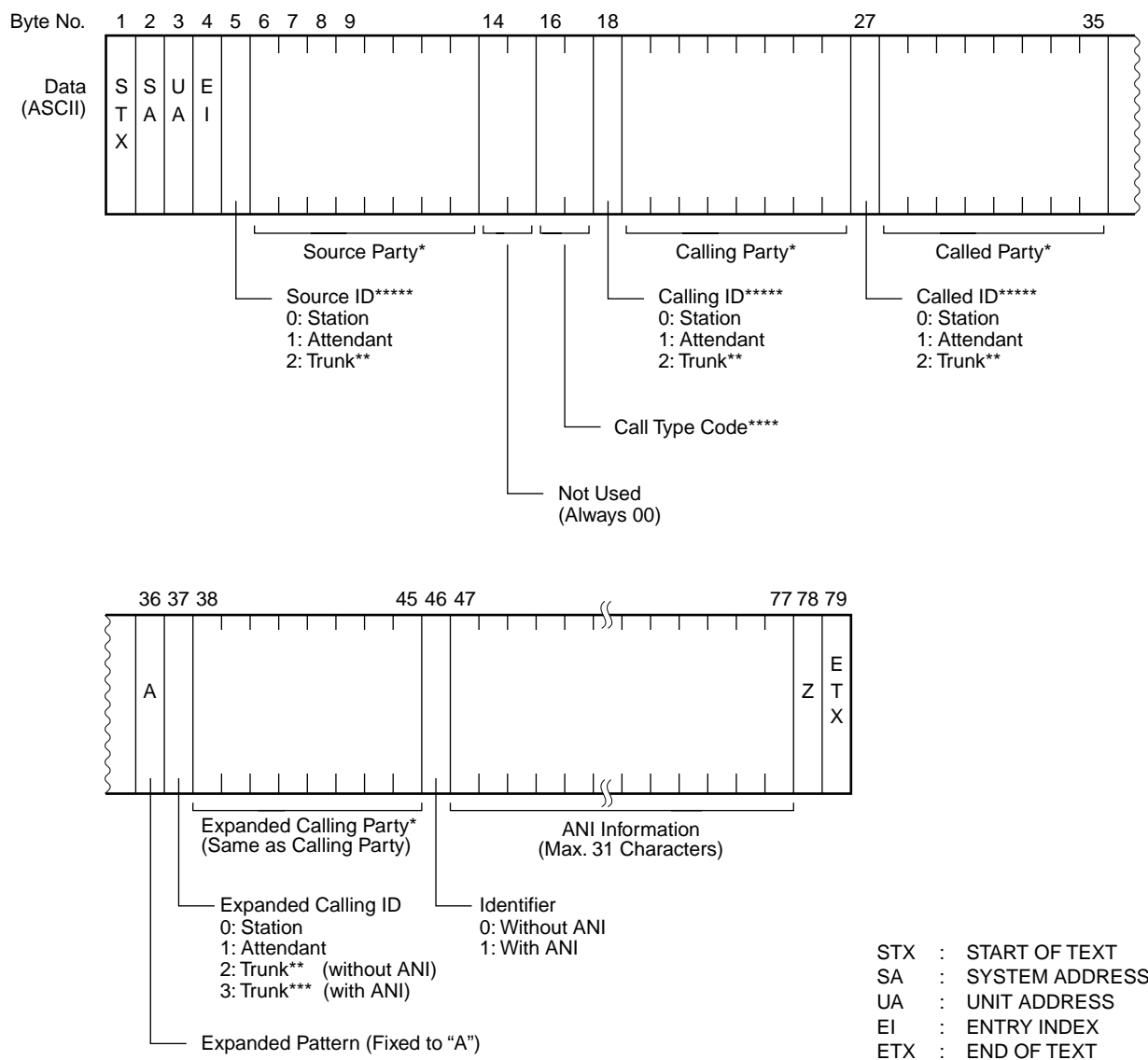
* This contains the station number, trunk number, or attendant number. The information in this field is left-justified.

** Trunk can be COT, DIT, DID.

*** Trunk can be ISDN, MFC, Caller ID.

**** See "Call Type Code". ☞ *page 41*

***** See "Example of Source ID/Calling ID/Called ID/Expanded Calling ID".
☞ *page 42*

Call Type Code

CALL TYPE CODE	CALL TYPE	SOURCE PARTY	CALLING PARTY	CALLED PARTY
40	Call Forwarding-Don't Answer (No Answer)	Station	Station/Trunk	Station
41	Call Forwarding-Busy Line	Station	Station/Trunk	Station
42	Call Forwarding-All Calls	Station	Station/Trunk	Station
43	Station/Trunk	Station	Station/Trunk	UCD Pilot
44	Station/Trunk via Attendant	Station	Station/Trunk	Attendant
45	Station/Trunk transferred to UCD Pilot Station	Station	Station/Trunk	Station

Example of Source ID/Calling ID/Called ID/Expanded Calling ID

- Source ID/Calling ID/Called ID/Expanded Calling ID: Station

Data | 0 | 0 | 1 | 4 | 1 | 2 | 3 | △ | △

Station No. (In this example, Station No.=4123)

Tenant No. (In this example, Tenant No.=01)

ID=0

△ : Blank
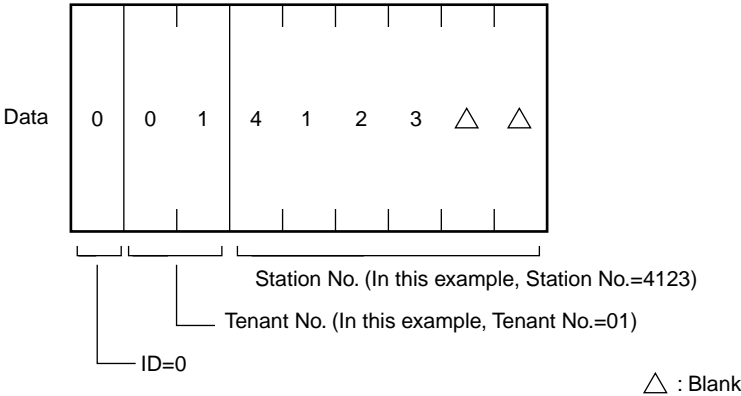
- Source ID/Calling ID/Called ID/Expanded Calling ID: Attendant

Data | 1 | 0 | 2 | 0 | 5 | △ | △ | △ | △

Blank

Attendant No. (In this example, Attendant No.=05)

Tenant No. (In this example, Tenant No.=02)

ID=1

△ : Blank

- Source ID/Calling ID/Called ID: Expanded Calling ID: Trunk

Data | 2 | 0 | 3 | 0 | 2 | 5 | 0 | 9 | 0

Trunk No. (In this example, Trunk No.=090)

Route No. (In this example, Route No.=025)

Tenant No. (In this example, Tenant No.=03)

ID=2 (without ANI)/3 (with ANI)
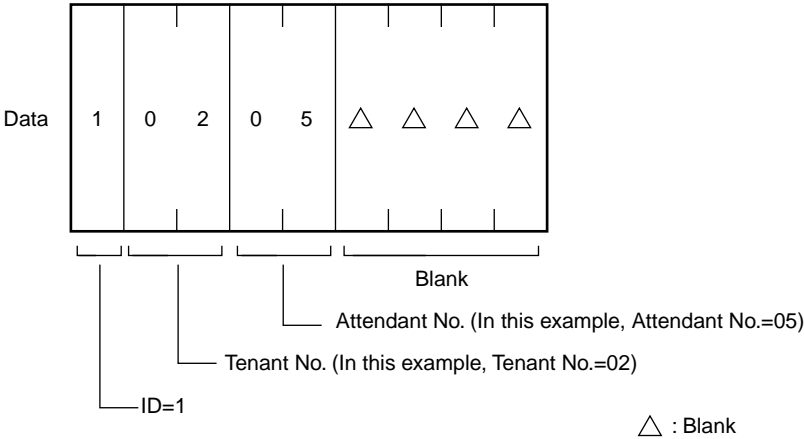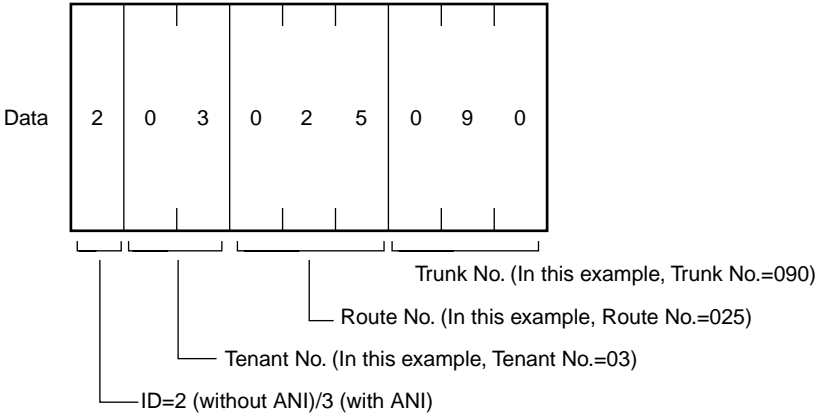
Message Waiting Control Message Format (VMS to PBX)

This message format is used to control Message Waiting lamp on a called station from a VMS. The data is sent to the PBX from VMS in the format shown below.

Message Waiting Lamp Control Message Format (VMS to PBX)

- When using Tenant No.:

Byte No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data (ASCII)	STX	SA	UA	EI														ETX

Byte 5: MW lamp status
0: OFF
1: ON
5: OFF

Bytes 6–11: Station 1*
Bytes 12–17: Station 2*

- When not using Tenant No.:

Byte No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Data (ASCII)	STX	SA	UA	EI														ETX

Byte 5: MW lamp status
0: OFF
1: ON
5: OFF

Bytes 6–11: Station 1*
Bytes 12–17: Station 2*
Byte 18: Tenant No. (Not used)
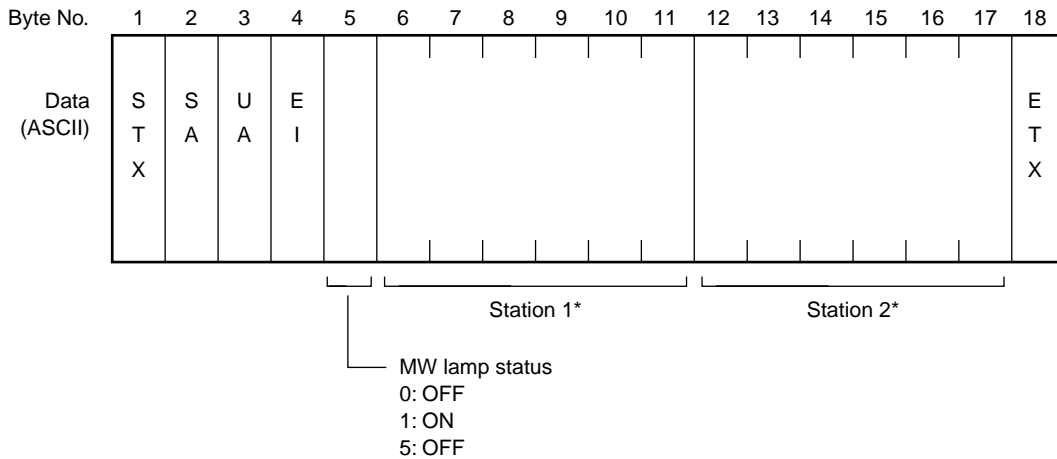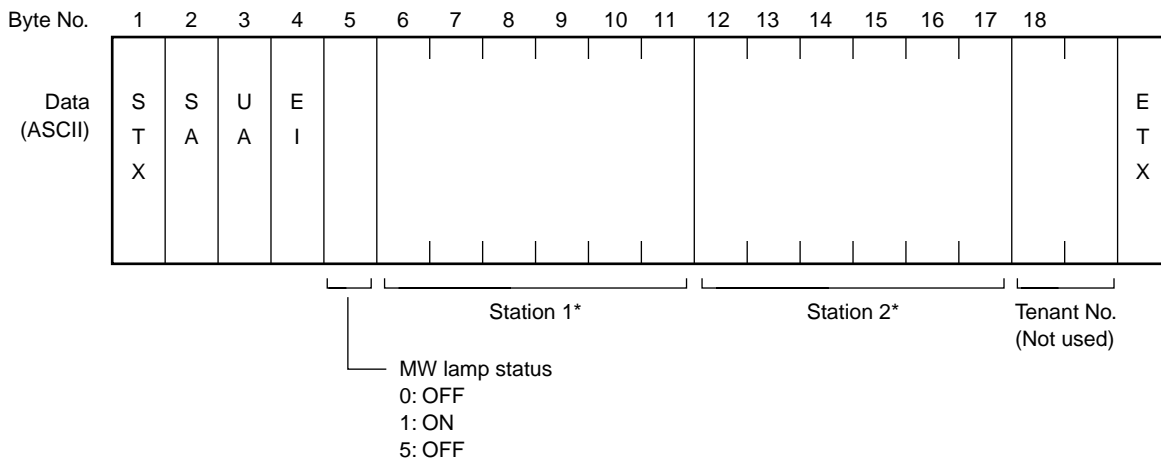
* For details on Station 1 and Station 2, see "Message Waiting Lamp Control Information".
☞ *page 44*

Message Waiting Lamp Control Information

CONDITION	STATION 1 DATA	STATION 2 DATA	DESCRIPTION
1	Station No.	Blank	Station/MW On/Off
2	Station No.	Station No.	No control
3	Blank	Blank	All stations MW On/Off

MCI Stop Message Format (PBX to VMS)

This message format is used to stop receiving a Message Waiting lamp control data from a VMS temporarily.

The data is sent to the VMS in the format shown below when Message Waiting lamp is set or cancelled for all stations in the system.

MCI Stop Message Format (PBX to VMS)

Byte No. 0 1 2 3 4 5 6 7 8 9   15 16   35

| Data (ASCII) | STX | SA | UA | EI | BLANK | 3 | 9 | BLANK | ETX |

Call Type Code (39)

STX : START OF TEXT
SA : SYSTEM ADDRESS
UA : UNIT ADDRESS
EI : ENTRY INDEX
ETX : END OF TEXT

MCI Restart Message Format (PBX to VMS)

This message format is used to restart receiving a Message Waiting lamp control data from a VMS.

The data is sent to the VMS in the format shown below when the system is initialized or when Message Waiting lamp is set or cancelled for all stations in the system.

MCI Restart Message Format (PBX to VMS)

Byte No.	0	1	2	3	4 5 6 7 8 9	15	16		35
Data (ASCII)	S T X	S A	U A	E I	BLANK	6	6	BLANK	E T X

Call Type Code (66)
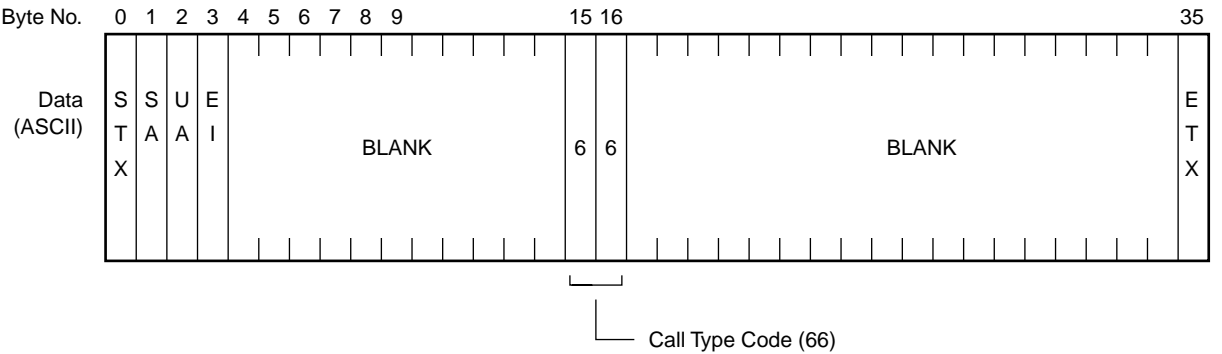
STX : START OF TEXT
SA : SYSTEM ADDRESS
UA : UNIT ADDRESS
EI : ENTRY INDEX
ETX : END OF TEXT

PMS INTERFACE SPECIFICATIONS

This chapter explains the line control characteristics of the Property Message System (PMS) interface and the data transmission protocol.

LINE CONTROL CHARACTERISTICS

The data link hardware consists of an RS-232C serial interface to the PBX.

Line Control Characteristics (PMS)

ITEM	DESCRIPTION
Data Rate	1200, 2400, 4800, 9600 bps, asynchronous, software selectable NOTE: For the Port 1 and Port 3, data speed 9600 bps can not be used.
Operating Mode	Half duplex
Electrical Interface Characteristic	EIA RS-232C electrical standard interface
Signal Form	EIA RS-404
Interface Distance	Max. 15 m (49.2 ft.) between PBX and PMS (without modem) NOTE: When modems are used, full duplex asynchronous type modems are required.
Word Framing	10 bits (1 start, 7 data, 1 parity, 1 stop) or 11 bits (1 start, 7 data, 1 parity, 2 stop)
Parity* VRC	No parity, even parity, odd parity; selected by PBX system data
Parity** LRC	Exclusive OR of message text
Frame Contents	US ASCII 7-bit codes
Control	Contention
Priority Sequence	Primary station: PBX Secondary station: PMS

*VRC : Vertical Redundancy Check
**LRC: Longitudinal Redundancy Check

DATA TRANSMISSION PROTOCOL

This section discusses the protocol for data exchange between the PBX and the PMS. The following control codes are used for data exchange:

PMS Data Transmission Protocol

CODE	DESCRIPTION
SA	System Address: ASCII code 31_{16} (digit "1")
UA	Unit Address: ASCII code 21_{16} (exclamation point "!")
STX	Indication of the start of message text
ETX	Indication of the end of message text
ACK	Positive acknowledgment of message text or selecting sequence
NAK	Negative acknowledgment of message text or selecting sequence
ENQ	Request for acknowledgment of message text, or last byte of selecting sequence
EOT	Indication of end of transmission or release of the data link by the sender
DLE "<"	Indication of interruption for the receiver to ask the sender for permission to send
DLE "|"	Indication of interruption for the receiver to ask the sender to stop transmission

NOTE: A chart listing the ASCII codes for these characters is given on next page.

ASCII Code

DECIMAL	HEX	CHARACTER	DECIMAL	HEX	CHARACTER	DECIMAL	HEX	CHARACTER
0	00	NUL (null)	43	2B	+	86	56	V
1	01	SOH	44	2C	,	87	57	W
2	02	STX	45	2D	-	88	58	X
3	03	ETX	46	2E	.	89	59	Y
4	04	EOT	47	2F	/	90	5A	Z
5	05	ENQ	48	30	0	91	5B	[
6	06	ACK	49	31	1	92	5C	\
7	07	BEL	50	32	2	93	5D	]
8	08	BS	51	33	3	94	5E	^
9	09	TAB	52	34	4	95	5F	_
10	0A	NEW LINE	53	35	5	96	60	`
11	0B	VT	54	36	6	97	61	a
12	0C	FF	55	37	7	98	62	b
13	0D	RETURN	56	38	8	99	63	c
14	0E	SO	57	39	9	100	64	d
15	0F	SI	58	3A	:	101	65	e
16	10	DLE	59	3B	;	102	66	f
17	11	DC1	60	3C	<	103	67	g
18	12	DC2	61	3D	=	104	68	h
19	13	DC3	62	3E	>	105	69	i
20	14	DC4	63	3F	?	106	6A	j
21	15	NAK	64	40	@	107	6B	k
22	16	SYN	65	41	A	108	6C	l
23	17	ETB	66	42	B	109	6D	m
24	18	CAN	67	43	C	110	6E	n
25	19	EM	68	44	D	111	6F	o
26	1A	SUB	69	45	E	112	70	p
27	1B	ESC	70	46	F	113	71	q
28	1C	FS	71	47	G	114	72	r
29	1D	GS	72	48	H	115	73	s
30	1E	RS	73	49	I	116	74	t
31	1F	US	74	4A	J	117	75	u
32	20	SP (space)	75	4B	K	118	76	v
33	21	!	76	4C	L	119	77	w
34	22	"	77	4D	M	120	78	x
35	23	#	78	4E	N	121	79	y
36	24	$	79	4F	O	122	7A	z
37	25	%	80	50	P	123	7B	{
38	26	&	81	51	Q	124	7C	Ω
39	27	'	82	52	R	125	7D	}
40	28	(	83	53	S	126	7E	¨
41	29	)	84	54	T	127	7F	DEL (delete)
42	2A	*	85	55	U			

General Message Format

The message will have the following general format:

PMS General Message Format

S T X	Message text	E T X	B C C

Each message has a different length depending on its function. BCC is the block check code (longitudinal redundancy checksum).
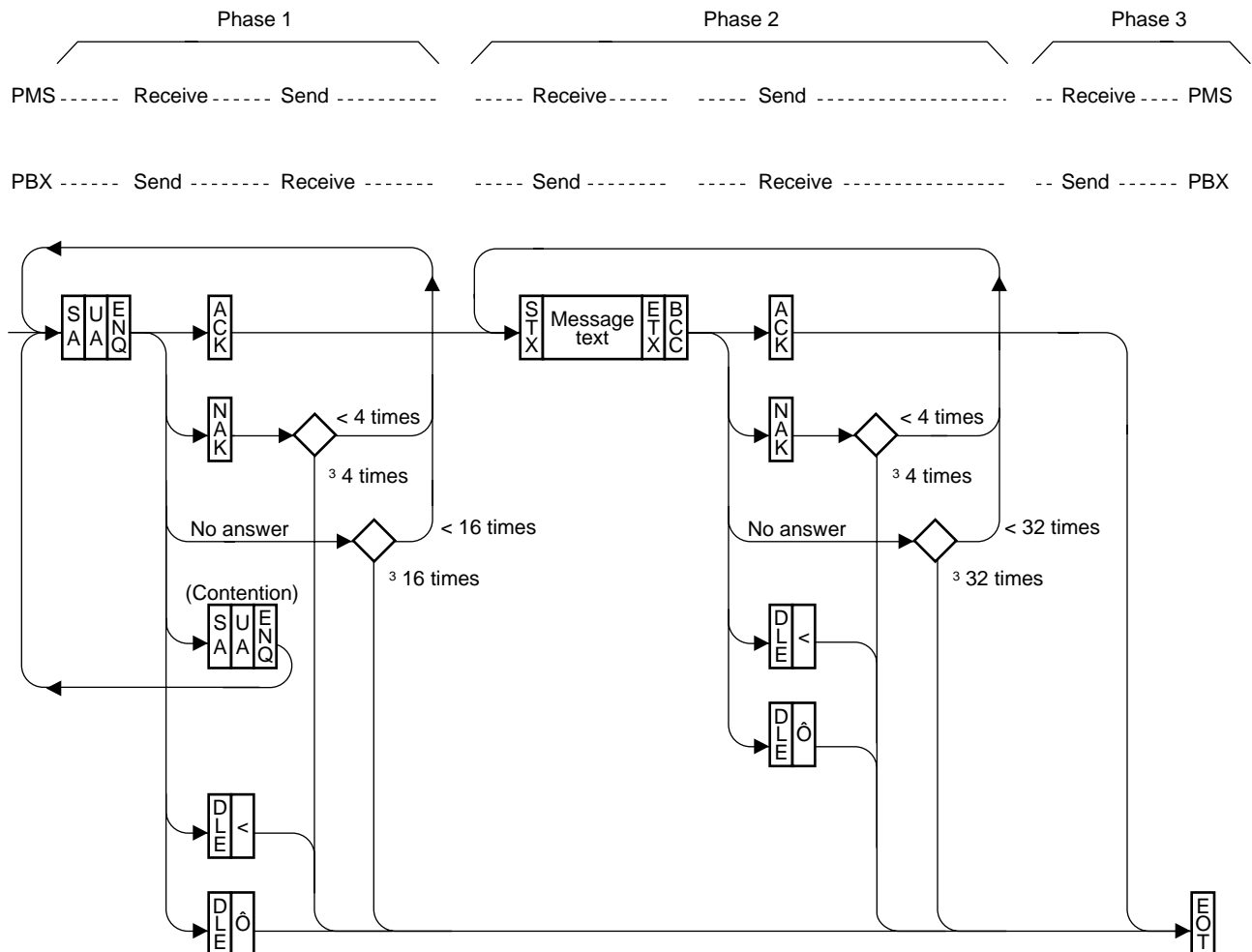
Exchange Protocol and Message Responses

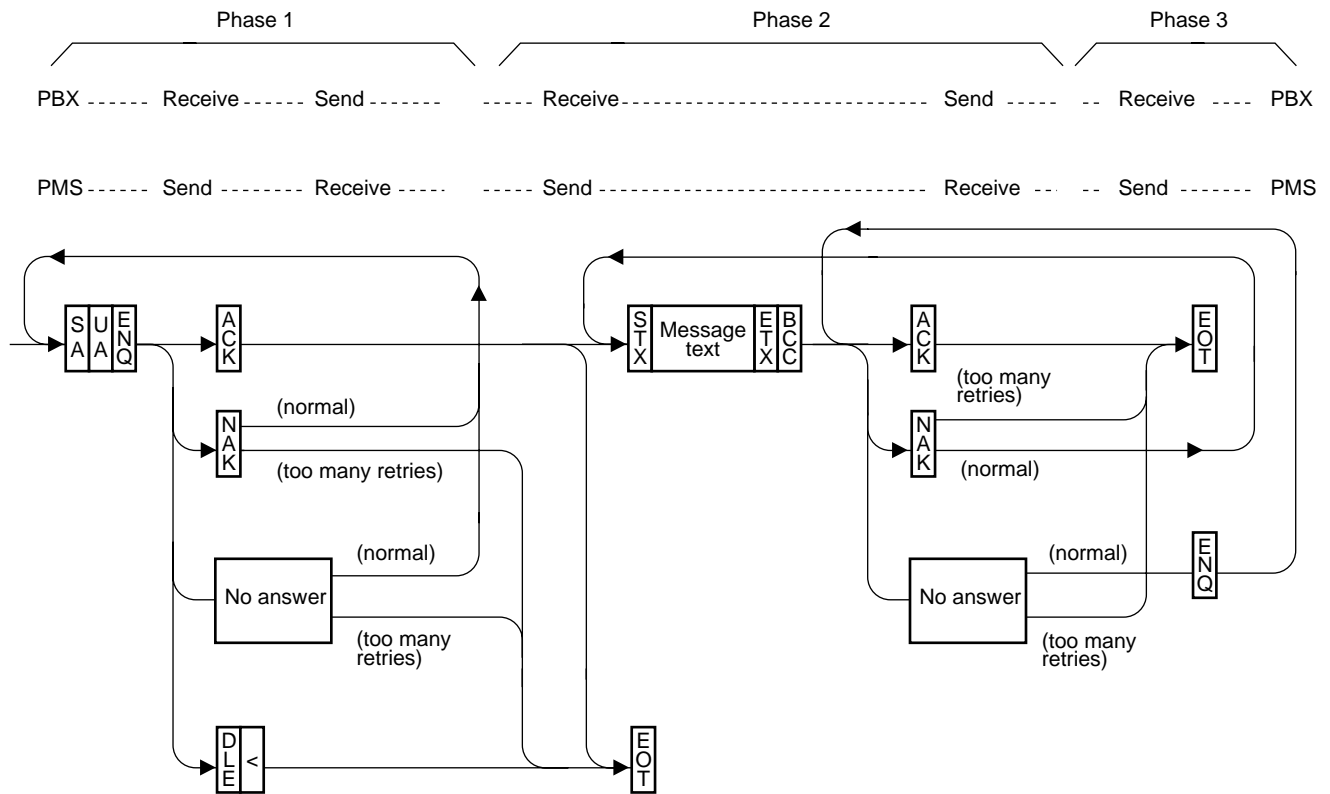In this exchange protocol, the following communication phases are included:

Phase 1   Initiation of the data link

Phase 2   Data transmission

Phase 3   Release of the data link

Figures below show the operation of the protocol. The text on the following pages describes the three phases in detail.

Data Transmission from PBX to PMS

Data Transmission from PMS to PBX

Example of PMS Data Link Protocol

Typical message sequence with no errors

Sequence with error: PMS responds with NAK

PMS

PBX

Parity error

PBX retransmits; some data is lost

Timeout occurs;
PBX asks for status

PBX retransmits again (successfully)

PMS

No ETX received:
PMS does not answer

PBX

Timeout occurs;
PBX retransmits

PMS Timer 2 expires

PMS

No answer

Lost

No message

Lost

PBX

Timeout occurs;
PBX takes control

PMS

PBX

(1) Phase 1: Initiation of the Data Link
For initiating the data link, the following control codes are used.

(a) Transmission of the selecting sequence codes
The sender transmits selecting sequence codes (SA-UA-ENQ) before the message text
to ensure that the receiver is available.

(b) Answer for the selecting sequence codes
- **Positive acknowledgment (ACK).** If the receiver is ready to receive the message text,
it transmits the ACK code. When the sender receives the ACK code, it enters Phase 2
to send the message text.
- **Negative acknowledgment (NAK).** If the receiver is not ready or detects a VRC error,
it transmits the NAK code. If the sender has received the NAK code four times, it enters
Phase 3 to release the data link.
- **Interruption for permission to send (DLE "<").** If the receiver has information for the
sender, it transmits the DLE "<" code to ask for permission to send. When the sender
receives the DLE "<" code, it enters Phase 3 to release the data link.
- **Selecting sequence codes (SA-UA-ENQ).** If both systems try to initiate the data link
at the same time, the PBX has priority. The PMS should return to an idle state and wait
for the PBX to send the codes again.
- **No answer.** If the sender does not receive ACK, NAK, or DLE during the Timer 1
interval, it will retransmit the selecting sequence code up to 16 times. If no answer is
received after 16 retries, the sender enters Phase 3 to release the data link.

(2) Phase 2: Data Transmission
In Phase 2, the following codes are used:

(a) Transmission of the message text
The sender transmits the message text, starting with the STX code, and ending with the
ETX code followed by the BCC.

(b) Answer for the message text
- **Positive acknowledgment (ACK).** When the message text is received correctly, the
receiver transmits the ACK code. When the ACK code is received, the sender enters
Phase 3 to release the data link. If the sender has several messages to send, it can send
them successively without entering Phase 3 after each transmission.

- **Negative acknowledgment (NAK).** If the receiver does not receive the message correctly due to VRC or LRC error, or receives a message text with an undefined code, etc., the receiver transmits the NAK code. When the NAK is received, the sender retransmits the same message text up to four times. After four attempts, the sender enters Phase 3 to release the data link.

- **Interruption to stop transmission (DLE "|").** If the receiver is not ready to receive the message text because its buffer is full, it transmits the DLE "|" code to ask the sender to stop the transmission. When the sender receives the DLE "|" code, it enters Phase 3 to release the data link. In this case, the sender should recognize that its last message was not received correctly.

- **Interruption for permission to send (DLE "<").** If the receiver has information for the sender, it transmits the DLE "<" code to ask for permission to send. When the sender receives the DLE "<" code, it enters Phase 3 to release the data link.

- **No answer.** If the sender does not receive ACK, NAK, DLE "<", or DLE "|" during the Timer 1 interval, it sends the ENQ code to request an answer for the previous message. It sends the ENQ code up to 32 times. If no answer is received after 32 attempts, the sender enters Phase 3 to release the data link.

(3) Phase 3: Release of the Data Link

The sender sends the EOT code to release the data link, then goes to Phase 1 when necessary to send another message. If the receiver does not receive the EOT code during the Timer 2 interval, it can begin sending messages.

Timing Considerations

The PBX has a 128-byte buffer for receiving messages from the PMS. It checks for incoming messages every 128 msec. If the PMS sends data faster than the PBX can process it, some data may be lost, resulting in retransmission of messages and a decrease in total message throughput.

Two software timers must be used to maintain data transmission. Timer 1 is maintained by the sender. Timer 2 is maintained by the receiver.

Timer 1

This timer begins counting when a selecting sequence code (SA, UA, ENQ), message text (STX ... BCC), or inquiry code (ENQ), is sent; and stops counting when a valid answer (ACK, NAK, DLE "|", or DLE "<") is received. The timer interval is one second. If timeout occurs after transmission of the selecting sequence codes, the codes are retransmitted up to 16 times. If timeout occurs after text or inquiry codes are transmitted, the inquiry code to request an answer is retransmitted up to 32 times.

Timer 2

This timer begins counting upon transmission of a positive acknowledgment code (ACK) for the selecting sequence code or message text, and stops counting upon receiving a message text or valid end code (EOT). The timer interval is 35 seconds. If timeout occurs, the receiver can enter Phase 1 to become the sender.
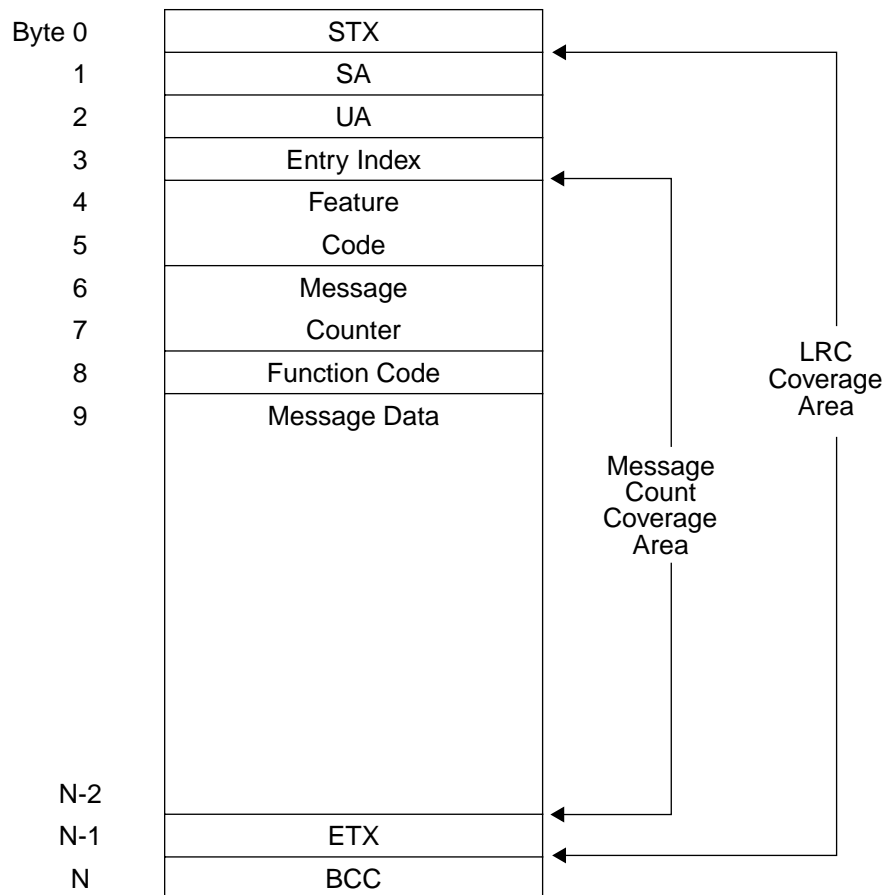
Message Text Format

As noted previously, the general format for a message is:

S T X	Message text	E T X	B C C

The message text consists of 7-bit ASCII codes plus 1 parity bit. The first 8 characters immediately following the STX are fixed in format, and indicate the format and length of the remaining bytes, which may vary depending on the message type. The message text format is as shown below.

PMS General Message Text Format

Byte 0	STX
1	SA
2	UA
3	Entry Index
4	Feature
5	Code
6	Message
7	Counter
8	Function Code
9	Message Data
N-2	
N-1	ETX
N	BCC

LRC Coverage Area

Message Count Coverage Area

• Entry Index

This character specifies which of the transmitted messages the PBX supplies. For the PMS interface, the ASCII code "L" is always used.

• Feature Code and Violation Code

The Feature Code consists of two digits that specify possible feature messages, such as "13" for Message Waiting, or "16" for Check In/Out functions.

When message data from the PMS specifies a station number that does not exist in the PBX, the PBX sends the message data back to the PMS with a Violation Code replacing the Feature Code frames. Also, a Violation Code is sent by the PBX in the following cases:

- Upon receipt of unused feature codes and function codes
- Upon receipt of unused restriction level
- When the Message Counter does not match the number of characters received.

The following Feature Codes and Violation Codes are used:

FEATURE CODE	VIOLATION CODE	FEATURE
11	91	Maid Status (from guest room telephone)
12	92	Maid Status (from preassigned telephone)
13	93	Message Waiting
14	94	Station Message Detail
15	95	Controlled Restriction
16	96	Check In/Out
17	97	Room Data Image
19	99	Wake Up
20	A0	Room Change/Room Swap
21	A1	Room Occupancy/Room Data Change
59	—	Direct Data Entry
70	—	Status Inquiry

• Message Counter

The Message Counter specifies the number of bytes in the message from the Feature Code through the last data character, inclusive. This counter is checked by the receiver, and if the value does not match the number of bytes received, the receiver discards the data and sends the Violation Code corresponding to the received Feature Code.

• Function Code

The Function Code specifies the action or process for a feature message.

• Message Data

The contents of the Message Data vary depending on the feature and function. The types of data that may be present are described below. Note that all numeric data is expressed using the ASCII digits "0" through "9" (codes 30_H through 39_H).

- Room Station Number (RSN)

The PBX Room Station Number consists of four digits, indicating the room number related to the Feature Code and Function Code. If the Room Station Number is less than four digits, unused bytes must be filled with trailing spaces. For example, if the Room Station Number is 432, the first digit "4" is placed in the first byte of the field, followed by "3," "2," and a space.

- Maid Identification Number

This number consists of two digits. The numbers in the bytes range from "10" to "99".

- Route Number and Trunk Number

These numbers each consist of three digits. The Route Number ranges from "000" to "063", and the Trunk Number ranges from "000" to "255." If the Route or Trunk Number consists of one or two digits, 0 must be placed in the high digit positions.

- Called Subscriber Number

This number consists of 16 characters, including the C.O. access code. If the number is less than 16 digits, unused bytes are filled with trailing spaces just like the Room Station Number.

- Call Start Time

This item consists of six characters indicating the hour, minute, and second as follows:

(Example)	0	7	0	1	0	9

Hour   Minute   Second
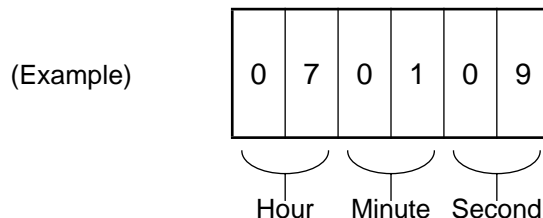
(24-hour format)

Call Start Time: 7:01:09 A.M. (7 hours, 1 minute, 9 seconds)

- Call Duration Time

This item consists of five characters, specifying the duration in seconds. If the duration is less than five digits, unused bytes are filled with ASCII "0" codes. For example, if the duration is 999 seconds, the frame arrangement is "00999."

- Restriction Level

This item consists of one digit, indicating the restriction status of the room station number:

RESTRICTION LEVEL	MEANING
0	Preassigned restriction
1	Set Room Cut Off
2-4	Not used
5	Set Do Not Disturb
6	Set Room Cut Off and Do Not Disturb

- Language

This item consists of one digit indicating one of the following languages:

CODE	MEANING
1	Japanese
2	English
3	German
4	French
5	Spanish
6	Chinese
7	Russian

- Room Occupancy
  This item consists of one digit whose value indicates two separate status items, as listed below:

CODE	VIP	ROOM KEY
1	No	In room
2	Yes	In room
3	No	At front desk
4	Yes	At front desk

- Guest Name
  This item consists of 15 characters. As in the Room Station Number, if the guest name is less than 15 characters, unused bytes must be filled with trailing spaces.

- Vacant/Occupied Status
  This item consists of one digit: "0" for Vacant; "1" for Occupied.

- Message Waiting Lamps Status
  This item consists of one digit: "0" for Off, and "1" for On.

- Reservation
  This item consists of one digit: "0" for Not Reserved, and "1" for Reserved.

- Maid Status

This item consists of one digit, ranging in value from 1 through 8, the room status. The exact meanings of these codes are determined by the PBX system manager. A sample set of values is listed below:

CODE	MEANING
1	Cleaning is necessary for the specified room.
2	The specified room is cleaned.
3	The specified room is ready for reservation.
4	The specified room is out of service.
5	The specified room needs repair.
6	The specified room is repaired.

NOTE: See the Maid Status (Feature code 11 or 12) in PMS operation for details on the use of this code.

- Wake Up Time

This item consists of four digits indicating the Wake Up hour and minute as shown below:

(Example)

| 0 | 8 | 0 | 0 |

Hour   Minute

Wake Up time: 8:00 a.m.

(24-hour format)
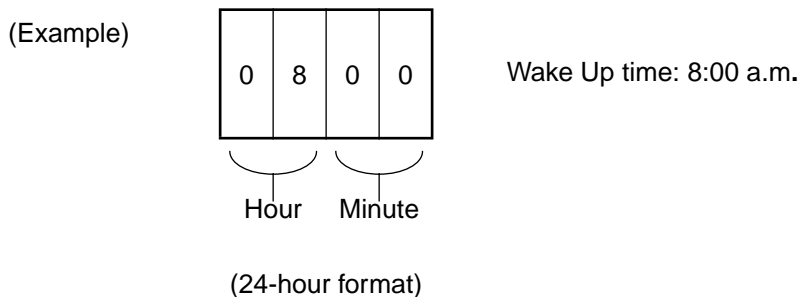
- Wake Up Result

This item consists of one digit indicating the following conditions:

CODE	MEANING
1	Answer
2	Busy
3	No answer
4	Blocked

- Guest/Administration Status
  This item consists of one digit: "0" for Administration, or "1" for Guest.

- Wake Up Set
  This item consists of one digit, indicating who set the Wake Up call. (See "PMS OPERATION, Wake Up (Feature code 19)." ☞ *page 87*)

CODE	MEANING
1	Guest
2	Operator
3	Administration
4	PMS

- Numeric Input
  In Direct Data Entry, this data represents numeric input to indicate the codes and quantities of the goods requested from a guest room station to the PMS. The numeric input is set into the Message Data field between the station number and Line Equipment Number. If the number is less than 8 digits, spaces are assigned to the remaining digit positions.

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PMS OPERATION

This chapter explains the operations associated with each PMS feature message. The set of feature messages used can vary from one PMS to another, depending on system applications. For each feature message, general operations and PBX and/or PMS function will be discussed, and function codes and their uses will be defined.

FEATURE CODE SUMMARY

The PMS feature codes available are summarized below.

PMS Feature Code Summary

FEATURE	CODE	TYPE OF INFORMATION
Maid Status	11	Maid status set up by guest room telephones
	12	Maid status set up by the front desk terminal
Message Waiting	13	MW lamp status changes
Station Message Detail	14	Local/toll call details on completion of calls
Controlled Restriction	15	Changes in telephone calling restrictions placed on room station numbers
Check In/Check Out	16	Room Check In/Check Out status
Room Data Image	17	Complete status information for a room
Wake Up	19	Wake Up status
Room Change/Room Swap	20	Room change/room swap status
Room Occupancy Change/Room Data Change	21	Room occupancy/room data changes
Direct Data Entry	59	Data entered from a guest room station
Status Inquiry	70	Data link maintenance

OPERATION OF TEXT

Maid Status (Feature code 11 or 12)

The maid status is transmitted to the PMS when an appropriate access code is dialed. Feature code 11 is used when dialed by guest room telephones. Feature code 12 is used when dialed by the Front Desk Terminal.

The function code can range in value from 1 through 8, and indicates the room status that was dialed. The exact meanings of these codes are determined by the property manager. A sample set of values is listed below:

FUNCTION CODE	MESSAGE DIRECTION	INDICATION
1	To PMS	Cleaning is necessary for the specified room
2	To PMS	The specified room is cleaned
3	To PMS	The specified room is ready for reservation
4	To PMS	The specified room is out of service
5	To PMS	The specified room needs repair
6	To PMS	The specified room is repaired

In addition to these six indications, the Maid Status message may be sent by the PBX to signal a Check In or Check Out from the Front Desk Terminal. In this case, the PMS must be programmed to respond to those function codes.

The maid status message is sent to the PMS in accordance with the PBX installation parameter setting for the maid status feature. (The feature must be active in the PBX.)

The following items should also be considered:

• When room change 20.1 is activated, a 12.1 message is sent for the room specified by the old station number.
• If a 16.2 or 20.1 message is activated by the PMS terminal, the Maid Status message will not be sent to the PMS from the PBX.
• When the maid identification code is not used, all bytes for the maid identification code will contain the ASCII space code.
• The PBX will not check whether or not the dialed maid identification code is valid.

Message Data Format

Byte No.	Field	Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	Feature code	High digit: "1" for normal or "9" for violation
5		Low digit: "1" for station, "2" for front desk
6	"1"	Message counter high digit
7	"7"	Message counter low digit
8	Function code	
9		
10	Station number	
11		
12		
13	Unused	Contains ASCII spaces
14		
15	Maid ID	High digit
16		Low digit
17		
18	Unused	Contains ASCII spaces
19		
20		
21	ETX	
22	BCC	LRC parity check byte

Message Waiting (Feature code 13)

The Message Waiting feature turns the MW lamp on and off at guest and administration telephones. It operates on commands entered on the Attendant Consoles or Front Desk Terminal, with notification to the PMS; or upon receipt of messages from the PMS. Four function codes are defined.

FUNCTION CODE	MESSAGE DIRECTION	MEANING
1	From PMS	Turn on MW lamp for the specified station
2	From PMS	Turn off MW lamp for the specified station
3	To PMS	The lamp for the specified station has been turned on via Attendant Console or Front Desk Terminal
4	To PMS	The lamp for the specified station has been turned off via Attendant Console or Front Desk Terminal

The Message Waiting feature messages are sent and/or received based on the PBX installation parameter setting for the Message Waiting communication feature. The possibilities are:

- The feature is active in the PBX with no communication with the PMS.
- The feature is active in the PBX and communication with the PMS is in effect.

With the feature active, the operational considerations are:

- Entry (activate/deactivate) and status display via any assigned Attendant Console or Front Desk Terminal is fully operational at all times.
- The Message Waiting status of each station is stored in PBX memory.
- When a change in Message Waiting status for a station is entered via the Attendant Console or Front Desk Terminal, the lamp will be turned on (13.3) or off (13.4), and a message is sent to the PMS with the station number indicated.
- Upon receipt by the PBX of a "turn lamp on" (13.1) or "turn lamp off" (13.2) message, the appropriate lamp status is changed by the PBX.
- When a room Check Out message is received from the PMS, a 16.6 Check Out complete message is sent to the PMS if the room telephone's lamp is on. The lamp is then reset to the off state. If the room telephone did not have its lamp on, a 16.5 Check Out complete message is sent.

Message Data Format

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"3"	Feature code low digit
6	"1"	Message counter high digit
7	"1"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	ETX	
16	BCC	LRC parity check byte

Station Message Detail (Feature code 14)

This feature allows the PBX to send the PMS the detail of local, toll and international calls. The information is sent at the completion of each call. Only one function code is used with this feature:

FUNCTION CODE	MESSAGE DIRECTION	TYPE OF INFORMATION
2	To PMS	Details of station message

This feature is controlled by the PBX installation parameter setting for the Station Message Detail Recording feature. The feature must be active in the PBX.

When the data link is faulty, the station message details can be automatically printed out on the PBX printer after the completion of each call.

Message Data Format

Byte No. 0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"4"	Feature code low digit
6	"5"	Message counter high digit
7	"0"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Contains ASCII spaces
14		
15	Route number	
16		
17		
18	Trunk number	
19		
20		
21	Called subscriber	
22	number	
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		**(Continued on next page)**

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Byte No.	Field	Description
37	Call start time	Hours
38		
39		Minutes
40		
41		Seconds
42		
43	Call duration	Seconds (5 digits)
44		
45		
46		
47		
48		Contains ASCII spaces
49		
50	**Unused**	
51		
52		
53		
54	ETX	
55	BCC	LRC parity check byte

Controlled Restriction (Feature code 15)

This feature allows a guest telephone line to be restricted via an entry from the Attendant Console or Front Desk Terminal, or upon receipt of feature code 15 from the PMS. This restriction is accomplished using selected origination and/or termination capabilities. Two function codes are available:

FUNCTION CODE	MESSAGE DIRECTION	MEANING
1	From PMS	Set indicated restriction for specified room station
2	To PMS	Restriction has been set for the specified room station number by the Attendant Console or Front Desk Terminal

Communication of the Controlled Restriction message between the PBX and the PMS is dependent on PBX installation parameters. The possibilities are:

- The feature is active in the PBX, but communication with the PMS is not in effect.
- The feature is active in the PBX and communication with the PMS is in effect. In this configuration, the change can be initiated either through the Attendant Console or Front Desk Terminal, with notification to the PMS; or from the PMS via a request to the PBX to impose the specified restriction level.
- When the Controlled Restriction feature is active, and a change in controlled restriction for a room telephone is entered via the Attendant Console or Front Desk Terminal, a 15.2 message containing the specified room station number and new restriction level is sent to the PMS.
- When a 15.1 message is received from the PMS, the specified restriction change is implemented on the specified room telephone, overriding any previous restriction.

Message Data Format

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"5"	Feature code low digit
6	"1"	Message counter high digit
7	"4"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Restriction level	
16	**Unused**	Must contain ASCII spaces
17		
18	ETX	
19	BCC	LRC parity check byte

The controlled restriction level codes and corresponding actions are:

LEVEL	ACTION
0	No restriction
1	Outward restriction: denies all local and toll calling from the room telephone (Room Cut Off)
5	Termination restriction: denies all incoming calls to the room telephone (Do Not Disturb)
6	Both outgoing and incoming restriction

When a restriction is in effect, a denied call receives the reorder tone, or is forwarded to the Attendant Console or a preassigned station, according to system programming.

Check In/Out (Feature code 16)

While this message does not represent a unique feature, it is a rather convenient device for activating a sequence of functions commonly performed when a guest checks in or out of a room. The PBX requires Check In/Out notification from the PMS in order to perform the appropriate internal status changes required for guest rooms: Message Waiting lamp status, Wake Up request, controlled restriction level, etc. The available function codes are:

FUNCTION CODE	TEXT FORMAT	MESSAGE DIRECTION	MEANING
1	1	From PMS	The PBX is to perform the functions associated with Check In for the specified room station number (RSN)
2	1	From PMS	The PBX is to perform the functions associated with Check Out for the specified RSN
5	1	To PMS	Check Out functions have been completed for the specified RSN, and the Message Waiting lamp is off
6	1	To PMS	Check Out functions have been completed for the specified RSN, and the Message Waiting lamp is on
A	2	From PMS	The PBX is to perform the functions associated with Check In for the indicated RSN, including storing Language and Room Occupancy
B	3	From PMS	The PBX is to perform the functions associated with Check In for the indicated RSN, including storing Language, Room Occupancy, and Guest Name

The PBX maintains the Vacant or Occupied status for each RSN. This status is activated upon receipt of a Check In or Check Out message from the PMS. Under normal operation, Check In and Check Out is not performed through the Front Desk Terminal, but through the PMS terminals only. The PMS is required to send each Check In/Out to the PBX immediately in order to support the PMS data link and associated PBX operations.

Message Data Format

Text Format 1

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"6"	Feature code low digit
6	"1"	Message counter high digit
7	"1"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	ETX	
16	BCC	LRC parity check byte

Text Format 2

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"6"	Feature code low digit
6	"1"	Message counter high digit
7	"3"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Language	
16	Room Occupancy	
17	ETX	
18	BCC	LRC parity check byte

Text Format 3

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"6"	Feature code low digit
6	"3"	Message counter high digit
7	"4"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13		Must contain ASCII spaces
14		
15		
16	Unused	
17		
18		
19		
20		
21	Language	
22	Room occupancy	
23	Guest name	
⋮		
36		
37		
38	ETX	
39	BCC	LRC parity check byte

• Check In

When the PBX receives a room Check In message (16.1, 16.A, or 16.B), it sets the status of the room to checked-in. It also takes the following actions:

- Deactivates controlled outward restriction.
- Sets Occupied and Cleaned Up, and clears the Reservation.
- Clears the Wake Up time data, if set, and prints out the Wake Up time on the PBX printer.
- Stores Language and Room Occupancy information (16.A or 16.B only).
- Stores Guest Name information (16.B only).

• Check Out

When the PBX receives a room Check Out (16.2) message, it sets the status of the room to checked-out. It also takes the following actions:

- Turns the Message Waiting lamp off.
- Clears Reservation.
- Cancels any current incoming restriction (Do Not Disturb), and activates Controlled Outward Restriction (Room Cut Off).
- Sets Vacant and To Be Cleaned.
- Prints out the room status data.
- Sets Language to "0" and Room Occupancy to "3."
- Clears any existing Wake Up entry.
- Finally, the PBX sends a Check Out Complete message (16.5 or 16.6) to the PMS within 3 seconds after completing the above tasks. It sends the 16.6 message if the Message Waiting lamp for the RSN was on before the Check Out was done, or the 16.5 message if the lamp was off.

• Data Link Failure

When loss of communication with the PMS occurs due to failure of the data link, the PBX still allows Check In/Out functions to be completed via the Front Desk Terminal. Check In and Check Out via the Front Desk Terminal causes the system to perform the functions listed above.

During the recovery process, a room's occupancy status specified by the PMS in the Room Image Data message (17.3, 17.7, or 17.B) may differ from the PBX status for the room. This indicates that a Check In or Check Out was performed for that room in the PBX.

Room Data Image (Feature code 17)

This message type is used to transfer a set of status items for a specific RSN between the PBX and PMS. Six of the function codes are provided for information exchange regarding the status of the other system, and do not necessarily mean that status changes are to be performed. Six other function codes are provided for the database exchange recovery procedure, and can indicate status changes in either or both systems. The function codes for this message are listed below:

FUNCTION CODE	TEXT FORMAT	MESSAGE DIRECTION	MEANING
1	1	From PMS	Request to send the data image for the specified room for informational purposes only
2	1	To PMS	Response to function code 1 message
3	1	From PMS	Database status update and/or request for PBX status
4	1	To PMS	Response to function code 3 message
5	2	From PMS	Request to send the data image for the specified room for informational purposes only
6	2	To PMS	Response to function code 5 message
7	2	From PMS	Database status update and/or request for PBX status
8	2	To PMS	Response to function code 7 message
9	3	From PMS	Request to send the data image for the specified room for informational purposes only
A	3	To PMS	Response to function code 9 message
B	3	From PMS	Database status update and/or request for PBX status
C	3	To PMS	Response to function code B message
F	4	To PMS	Response to 70.8 message, or indication that the data for the specified room has been changed

Function codes 1, 5, and 9 are used in the information exchange mode. The PMS requests status from the PBX by sending a 17.1, 17.5, or 17.9 message; the PBX responds with the data in a 17.2, 17.6 or 17.A message. The 17.1, 17.5, or 17.9 does not indicate any status change to the PBX.

Function codes 3, 4, 7, 8, B and C are reserved for the database exchange procedure. This procedure is done in the interval between transmission of the 70.3 Start Database Exchange message, and the 70.4 End Database Exchange message. (Both messages are transmitted by the PMS.)

The 70.3 message signals the start of database synchronization. Then, for each room, the PMS sends a 17.3, 17.7, or 17.B message carrying current PMS status data and/or requesting status data. The PBX processes this message and returns a 17.4, 17.8, or 17.C message containing any requested PBX status. When either system receives status from the other, that system updates its status to match the other system. Thus, the exchange synchronizes the two systems' databases for a specific room. After the exchange is complete for all rooms, the PMS sends the 70.4 message signaling the end of the database synchronization procedures.

Function code F operates differently from the other message types. It is used to exchange Room Class and Administration/Guest status, which generally do not change as often as the other status items. When the PBX receives a 70.8 message, it transmits status data for all rooms to the PMS, in random order, with a series of 17.F messages. The PBX does not transmit an "end" message after the last room image.

The Room Image feature message uses the following item fields:

ITEM	USED WITH TEXT FORMATS
Vacant/occupied	1, 2, 3
Message Waiting lamp	1, 2, 3
Restriction level	1, 2, 3
Room occupancy	2, 3
Reservation	2, 3
Language	2, 3
Maid status	2, 3
Wake Up result	2, 3
Wake Up time	2, 3
Administration/Guest	4
Room class	4

For all Room Image messages, each status item either contains data or is null. A null item in a 17.1, 17.3, 17.5, 17.7, 17.9, or 17.B message indicates a request for the status data for that item from the other system. A null item in the returned 17.2, 17.4, 17.6, 17.8, 17.A, or 17.C message means that either the status update was done, or that no valid status data is available.

Note that a field is reserved in the Room Image message for each status item possible in a data link configuration, even though all feature messages may not be activated. The receiving system ignores any request for status or indicated change for any field for which normal status changes are not communicated. For instance, if the Controlled Restriction feature message (15.x) is not defined in a particular data link configuration, the controlled restriction field in the Room Image message is likewise inactive.

Message data Format

Text Format 1

Byte No.	Field	Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"7"	Feature code low digit
6	"2"	Message counter high digit
7	"8"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Vacant/Occupied	
16	MW lamp status	
17	Restriction	
18		Must contain 0
19		
20		
21		
22		
23		
24	**Unused**	
25		
26		
27		
28		
29		
30		
31		
32	ETX	
33	BCC	LRC parity check byte

Text Format 2

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"7"	Feature code low digit
6	"2"	Message counter high digit
7	"3"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Vacant/Occupied	
16	MW lamp status	
17	Restriction	
18	Room occupancy	
19	Reservation	
20	Language	
21	Maid status	
22	Wake Up result	
23	Wake Up time	
24		
25		
26		
27	ETX	
28	BCC	LRC parity check byte

Text Format 3

Byte No.	Field	Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"7"	Feature code low digit
6	"3"	Message counter high digit
7	"8"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	Unused	Must contain ASCII spaces
14	Unused	
15	Vacant/Occupied	
16	MW lamp status	
17	Restriction	
18	Room occupancy	
19	Reservation	
20	Language	
21	Maid status	
22	Wake Up result	
23	Wake Up time	
24		
25		
26		
27	Unused	Must contain 0
28	Unused	
42	ETX	
43	BCC	LRC parity check byte

Text Format 4

Byte No.	Field	Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"7"	Feature code low digit
6	"1"	Message counter high digit
7	"3"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Administration/Guest	
16	Room class	
17	ETX	
18	BCC	LRC parity check byte

Wake Up (Feature code 19)

This feature allows a station to be rung at a desired time. The feature can be activated from the station telephone, from an Attendant Console or Front Desk Terminal, or from the PMS with feature code 19. The following function codes are available:

FUNCTION CODE	TEXT FORMAT	MESSAGE DIRECTION	MEANING
1	1	To PMS	Set Wake Up for specific telephone set
2	2	To PMS	Cancel Wake Up for specific telephone set
3	3	To PMS	Result of Wake Up for specific telephone set
4	1	From PMS	Set Wake Up for specific telephone set
5	2	From PMS	Cancel Wake Up for specific telephone set

The Wake Up feature messages are sent and/or received based upon the PBX installation parameter setting for the Wake Up communication feature. The possibilities are:

- The feature is active in the PBX but communication with the PMS is not in effect.
- The feature is active in the PBX and communication with the PMS is in effect.

With the Wake Up feature active, the operational considerations are:

- Entry (activated) is varied to the station in an occupied state. Entry (deactivated?) is fully operational at all times.
- Entry can be made via the Attendant Console or Front Desk Terminal, or through stations. Status display is available at the Attendant Console or Front Desk Terminal.
- When the PBX receives a 19.4 or 19.5 message, it makes the appropriate Wake Up setting.
- The result of a Wake Up is sent to the PMS with a 19.3 message and printed out on the PBX printer.
- No communication is made on administrative stations.
- Time is set to an accuracy of 1 minute.
- Each guest room station can have only one Wake Up in effect. A new setting will replace any previous setting. Once the Wake Up is performed, the setting is automatically erased.
- A Wake Up call to a busy station is re-executed up to three times at 1-minute intervals. (The number of retries is based on a PBX installation parameter.)
- No more than 32 stations can be set for a Wake Up at one time. If an attempt is made to exceed this number, the system automatically sets the time 5 minutes earlier. The number of times this process is repeated is assigned with system data.

Message Data Format

Text Format 1

Byte No.		Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"9"	Feature code low digit
6	"1"	Message counter high digit
7	"6"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Wake Up time	
16		
17		
18		
19	Wake Up set	
20	ETX	
21	BCC	LRC parity check byte

Text Format 2

Byte No.		Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"9"	Feature code low digit
6	"1"	Message counter high digit
7	"6"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15		Must contain 0
16	**Unused**	
17		
18		
19	Wake Up set	
20	ETX	
21	BCC	LRC parity check byte

Text Format 3

Byte No.		Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"1" or "9"	Feature code high digit (normal or violation)
5	"9"	Feature code low digit
6	"1"	Message counter high digit
7	"6"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	Unused	Must contain ASCII spaces
14		
15	Wake Up time	
16		
17		
18		
19	Wake Up result	
20	ETX	
21	BCC	LRC parity check byte

Room Change/Room Swap (Feature code 20)

This feature provides a convenient service for instant operation of a room status change that does not involve a guest Check Out. Three function codes are available:

FUNCTION CODE	MESSAGE DIRECTION	MEANING
1	From PMS	Set room change
2	From PMS	Set room swap
5	From PMS	Set room copy

- Room Change

  Upon receipt of a Room Change message (20.1), the PBX performs the following status changes:

SERVICES	OLD ROOM	NEW ROOM
Vacant/occupied	Vacant	Occupied
Maid Status	"1"	(No change)
Room Cut Off	Set	Reset
Do Not Disturb	Reset	Copied from old room
Message Waiting	Reset	Copied from old room
Wake Up	Canceled	Copied from old room
Language	"0"	Copied from old room
Room Occupancy	"3"	Copied from old room
Guest Name	Cleared	Copied from old room
Reservation	Reset	Copied from old room

- Room Swap

  Upon receipt of a Room Swap message (20.2), the PBX exchanges all status data between the two specified rooms.

- Room Copy

  Upon receipt of a Room Copy message (20.5), the PBX copies the status data of the specified old room to the specified new room. The status of the old room is not changed.

Message Data Format

Byte No.	Field	Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"2" or "A"	Feature code high digit (normal or violation)
5	"0"	Feature code low digit
6	"1"	Message counter high digit
7	"7"	Message counter low digit
8	Function code	
9	Old station number	
10		
11		
12		
13–14	**Unused**	Must contain ASCII spaces
15	New station number	
16		
17		
18		
19–20	**Unused**	Must contain ASCII spaces
21	ETX	
22	BCC	LRC parity check byte

Room Occupancy/Room Data Change (Feature code 21)

This feature provides a convenient way for the PMS to change room status data in the PBX. The following function codes are available:

FUNCTION CODE	TEXT FORMAT	MESSAGE DIRECTION	MEANING
1	1	From PMS	Change VIP, room key, or language status for the specified room
4	2	From PMS	Set reservation status for the specified room
5	2	From PMS	Reset reservation status for the specified room
6	3	From PMS	Change the guest name data

Message Data Format

Text Format 1

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"2" or "A"	Feature code high digit (normal or violation)
5	"1"	Feature code low digit
6	"1"	Message counter high digit
7	"3"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Language	
16	Room occupancy	
17	ETX	
18	BCC	LRC parity check byte

Text Format 2

Byte No.		Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"2" or "A"	Feature code high digit (normal or violation)
5	"1"	Feature code low digit
6	"1"	Message counter high digit
7	"1"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	Unused	Must contain ASCII spaces
14		
15	ETX	
16	BCC	LRC parity check byte

Text Format 3

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"2" or "A"	Feature code high digit (normal or violation)
5	"1"	Feature code low digit
6	"2"	Message counter high digit
7	"6"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	Unused	Must contain ASCII spaces
14		
15	Guest name	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30	ETX	
31	BCC	LRC parity check byte

Direct Data Entry (Feature code 59)

This feature allows the text to be reported from the PBX to the PMS by dialing a special number from a guest room station to input data to the PMS.

The text is used to indicate the codes and quantities of the goods requested from a guest room.

The following function codes are used with this feature.

CODE	MESSAGE DIRECTION	MEANING
1	To PMS	Direct Data Entry (Station Number, Numeric Input)
8	From PMS	Direct Data Entry-Negative Answer (Station Number)
9	From PMS	Direct Data Entry-Positive Answer (Station Number)

After a guest room station dials a special number, the "Direct Data Entry" text (59.1) will be reported from the PBX to the PMS.

The PBX will wait for an answer from the PMS. If there is no answer from the PMS within 30 seconds after the text has been sent, the guest room station will hear a reorder tone.

If the PBX receives a report of the "Direct Data Entry-Negative Answer" (59.8) from the PMS, the PBX will recognize it as data entry error to the PMS or data failure, and the reorder tone connection will be made. When the PBX receives a report of the "Direct Data Entry-Positive Answer" (59.9) from the PMS, the PBX will recognize that the data has been entered normally to the PMS, and the service set tone connection will be made.

Message Data Format

Text Format 1

Byte No.		Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"5"	Feature code high digit
5	"9"	Feature code low digit
6	"4"	Message counter high digit
7	"7"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15	Numeric Input	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		

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Text Format 1

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Byte No.		
37	Numeric Input	
38		
39		
40		
41		
42		
43		
44		
45	**Unused**	Must contain ASCII spaces
46		
47		
48		
49		
50		
51	ETX	
52	BCC	LRC parity check byte

Text Format 2

Byte No.		
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"5"	Feature code high digit
5	"9"	Feature code low digit
6	"1"	Message counter high digit
7	"7"	Message counter low digit
8	Function code	
9	Station number	
10		
11		
12		
13	**Unused**	Must contain ASCII spaces
14		
15		
16		
17		
18		
19		
20		
21	ETX	
22	BCC	LRC parity check byte

Status Inquiry and Failure Management (Feature code 70)

This feature provides data link maintenance services. The supported functions allow the two systems to maintain a dialog on the state of the data link. No station number or other data is needed. The following function codes are available:

CODE	MESSAGE DIRECTION	MEANING
F	From PMS	Status Inquiry ("are you there") message **NOTE:** The PMS must send this message repeatedly at intervals of 500 ms to 60 seconds, except during a database exchange.
0	To PMS	Response to Status Inquiry message Indicates that the PBX has had no changes that were not communicated to the PMS, and has not reinitialized
2	To PMS	Response to Status Inquiry message Indicates the PBX has failed and reinitialized; the PMS requests a database exchange
3	From PMS	Start of database exchange The PMS sends a Room Image message for each room requiring status synchronization
4	From PMS	End of database exchange
5	From PMS	Request to release the data link for maintenance activity
6	To PMS	Confirm release of the data link
8	From PMS	Request all existing data on station number, Administration/Guest and room class

These messages allow both systems to determine if the data link is functioning correctly. Either system can recognize a failure (as described below), and can request PBX or initiate (PMS) a database exchange to synchronize both systems' room data. The PMS decides which rooms will be included in the exchange, and which status items for each room will be updated on the PBX.

Message Data Format

Byte No.		Description
0	STX	
1	SA	
2	UA	
3	"L"	Entry index for PMS interface
4	"7"	Feature code high digit (normal or violation)
5	"0"	Feature code low digit
6	"0"	Message counter high digit
7	"7"	Message counter low digit
8	Function code	
9	**Unused**	Must contain ASCII spaces
10		
11	ETX	
12	BCC	LRC parity check byte

- Recognition of Data Link Failure

  Either system may recognize loss of communication by one or more of the following conditions:

  - Lack of data for more than 60 seconds. The use of the Status Inquiry message and the corresponding response message ensures that each system receives one of these messages at least once every 60 seconds.

  - Excessive protocol errors. Large numbers of events such as NAK message response instead of ACK, or no response to an ENQ, can indicate data link failure.

  - Hardware-controlled signal. Whenever the PBX considers the data link to be "down," either for maintenance or because of errors, it puts the Data Set Ready signal (interface pin 6) into the Off state.

  - Requested release of the data link for maintenance (70.5) message.

  - Other conditions, such as lack of memory to hold incoming messages, can cause a data link failure that cannot be explicitly communicated to the other system.

- Operation during Data Link Failure

  When a failure occurs, each system is able to hold its outgoing messages for transmission after the data link is restored. In this case, a database exchange may not be required.

  If the data link or PMS becomes unavailable, the PBX continues to support basic telecommunications functions.

• Recovery from Data Link Failure

If the PMS remains operational during a data link failure, it continues sending 70.F messages. When it receives a response from the PBX, it can begin recovery. If the PMS has failed and restarted, it must not resume sending 70.F messages until recovery and database exchange are completed.

If the PBX responds to a Status Inquiry with function code 0, it has made no change in room status during the data link failure. If it responds with function code 2, it has failed; the PMS performs a database exchange for all rooms.

• Database Exchange Procedure

If the PBX recognizes that the data link is restored, and responds to a Status Inquiry with a 70.2 message, it requires a full database exchange with the PMS. In this case, the PBX does not process any messages, except Status Inquiry, until the PMS initiates a database exchange.
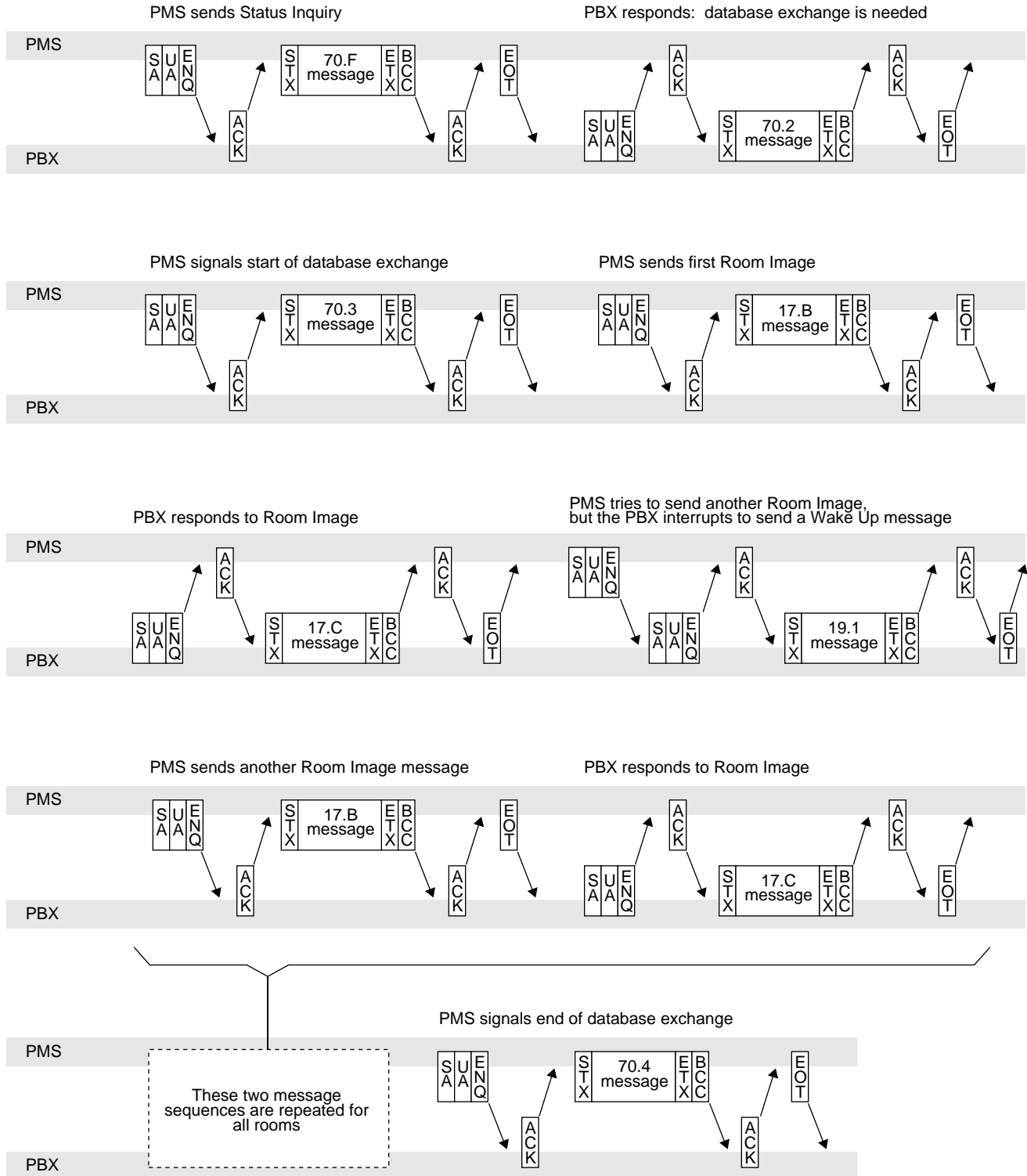
The PMS starts the exchange by sending a 70.3 message to the PBX. This also informs the PBX that transmission of normal status changes can resume. Next, the PMS transmits a Room Image message (17.3, 17.7, or 17.B) for each room for which synchronization is required. Note that a time delay can be required after each Room Image message to ensure the maximum message rate is not exceeded and to provide time for normal status change messages.

The PBX processes each Room Image message and sends the corresponding response message (17.4, 17.8, or 17.C). The PMS updates its own status with data from active fields in these responses. Note that the PBX can send new status changes to the PMS during the database exchange. The PMS sends only the most current data to the PBX.

When the PMS has sent the data for all rooms and processed the responses, it sends a 70.4 message to the PBX. The recovery is not considered to be complete until the PBX receives this message, since the failure to receive it may indicate continuing problems with the data link. The PBX counts the number of database exchanges started by 70.3 but not ended by 70.4. If this occurs too many times, the PBX causes a data link failure by turning off the Data Set Ready signal (interface pin 6) and stopping all communication with the PMS.

The figure below illustrates the example of the database exchange process.

Example of Data Link Recovery

PMS sends Status Inquiry

PMS

S A | U A | E N Q | ACK | S T X | 70.F message | E T X | B C C | ACK | E O T

PBX

PBX responds: database exchange is needed

ACK | S A | U A | E N Q | S T X | 70.2 message | E T X | B C C | ACK | E O T

PMS signals start of database exchange

PMS

S A | U A | E N Q | ACK | S T X | 70.3 message | E T X | B C C | ACK | E O T

PBX

PMS sends first Room Image

S A | U A | E N Q | ACK | S T X | 17.B message | E T X | B C C | ACK | E O T

PBX responds to Room Image

PMS

ACK | S A | U A | E N Q | S T X | 17.C message | E T X | B C C | ACK | E O T

PBX

PMS tries to send another Room Image, but the PBX interrupts to send a Wake Up message

S A | U A | E N Q | ACK | S A | U A | E N Q | S T X | 19.1 message | E T X | B C C | ACK | E O T

PMS sends another Room Image message

PMS

S A | U A | E N Q | ACK | S T X | 17.B message | E T X | B C C | ACK | E O T

PBX

PBX responds to Room Image

ACK | S A | U A | E N Q | S T X | 17.C message | E T X | B C C | ACK | E O T

These two message sequences are repeated for all rooms

PMS signals end of database exchange

PMS

S A | U A | E N Q | ACK | S T X | 70.4 message | E T X | B C C | ACK | E O T

PBX

PMS MESSAGE SUMMARY

The following table provides a summary of all messages sent between the PMS and the PBX. The feature codes, function codes, and direction of transmission are given for each message.

PMS Message Summary

FEATURE	CODE	FUNCTION CODE	TEXT FORMAT	MESSAGE DIRECTION	MEANING
Maid Status	11 or 12	1		To PMS	The specified room needs cleaning.
		2		To PMS	The specified room is cleaned.
		3		To PMS	The specified room is ready for reservation.
		4		To PMS	The specified room is out of service.
		5		To PMS	The specified room needs repairs.
		6		To PMS	The specified room is repaired.
Message Waiting	13	1		From PMS	Turn on MW lamp for specified room.
		2		From PMS	Turn off MW lamp for specified room.
		3		To PMS	MW lamp for specified room has been turned on via PBX control entry.
		4		To PMS	MW lamp for specified room has been turned off via PBX control entry.
Station Message Detail	14	2		To PMS	Time and duration of outgoing local or toll call from the room.
Controlled Restriction	15	1		From PMS	Set restriction for the specified room.
		2		To PMS	Restriction has been set for the specified room by the Attendant Console or Front Desk Terminal.
Check In/ Check Out	16	1	1	From PMS	Perform Check In functions for the specified room.
		2	1	From PMS	Perform Check Out functions for the specified room.
		5	1	To PMS	Check Out functions have been completed for the specified RSN, and the MW lamp was off.
		6	1	To PMS	Check Out functions have been completed for the specified RSN, and the MW lamp was on.
		A	2	From PMS	Perform Check In functions for the specified RSN.
		B	3	From PMS	Perform Check In functions for the specified RSN.

PMS Message Summary

FEATURE	CODE	FUNCTION CODE	TEXT FORMAT	MESSAGE DIRECTION	MEANING
Room Data Image	17	1	1	From PMS	Request to send the data image for the specified room for informational purposes only.
		2		To PMS	Response to function code 1 message.
		3		From PMS	Database update status informed and/or request for PBX status.
		4		To PMS	Database update status response to function code 3 message.
		5	2	From PMS	Request to send the data image for the specified room for informational purposes only.
		6		To PMS	Response to function code 5 message.
		7		From PMS	Database update status informed and/or request for PBX status.
		8		To PMS	Database update status response to function code 7 message.
		9	3	From PMS	Request to send the data image for the specified room for informational purposes only.
		A		To PMS	Response to function code 9 message.
		B		From PMS	Database update status informed and/or request for PBX status.
		C		To PMS	Database update status response to function code B message.
		F	4	To PMS	Response to 70.8 message.
Wake Up	19	1	1	To PMS	Wake Up for specific telephone set.
		2	2	To PMS	Cancel Wake Up for specific telephone set.
		3	3	To PMS	Result of Wake Up for specific telephone set.
		4	1	From PMS	Set Wake Up for specific telephone.
		5	2	From PMS	Cancel Wake Up for the specified RSN.
Room Change Room Swap Room Copy	20	1		From PMS	Set room change.
		2		From PMS	Set room swap.
		5		From PMS	Set room copy.
Room Occupancy Room Data Change	21	1	1	From PMS	Change the data for VIP, room key, or language for specified room.
		4	2	From PMS	Set reservation status for specified room.
		5	2	From PMS	Clear reservation status for specified room.
		6	3	From PMS	Change the guest name for the specified room.
Direct Data Entry	59	1		To PMS	Direct Data Entry from the guest room station.
		8		From PMS	The data from the guest room station has been found abnormal.
		9		From PMS	The data from the guest room station has been found normal.

PMS Message Summary

FEATURE	CODE	FUNCTION CODE	TEXT FORMAT	MESSAGE DIRECTION	MEANING
Status Inquiry Failure Management	70	F		From PMS	"Are you there" message; must be issued by PMS at least every 60 sec., and at most every 500 msec.
		0		To PMS	Acknowledgment of "are you there" message; indicates the PBX has had no status changes that were not sent to the PMS, and has not initialized.
		2		To PMS	Acknowledgment of "are you there" message; indicates that the PBX has failed and the status memory has been initialized. The PMS initiates a database exchange.
		3		From PMS	Start of database exchange; the PMS sends a Room Data Image message for each room requiring status synchronization.
		4		From PMS	End of database exchange.
		5		From PMS	Request for the data link to be released for maintenance activity.
		6		To PMS	Confirmation that the data link is released.
		8		From PMS	Request for all existing data on station number, administration/guest and room class.