

Chapter 10

Central to Terminal Messages

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Central to Terminal Messages

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APTRA™ Advance NDC, Reference Manual

Overview

This chapter describes host to terminal messages, under the following topics:

- Terminal Commands
- Customisation Data Commands
- Transaction Reply Command
- Interactive Transaction Response
- Electronic Journal Commands
- Message Exception Handling
- Messages Received in Wrong Operational Mode.

For any differences on other vendors' SSTs, refer to the *APTRA Advance NDC, Multi-Vendor Support Reference Manual*.

For information on clearing persistent storage, refer to section "Clearing Persistent Memory (NVRAM)" in Chapter 11, "Interactive Installation of Advance NDC" of the *APTRA Advance NDC, Developer's Guide*.

Command Limitations

Commands that are not supported in APTRA Advance NDC are marked as not supported or reserved in the message formats, except for send tallies and send error logs, as default messages are returned if these commands are sent.

Terminal Command Limitations

All terminal commands are processed and acknowledged, with the exception of the following:

- Send tally information (command code 5).
This always reports a last cleared date of midnight 1st January 2000 (000101000000) and no tally data (000000)
- Send error log information (command code 6).
This always reports no new entries (00) and a last cleared date of midnight 1st January 2000 (000101000000)
- Retrieve and send hallmark key from EKC, command code =
This command is rejected with the reason
Function not supported by software
- Enable FREE JDATA, command code >
This command is rejected with the reason
Function not supported by software
- Enable image dumping, command code ?
This command is rejected with the reason
Function not supported by software.

Customisation Data Command Limitations

All data commands are processed and acknowledged, except the following:

- Initialise EKC (identifier F)
- Override reserved screens (identifier G)
- Screen/Keyboard Data: Nested Keyboard Data (field 'j3')

EMV Message Class Support

Message class 8 is supported by EMV/CAM2 Exits for APTRA Advance NDC. For details, refer to the *EMV Integrated Circuit Card (ICC) Reference Manual*.

Terminal Commands

These commands are sent by the host to start up or shut down the SST, or to request configuration details, counter values or date and time information.

Table 10-1
Terminal Commands

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: ‘1’ - Terminal Command.
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Command Code. One-character field used to identify the type of Terminal Command. The codes that can be used in this field are:
		Code	Description
		1	Go in-service (start-up). The Start-Up command is used to put the terminal into service after a power-up and Customisation Data load. The terminal sends a Ready status in response to a start-up command when the terminal enters the In-Service mode. If a start-up command is received while the terminal is In-Service, but not in State 000, the terminal sends a Ready status when it enters State 000. The start-up command can also put the terminal into service after a shut-down, exit from Supervisor mode or Suspend.

Central to Terminal Messages
Terminal Commands

Field	Number of Characters	Mandatory/Optional	Description
	2		Go out-of-service (shut-down). The Shut-Down command places the terminal temporarily Out-of-Service. All pending messages are sent and current transactions completed before the terminal executes the shut-down. The terminal then indicates that it has successfully completed the shut-down procedure by sending a Ready status in a Solicited Status message.
	3		Send configuration ID. The Send Configuration ID command asks the terminal to send the Config ID number to Central.
	4		Send supply counters. The Send Supply Counters command asks the terminal to send the state of the supply counters to Central in the format identified by the Command Modifier field 'g', as follows: - Send basic supply counters message - Send extended supply counters message
	5		Send tally information. Not supported; default message returned.
	6		Send error log information. Not supported; default message returned.
	7		Send configuration information. The Send Configuration Information command asks the terminal to send the following configuration information data, identified by the Command Modifier field 'g', to Central: - Hardware Configuration * - Supplies Status * - Hardware Fitness * - Sensor Status - Software ID and release number - Local Configuration Option Digits - Report cash deposit definition * These categories return information for a subset of possible devices.
	8		Send date and time information. The Send Date and Time Information command asks the terminal to send the locally held date and time to Central.
	9		Reserved.
	:		Reserved.
	;		Reserved.
	=		Reserved.

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Field	Number of Characters	Mandatory/Optional	Description
			< Reserved.
			> Reserved.
			? Reserved.
			F Disconnect. For details, see Chapter 13, “CCM VISA2 Dialup System”.
			G Maintain connection to complete transaction (No-Op). For details, see Chapter 13, “CCM VISA2 Dialup System”.
g	1	0	Command Modifier. This field <i>can optionally</i> be used when the Command Code is 2 or 4 and <i>must</i> be present when the Command Code is 5, 6 or 7. Code Go out of service (Command Code = 2). ‘0’ Standard Out-of-Service screen displayed ‘1’ Temporary Out-of-Service screen displayed Defaults to zero if: - Any value other than zero or one is sent - The field is empty <hr/> Code Send Supply Counters message (Command Code = 4) none Send basic supply counters message ‘1’ Send basic supply counters message ‘2’ Send extended supply counters message <hr/> Code Tally (Command Code = 5) <i>Not supported</i> <hr/> Code Error Log (Command Code = 6) <i>Not supported</i> <hr/> Code Configuration Information (Command Code = 7) none Send configuration information (included for compatibility with earlier releases) ‘1’ Send hardware configuration data only ‘2’ Send supplies data only ‘3’ Send fitness data only ‘4’ Send tamper and sensor status data only ‘5’ Send software ID and release number data only

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Central to Terminal Messages
Terminal Commands

Field	Number of Characters	Mandatory/ Optional	Description
			'6' Send enhanced configuration data
			'7' Send local configuration option digits
			'8' Report cash deposit definition
			If the command modifier is not within the range '1' - '8', the message will be rejected. If the specific command reject option is set, a Specific Command Reject will be returned.
h	Var	M	Trailer. Protocol-dependent.

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Customisation Data Commands

Central can use various Customisation Data commands to download different types of data to the terminal. The commands are as follows:

- State Tables Load
- Screen/Keyboard Data Load
- Configuration Parameters Load
- Enhanced Configuration Parameters Load
- FIT Data Load
- Configuration ID Number Load
- MAC Field Selection Load
- Date and Time Load
- Encryption Key Change
- Extended Encryption Key Change
- Dispenser Currency Cassette Mapping Table
- XML Configuration Download

The following table shows the message class, sub-class and identifier for each command.

Table 10-2
Customisation Data Commands

Message Class	Message Sub-Class	Identifier	Command
3	1	1	Screen/Keyboard Data Load
3	1	2	State Tables Load
3	1	3	Configuration Parameters Load
3	1	4	Reserved
3	1	5	FIT Data Load
3	1	6	Configuration ID Number Load
3	1	A	Enhanced Configuration Parameters Load
3	1	B	MAC Field Selection Load
3	1	C	Date and Time Load
3	1	D	Reserved
3	1	E	Dispenser Currency Cassette Mapping Table
3	1	F	Reserved

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Central to Terminal Messages
Customisation Data Commands

Message Class	Message Sub-Class	Identifier	Command
3	1	G	Reserved
3	1	I	XML Configuration Download
3	2	0-2	Interactive Transaction Reply
3	3	1-9	Encryption Key Change
3	4	1-9, A-K	Extended Encryption Key Change

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State Tables Load

Use this message to download state tables to the terminal. It may take more than one message to transmit the state tables, in which case each message will contain a portion of the state tables.

For details of the state tables, see Chapter 2, "State Tables".

Table 10-3
State Tables Load

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '1' - Customisation Data
g	1	M	Message Identifier. The message identifier is: '2' - State Table
FS	1	M	Field Separator.
h	3	M	State Number. Contains a base 10 (decimal) number in the range 000-254 or 256-999, or a base 36 (alphanumeric) number in the range 000-254 or 256-ZZZ. This identifies the state number for the state data which follows it. See Table Note 2
i	Var (25)	M	State Table Data. The first character identifies the state type. Valid values are: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, R, S, T, V, W, X, Y, Z, b, d, e, f, g, k, m, w, z, _&, > . Characters 2 to 25 give associated state data.

Central to Terminal Messages
State Tables Load

Field	Number of Characters	Mandatory/ Optional	Description
FS	1	O	Field Separator.
	3	O	State Number.
	Var (25)	O	State Table Data.
:			
The field separator, state number and state data fields may be repeated if necessary to the maximum length per message permitted by the protocol.			
:			
FS	1	See Table Note 1	Field Separator.
j	8	See Table Note 1	Message Authentication Code (MAC) Data. Contains the value transmitted for authentication of this message.
k	Var	M	Trailer. Protocol-dependent.

Table Note 1: The field separator and field ‘j’ are only used when the Data Security feature is selected and the flags are correct. For details, refer to the *APTRA Advance NDC, Supervisor’s Guide*.

Table Note 2: Enhanced Configuration Parameters Load option 80 with the required setting for the Alphanumeric State Entry state must be sent before the State Tables Load message. If it is not sent, the default value of base 10 is assumed. For more information, see “Enhanced Configuration Parameters Load” on page 10-17.

Screen/Keyboard Data Load

This message is used to download screen and/or keyboard data into the terminal. The maximum length of a single Screen/Keyboard Data Load message is 2000 bytes.

Table 10-4
Screen/keyboard Data Load

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol Dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '1' - Customisation Data
g	1	M	Message Identifier. The message identifier is: '1' - Screen and/or Keyboard Data
FS	1	M	Field Separator.
h	3, 5 or 6	See Table Note 3 Table Note 4	Screen Number. Identifies the screen data being transmitted. For details, see Chapter 3, "Screen Data". Screen numbers can be specified as three decimal digits (123), four decimal digits in double quotes ("0123"), a group letter and two digits or a group letter and four digits. The groups with four digit numbers are 'E', 'X', 'Y', 'Z' and 'u'. A screen defined in group 'I' is also accepted, mapping directly onto group 'u' (I0123 is equivalent to u0123).

Field	Number of Characters	Mandatory/Optional	Description
			Note: The numbering for error message reserved screens consists of an alpha character followed by four numeric digits. The numbering for all other reserved screens consists of an alpha character followed by two numeric digits.
i	Var	See Table Note 3	Screen Data Field. Represents the data to be displayed on the cardholder screen or printer. This field always follows a screen number field and is always followed by a field separator or protocol-dependent trailer. For details, see Chapter 3, "Screen Data".
GS	1	See Table Note 3	Group Separator.
j1	Var	See Table Note 5	Keyboard Number and Keyboard Data. Identifies the physical keyboard data being transmitted. It must have a minimum of three characters in the range 000-999 that are used to specify the keyboard number to be processed. The remaining characters make up a variable length data field that defines the keyboard layout. This data is made up of sets of four characters, two for the position code and two for the return code. For details, see "The Keyboard Interface" on page 4-2.
GS	1	See Table Note 5	Group Separator.
j2	Var	See Table Note 5	Touch Screen Data. Identifies the touch screen keyboard data being transmitted. The characters make up a variable length data field that defines the keyboard layout. This data is made up of sets of 34 characters, 32 for defining the touch area plus two for the return code. For details, see "Rear Interface: Operator Keyboard Layout" on page 4-14. If you create new definitions, you can calculate the co-ordinates of the touch area manually. For details, see "Calculating Full Touch-Screen Positions" on page 4-17.
GS	1	See Table Note 5	Group Separator.
j3	3	See Table Note 5	Nested Keyboard Data. <i>(Not supported)</i>
GS	1	See Table Note 5	Group Separator.
j4	Var	See Table Note 5	Miscellaneous Keyboard Data. This field is reserved for future expansion.
k	Var	M	Trailer. Protocol-dependent.

Table Note 3: Screen data and/or keyboard data may be downloaded in a message. If any part of field 'j1' - 'j4' is present, the screen data field must be terminated by a group separator to indicate the start of keyboard data.

Table Note 4: Fields 'h' - 'j4' may be repeated any number of times, as defined by the communications protocol limit but not exceeding

the maximum message length of 2000 bytes for Screen/Keyboard data. The field separator preceding field 'h' must be repeated for each additional screen and/or keyboard definition.

Table Note 5: If keyboard data is to be downloaded, it must be separated from the screen data field by a group separator even when no screen data is present in the message.

Each field of keyboard data must be terminated by the associated group separator, even when that field is empty. The only exception to this is that trailing group separators may be omitted after the last keyboard field that contains actual data. This rule means that the keyboard data type can be identified by the number of group separators preceding it.

Managing Keyboards and Associations

It is possible to add, delete and change keyboard layouts and associations between screens and layouts. The following list gives examples of how this is done.

- a** To add or update a keyboard definition alone:

```
<gs>  
<keyboard no.> <keyboard data>  
<gs>  
<touch data>
```

- b** To delete a keyboard and any associations to it:

```
<gs>  
<keyboard no.>
```

- c** To replace existing screens without changing any associations:

```
<screen no.> <screen data>  
<fs>  
<screen no.> <screen data>
```

- d** To delete screens and any associations with them:

```
<screen no.>  
<fs>  
<screen no.>
```

- e** To delete a screen and delete a keyboard layout, destroying any other associations to that layout:

```
<screen no.>  
<fs>  
<keyboard no.>
```

- f** To send a new screen and its associated keyboard details in one message:

```
<screen no> <screen data>  
<gs>  
<keyboard no.> <keyboard data>  
<gs>  
<touch data>
```

- g** To send a new screen and specify an associated keyboard that will be provided elsewhere:

```
<screen no.> <screen data>  
<gs>  
<keyboard no.>
```

Configuration Parameters Load

This message downloads the Logical Unit Number (LUNO), parameters and timers into the terminal. For details of the parameters, see “Configuration Parameters Load Message” on page 7-2. For descriptions of the timers, see “Timers” on page 7-24.

This message does not enable the configuration of additional options available with Advance NDC, for which you use the “Enhanced Configuration Parameters Load” message described on page 10-17.

Table 10-5
Configuration Parameters Load

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: ‘3’ - Data Command
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: ‘1’ - Customisation Data
g	1	M	Message Identifier. The message identifier is: ‘3’ - Configuration Data
FS	1	M	Field Separator.
h	1	See Table Note 6	Camera Control
i	3	See Table Note 6	Reserved
j	3	See Table Note 6	Reserved
k	3	See Table Note 6	Reserved

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Central to Terminal Messages
Configuration Parameters Load

Field	Number of Characters	Mandatory/Optional	Description
l	3	See Table Note 6	Reserved
m	3	O See Table Note 6	Supply Mode, Ready Status and Amount Buffer Length Options. (For details, see page 7-2)
n	9	O See Table Note 6	Reserved. Must be 000 000 000.
FS	1	See Table Note 7	Field Separator.
o	3	O	LUNO. Logical Unit Number to return in transaction requests, and solicited status and unsolicited status messages sent by the terminal. (For details, see page 7-3)
FS	1	See Table Note 7	Field Separator. Must be present if the following fields are present.
p	2	O See Table Note 8	Timer Number. (For a list of timers, see Table 7-3 on page 7-4; for detailed descriptions, see page 7-24)
q	3	O	Number of 800 Millisecond Ticks per Timer Field. (For details, see page 7-4)
:			
The timer number and ticks are repeated. The data for each timer is downloaded in this sequence: timer number (2 bytes), number of 800-millisecond ticks (3 bytes) unless stated otherwise in the table above. If a particular timer is not included, a default value is assumed.			
:			
r	Var	M	Trailer. Protocol-dependent.

Table Note 6: Fields 'h' to 'n' may be omitted unless field 'm' is populated when all the earlier fields must be populated. The omitted fields assume a value of zero.

Table Note 7: This field separator must be present if any of the later fields in the message are present.

Table Note 8: Unless otherwise stated in the timer descriptions a time-out interval of 000 is taken as infinity, and an unconfigured timer takes a time-out interval of 30 ticks (see "Time Units for Timers" on page 7-24).

Enhanced Configuration Parameters Load

This message supports configuration of options and timers, including additional options that are not supported in the Configuration Parameters Load message. For more details of the format, see “Enhanced Configuration Parameters Load Message” on page 7-6

This message does not include options and timers for the Electronic Journal (EJ) Upload feature; these are set in the EJ Options and Timers command. For details, see “EJ Commands” on page 10-96.

Table 10-6
Enhanced Configuration Parameters Load

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: ‘3’ - Data Command
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: ‘1’ - Customisation Data
g	1	M	Message Identifier. The message identifier is: ‘A’ - Enhanced Configuration Data
FS	1	M	Field Separator.
h	3	O	Logical Unit Number. As field ‘o’ of Configuration Parameters Load; (for details see page 7-3)
FS	1	See Table Note 9	Field Separator. Must be present if any of the following fields are present.

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Central to Terminal Messages
Enhanced Configuration Parameters Load

Field	Number of Characters	Mandatory/Optional	Description																																														
i	2	O See Table Note 11	Option Number. Contains a configuration option number, for which the values are held in field 'j'.																																														
j	3	O See Table Note 11	<div>Option Code. Specifies the configuration for the function (option number) in field 'i'. Option numbers are as follows. For details of the option codes for each option, see “Enhanced Configuration Parameters Load Message” on page 7-6.</div> <table><tr><th>Option Number</th><th>Description of Option</th></tr><tr><td>00</td><td>Camera control option: as field 'h' in Configuration Parameters Load; (for details, see page 7-2)</td></tr><tr><td>01</td><td>Ready/Supply/Amount buffer options: as field 'm' in Configuration Parameters Load; (for details, see page 7-2)</td></tr><tr><td>02</td><td>Auto voice</td></tr><tr><td>03</td><td>Date format for Supervisor journal messages</td></tr><tr><td>04</td><td>Roll width</td></tr><tr><td>05</td><td>Left print column</td></tr><tr><td>06</td><td>Reserved</td></tr><tr><td>07</td><td>Track 1 format</td></tr><tr><td>08–11</td><td>Reserved</td></tr><tr><td>12</td><td>Specific command reject option</td></tr><tr><td>13–14</td><td>Reserved</td></tr><tr><td>15</td><td>Transaction status information option</td></tr><tr><td>16</td><td>Journal printer backup time option</td></tr><tr><td>17</td><td>Journal printer backup print operations option</td></tr><tr><td>18 - 22</td><td>Reserved</td></tr><tr><td>23</td><td>Envelope dispenser status option</td></tr><tr><td>24</td><td>Enhanced TI/Sensor status option</td></tr><tr><td>25</td><td>Media entry/exit indicators flash rate option</td></tr><tr><td>26</td><td>Reserved</td></tr><tr><td>27</td><td>Remote relay</td></tr><tr><td>28 - 31</td><td>Reserved</td></tr><tr><td>32</td><td>Unsolicited Reporting Control for camera and voice guidance</td></tr></table>	Option Number	Description of Option	00	Camera control option: as field 'h' in Configuration Parameters Load; (for details, see page 7-2)	01	Ready/Supply/Amount buffer options: as field 'm' in Configuration Parameters Load; (for details, see page 7-2)	02	Auto voice	03	Date format for Supervisor journal messages	04	Roll width	05	Left print column	06	Reserved	07	Track 1 format	08–11	Reserved	12	Specific command reject option	13–14	Reserved	15	Transaction status information option	16	Journal printer backup time option	17	Journal printer backup print operations option	18 - 22	Reserved	23	Envelope dispenser status option	24	Enhanced TI/Sensor status option	25	Media entry/exit indicators flash rate option	26	Reserved	27	Remote relay	28 - 31	Reserved	32	Unsolicited Reporting Control for camera and voice guidance
Option Number	Description of Option																																																
00	Camera control option: as field 'h' in Configuration Parameters Load; (for details, see page 7-2)																																																
01	Ready/Supply/Amount buffer options: as field 'm' in Configuration Parameters Load; (for details, see page 7-2)																																																
02	Auto voice																																																
03	Date format for Supervisor journal messages																																																
04	Roll width																																																
05	Left print column																																																
06	Reserved																																																
07	Track 1 format																																																
08–11	Reserved																																																
12	Specific command reject option																																																
13–14	Reserved																																																
15	Transaction status information option																																																
16	Journal printer backup time option																																																
17	Journal printer backup print operations option																																																
18 - 22	Reserved																																																
23	Envelope dispenser status option																																																
24	Enhanced TI/Sensor status option																																																
25	Media entry/exit indicators flash rate option																																																
26	Reserved																																																
27	Remote relay																																																
28 - 31	Reserved																																																
32	Unsolicited Reporting Control for camera and voice guidance																																																

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Field	Number of Characters	Mandatory/Optional	Description
			33 Simulate Supervisor Mode entry/exit
			34 MCN range
			35 Report Dual Mode EJ and Hardcopy Backup Unsolicited Messages
		See Table Note 10	36 Enhanced EJ backup
			37 Print Track 2 to Journal
			38 - 43 Reserved
			44 Bunch Note Acceptor (BNA) Journal Vaulted Notes Count
			45 Bunch Note Acceptor (BNA) Message Settings
			46 MCRW Enhanced Card Device (ECD) Security Jitter
			47 Reserved
			48 Barcode reader
			49-68 Reserved
			69 EMV Smart Card Extended Status: reserved for use with EMV/CAM2 Exits
			70 EMV Smart Card: reserved
			71 Time-Out State entry
			74 Cash Deposit Retract Destination
			76 Cash Handlers
			77 Next state number
			78 GBRU variant reporting
			79 Coin Dispenser
		See Table Note 12	80 Alphanumeric State Entry
			82 Unsolicited application status
			83 Cheque Processing Module
FS	1	See Table Note 9	Field Separator.
k	2	O See Table Note 11	Timer Number. Contains the timer number. The use of the timers is as follows. Timers with an asterisk (*) can be adjusted for a voice-guided session. For more information, see "Timers" on page 7-24. '00' * Keyboard entry time-out '01' * Cardholder response to time-out screen time-out

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Central to Terminal Messages
Enhanced Configuration Parameters Load

Field	Number of Characters	Mandatory/Optional	Description
			'02' Close state screen time-out
			'03' Communications response time-out
			'04' * Envelope/cheque/card insertion time-out
			'05' * Cash retract time-out
			'06' Poll/select time-out
			'07' * Present time-out
			'08' * Night safe deposit time-out
			'09' * Card removal time-out
			'10' Additional present time-out
			'11 - 59' Reserved
			'60' EJ acknowledgement timer
			'61' * Barcode reader scan time-out
			'62' Reserved
			'63' Hardware failure screen time-out
			'64 - 67' Reserved
			'68' Statement MEI duration time-out
			'69' Receipt MEI duration time-out
			'70' 71' Reserved
			'72' DASH card removal time-out
			'73 -76' Reserved
			'77' * BNA cash acceptance time-out
			'78' * GBXX cash retract time-out
			'79 - 86' Reserved
			'87' * Cheque capture screen time-out
			'88 - 91' Reserved
			'92' Fault display time-out

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Field	Number of Characters	Mandatory/Optional	Description
			'93' Reserved '94' * Cheque removal time-out '95' * Statement retract time-out '96' * Statement present time-out '97 - 99' Reserved.
l	3	O See Table Note 11	Customisation Data Commands Number of Seconds per Timer Field. Specifies the time-out interval for the preceding timer in seconds. The number of seconds can be 001-255. If the time-out interval is not specified, the timer default value of 30 seconds is applied
m	Var	M	Trailer. Protocol-dependent.

Table Note 9: This field separator must be present if any of the subsequent fields in the message are present.

Table Note 10: A Supervisor option allows option 36 to be ignored if sent from the host. For further information, refer to the *APTRA Advance NDC, Supervisor's Guide*.

Table Note 11: Fields 'i', 'j', 'k' and 'l' may be repeated to define multiple options and/or timers.

Table Note 12: Enhanced Configuration Parameters Load option 80 (Alphanumeric State Entry) affects following State Tables Load messages. For more information, see "State Tables Load" on page 10-9.

FIT Data Load

This message downloads Financial Institution Tables (FIT) to the terminal. Each command can include as many tables as the protocol permits. Up to 1000 FITs can be stored on the SST. One FIT is required for each member Financial Institution in the network. For details, see Chapter 8, "Financial Institution Tables".

Table 10-7
FIT Data Load

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '1' - Customisation Data
g	1	M	Message Identifier. The message identifier is: '5' - FIT Data
FS	1	M	Field Separator.
h	3	M	FIT Number. Designates the number assigned to the FIT in the following field. Values in the range 000 to 999 are valid. The FIT number defines the search order. For example, FIT 000 is the first entry checked during a FIT search. If there is a gap in the numbering range, all omitted entries in the FIT data default to 000. If linked FITs are used, they must have consecutive FIT numbers.

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Field	Number of Characters	Mandatory/Optional	Description
i	Var	M	<p>FIT Data. Specifies control words for the following:</p> <ul style="list-style-type: none"> • Remote PIN encryption • Local PIN verification • Indirect next state processing. <p>FIT data consists of a number of three-character decimal entries in the range 000-255. The terminal stores 41 entries. Those in excess of this are ignored. If fewer than 41 entries are received, no values are stored. For details of the data, see “Linked FITs” on page 8-12.</p>
FS	1	M	Field Separator.
j	3	M <i>See Table Note 13</i>	FIT Number. As field ‘h’.
k	Var	M <i>See Table Note 13</i>	FIT Data. As field ‘i’.
FS	1	<i>See Table Note 14</i>	Field Separator.
l	8	<i>See Table Note 14</i>	<p>Message Authentication Code (MAC) Data. Contains the value transmitted for authentication of this message.</p> <p>The characters are 0-9, A-F.</p>
m	Var	M	Trailer. Protocol-dependent.

Table Note 13: A field separator and fields ‘j’ and ‘k’ can be repeated until the maximum length permitted by the protocol is reached.

Table Note 14: The field separator and MAC Data field ‘l’ are only present if the flag settings are correct. For details, see the *APTRA Advance NDC, Supervisor’s Guide*.

Configuration ID Number Load

This message contains an identifier for the customisation data in the terminal. At terminal installation time, or any time customisation data is sent to the terminal, the configuration ID is set to 0000. The configuration ID number load message must be included as the last of the downloaded customisation data messages to set the configuration ID to the desired number. The configuration ID number can be any number from 0001 to 9999.

The terminal holds customisation data and the configuration ID on the system disk. On receipt of a power-up status message from the terminal, Central can verify that the customisation data has been correctly loaded. Only if a configuration ID of 0000 is received does Central need to reload the customisation data.

Note: Config ID is stored in memory, but not saved until a go-in-service is issued. If power fail occurs before the command is issued, the Config ID will need to be reloaded.

Table 10-8
Configuration ID Number Load

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '1' - Customisation Data
g	1	M	Message Identifier. The message identifier is: '6' - Configuration ID number

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Field	Number of Characters	Mandatory/ Optional	Description
FS	1	M	Field Separator.
h	4	M	Configuration ID Number. The valid range is 0001-9999.
i	Var	M	Trailer. Protocol-dependent.

Message Authentication Field Selection Load

This message is used to set the messages and fields specified for full or selective MAC verification, if a change to the default values is necessary. Fields are selected for inclusion in the MAC if the relevant offset byte is set to 1.

Table 10-9
 Message Authentication Field Selection Load

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '1' - Customisation Data
g	1	M	Message Identifier. The message identifier is: 'B' - Message Authentication Field selection
FS	1	M	Field Separator.
h	Var (47)	See Table Note 15	Transaction Request Field. This field contains the field selection data for the transaction request message. The fields of the Transaction Request message are selected for inclusion in the MAC if the relevant offset byte is set to 1. The offsets for the Transaction Request message fields are shown:

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Field	Number of Characters	Mandatory/Optional	Description
			<div>Offset</div> <div>Description</div>
			<div>0</div> <div>0 - MAC the complete message. Ignore the following digits in the field 1 - Selectively MAC the fields below if the relevant byte is set to 1</div>
			<div>1</div> <div>Fields 'b' and 'c'</div>
			<div>2</div> <div>Field 'd'</div>
			<div>3</div> <div>Reserved</div>
			<div>4</div> <div>Field 'e'</div>
			<div>5</div> <div>Field 'f'</div>
			<div>6</div> <div>Field 'g'</div>
			<div>7</div> <div>Field 'h'</div>
			<div>8</div> <div>Field 'i'</div>
			<div>9</div> <div>Field 'j'</div>
			<div>10</div> <div>Field 'k'</div>
			<div>11</div> <div>Field 'l'</div>
			<div>12</div> <div>Field 'm'</div>
			<div>13</div> <div>Field 'n'</div>
			<div>14</div> <div>Field 'o'</div>
			<div>15</div> <div>Field 'p'</div>
	See Table Note 15		<div>16</div> <div>Fields 'q' and 'r', optionally buffer 'f'</div>
			<div>17</div> <div>Field 'aa' * - Identified by Data ID 'A' - Reserved</div>
			<div>18</div> <div>Field 'ab' * - Identified by Data ID 'B' - Reserved</div>
			<div>19</div> <div>Field 'ac' * - Identified by Data ID '6' - Reserved</div>
			<div>20</div> <div>Field 'ad' * - Identified by Data ID 'C' - Reserved</div>
			<div>21</div> <div>Field 'ae' * - Identified by Data ID 'D' - Reserved</div>
			<div>22</div> <div>Field 'af' * - Identified by Data ID 'E' - Reserved</div>
			<div>23</div> <div>Field 'ag' * - Identified by Data ID 'F' - Reserved</div>
			<div>24</div> <div>Field 'ah' * - Identified by Data ID 'G' - Reserved</div>
			<div>25</div> <div>Field 'ai' * - Identified by Data ID 'H' - Reserved</div>
			<div>26</div> <div>Field 'aj' * - Identified by Data ID 'I' - Reserved</div>

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Central to Terminal Messages
Message Authentication Field Selection Load

Field	Number of Characters	Mandatory/Optional	Description
			27 Field 'ak' * - Identified by Data ID 'J' - Reserved
			28 Field 'al' * - Identified by Data ID 'K' - Reserved
			29 Field 'am' * - Identified by Data ID 'L' - Reserved
			30 Field 'an' * - Identified by Data ID 'M' - Reserved
			31 Field 'ao' * - Identified by Data ID 'N' - Reserved
			32 Field 'ap' * - Identified by Data ID 'O' - Reserved
			33 Field 'aq' * - Identified by Data ID 'P' - Reserved
			34 Field 'ar' * - Identified by Data ID 'Q' -Reserved
			35 Field 'as' * - Identified by Data ID 'R' - Reserved
			36 Field 'at' * - Identified by Data ID 'S' - Reserved
			37 Field 'au' * - Identified by Data ID 'T' - Reserved
			38 Field 'av' * - Identified by Data ID 'U' - CSP Data
			39 Field 'aw' * - Identified by Data ID 'V' - Confirmation CSP Data
			40 Field 'ax' * - Identified by Data ID 'W' - Available for use by Exits
			41 Field 'ay' * - Identified by Data ID 'X' - Available for use by Exits
			42 Field 'az' * - Identified by Data ID 'Y' - Available for use by Exits
			43 Field 'ba' * - Identified by Data ID 'Z' - Available for use by Exits
			44 Field 'bb' * - Identified by Data ID '[' - Available for use by Exits
			45 Field 'bc' * - Identified by Data ID '\' - Available for use by Exits
			46 Field 'bd' * - Identified by Data ID '5' - Available for use by EMV/CAM2 Exits
			51 Field 'ce' identified by Data ID 'e' - Barcode reader data
			* Indicates that all the elements present for that field will be MACed (group separators excluded).
FS	1	O	Field Separator.
i	Var (36)	See Table Note 16 and Table Note 19	Transaction Reply Field. This field contains the selection data for the Transaction Reply message.

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Field	Number of Characters	Mandatory/Optional	Description																																																													
			The fields of the Transaction Reply message are selected for inclusion in the MAC if the relevant offset byte is set to 1. The offsets for the Transaction Reply message fields are shown below:																																																													
			<table><tr><th>Offset</th><th>Description</th></tr><tr><td>0</td><td>0 - MAC the complete message. Ignore the following digits in the field 1 - Selectively MAC the fields below if the relevant byte is set to 1</td></tr><tr><td>1</td><td>Fields 'b' and 'c'</td></tr><tr><td>2</td><td>Field 'd'</td></tr><tr><td>3</td><td>Field 'e'</td></tr><tr><td>4</td><td>Field 'f'</td></tr><tr><td>5</td><td>Fields 'g', 'h', 'i', 'j' and 'j1' - 'jn'</td></tr><tr><td>6</td><td>Field 'k'</td></tr><tr><td>7</td><td>Field 'l'</td></tr><tr><td>8</td><td>Field 'm'</td></tr><tr><td>9</td><td>Field 'n'</td></tr><tr><td>10</td><td>Field 'o'</td></tr><tr><td>11</td><td>Field 'p'</td></tr><tr><td rowspan="2">See Table Note 15</td><td>12</td><td>Fields 'q' and 'r'</td></tr><tr><td>13</td><td>Fields 's' and 't'</td></tr><tr><td></td><td>14</td><td>Fields 'u', 'v' and subsequent print fields. See Table Note 18.</td></tr><tr><td></td><td>15</td><td>Field 'w'</td></tr><tr><td></td><td>16</td><td>Field 'x'</td></tr><tr><td></td><td>17</td><td>Field 'aa' * - Identified by Data ID 'A' - Reserved</td></tr><tr><td></td><td>18</td><td>Field 'ab' * - Identified by Data ID 'B' - Reserved</td></tr><tr><td></td><td>19</td><td>Field 'ac' * - Identified by Data ID 'C' - Reserved</td></tr><tr><td></td><td>20</td><td>Field 'ad' * - Identified by Data ID 'D' - Reserved</td></tr><tr><td></td><td>21</td><td>Field 'ae' * - Identified by Data ID 'E' - Reserved</td></tr><tr><td></td><td>22</td><td>Field 'af' * - Identified by Data ID 'F' - Reserved</td></tr><tr><td></td><td>23</td><td>Field 'ag' * - Identified by Data ID 'G' - Reserved</td></tr></table>	Offset	Description	0	0 - MAC the complete message. Ignore the following digits in the field 1 - Selectively MAC the fields below if the relevant byte is set to 1	1	Fields 'b' and 'c'	2	Field 'd'	3	Field 'e'	4	Field 'f'	5	Fields 'g', 'h', 'i', 'j' and 'j1' - 'jn'	6	Field 'k'	7	Field 'l'	8	Field 'm'	9	Field 'n'	10	Field 'o'	11	Field 'p'	See Table Note 15	12	Fields 'q' and 'r'	13	Fields 's' and 't'		14	Fields 'u', 'v' and subsequent print fields. See Table Note 18.		15	Field 'w'		16	Field 'x'		17	Field 'aa' * - Identified by Data ID 'A' - Reserved		18	Field 'ab' * - Identified by Data ID 'B' - Reserved		19	Field 'ac' * - Identified by Data ID 'C' - Reserved		20	Field 'ad' * - Identified by Data ID 'D' - Reserved		21	Field 'ae' * - Identified by Data ID 'E' - Reserved		22	Field 'af' * - Identified by Data ID 'F' - Reserved		23	Field 'ag' * - Identified by Data ID 'G' - Reserved
Offset	Description																																																															
0	0 - MAC the complete message. Ignore the following digits in the field 1 - Selectively MAC the fields below if the relevant byte is set to 1																																																															
1	Fields 'b' and 'c'																																																															
2	Field 'd'																																																															
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4	Field 'f'																																																															
5	Fields 'g', 'h', 'i', 'j' and 'j1' - 'jn'																																																															
6	Field 'k'																																																															
7	Field 'l'																																																															
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	22	Field 'af' * - Identified by Data ID 'F' - Reserved																																																														
	23	Field 'ag' * - Identified by Data ID 'G' - Reserved																																																														

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Central to Terminal Messages
Message Authentication Field Selection Load

Field	Number of Characters	Mandatory/Optional	Description
			24 Field 'ah' * - Identified by Data ID 'H' - Reserved
			25 Field 'ai' * - Identified by Data ID 'I' - Reserved
			26 Field 'aj' * - Identified by Data ID 'J' - Reserved
			27 Field 'ak' * - Identified by Data ID 'K' - Track 1 Data
			28 Field 'al' * - Identified by Data ID 'L' - Track 2 Data
			29 Field 'am' * - Identified by Data ID 'M' - Virtual Controller data
			30 Field 'an' * - Identified by Data ID 'N' - Virtual Controller data
			31 Field 'ao' * - Identified by Data ID 'O' - Virtual Controller data
			32 Field 'ap' * - Identified by Data ID 'P' - Virtual Controller data
			33 Field 'aq' * - Identified by Data ID 'Q' - Virtual Controller data
			34 Field 'ar' * - Identified by Data ID 'R' - Virtual Controller data
			35 Field 'as' * - Identified by Data ID 'a' - single cheque deposit data. See Table Note 20.
			36 Field 'at' * - Identified by Data ID '5' - Available for use by EMV/CAM2 Exits. See Table Note 20.
			* Indicates that all the elements present for that field will be MACed (group separators excluded).
FS	1	O	Field Separator.
j	11	See Table Note 16	Solicited Status Field. This field contains the MAC selection data for the solicited status message.
FS	1	O	Field Separator.
k	4	See Table Note 16	Other Messages Field. This field contains the MAC selection data for FIT load, state tables load, and terminal state status and Dispenser Currency Cassette Mapping Table messages.
FS	1	O	Field Separator.
l	6	See Table Note 16	Track 1 Field. This field contains the MAC selection data for magnetic card track 1.
FS	1	O	Field Separator.
m	6	See Table Note 16	Track 2 Field. This field contains the MAC selection data for magnetic card track 2.
FS	1	O	Field Separator.

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Field	Number of Characters	Mandatory/Optional	Description
n	11	See Table Note 16	Track 3 Field. This field contains the MAC selection data for magnetic card track 3.
FS	1	O	Field Separator.
o	5	See Table Note 16	EMV Smart Card Configuration. This field contains the MAC selection data for the EMV Configuration message.
FS	1	See Table Note 17	Field Separator.
p	8	See Table Note 17	Message Authentication Code (MAC) Data. This field contains the eight-character value transmitted for authentication of this message. The characters are 0-9 and A-F.
q	Var	M	Trailer. Protocol-dependent.

Table Note 15: Offset 16 not only controls whether fields ‘q’ and ‘r’ are included in the MAC generation, but also whether buffer ‘f’ is included when more than four hopper types are supported by the coin dispenser.

Table Note 16: Variable length fields may be truncated, that is, trailing characters may be omitted. The omitted characters will take a value of zero. If Message Authentication is turned on, any fixed (not variable) length fields must be either empty or fully populated, or the message will be rejected with a MAC failure.

Table Note 17: The field separator and MAC are only present when the Data Security feature is selected and the flags are set correctly. For details, refer to the *APTRA Advance NDC, Supervisor’s Guide*.

When the Data Security feature is set, all the messages sent from Central to the terminal that contain a MAC field must have this optional field present.

Table Note 18: The printer fields, following fields ‘u’ and ‘v’, will be MACed if fields ‘u’ and ‘v’ are to be MACed. The group separators between the additional printer fields will not be included in the MACing activity.

Table Note 19: The MACing of other messages, including the Dispenser Currency Cassette Mapping Table message and the EMV Configuration messages, are specified in “Selective Message Authentication” on page 11-13”.

Table Note 20: If you wish to use selective MACing on EMV ICC data with Advance NDC and NDC+ based terminals, you cannot use the same Message Authentication Field Selection Load message.

Message Authentication Field Selection Load

This is because of the different EMV field offsets (35 for NDC+ and 36 for Advance NDC). For more information about EMV Integrated Circuit Card (ICC or 'Smart Card') configuration using APTRA Advance NDC, See "Other NCR Documentation" on page G-6.

Date and Time Load

This message is used to set the local date and time in the terminal.

Table 10-10
Date and Time Load

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '1' - Customisation Data
g	1	M	Message Identifier. The message identifier is: 'C' - Date and Time
FS	1	M	Field Separator.
h	10	M	Date/Time Data. This field contains the date and time in the following format: YY = Year ('00' - '99') MM = Month ('01' - '12') DD = Day ('01' - '31') HH = Hour ('00' - '23') MM = Minute ('00' - '59') If 00<=YY<=89, the year is taken to be in the range 2000<=YY<=2089. If 90<=YY<=99, the year is taken to be in the range 1990<=YY<=1999. Note: Seconds are set to zero when the date and time are set.

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Encryption Key Change

For security, the Central programmer can use this message to change the Master Key ('A' key), Communication Key ('B' key) and VISA Master Key ('V' key) initially entered by a local operator through Supervisor mode. From Advance NDC 2.02, it is possible to change the Communication key while the terminal is in-service, but not currently handling a transaction. This is not possible when the terminal is in suspend mode, or the operator is initiating the execution of settlement transactions.

In addition to the Encryption Keys, the operator may change the Message Authentication Key and VISA Key Table. For details, refer to the *APTRA Advance NDC, Supervisor's Guide*.

Note: If an Encryption Key Change message is sent in Supervisor mode, the message is not processed until the front keyboard is disabled, following a menu selection or Supervisor mode exit.

The Encryption Key Change message may:

- Include an encrypted encryption key.
- Specify the current encryption key that the terminal must use to decrypt this encrypted encryption key.
- Specify which of the current encryption keys to replace.

The above specifications are contained in the modifier field of the message.

A solicited status message will be returned to Central after an attempt to modify an encryption key, to indicate its success or failure.

Central must encrypt the new encryption key with the same key designated to decrypt it at the terminal.

PIN verification may require the use of a separate PIN key. The key used in this case is the PEKEY, contained in the FIT, which can be different for each financial institution in the system.

On power failure, the host sends the Key Exchange messages.

This message is not considered part of the customisation data and does not reset the configuration ID to zero.

Table 10-11
Encryption Key Change

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '3' - Encryption Key Information
g	1	M	Modifier. This one-character field specifies the encryption key change to take place: '1' - Decipher new master key with current master key * '2' - Decipher new communications key with current master key * '3' - Decipher new communications key with current communications key * '4' - Use locally-entered communications key ('B' key) as current communications key '5' - Decipher new MAC key with current master key * '6' - Decipher new MAC key with current communications key * '7' - Use locally-entered communications key ('B' key) as current MAC key '8' - Decipher new VISA master key with current VISA master key '9' - Key data is new VISA key table; the equivalent old key is overwritten. <i>See</i> Table Note 21. * The equivalent old key is overwritten.
FS	1	O	Field Separator.

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Central to Terminal Messages
Encryption Key Change

Field	Number of Characters	Mandatory/ Optional	Description
h	24 or 288	O	<p>New Key Data. Key data consists of entries of three characters. The valid range of each entry is 000-255.</p> <p>Each entry defines the value of two hexadecimal encryption key digits. A key consists of eight entries. The first entry contains digits 1 and 2. The last entry contains digits 15 and 16 (95 and 96).</p> <p>For example, 255, 254, 253, 252, 251, 250, 249, 248 is equivalent to FF, FE, FD, FC, FB, FA, F9, F8 entered locally at the terminal. <i>See Table Note 22.</i></p>
i	Var	M	Trailer. Protocol-dependent

Table Note 21: When VISA PIN verification is used, any change to the keys should be done with a message modifier '8' to change the master key, followed by a message modifier '9' to load the new key table.

Table Note 22: In all messages where key data is present, except for modifier '9', only one key is present. For modifier '9', twelve keys comprising the six VISA key table pairs are present.

Extended Encryption Key Change

With an Encrypting PIN Pad (EPP), this message can be used to change the Master Key (A key), Communication Key (B key) and VISA Master Key (V key) initially entered by a local operator through Supervisor mode. If an EPP is not present, this message is rejected.

It is possible to change the Communication key while the terminal is in-service, but not currently handling a transaction. This is not possible when the terminal is in Suspend mode, or the operator is initiating the execution of supervisory or settlement transactions.

This message supports the terminal key modes of single and double-length keys. For further details, see Chapter 11, "Security Features".

Note: If an Extended Encryption Key Change message is sent in Supervisor mode, the message is not processed until the front keyboard is disabled, following a menu selection or Supervisor mode exit.

The Extended Encryption Key Change message may:

- Include an encrypted encryption key
- Specify the current encryption key that the terminal must use to decrypt this encrypted encryption key
- Specify which of the current encryption keys to replace.

The above specifications are contained in the modifier field of the message.

The Extended Encryption Key Change message enables single-length keys to be downloaded (as the previous Encryption Key Change message), but also double-length keys.

If this message is sent for a single-length key when the terminal is in double-length key mode, or vice versa, a command reject is issued indicating an Encryption Key Change message of the wrong length has been issued.

The Extended Encryption Key Change message can be sent to change the Communication Key ('B' key) at any point after it is initially entered, except when a transaction is in process, or the terminal is in Suspend mode, or when the operator is executing a supervisor/settlement transaction.

If the key load is successful, an “Encryptor Initialisation Data” message is returned to Central to report the Key Verification Value (KVV) for the new key. If the key load fails, a reject message is sent.

When a DES key is used to encrypt the new encryption key, Central must encrypt the new encryption key with the same key designated to decrypt it at the SST.

PIN verification may require the use of a separate PIN key. The key used in this case is the PEKEY, contained in the FIT, which can be different for each financial institution in the system.

On power failure the Master key is unchanged, but the Communications key and MAC key are changed to the locally entered B key if the Restart Mode option specifies this, or if configuration data reload from disk fails.

The host must ensure that any required Extended Encryption Key Change messages are sent.

The Extended Encryption Key Change message can be sent to change the MAC key to the current Master key (modifier 5) or the current Communications key (modifier 6) at any point after it is initially entered, except for the following:

- When a cardholder transaction is in progress
- When the SST is in Suspend mode
- When a Supervisor settlement transaction is in progress.

This message is not considered part of the customisation data and does not reset the configuration ID to zero.

Table 10-12
Extended Encryption Key Change

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.

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Field	Number of Characters	Mandatory/ Optional	Description
e	3	O	Message Sequence Number. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '4' - Extended Encryption Key Information
g	1	M	<p>Modifier. This one-character field specifies the encryption key change to take place:</p> <p>'1' - Decipher new master key with current master key. <i>See Table Note 23.</i></p> <p>'2' - Decipher new communications key with current master key. <i>See Table Note 23.</i></p> <p>'3' - Decipher new communications key with current communications key. <i>See Table Note 23 and Table Note 24.</i></p> <p>'4' - Use locally entered communications key ('B' key) as current communications key. <i>See Table Note 24 and Table Note 26.</i></p> <p>'5' - Decipher new MAC key with current master key. <i>See Table Note 23.</i></p> <p>'6' - Decipher new MAC key with current communications key. <i>See Table Note 23 and Table Note 24.</i></p> <p>'7' - Use locally entered communications key ('B' key) as current MAC key. <i>See Table Note 24 and Table Note 26.</i></p> <p>'8' - Decipher new VISA master key with current VISA master key. <i>See Table Note 26.</i></p> <p>'9' - Key data is new VISA key table. <i>See Table Note 23 and Table Note 25.</i></p> <p>'A' - Decipher new VISA master key with current master key. <i>See Table Note 23 and Table Note 25.</i></p> <p>'B' - Load Host Security Module (HSM) public key and signature. <i>See Table Note 27.</i></p> <p>The key data field contains the HSM public key (PK-HSM) and signature block (PK-HSM) created using SK-NCR, each base 94 encoded giving a total length of 640 bytes.</p>

Field	Number of Characters	Mandatory/ Optional	Description
			<p>'C' - Load initial master key (A-key) with RSA key. See Table Note 27. The key data field contains the initial A-key encrypted with the EPP public key [A-KEY], PK-EPP and signature block ([A-KEY], PK-EPP) created using SK-HSM, each base 94 encoded giving a total length of 640 bytes. See Table Note 35.</p>
			<p>'D' - Load new initial communications key (B-key) with RSA key. See Table Note 27. The key data field contains the initial B-key encrypted with the EPP public key [B-KEY], PK-EPP and signature block ([B-KEY], PK-EPP) created using SK-HSM, each base 94 encoded giving a total length of 640 bytes. See Table Note 24 and Table Note 35.</p>
			<p>'E' - Load new initial VISA master key (V-key) with RSA key. See Table Note 27. The key data field contains the initial V-key encrypted with the EPP public key [V-KEY], PK-EPP and signature block ([V-KEY], PK-EPP) created using SK-HSM, each base 94 encoded giving a total length of 640 bytes. See Table Note 35.</p>
			<p>'F' - Send EPP serial number. See Table Note 27. The terminal will respond with an Encryptor Initialisation Data message containing the signed serial number. If the EPP serial number returned by the EPP is not 8 bytes in length. it will be rejected with a Specific Command Reject code of E06. If the encryptor has previously been used in BAPE mode, this command option will fail unless the key entry mode is changed through either the modifier 'J' or the Supervisor Access menu. See Table Note 33.</p>
			<p>'G' - Send EPP public key. See Table Note 27. The terminal will respond with an Encryptor Initialisation Data message containing the signed EPP public key</p>
			<p>'H' - Send all KVV's. See Table Note 26</p>
			<p>'I' - Reserved.</p>
			<p>'J' - Set key entry mode. See Table Note 27 and Table Note 33</p>
			<p>'K' - Send current key entry mode</p>
			<p>'L' - Load host certificate (primary or secondary)</p>
			<p>'M' - Send SST certificate</p>

Field	Number of Characters	Mandatory/ Optional	Description
			<p>'N' - Send SST random number This is supported only if the SST is using certificates or the Enhanced Signature scheme for remote key loading. If 'N' is not supported, the message will be rejected with reason E02:</p> <p>'O' - Load A-key PKCS7 encoded.</p>
			<p>'P' - Replace certification authority certificate If the command fails or is not supported, the message will be rejected with reason C02. If the EPP is not present, the message will be rejected with reason E02.</p> <p>'Q' - Send encryptor capabilities and state.</p> <p>'R' - Load NCR Sub public key and signature. <i>See Table Note 36</i></p> <p>'S' - Delete HSM public key. <i>See Table Note 37</i></p> <p>'T' - Delete NCR Sub public key. <i>See Table Note 36 and Table Note 37</i></p> <p>'U' - Send EPP attributes <i>See Table Note 38</i></p> <p>'V' - Send variable length EPP serial number. <i>See Table Note 39</i></p> <p>'W' - Reserved</p> <p>'X' - Load HSM public key (Bind EPP) with TR34 certificate. <i>See Table Note 40</i></p> <p>'Y' - Load TR31 Key Block protection key with TR34 certificate. <i>See Table Note 40</i></p> <p>'Z' - Reload HSM public key (Rebind EPP) with TR34 certificate. <i>See Table Note 40</i></p> <p>'a' - Reload HSM public key (Force Rebind EPP) with TR34 certificate. <i>See Table Note 40</i></p> <p>'b' - Delete HSM public key (Unbind EPP) with TR34 certificate. <i>See Table Note 40</i></p> <p>'c' - Delete HSM public key (Force Unbind EPP) with TR34 certificate. <i>See Table Note 40</i></p> <p>'d' - Reserved.</p> <p>'e' - Load New Communications key with current TR31 Key Block Protection Key. <i>See Table Note 41</i></p> <p>'f' - Load new MAC key with current TR31 Key Block protection key. <i>See Table Note 41</i></p> <p>'g' - Send host certificate</p> <p>'h' - Send extended capabilities</p>

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Central to Terminal Messages
Extended Encryption Key Change

Field	Number of Characters	Mandatory/ Optional	Description
			<p>'i' - Send extended key Status</p> <p>'j' - Diebold unbind EPP This identifier is not supported</p> <p>'k' - Start Authenticated command See Table Note 42</p>
FS	1	O	Field Separator.
h	3	O	<p>Key Data Size. Specifies the size of the following key data field in hexadecimal (hex).</p> <p>For a single-length DES key, the size is 018 hex (24 decimal) characters.</p> <p>For a double-length DES key, the size is 030 hex (48 decimal) characters.</p> <p>For the six VISA table keys, the size is 120 hex (288 decimal) characters.</p>
i	0 - 640	O	<p>New Key Data. Maximum length is 640 bytes. See Table Note 27, Table Note 32 and Table Note 33</p> <p>For DES keys, the key data consists of entries of three characters. The valid range of each entry is 000-255.</p> <p>Each entry defines the value of two hexadecimal encryption key digits. A key consists of eight entries for a single-length key, or sixteen entries for a double-length key. The first entry contains digits 1 and 2. The last entry contains digits 15 and 16 (95 and 96).</p> <p>For example, 255, 254, 253, 252, 251, 250, 249, 248 is equivalent to FF, FE, FD, FC, FB, FA, F9, F8 entered locally at the terminal.</p> <p>In all messages where DES key data is present, except for modifier '9', only one key is present. For modifier '9', twelve keys comprising the six VISA key table pairs are present.</p> <p>The key is interpreted as single or double-length depending on the Key Entry mode option selected from the Supervisor Access menu. For more information, see Chapter 11, "Security Features".</p>

Table Note 23: For modifiers '1', '2', '3', '5', '6', '8', '9' and 'A' the equivalent old key is overwritten.

Table Note 24: Modifiers '3', '4', '6', '7' and 'D' cannot be used if the Key Entry mode is set to Double Length Restricted, when they will be rejected with reason C17. See Chapter 11, "Security Features".

Table Note 25: When VISA PIN verification is used, any change to the keys should be performed with message modifier '8' or 'A' to change the master key, followed by message modifier '9' to load the new key table.

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Table Note 26: For modifiers '4', '7' and 'H', field 'i' is not present.

Table Note 27: Modifiers 'B', 'C', 'D', 'E', 'F', 'G', 'J', 'U' and 'V' are supported only by the EPP. If the terminal does not have an EPP, the message will be rejected with Specific Command Reject E02 'Function not supported in hardware'.

Table Note 28: Only the A key has to be downloaded using RSA. The communications key, MAC key and VISA key, encrypted by the A key, can be loaded.

Table Note 29: Modifiers 2 and 3 can be used while the terminal is in service, but not performing a transaction, to change the communications key. All other modifiers can only be used while the terminal is out of service. If the terminal is not in the correct mode, the message is rejected with reason C15.

Table Note 30: Depending on the single/double encryption mode of the terminal, the initial keys (A, B and V) may be single or double length. As the length of an encrypted RSA block is always 256 bytes, the message length remains unchanged.

Table Note 31: The exponent of the HSM-PK is always 65537, and is therefore not transmitted to the terminal.

Table Note 32 The format of field 'i' for modifiers 'L', 'M', 'N', 'O', 'P' and 'Q' is as follows:

Modifier	Key Data Format	Number of characters
'L' or 'P'	Binary data length Certificate, base 94 encoded	3 bytes VAR
M	Certificate type '0' = encryption certificate '1' = verification certificate	1
'N' & 'Q'	No key data	
'O'	Binary data length Key Load Packet	3 bytes VAR

Table Note 33: Modifier 'J' is supported only on the EPP encryptor, and has the additional restriction that it will be accepted only after the host has demonstrated that it has the ability to download encryption keys using RSA key download. This is achieved by the exchange of public keys and reading the EPP serial number. If this exchange of messages has not been performed since the last power up the command will be rejected (Reason C18 - not authorised). To permit migration from previous NDC+ releases, if the EPP is

operating in BAPE emulation mode this modifier will be accepted once without the need for the authorisation sequence. Changing the key entry mode will switch the encryptor into EPP mode.

For modifier 'J' the key data consists of a single character in the range '1' to '4' which selects the new mode, as follows:

'1' = Set mode to single length without XOR

'2' = Set mode to single length with XOR

'3' = Set mode to double length with XOR

'4' = Set mode to double length restricted.

The mode controls the manual encryption key entry mode, the encryption key size and the restrictions placed on key usage. When using a remote key protocol, the mode must be set based on the DES key size to be used and the level of restriction to be placed on the usage of encryption keys.

All four key modes are supported for a non-secure EPP on NCR and other vendors' machines. With a secure EPP and firmware such as DAPI-7, only key mode '4' is supported. If the mode cannot be supported by the EPP, a Specific Command Reject is returned.

Table Note 34: Security messages from Central will not be processed if the application is in Supervisor mode.

Table Note 35: For modifiers 'C', 'D' and 'E', the key data consists of either a single- or double-length DES key, which is padded and encrypted with PK-EPP using the RSAES-PKCS1-v1_5 encryption scheme. The 256-byte result is then signed with SK-HSM using the RSASSA-PKCS1-v1_5 signature algorithm to give a 256-byte signature. Each block is Base 94 encoded giving 320 bytes.

The same process is followed when the Enhanced Signature scheme is used but the signature is generated from the random number returned in response to an EEKC request with modifier 'N' and concatenated with the encrypted single- or double-length DES key. The random number is not included in the message from the host to the EPP. All of the data returned in the random number from the SST must be used in the cryptogram.

Table Note 36: Modifiers 'R', 'S' and 'T' are supported only under the enhanced signature remote key protocol. If the enhanced signature is not supported, Specific Command Reject E02 is returned.

Table Note 37: Modifiers 'S' and 'T' are used to delete the HSM public key and HSM Root public key.

Table Note 38: Modifier 'U' is used to return the EPP attributes for the host to determine whether the EPP is PCI compliant.

Table Note 39: Where variable length EPP serial numbers are supported use modifier 'V' to report EPP serial numbers for all hardware variants to avoid different host processing requirements on different hardware.

Note: The application adds the SN-EPP to the message data for verification.

Table Note 40: For modifiers 'X', 'Y', 'Z', 'a', 'b' and 'c' the key data consist of the TR34 certificate encoded using base 94. The key data size is ignored and should be set to 000. The length of the certificate is determined by inspecting the length attribute in the first tag after base 94 decoding.

Table Note 41: For modifiers 'e' and 'f' the key data consists of the TR31 key block. This data is not base 94 encoded as the TR31 format defines that the key block consists of printable characters and ASCII encoded hex. The key data size is ignored and should be set to 000.

Table Note 42: Modifier 'k' is used to request EPP data that needs to be included when generating an authentication data block for a command, which needs to be authenticated before it can be completed by the EPP. The data included with modifier 'k' identifies the command that is about to be executed that requires authentication. The Key Data Size is ignored and should be set to 000. The data included with modifier 'k' is a one byte field containing the modifier for the command that is about to be executed. The modifiers 'b' and 'c' require authentication data to be requested.

Request for Authentication data for other modifiers will be rejected with a specific reject of B38. Existing authentication mechanisms are not affected by this new protocol.

The Enhanced Signature RKL mechanism for public key deletion does not use this command.

Dispenser Currency Cassette Mapping Table

The table contained in this message is used to define currency types, which map to the configuration settings in table entry 7 of the Amount Check State defined in the Amount Check State Table.

When the Data Security feature is set, all the messages sent from the host to the terminal that contain a MAC field must have this optional field present.

Table 10-13
 Dispenser Currency Cassette Mapping

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
e	3	O	Message Sequence Number. This field is included for future use and is ignored by the terminal.
FS	1	M	Field Separator.
f	1	M	Message Sub-Class. The message sub-class is: '1' - Customisation Data
g	1	M	Message Identifier. The message identifier is: 'E' - Dispenser Currency Cassette Mapping Table
FS	1	M	Field Separator.
h	2	M	Number of Mapping Entries. Two-digit ASCII hex value (range 01 to FF). <i>See</i> Table Note 43.
i1	2	<i>See</i> Table Note 43	Currency Type. Single-digit ASCII hex value (range 01 to FF). Used for mapping to state type 'G' table entry 7.

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Field	Number of Characters	Mandatory/ Optional	Description
i2	1	See Table Note 43	Cassette Type. Single-digit ASCII hex value (range 0 to F, types 1 to 4 supported).
i3	5	See Table Note 43	Denomination for Cassette. Five-digit ASCII numeric value (for example, 00005 for \$5).
FS	1	See Table Note 44	Field Separator.
j	8	See Table Note 44	Message Authentication Code (MAC) Data. Contains the value transmitted for authentication of this message. The characters are 0-9, A-F.
k	Var	M	Trailer. Protocol-dependent.

Table Note 43: If field h is greater than 01, the fields i1 to i3 inclusive are repeated for the number of times indicated by field h.

The Data Command message is expected at the SST only when the SST is in out-of-service mode or supply/Supervisor mode.

If the host transmits a Data Command message that does not conform to the format above, or is sent unexpectedly, a solicited error message is generated, identifying a Specific Command Reject value for the failure reason (or simply 'A' if Specific Command Reject processing is not activated).

If a Specific Command Reject value is generated then the message content will be ignored.

The following example shows the contents for fields h and i using two currencies and four cassette types:

- Cassette type 1 = 10 dollars
- Cassette type 2 = 20 dollars
- Cassette type 3 = 100 euros
- Cassette type 4 = 200 euros

```
.... 04 01 1 00010 01 2 00020 02 3 00100 02 4 00200
....
```

The spaces are included for clarity but do not appear in the actual message to the SST.

Table Note 44: The field separator and MAC are present only when the Data Security feature is selected and the flags are set correctly. For details, refer to the *APTRA Advance NDC, Supervisor's Guide*.

When the Data Security feature is set, all the messages sent from the host to the terminal that contain a MAC field must have this optional field present.

XML Configuration Download

This message is a generic command that downloads configuration data to the terminal. The configuration data content is defined in XML files and is contained within a number of XML schema files. These schema files are defined when new configuration requirements are identified.

Advance NDC responds to the XML configuration download in the same way as all other data commands, for example, it sends a 'Ready 9' or a Reject solicited message. An XML schema file containing configuration data can be downloaded in parts (up to a maximum of 9999), or as a single file. The 'Ready 9' acknowledges receipt of each XML schema file part; but this does not imply the content is valid. Validation occurs only when the final part of the file is downloaded.

The host must download the parts of the file in sequence. When the last part of the file is downloaded, Advance NDC constructs the whole file, validates the file, completes the configuration process and stores the file. The name of the file is read from the XML configuration data and is stored in the *C:\Program Files\NCR APTRA\config* directory. If part of a file is downloaded out of sequence, a Specific Command Reject is returned. If the host does not receive the 'Ready 9' acknowledgement, it can re-send the last part without getting an error. This allows the host to recover from a communications failure or continue with the download after a power failure at the SST.

The host can cancel a download (and potentially re-start the whole process) by setting either field 'h' (Total Message Parts), or field 'i' (Message Part) to '0000'. The cancel download request is required if the host receives a Specific Command Reject. Advance NDC replies with a 'Ready 9' when it has processed the cancel download request.

All parts of the download are discarded when the final part has been downloaded and processed, or when the host cancels the download.

Central to Terminal Messages
XML Configuration Download

Table 10-14
XML Configuration Download Message
Format

Field	Number of Characters	Mandatory/ / Optional	Description
b	1	M	Message Class. The message class is: '3' - Data Command.
c	1	O	Response Flag. This field is included for future use and is ignored by the terminal.
	1	M	Field Separator.
d	3	O	Logical Unit Number. Included for future use and is ignored by the terminal.
	1	M	Field Separator.
e	3	O	Message Sequence Number. Included for future use and is ignored by the terminal.
	1	M	Field Separator.
f	1	M	Message Subclass. The message subclass is: '1' - Customisation Data.
g	1	M	Message Identifier. The message identifier is: 'T' - XML Configuration Download.
	1	M	Field Separator.
h	4	M	Total Message Parts. Total number of parts that the configuration data is split into. It contains a four digit decimal number, in the range '0000' to '9999'. If this value is '0000', all previous parts of a partial configuration data download are discarded (<i>see</i> Table Note 45).
	1	M	Field Separator.
i	4	M	Message part. Part number for the configuration data contained within this message. It contains a four-digit decimal number, in the range '0000' to '9999'. If this value is '0000', all previous parts of a partial configuration data download are discarded (<i>see</i> Table Note 45). If this value equals the value in Total Message Parts (field h), the downloaded parts are combined and validated against the specific schema. If the data is valid the configuration data is stored in an XML file at a specific location.
	1	M	Field Separator.

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Field	Number of Characters	Mandatory/ / Optional	Description
j	Var	M	NDC Configuration Data. For details of the configuration data format, refer to the <i>APTRA Advance NDC Developer's Guide</i>
	1	See Table Note 46.	Field Separator.
k	8	See Table Note 46.	Message Authentication Code Data (MAC) Data. Value transmitted for authentication of this message. The characters are in the range '0-9' and 'A-F'.

Table Note 45: If either field h or i contain the value '0000', all previous parts of a partial configuration download are discarded.

Table Note 46: The field separator and MAC Data field k are only present if the flag settings are correct. For details, refer to the *APTRA Advance NDC, Supervisor's Guide*.

Transaction Reply Command

A Transaction Reply command is sent to the SST once the cardholder has entered all the data necessary for a specific Transaction Request, and a request has been sent to Central.

The SST regards the Transaction Reply command as an authorisation to complete the transaction. If the transaction cannot be completed successfully, the SST sends a solicited device fault status message to Central. The SST then waits for another Transaction Reply command, authorising it to complete the transaction in another way.

The maximum length of a Transaction Reply command depends on the communications protocol in use.

Table 10-15
Transaction Reply Command: Message
Format

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '4' - Transaction Reply Command
c	1	O	Response Flag. Included for future use and ignored by the terminal.
FS	1	M	Field Separator.
d	3 or 9	O	Logical Unit Number (LUNO). The contents of this field are only used when Central asks for the security terminal number to be checked. In this case the field will contain nine characters, the last six of which are checked.
FS	1	M	Field Separator.
e	3 or 8	See Table Note 57	Message Sequence/Time Variant Number. The Message Sequence number field is ignored by the terminal and is included for future use. The Time Variant field contains an eight-character time variant number which should be the same as the last time variant number transmitted to Central.
FS	1	M	Field Separator.

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Field	Number of Characters	Mandatory/ Optional	Description
f	3	O	Next State ID Data. Contains a base 10 (decimal) number in the range 000-254 or 256-999, or a base 36 (alphanumeric) number in the range 000-254 or 256-ZZZ. This identifies the state number which the SST should execute after it has completed the specified Transaction Reply command. This field must be included in all Transaction Reply messages except a Print Immediate.
FS	1	M	Field Separator.
g1	2	See Table Note 53, Table Note 54, Table Note 55, and Table Note 56	Number of type 1 notes to dispense. Contains the number of type 1 notes to be dispensed. Valid range is defined by hardware capabilities.
g2	2	See Table Note 53, Table Note 54, Table Note 55, and Table Note 56	Number of type 2 notes to dispense. Contains the number of type 2 notes to be dispensed. Valid range is defined by hardware capabilities.
g3	2	See Table Note 53, Table Note 54, Table Note 55, and Table Note 56	Number of type 3 notes to dispense. Contains the number of type 3 notes to be dispensed. Valid range is defined by hardware capabilities.
g4	2	See Table Note 53, Table Note 54, Table Note 55, and Table Note 56	Number of type 4 notes to dispense. Contains the number of type 4 notes to be dispensed. Valid range is defined by hardware capabilities.
g5	2	See Table Note 53, Table Note 54, Table Note 55, and Table Note 56	Number of type 5 notes to dispense. Contains the number of type 5 notes to be dispensed. Valid range is defined by hardware capabilities.
g6	2	See Table Note 53, Table Note 54, Table Note 55, and Table Note 56	Number of type 6 notes to dispense. Contains the number of type 6 notes to be dispensed. Valid range is defined by hardware capabilities.
g7	2	See Table Note 53, Table Note 54, Table Note 55, and Table Note 56	Number of type 7 notes to dispense. Contains the number of type 7 notes to be dispensed. Valid range is defined by hardware capabilities.
GS	1	See Table Note 60	Group Separator
j1	2	See Table Note 61 and Table Note 60	Number of hopper type 1 Coins to Dispense. Contains the number of coins to be dispensed from hopper type 1. Valid range is defined by hardware capabilities. See Table Note 62.

Central to Terminal Messages
Transaction Reply Command

Field	Number of Characters	Mandatory/ Optional	Description										
j2	2	See Table Note 61 and Table Note 60	Number of hopper type 2 Coins to Dispense. Contains the number of coins to be dispensed from hopper type 2. Valid range is defined by hardware capabilities. See Table Note 62.										
j3	2	See Table Note 61 and Table Note 60	Number of hopper type 3 Coins to Dispense. Contains the number of coins to be dispensed from hopper type 3. Valid range is defined by hardware capabilities. See Table Note 62.										
j4	2	See Table Note 61 and Table Note 60	Number of hopper type 4 Coins to Dispense. Contains the number of coins to be dispensed from hopper type 4. Valid range is defined by hardware capabilities. See Table Note 62.										
j5	2	See Table Note 61 and Table Note 60	Number of hopper type 5 Coins to Dispense. Contains the number of coins to be dispensed from hopper type 5. Valid range is defined by hardware capabilities. See Table Note 62.										
			:										
...	Repeated for the number of hopper types present.												
			:										
j _n	2	See Table Note 61 and Table Note 60	Number of hopper type <i>n</i> Coins to Dispense. Contains the number of coins to be dispensed from hopper type <i>n</i> . Valid range is defined by hardware capabilities. See Table Note 62.										
FS	1	M	Field Separator.										
k	4	M	Transaction Serial Number. Number that Central uses to identify the transaction. It is used by the SST for the following functions: - Default PPD printing - Transaction number of the last transaction processed by the SST. (This can be requested by Central by transmitting a Send Supply Counters Terminal Command to the SST.) - Part of the information printed on the journal when an exception status is sent to Central. Valid range is 0000-9999										
l	1	M	Function Identifier. Instructs the terminal on what functions are to be performed: <table><thead><tr><th>Function ID</th><th>Functions Performed</th></tr></thead><tbody><tr><td>‘1’ or ‘7’</td><td>Deposit and print. See Table Note 49.</td></tr><tr><td>‘2’ or ‘8’</td><td>Dispense and print. See Table Note 47.</td></tr><tr><td>‘3’ or ‘9’</td><td>Display and print</td></tr><tr><td>‘4’</td><td>Print immediate</td></tr></tbody></table>	Function ID	Functions Performed	‘1’ or ‘7’	Deposit and print. See Table Note 49.	‘2’ or ‘8’	Dispense and print. See Table Note 47.	‘3’ or ‘9’	Display and print	‘4’	Print immediate
Function ID	Functions Performed												
‘1’ or ‘7’	Deposit and print. See Table Note 49.												
‘2’ or ‘8’	Dispense and print. See Table Note 47.												
‘3’ or ‘9’	Display and print												
‘4’	Print immediate												

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Field	Number of Characters	Mandatory/ Optional	Description
			'5' Set next state and print
			'6' Night safe deposit and print
			'A' Eject card and dispense and print (card before cash)
			'B' or 'C' Parallel dispense and print and card eject
			'E' Reserved. A specific command reject will be sent if this is received.
			'F' Card before parallel dispense/print
			'O' Reserved
			'P' Print statement and wait. <i>See Table Note 48.</i>
			'Q' Print statement and set next state. <i>See Table Note 48.</i>
			'R' Reserved. A Specific Command Reject will be sent if this is received.
			'S' Reserved. A Specific Command Reject will be sent if this is received.
			'T' Reserved. A Specific Command Reject will be sent if this is received.
			'#' Print passbook and set next state (<i>Not supported</i>)
			'%' Print passbook and wait (<i>Not supported</i>)
			'*' Refund notes and print
			'_' Deposit notes and print
			''' Deposit notes and wait
			':' Process cheque
			'b' Dispense notes first during valuable media exchange
			'c' Process multiple cheques
			'e' Print valuable media and set next state (<i>not supported</i>)
			'f' Deposit media first during valuable media exchange

Table Note 47: If the Dispense and Print function is used with a spray cash dispenser and a motorised card reader, the full timeout on cash taken before returning card and then printing will be used.

Table Note 48: Function IDs 'P' and 'Q' are used to print statements on the statement printer when the printer flag in the Transaction Reply is '8' or sideways on the receipt printer when the printer flag is '='.

Central to Terminal Messages
Transaction Reply Command

Field	Number of Characters	Mandatory/ Optional	Description												
			<p>The action taken on a Print Immediate command depends on when it is received and the contents of the next state ID field.</p> <p>Table Note 49: Diebold mode is not supported, therefore Advance NDC operation is different from NDC+. In Advance NDC, an envelope is always dispensed on execution of the transaction reply if an envelope has not previously been dispensed through the execution of the Envelope Dispenser State.</p> <table><tr><th>State</th><th>Next State Field</th><th>Action</th></tr><tr><td>Trans. Request</td><td>Included</td><td>As next state and print.</td></tr><tr><td>Trans. Request</td><td>Omitted</td><td>Print and wait for new Transaction Reply command.</td></tr><tr><td>Other</td><td>-</td><td>See “Message Validation” on page 10-102.</td></tr></table>	State	Next State Field	Action	Trans. Request	Included	As next state and print.	Trans. Request	Omitted	Print and wait for new Transaction Reply command.	Other	-	See “Message Validation” on page 10-102.
State	Next State Field	Action													
Trans. Request	Included	As next state and print.													
Trans. Request	Omitted	Print and wait for new Transaction Reply command.													
Other	-	See “Message Validation” on page 10-102.													
m	3 or 5		<p>Screen Number. Contains either a three-digit decimal value from 010 to 999, or a five-character value containing a four-digit screen number prefixed with the letter ‘u’ or ‘l’. The screen number defines the screen to be displayed on the terminal during execution of the specified function.</p> <p>To select a screen from the current language group, use either group ‘l’ or a three-digit screen number. To select a screen independently of language group, use group ‘u’.</p> <p>On a Card Before Cash or Card Before Parallel Dispense and Print transaction, this screen should contain two nested screen numbers for displaying at different times during the transaction; S0 (screen 1) S0 (screen 2). Do not include a clear screen control, as this prevents the nested screens being displayed.</p> <p>This field must be present if field ‘n’ is present. Otherwise, it is optional. If the screen number is not present or not defined, no voice data will be played.</p>												
n	Var	O	<p>Screen Display Update. Contains screen numbers and new screen data which can replace existing screen data. The new screen data is displayed when its screen number is referenced during transaction processing.</p> <p>To immediately update a displayed screen, the displayed screen must be the first screen in the screen update data. In a voice-guided session, this can be used to insert dynamic audio data in a message; for details, See “Digital Audio Control for Voice Guidance” on page 3-23.</p>												

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Field	Number of Characters	Mandatory/ Optional	Description														
			<p>Screen numbers in the screen update can be specified as four digit numbers in group 'u' (u1234) to load a screen independent of language group. A screen number from group 'l' (l1234) can be specified to load a screen in the current language group. A screen number specified with three decimal digits (123) will be language independent, unless a language has been selected with a group size of 1000 or greater, in which case the screen number will be adjusted for language.</p> <p>The screen update data is in the following format:</p> <table><tr><th>No. Of Bytes</th><th>Content</th></tr><tr><td>3, 5 or 6</td><td>Screen number</td></tr><tr><td>Var</td><td>Screen data</td></tr><tr><td>1 *</td><td>Group separator</td></tr><tr><td>4 *</td><td>Reserved</td></tr><tr><td>3 *</td><td>Screen number</td></tr><tr><td>Var *</td><td>Screen data</td></tr></table> <p>* These fields are only included when multiple screens are to be updated within one message. They are repeated for each additional screen.</p>	No. Of Bytes	Content	3, 5 or 6	Screen number	Var	Screen data	1 *	Group separator	4 *	Reserved	3 *	Screen number	Var *	Screen data
No. Of Bytes	Content																
3, 5 or 6	Screen number																
Var	Screen data																
1 *	Group separator																
4 *	Reserved																
3 *	Screen number																
Var *	Screen data																
FS	1	M	Field Separator.														
o	1	M	Message Co-ordination Number. For details, see field “g” on page 9-3														
p	1	M	<p>Card Return/Retain Flag. Tells the terminal to either return or retain the card during the Close state</p> <p>‘0’ - return card during the Close state</p> <p>‘1’ - retain card during the Close state</p> <p>‘4’ - return card while processing the transaction reply. This value can only be used when the function id is ‘b’ or ‘f’. If this value is used with any other function id the transaction reply will be rejected (Specific Command Reject E01)</p> <p>This flag is ignored and the card is always returned if the Function ID is ‘A’, ‘B’ or ‘C’ and the card is not in the card reader at the close state.</p>														
q	1	M See Table Note 50	<p>Printer Flag. Tells the terminal which printer or printers to use.</p> <p>‘0’ - Do not print</p> <p>‘1’ - Print on journal printer only</p>														

Field	Number of Characters	Mandatory/ Optional	Description
			<p>'2' - Print on receipt printer only</p> <p>'3' - Print on receipt and journal printer</p> <p>'4' - Print on PPD if the Function ID is '1' or '7' (Deposit and print).</p> <p>'5' - Print on PPD and journal if the Function ID is '1' or '7' (Deposit and print).</p> <p>'8' - Print on statement printer only</p> <p>'9' - Reserved</p> <p>':' - Print on passbook (<i>not supported</i>)</p> <p>'=' - Print sideways on the receipt printer if the Function ID is 'P' (Print Statement and Wait) or 'Q' (Print Statement and Set Next State).</p> <p>'>' or 'w' - Identifies audio data for a voice-guided session. <i>See Table Note 66</i></p> <p>'a' - Stamp cheque if the Function ID is ':' (Process cheque). This flag indicates that a cheque is to be stamped. The data field is ignored as the stamp content is fixed. This flag is not actioned if the cheque is ejected.</p> <p>'b' - Endorse cheque if the Function ID is ':' (Process cheque) or 'c' (Process Multiple Cheques). This flag indicates that printing takes place on the reverse of a cheque and relates to cheque endorsement. This flag is not actioned if the cheque is ejected.</p> <p>If the Function ID is 'B' or 'C' (Parallel dispense, eject and print), NCR recommends that you use only one journal print data field and one receipt print data field.</p> <p>If multiple printer flags '4' and/or '5' are used in the same transaction message, only the first printer data field will be printed on the depository.</p> <p>If printer flag '8' is used in any functions other than 'P' and 'Q', the following printer data field will be ignored. Only the first printer data field with flag value '8' will be accepted in a message.</p> <p>For sideways printing on the receipt, only one printer flag of '=' will be accepted in the message for functions 'P' and 'Q'. If printer flag '=' is used in any other function, the following printer data field will be ignored.</p> <p>If printer flags '=' and '8' are both present in a transaction reply along with Function ID 'P' or 'Q', the first of these flags encountered in the message will be accepted and processed. It is therefore recommended that only one of these printer flags is present in a Print Statement and Wait or Print Statement and Set Next State function.</p>

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Field	Number of Characters	Mandatory/ Optional	Description
			Printer flags '9' and ':' are ignored.
r	Var (500)	O	<p>Printer Data Field. The maximum length of this field depends on the amount of data compression used in the transmitted data, but it is at least 500 bytes of uncompressed print data. Data sent to each separate printer data field is printed on a new line. Inserted data is printed by the printer indicated in the Printer Flag field.</p> <p>Each printer device has its own restrictions:</p> <p>Text sent to print on the depository must be 80 characters or less.</p> <p>Text sent to print on the receipt printer must be:</p> <ul style="list-style-type: none"> - 24 lines or less if printing in normal mode - 49 lines or less if local configuration option digit 6B is set - 20 lines or less for sideways printing on the receipt. <p>Sideways printing is not supported for the journal printer.</p> <p>Text sent to be printed sideways on the receipt printer can be up to a maximum width of 80 characters.</p> <p>The statement printer is constrained either to the compressed data length and the overall message length, or to the length of paper.</p> <p>When used with printer flag 'b' for Function ID ':' (Process cheque) or Function ID 'c' (Process Multiple Cheques), this field contains the endorsement print data (ASCII text) for the cheque.</p> <p>When used with printer flag 'w' or '>' (Identify audio data for voice guidance), this field contains the <code>audioID</code> sub-element reference to the <code>Text</code> element in the voice guidance XML configuration file, and any dynamic audio data to be included in the message. <i>See Table Note 66.</i></p> <p>If the first character is '?', the text is printed in the alternative format. The alternative format could be normal, bold, or compressed text depending on the cheque processor variant.</p> <p>The '?' character can be used to select the XFS PTR form to use. These forms can be used to modify the text format. For details, refer to the APTRA documentation under APTRA XFS Programmer's Reference XFS Service Providers XFS PTR Service Provider.</p> <p>No escape sequences or control codes are supported with printer flag 'b'. If no endorsement data is supplied with this flag, a Specific Command Reject is returned.</p>
GS	1	See Table Note 50	Group Separator.
s	1	O	Printer Flag. <i>See field 'q'.</i>
t	Var (500)	O	Printer Data. <i>See field 'r'.</i>
GS	1	See Table Note 50	Group Separator.
u	1	O	Printer Flag. <i>See field 'q'.</i>

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Transaction Reply Command

Field	Number of Characters	Mandatory/ Optional	Description
v	Var (500)	O	Printer Data. <i>See</i> field 'r'.
GS	1	<i>See</i> Table Note 50	Group Separator
v1	1	O	Printer Flag. <i>See</i> field 'q'.
v2	Var (500)	O	Printer Data. <i>See</i> Field 'r'.
:			
GS, 'v1' and 'v2' may be repeated up to nine further times. <i>See</i> Table Note 50.			
:			
FS	1	<i>See</i> Table Note 52	Field Separator.
w	1	O <i>See</i> Table Note 52	Buffer Identifier. A '4' in this field identifies the following data as Track 3 data.
x	Var (106)	O <i>See</i> Table Note 52	Track 3 Data. Contains the data to be written on to Track 3 during the Card Write state or Card Before Cash function command. This data replaces any existing data in the terminal's Track 3 buffer. The Track 3 data consists of up to 106 characters including the start and end sentinels.
FS	1	<i>See</i> Table Note 52	Field Separator.
ak1	1	O	Buffer Identifier 'K'. A value of 'K' for the Buffer Identifier indicates that the following fields define the new Track 1 data that is to be written to the card.
ak2	Var (78)	O	Track 1 Data. This field contains the data to be written to Track 1 during the Card Write state or Card Before Cash function command. This data replaces any data already in the terminal's Track 1 buffer. The Track 1 data consists of up to 78 characters.
FS	1	<i>See</i> Table Note 52	Field Separator.
al1	1	O	Buffer Identifier 'L'. A value of 'L' for the Buffer Identifier indicates that the following fields define the new track data that is to be written to the card.
al2	Var(39)	O	Track 2 Data. This field contains the data to be written to Track 2 during the Card Write state or Card Before Cash function command. This data replaces any data already in the terminal's Track 2 buffer. The Track 2 data consists of up to 39 characters.
FS	1	<i>See</i> Table Note 52	Field Separator.
am1	1	O	VC data ID 'M'. Fields am1/am2 to ar1/ar2 are reserved for Exits use. The first field in the pair is a data identifier, the second is a variable length buffer. The data identifier should be in the range 'M' (4DH) to 'R' (52H). The fields can be selectively MACed. For details, <i>See</i> "Message Authentication" on page 11-10.

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Field	Number of Characters	Mandatory/ Optional	Description
am2	Var	O	VC data The Exit data. The data field should not contain the Group Separator character (1DH).
FS	1	See Table Note 52	Field Separator
an1	1	O	VC data ID 'N'
an2	Var	O	VC data
FS	1	See Table Note 52	Field Separator
ao1	1	O	VC data ID 'O'
ao2	Var	O	VC data
FS	1	See Table Note 52	Field Separator
ap1	1	O	VC data ID 'P'
ap2	Var	O	VC data
FS	1	See Table Note 52	Field Separator
aq1	1	O	VC data ID 'Q'
aq2	Var	O	VC data
FS	1	See Table Note 52	Field Separator
ar1	1	O	VC data ID 'R'
ar2	Var	O	VC data
FS	1	See Table Note 52	Field Separator
as1	1	See Table Note 52	Buffer Identifier 'S' (<i>Reserved for internal use</i>)
as2	1	See Table Note 52	Cash handler number (0 or 1)
as3	3	See Table Note 52	1st cassette type in specified cash handler
as4	3	See Table Note 52	Number of bills to dispense from 1st type
as5	3	See Table Note 52	2nd cassette type in specified cash handler
as6	3	See Table Note 52	Number of bills to dispense from 2nd type
as7	3	See Table Note 52	3rd cassette type in specified cash handler
as8	3	See Table Note 52	Number of bills to dispense from 3rd type
as9	3	See Table Note 52	4th cassette type in specified cash handler
as10	3	See Table Note 52	Number of bills to dispense from 4th type
...			

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Transaction Reply Command

Field	Number of Characters	Mandatory/ Optional	Description
asn	3	See Table Note 52	Last cassette type in specified cash handler
asn+1	3	See Table Note 52	Number of bills to dispense from last type
FS	1	O	See Table Note 59
at1	1	See Table Note 52	Smart card data ID '5'
at2	Var	See Table Note 52	Smart card data. For data that is specific to EMV/CAM2, the data will begin with 'CAM'. For more information, refer to the <i>EMV Integrated Circuit Card (ICC) Reference Manual</i> . Other smart card customisations may begin with a different value.
FS	1	O	See Table Note 59
ba1	1	See Table Note 52	Buffer Identifier 'a' (Cheque(s) Destination Data)
ba2	1	See Table Note 52 and Table Note 63	<p>Cheque(s) destination data</p> <p>'1' - Deposit cheque into pocket 1</p> <p>'2' - Deposit cheque into pocket 2</p> <p>'3' - Deposit cheque into pocket 3</p> <p>'E' - Eject the cheque</p> <p>The host can determine the number of pockets present by retrieving the Hardware Configuration Data only message. If the Transaction Reply specifies a pocket which does not exist, the cheque will be captured to the reject pocket and the count for the reject pocket will be updated. If a Transaction Reply is sent that does not contain one of the above destination values (an invalid cheque destination field), a Specific Command Reject with error code B13 - Unrecognised Document Destination will be returned.</p> <p>If the Transaction Reply does not include endorsement print data (see page 10-59), no endorsement data is printed and cheques are sent to pocket 2 (pocket 1 if only one pocket is available).</p>
FS	1	O	See

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Field	Number of Characters	Mandatory/ Optional	Description
bb1	1	O	Buffer Identifier 'b' (Process Multiple Cheques)
bb2	3	See Table Note 64	<p>Cheque Identifier. Range '000'-'999'</p> <p>Refers to specific cheques reported in the Transaction Request message. If this refers to a cheque that was not reported in the Transaction Request message, specific command reject B34 is returned</p> <p>If this is '000', the following fields apply to all cheques that do not have a specific action defined</p> <p>If this buffer does not include actions for all cheques included in the Transaction Request message, either explicitly or with a setting of '000', specific command reject B34 is returned and none of the cheques are processed</p> <p>For details of the specific command reject B34, see Table 10-41 "Specific Command Reject Value/Qualifier Combinations" on page 10-103</p>
bb3	2	See Table Note 64	<p>Cheque Destination</p> <p>Specifies the destination for the cheque identified by the Cheque Identifier field</p> <p>'00' - Return cheque to cardholder</p> <p>'01' - Deposit cheque into pocket 1</p> <p>...</p> <p>'15' - Deposit cheque into pocket 15</p>
bb4	1	See Table Note 64	<p>Cheque Stamp</p> <p>Specifies whether the cheque is to be stamped if supported by the hardware</p> <p>'0' - Do not stamp the cheque</p> <p>'1' - Stamp the cheque</p>
bb5	4	See Table Note 64	<p>Reserved</p> <p>Must be filled with zeros</p>
bb6	Var	See Table Note 64	<p>Cheque Endorse Text</p> <p>Contains the text to use when endorsing the cheque. Any print data provided for Printer flag 'b' is ignored</p> <p>Multiple lines of text can be provided with each line separated by a carriage return (0x0D) and line feed (0x0A) sequence</p> <p>If the bunch cheque acceptor does not support multi-line endorsement, the carriage return and line feed characters are removed and replaced with a space (0x20) character</p>
GS	1	See Table Note 64	Group separator
FS	1	See	Field separator
bc	1	O	Used for EMV dynamic currency conversion transactions. For details, refer to the <i>EMV Integrated Circuit Card (ICC) Reference Manual</i> .
FS		See Table Note 52	Field separator

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Field	Number of Characters	Mandatory/ Optional	Description
bd1	1	O <i>See Table Note 52</i>	Buffer Identifier 'd' This and its associated fields can be included in any Transaction Reply with any function identifier, but is typically used in the reply to a pre-authorisation request for a subsequent cash deposit within the same consumer transaction. It indicates that the following data fields define the limits for the following consumer deposit: the limit for the amount of the deposit, the limit for the number of notes or both limits. The data received is valid until the next Transaction Reply is received. If the consumer/transaction data is required across a number of Transaction Replies, it must be sent in each Transaction Reply. The data is cleared by the Close state.
bd2	10	<i>See Table Note 52</i>	Reserved
bd3	3	<i>See Table Note 52 and Table Note 58</i>	Customer/Transaction Data Element Identifier Valid values are: 001 = Deposit amount limit (applies to the specified currency) 002 = Deposit note number limit (applies to all currencies that can be deposited during the transaction)

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Field	Number of Characters	Mandatory/ Optional	Description
bd4	Var	See Table Note 52 and Table Note 58	<p>Customer/Transaction Data Element Buffer Format and content depend on the value of field bd3 :</p> <p>If bd3 = 001 A three-character ISO currency code followed by the maximum value in decimal of the primary currency unit. For example, 001GBP100.00 indicates that the maximum value in pounds sterling that can be deposited during the transaction is £100.00.</p> <p>Multiple deposit limit parameters can be provided in a single transaction reply. For example, if the Customer/Transaction Data Element buffer contains 'd0000000000001GBP200.00<GS>001EUR250.00<GS>002050', a maximum of 200 pounds sterling and 250 euros with a limit of 50 notes can be deposited.</p> <p>Note: The decimal point must be used regardless of the currency.</p> <p>If bd3 = 002 A three-digit decimal number specifying the maximum number of notes that can be deposited in the transaction. For example, 002050 indicates that a maximum number of 50 notes can be deposited. If the Customer/Transaction Data Element Identifier 002 occurs more than once in the field, the number of notes specified in the <i>last</i> element is used. For example, if the buffer contains 'd0000000000002030<GS>002050', a maximum of 50 notes for all available currencies can be deposited during the transaction.</p> <p>Note: The Customer/Transaction Data Elements in a Transaction Reply can be in any order, for example, 'd0000000000001GBP200.00<GS>002050' or 'd0000000000002050<GS>001EUR250.00' See Table Note 67 and Table Note 68</p>
bd5	1	See Table Note 58	Group separator (GS)
FS	1	See Table Note 59	Field separator
y	8	O	<p>Message Authentication Code (MAC) data Contains the transmitted value for authentication of this message. The characters can be 0-9, A-F.</p>
z	Var	M	Trailer. Protocol-dependent.

Table Note 50: A group separator and optional fields 's/t', 'u/v', 'v1/v2' and so on, comprise a group. When included in the message, all fields of the group must be present. There may be up to thirteen print field groups within a message.

Table Note 51: When defining the Transaction Reply message for a cheque processor, the message must contain one or both of printer flags 'a' or 'b'. If neither flag is present all cheques are deposited in the reject bin.

Table Note 52: The field separator followed by optional fields 'w' and 'x' or 'ae*', 'af*', 'ak*', 'ar*', 'as', 'at*' or 'bd*' comprise a group. When included in a message, all fields of the group must be present. If the group is not included, the field separator must be omitted.

Table Note 53: A higher-numbered type can be omitted if no dispense of that type is requested.

Table Note 54: It is possible to dispense from as many cassette types as are present in the cash handler.

Table Note 55: The length of this field is dependent on the setting of Enhanced Configuration option 76. For details, See "Option 76 – Cash Handlers" on page 7-19.. A Specific Command Reject is sent if the field is too long.

Table Note 56: The maximum number of notes that can be dispensed is reported in the Hardware Configuration message. The maximum number of notes is taken from the service provider capability information. Any request for more than 999 notes is rejected as this is above the message reporting capacity

Table Note 57: The Time Variant Number, length eight bytes, is present if the MAC flag settings are correct. Otherwise, the Message Sequence Number, length three bytes, is optionally present. For details, refer to the *APTRA Advance NDC, Supervisor's Guide*.

Table Note 58 Fields bd3 and bd4 are repeated for each element of the customer/transaction data, separated by a group separator. The last element of the customer/transaction data is not followed by a group separator.

Table Note 59: The field separator and MAC data field 'y' are present if the Data Security feature is selected, and the MAC flag settings are correct. For details, refer to the *APTRA Advance NDC, Supervisor's Guide*.

Table Note 60: This group separator should only be included if a coin dispense is required.

Table Note 61: Field 'j1' must be present if the preceding group separator is included. However, higher numbered hoppers may be omitted if no dispense from these hoppers is required. The total number of coins dispensed must not exceed 25.

Table Note 62: The maximum number of coins that can be dispensed is reported in the Hardware Configuration message. The maximum number of coins is taken from the service provider capability information. Any request for more than 999 coins is rejected as this exceeds the message reporting capacity.

Table Note 63: The message format can also support destinations '4' through '9' to deposit the cheque into cheque processor bins 4 through 9; and 'a' through 'f' to deposit the cheque into cheque processor bins 10 through 15. Advance NDC does not support these destinations.

Table Note 64: Fields bb2 to bb6 are repeated for each cheque, and the details for each cheque are separated by a Group Separator. Details for the cheques within a single currency can be provided in any order, that is, the cheque details are provided as an unordered list. The last cheque does not have a group separator following the data. Field bb2 corresponds to the Cheque Identifier used in the Transaction Request message.

Table Note 65: The field separator is required only if the following field is present.

Table Note 66: The voice guidance data is played after successful processing of the transaction reply function and before moving to the next state specified in the transaction reply message. If the transaction reply processing fails, for example, because of a dispenser fault, resulting in a solicited status sent to the host, voice data from the original transaction reply message is discarded. If alternative voice data is required, the host must send it in the subsequent transaction reply message.

Table Note 67: The host specifies the deposit limit for specific customers using transaction reply. If both the direct deposit limit and the transaction reply limits are defined, then the limit specified by the transaction reply takes precedence.

Table Note 68 : If a direct deposit limit and state based limit (amount or number of items) are set in a deposit transaction, the limit that is exceeded first is considered.

Specific Command Reject Messages for Buffer 'd'

Table 10-16
Invalid Customer/Transaction Data
Element Details

For cash deposit transactions, the following table describes the circumstances in which Transaction Replies containing Buffer Identifier 'd' are rejected:

Specific Command Reject Code	Examples
A01 — Message length error	
	Buffer Identifier 'd' (field bd1) is present but the subsequent fields are missing
	Reserved field bd2 of length 10 is missing after Buffer Identifier 'd'
	Buffer Identifier 'd' (field bd1) and a value of 0000000000 in field bd2 are present but the subsequent fields are missing
	Buffer Identifier 'd' is present, there is a value of 0000000000 (ten zeros) in field bd2 and the Customer/Transaction Data Element Identifier (field bd3) is present, but the subsequent field (bd4) is missing, for example, 'd00000000000001'
	The length of the Customer/Transaction Data Element Identifier is not three digits, for example, 'd0000000000 <u>01</u> '
	A limit on the number of notes that can be deposited is specified but the length of the Customer/Transaction Data Element Buffer (field bd4) is not three digits, for example, 'd00000000000002 <u>05</u> ' or 'd00000000000002 <u>0500</u> '
	All the fields are the correct length but a group separator is missing between the Customer/Transaction Data Elements, for example, 'd0000000000 <u>002050001EUR500</u> '
A04 — Group separator missing or found unexpectedly	
	The last Customer/Transaction Data Element Buffer has a group separator following the data, for example, 'd0000000000001EUR100<GS>002050 <u><GS></u> '
B08 — Data field value out of range	
	The Customer/Transaction Data Element Identifier (bd3) is not numeric, for example, 'd0000000000 <u>xxx</u> 050'
	The Customer/Transaction Data Element Buffer (bd4) defines a deposit amount limit but the value is not numeric, for example, 'd0000000000001EUR <u>200b</u> ' or 'd0000000000001EUR <u>100.5b</u> '

Specific Command Reject Code	Examples
	There are two Customer/Transaction Data Element Buffers but the first one is not numeric while the second one is valid (or the other way around), for example, 'd00000000000 <u>001EURXXX</u> <GS>002030'
	The limit for the number of notes specified in the Customer/Transaction Data Element Buffer has the correct length but is not numeric, for example, 'd00000000000 <u>205d</u> '
	Reserved field bd2 is present but it is not set to '0000000000'.
	The Customer/Transaction Data Element Identifier in field bd3 is not supported, for example 'd00000000000 <u>003</u> 050' or 'd00000000000 <u>006</u> 050'
	The currency specified in the Customer/Transaction Data Element Buffer (field bd4) is not a valid three-character ISO code, for example, 'd0000000000001 <u>\$</u> 100'
	The limit on the deposit amount or/and the limit on the number of notes is set to 000, for example, 'd0000000000002 <u>000</u> <GS>001EUR <u>000</u> '
	The limit specified for the number of notes that can be deposited is of the correct length and is numeric but it is invalid because it contains a decimal point, for example, 'd0000000000002 <u>3.5</u> '

Terminal Functions for Transaction Completion

Field 'I' of the Transaction Reply contains a Function Identifier. This tells the SST what functions are to be performed to complete the transaction. The functions are as follows:

- Deposit and Print (Table 10-17 on page 10-70)
- Dispense and Print (Table 10-18 on page 10-71)
- Display and Print (Table 10-19 on page 10-72)
- Print Immediate (Table 10-20 on page 10-72)
- Set Next State and Print (Table 10-21 on page 10-73)
- Night Safe Deposit and Print (Table 10-22 on page 10-73)
- Eject Card, Dispense and Print (Card Before Cash) (Table 10-23 on page 10-74)
- Parallel Eject/Dispense and Print (Table 10-24 on page 10-75)
- Card Before Parallel Dispense and Print (Table 10-25 on page 10-76)
- Print Statement and Wait (Table 10-26 on page 10-77)
- Print Statement and Set Next State (Table 10-27 on page 10-78)
- Refund Notes and Print (Table 10-28 on page 10-79)
- Deposit Notes and Print (Table 10-29 on page 10-80)
- Deposit Notes and Wait (Table 10-30 on page 10-81)
- Process Cheque (Table 10-31 on page 10-81)
- Dispense Cash First during Valuable Media Exchange (Table 10-32 on page 10-82)

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- Process Multiple Cheques (Table 10-34 on page 10-86).
- Deposit Media First during Valuable Media Exchange (Table 10-35 on page 10-87)

Dispense functions may have slightly different behaviour if a spray dispenser is present. This is because the spray dispenser sends each note straight into a receiving pocket instead of stacking and presenting them as a standard dispenser does. Also, there is no possibility of retracting notes dispensed by a spray dispenser.

The following tables illustrate the sequence of events, and related screen displays, for each of these functions.

Table 10-17
Deposit and Print (Function ID '1' or '7')

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	
	Transaction Reply Command Screen (INSERT ENVELOPE)	<p>Present envelope. <i>See</i> Table Note 69</p> <p>Enable depository.</p> <p>Start slow beep. <i>See</i> Table Note 70.</p> <p>Switch on media entry indicator.</p> <p>Wait for cardholder to insert envelope.</p> <p>Stop beeping.</p> <p>(Enter Time-Out state if timer 04 expires. <i>See</i> Table Note 71 and Table Note 72).</p> <p>Print on envelope.</p> <p>Print on receipt and journal to defined level.</p> <p>Send status.</p>
Next State in Transaction Reply Command	Next State Screen (for example, SELECT TRANSACTION)	<p>Switch off media entry indicator.</p> <p>Cut and deliver receipt if necessary and eject card.</p>
Eventual Close state	Close Screen (for example, TAKE CARD)	<p>Wait for card to be taken or captured. Timer 02</p> <p>Capture card if timer 09 expires. <i>See</i> Table</p> <p><i>See</i> Table Note 72. Note 73.</p>

Table Note 69: An envelope is presented only if an envelope has not previously been dispensed during the Envelope Dispenser State. For details, see "C - Envelope Dispenser State" on page 2-19.

Table Note 70: If the beeper is not required, local configuration option digit 2C can be set to stop its operation. For details, refer to the *APTRA Advance NDC, Supervisor's Guide*.

Table Note 71: The Cancel key is active when the 'Insert Envelope' screen is displayed. Pressing the Cancel key causes a time-out status to be sent to Central.

Table Note 72: For details of timers, see "Configuration Parameters Load" on page 10-15.

Table Note 73: Timer 02 (page 7-7) is used to determine the length of time that the Close screen is displayed.

Table 10-18
Dispense and Print (Function ID '2' or '8')

State	Screen	Operation	
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Dispense the requested cash and coins. <i>See Table Note 74</i>	
	Transaction Reply Screen (TAKE CASH)	Print on receipt and journal to defined level. Send status.	Timers (07 + 10) or (05 + 07) <i>See Table Note 75</i>
Next State in Transaction Reply Command	Next State Screen (for example, SELECT TRANSACTION)		

Table Note 74: A dispense can consist of notes only, coins only, or a combination of notes and coins. If the dispense includes a combination of notes and coins, the notes must be successfully dispensed before the coins are dispensed.

Table Note 75: If the SST is configured not to retract notes, timers 07 (page 7-26) and 10 (page 7-27) are used to control the minimum length of time for the transaction, with timer 05 (page 7-25) if beeping is active.

If the SST is configured to retract notes, timer 05 is used if beeping is active, and then timer 07. Timer 05 is started when notes are presented. If the local configuration option is selected, the beeper is sounded during the time that timer 05 is in use. For details of configuration options, refer to the *APTRA Advance NDC, Supervisor's Guide*.

If the notes are taken before the expiry of timer 05, the timer is cancelled. If the timer expires before the notes are taken, a retract is attempted. If some notes are retracted, the 'Presenter Error' message is logged to the journal, and an unsolicited error is reported to

Central. For details, see “Cash Handler (Solicited/Unsolicited)” on page 9-96.

Timer 07 is started after notes have been taken, and the next state is entered on expiry.

For timer format in a message, see “Configuration Parameters Load” on page 10-15.

Table 10-19
Display and Print (Function ID ‘3’ or ‘9’)

State	Screen	Operation	
Transaction Request	Transaction Reply Screen (for example, DISPENSE ERROR)	Print on receipt and journal to defined level. Send status.	Timer (10 + 07) or (07) See Table Note 76.
Next State in Transaction Reply Command	Next State Screen (for example, SELECT TRANSACTION)		

Table Note 76: On an SST configured not to retract notes, timers 10 (page 7-27) and 07 (page 7-26) are used. On an SST configured to retract notes, timer 07 is used.

For details of the timer format in a message, see “Configuration Parameters Load” on page 10-15. For details of configuration options, refer to the *APTRA Advance NDC, Supervisor’s Guide*.

Table 10-20
Print Immediate (Function ID ‘4’)

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Print on receipt and journal to defined level. Wait for another Transaction Reply command.

Print Immediate may also be received at other times. For details, see “Messages Received in Wrong Operational Mode” on page 10-110.

Table 10-21
Set Next State and Print (Function ID '5')

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Print on receipt and journal to defined level. Send status.
Next State in Transaction Reply Command	Next State Screen	

Table 10-22
Night Safe Deposit and Print (Function ID '6')

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Unlock night safe. Start slow beep.
	Transaction Reply Command Screen (INSERT BAG) <i>See Table Note 77</i>	Wait for cardholder to insert bag. Stop beeping. (Enter Time-Out state if timer 08 expires <i>See Table Note 78</i>). Print on receipt and journal to defined level. Send status.
Next state in Transaction Reply Command	Next State Screen (for example, Transaction State)	

Table Note 77: The Cancel key is active when the 'Insert Bag' screen is being displayed. Pressing the Cancel key causes an 'undetected deposit' status to be sent to Central.

Table Note 78: Timer 08 (page 7-26) is started when the night safe door is unlocked to accept a night safe deposit.

Table 10-23
Card Before Cash (Function ID 'A')

State	Screen	Operation	
Transaction Request <i>See</i> Table Note 79.	Transaction Request Screen (PLEASE WAIT)	Eject card. <i>See</i> Table Note 80.	Count and stack cash
	Transaction Reply Screen 1 (TAKE CARD)	Wait for card to be taken. (Capture card if timer 09 expires)	
	Transaction Reply Screen 2 (PLEASE WAIT FOR CASH AND RECEIPT)	Dispense the requested cash and coins. <i>See</i> Table Note 80 and Table Note 82. Print on receipt and journal to defined level. Send status. Cut and deliver receipt if necessary.	
Close	Close screen Table Entry 2 (TAKE RECEIPT AND CASH) or Table Entry 4 (TAKE CASH)	TTimer 02 (Determines the length of time that the Close screen is displayed).	

Table Note 79: In normal usage the next state is always Close.

Table Note 80: Track 3 update can take place before card eject if new Track 3 data is contained in the transaction reply message.

Table Note 81: A dispense can consist of notes only, coins only, or a combination of notes and coins. If the dispense includes a combination of notes and coins, the notes must be successfully dispensed before the coins are dispensed.

Table Note 82: For a terminal configured for note retraction, timer 05 (page 7-25) is started after the cash has been dispensed. Timer 05 is also used for beeping in Card Before Cash transactions where the SST is configured not to retract notes. For details of configuration options, see the *APTRA Advance NDC, Supervisor's Guide*.

On SSTs with cash retract enabled, if the notes have not been taken when this timer expires, retraction is attempted. If some notes are retracted, the 'Presenter Error' message is logged to the journal and an unsolicited error is reported to Central. For details, see "Cash Handler (Solicited/Unsolicited)" on page 9-99. If the notes are taken before the timer expires, the timer is cancelled. In both cases, timer

07 is started, and the next state is entered on expiry. For details of timers, See “Timers” on page 7-24..

If local configuration option digit 2B is set at the SST, the beeper is sounded during the time that timer 05 is operative. For details, see the *APTRA Advance NDC, Supervisor’s Guide*.

Table Note 83: When the no retract option is set in a Card Before Cash transaction, the recommended minimum value of timer 07 is 5 seconds.

Table 10-24
Parallel Eject/Dispense and Print -
Fast Cash (Function ID ‘B’ or ‘C’)

State	Screen	Operation
Transaction Request <i>See Table Note 84</i>	Transaction Request Screen (PLEASE WAIT)	Parallel Eject/Dispense and Print. <i>See Table Note 86, Table Note 87 and Table Note 89</i>
	Transaction Screen (TAKE CARD AND CASH)	Print receipt and journal to defined level. Send status. <i>See Table Note 88.</i> Cut and deliver receipt if necessary.
Close	Close Screen Table Entry 2 (AND RECEIPT) or Table Entry 4 (NULL) <i>See Table Note 85</i>	Wait for card to be taken or captured, if not already taken. Timer 02 <i>See Table Note 90.</i>

Table Note 84: In normal usage the next state is Close.

Table Note 85: NCR recommends that the Close screens add text to the Transaction Reply screen rather than clear the screen.

Table Note 86: Following the parallel eject/dispense and print, timers 05 and 07 are started. For details of timers, see “Configuration Parameters Load” on page 10-15. If the total timeout period expires before the cash is taken a retract is attempted. If some notes are retracted the ‘Presenter Error’ message is logged to the journal, and an unsolicited error is reported to Central. For details, See “Cash Handler (Solicited/Unsolicited)” on page 9-99.. If the notes are taken before the timer expires, it is cancelled and the next state is entered. If the local configuration option is selected, the beeper is sounded whilst timer 07 is in use. For details of configuration option, see the *APTRA Advance NDC, Supervisor’s Guide*.

Table Note 87: A transaction that uses the Parallel Eject/Dispense and Print reply is commonly referred to as a Fast Cash transaction. To achieve optimum performance with a Fast Cash transaction, this reply should be used together with the “T - Card Read - PIN Entry Initiation State” described in Chapter 2.

Table Note 88: Printer and card reader errors are reported as unsolicited status messages. A dispense error is reported by a solicited status message to give the host the option of printing an error report or displaying an error screen.

Table Note 89: A dispense can consist of notes only, coins only, or a combination of notes and coins. If the dispense includes a combination of notes and coins, the notes must be successfully dispensed before the coins are dispensed.

Table Note 90: Timer 02 is used to determine the length of time that the Close screen is displayed.

Table 10-25
Card Before Parallel Dispense and Print
(Function ID 'F')

State	Screen	Operation
Transaction Request <i>See Table Note 91</i>	Transaction Request Screen (PLEASE WAIT)	Wait for transaction reply
	Transaction Reply Screen 1 (TAKE CARD)	Eject card. Wait for card to be taken. (Capture card if timer 09 expires) Send status if failure and abort (<i>see Table Note 94</i>). Otherwise continue.
<i>See Table Note 92</i>	Transaction Reply Screen 2 (PLEASE WAIT FOR CASH AND RECEIPT)	Stack and dispense cash, and print full receipt data, but only cut the receipt if a form feed is sent or a complete page (24 or 49 lines) has been printed. Send status if failure and abort. Send status. <i>See Table Note 95.</i>
Close	Close Screen <i>See Table Note 93</i>	Cut and deliver receipt if necessary.

Table Note 91: In normal usage, the next state is a Close state.

Table Note 92: A dispense can consist of notes only, coins only, or a combination of notes and coins. If the dispense includes a combination of notes and coins, the notes must be successfully dispensed before the coins are dispensed.

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Table Note 93: NCR recommends that the Close screens do not clear the screen but simply add text to the Transaction Reply screen.

Table Note 94: Printer and card reader errors are reported as solicited status messages. A dispense error is reported by a solicited status message to give Central the option of printing an error report or displaying an error screen.

Table Note 95: Following the card eject, dispense and print, timers 05 and 07 are started. If the total timeout period expires before the cash is taken, a retract is attempted, the 'Presenter Error' message is logged to the journal and an unsolicited error will be reported to Central if the local configuration option to delay status reporting is not set.

If the notes are taken before the timers expire, they are cancelled and the next state entered. For details, See "Timers" on page 7-24..

If the local configuration option to sound the beeper is set and the no-retract option is not set, the beeper will be sounded during the time that timers 05 plus 07 are operative.

For details of local configuration options, refer to the *APTRA Advance NDC, Supervisor's Guide*.

Table 10-26
Print Statement and Wait
(Function ID 'P')

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	
	Transaction Reply Screen (STATEMENT BEING PRINTED)	Print on statement or print sideways on receipt printer and journal to defined level. Send status (statement printer or receipt printer if printing sideways on the receipt). Wait for another Transaction Reply command.

Note: A local configuration option (Option Digit 3C) can be set to enable the **Cancel** key on the cardholder keyboard. For details, refer to the *APTRA Advance NDC, Supervisor's Guide*.

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Table 10-27
Print Statement and Set Next State
(Function ID 'Q')

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Print on Statement or print sideways on receipt printer.
	Transaction Reply Screen (TAKE STATEMENT)	Print on receipt and journal to defined level. Timer 96 Send status (statement printer or receipt printer if printing sideways on the receipt)
Next State in Transaction Reply Command	Next State Screen	

Table Note 96: Timer 96 is used only in the print statement and continue function and is started whether or not a statement is being delivered. When the timer expires, the next state specified by the Transaction Reply command is entered.

Table 10-28
Refund Notes and Set Next State
(Function ID ‘*’)

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Attempt to move notes from the escrow to the refund slot. <i>See</i> Table Note 97
	Transaction Reply Screen (PLEASE REMOVE NOTES FROM REFUND SLOT) <i>See</i> Table Note 98 and Table Note 99	Wait for notes to be removed from the refund slot. Timer 78 If specified, print on receipt and journal to defined level. Send status as follows: If an error occurs before the notes are presented, send a solicited message. If an error occurs or Timer 78 expires after the notes are presented and before the notes are removed, either retract the notes if the retract option is set and send an unsolicited message, or just send an unsolicited error message to Central. Send a Ready message when the notes are successfully presented.
Next State in Transaction Reply Command	Next State Screen	

Table Note 97: If inserted cash is deposited directly to the cassettes, the notes cannot be refunded. In this situation, a solicited status message (‘w5’) reports that the escrow is empty.

Table Note 98: If the screen referenced in the Transaction Reply only contains nested screens, the first nested screen is displayed when the notes are presented; and the second nested screen is displayed when the notes are being retracted (if the customer has not taken the notes and Advance NDC has been configured to retract the notes). If the screen referenced in the Transaction Reply contains more than nested screens, it is fully displayed when the notes are presented.

Table Note 99: If the consumer takes the refunded notes late as the retract operation starts, no unsolicited message (‘w7’) is sent but if a ‘retract notes’ screen is configured, it is displayed.

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Table 10-29
Deposit Notes and Print
(Function ID '-')

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	
	Transaction Reply Screen (YOUR CASH IS BEING DEPOSITED) <i>See</i> Table Note 100 and Table Note 111	<p>Attempt to encash the notes. If cash has been deposited directly to the cassettes, this is a logical operation only: no physical movement of notes takes place as the operation is already complete.</p> <p>If specified, print on receipt and journal to defined level. This is normally done after the encash operation.</p> <p>Print on statement or print sideways on receipt printer.</p> <p>Send status as follows:</p> <p>If an error occurs, send a solicited error message.</p> <p>If notes are successfully deposited, set the next state and send a Ready message to Central.</p> <p>Unsolicited messages can accompany the Ready message when a threshold or cassette error occurs during the successful encash</p>
Next State in Transaction Reply Command	Next State Screen	

Table Note 100 Enhanced Configuration Parameter option 44 can be used to journal the encash counts in the usual status message format whenever the Ready message is sent.

Table Note 101 If configured in the registry, the transaction reply print data will be printed while notes are being moved to the cassettes, otherwise it will be printed after the Deposit operation is completed. For details of the registry setting, `DoParallelEncashPrint`, refer to the *APTRA Advance NDC Developer's Guide*.

Table 10-30
Deposit Notes and Wait
(Function ID “”)

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	
	Transaction Reply Screen (YOUR CASH IS BEING DEPOSITED) <i>See</i> Table Note 100 and Table Note 111	<p>Attempt to move the notes from the escrow to the cash deposit bin (encash). If cash has been deposited directly to the cassettes, this is a logical operation only: no physical movement of notes takes place as the operation is already complete.</p> <p>If specified, print on receipt and journal to defined level. This is normally done after the encash operation.</p> <p>Send status as follows:</p> <p>If an error occurs send a solicited message.</p> <p>If the notes are successfully deposited Send a Ready message. Unsolicited messages can accompany the Ready message when a threshold or cassette error occurs during the successful encash</p> <p>Wait for another Transaction Reply command.</p>

Table 10-31
Process Cheque (Function ID “.”)

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	
	Transaction Reply Screen (YOUR CHEQUE IS BEING PROCESSED)	<p>Endorse cheque, and attempt to move cheque to bin 1, 2 or 3.</p> <p><i>See</i> Table Note 102</p> <p>Cheque stamping is not supported by Advance NDC.</p> <p>Send status:</p> <ul style="list-style-type: none"> - If the cheque is successfully processed, send a Ready 9 message to Central. - If cheque is ejected, but not taken, retain in bin 2 and send an unsolicited error message to Central. <p>Timer 94</p>
Next State in Transaction Reply Command	Next State Screen	

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Table Note 102: On a single cheque processor, cheques are endorsed when pocketed, retracted or returned by the host. If the single cheque processor fails to endorse a returned cheque, this is reported in an unsolicited status message for the cheque processor.

Table 10-32
Dispense Cash First During Valuable
Media Exchange (Function ID 'b')

State	Screen	Operation	
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Wait for transaction reply	See Table Note 103 and Table Note 104
	Transaction Reply Screen (TAKE CARD)	Return card (if specified) If card return during transaction processing is specified then the card is returned and must be taken.	See Table Note 105
	(TAKE CASH)	Dispense notes Wait for the consumer to take the notes (when retract is enabled and option 4a set to 1)	See Table Note 106 and Table Note 107
		Dispense the coins	See Table Note 108
		Deposit the notes, print the receipt and journal data in parallel.	See Table Note 109 and Table Note 110
		Send status	
Next State in Transaction Reply Command	Next State Screen (for example SELECT TRANSACTION)		

Table Note 103 This function must only be used when notes are to be deposited and cash is to be dispensed in a single transaction reply. If only a note deposit is to be processed, the Deposit Notes and Print (function ID '_') must be used. If this function is used and no notes or coins are specified, the request will be rejected with a Specific Command Reject of B11).

Table Note 104 This function can also be used for the following:

- When the extended cash dispenser interface is used (Enhanced Configuration option 76 is set to 001) to support more than 4 cassette types
- When a dual dispenser is present.

Table Note 105 If card return during transaction processing is specified, the card is returned to the consumer and must be taken before any notes are dispensed. If there is an error while processing the card or the consumer does not take the card and it is captured, a solicited card reader device status message is sent. No notes and coins are dispensed and media will not be deposited. If the card is not to be returned during the transaction processing, notes are dispensed as the first step in the process.

Table Note 106 The notes specified in the Transaction Reply are dispensed to the cardholder. If the notes are successfully dispensed, any coins specified are dispensed at the point where a Ready 9 or Ready B status message would normally be generated for the cash dispense operation; then the notes are deposited.

In a cash dispense operation, Supervisor Message Mode options 2 and 4 control when solicited messages for the cash dispenser are sent (error messages and Ready 9). Advance NDC can be configured (Message Mode option 4a is set to 0) to send a solicited message after notes have been successfully presented, or an error has occurred, up to and including the present operation, (without waiting for a cash retract operation or an auto-purge cycle).

Alternatively, Advance NDC can also be configured (Message Mode option 4a is set to 1) to send a solicited message after an error occurs up to and including the present operation or after the notes have been retracted/taken.

For details of how the flow of operations is affected by the settings for Message Mode options 2 and 4, see Table 10-33, "Dispense Cash First During Valuable Media Exchange: Operational Flow" on page 10-85.

Table Note 107 If the note dispense fails, a cash dispenser solicited status message is sent to the host, no coins are dispensed and the inserted notes are not deposited. Advance NDC waits for further instruction from the host, for example, the host uses the Refund Notes and Print function (Function ID '*') to return the notes to the cardholder, or Deposit Notes and Print (function ID '-') to deposit the notes.

Table Note 108 If there is a failure during the coin dispense, a solicited status message for the coin dispenser is sent; the inserted

notes are not deposited and Advance NDC waits for further instruction from the host.

Table Note 109 During deposit, notes are moved to the cash deposit bins defined by the device configuration.

Table Note 110 If the note deposit operation fails, a solicited message for the cash acceptor is sent to the host and Advance NDC waits for further instructions from the host.

Table 10-33
Dispense Cash First During Valuable
Media Exchange: Operational Flow

Option 2A	Option 4A	Notes Presented	Notes Taken	Notes Retracted	Coins Dispensed	Cash Deposited	Print Operations	Message Sent
0 (retract enabled)	0	✓	✓	✗	✓ (coin dispense starts after notes presented)	✓	✓	Ready 9
0	0	✓	✗	✓	✓ (coin dispense starts after notes presented)	✓	✓	Unsolicited Notes Retract; Ready 9
0	1	✓	✓	✗	✓ (coin dispense starts after notes taken)	✓	✓	Ready 9
0	1	✓	✗	✓	✗ (no coins dispensed as notes not taken)	✗	✗	Solicited Notes Retract
1	— (Ignored)	✓	✓	✗	✓ (coin dispense starts after notes presented)	✓	✓	Ready 9
1	— (Ignored)	✓	✗	✗	✓ (coin dispense starts after notes presented)	✓	✓	Ready 9

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Table 10-34
Process Multiple Cheques (Function ID 'c')

State	Screen	Operation
Transaction Request	Transaction Request Screen (PLEASE WAIT)	
	Transaction Reply Screen <i>See Table Note 111</i>	<p>Cheque handling is specified by the content of buffer 'b' in the Transaction Reply message, as follows:</p> <ul style="list-style-type: none"> • Return all cheques to the cardholder without endorsing or stamping any cheque • Deposit all cheques, stamped and endorsed • Return all cheques to the cardholder, stamped and endorsed • Selectively return or deposit cheques, control stamping and endorsement individually for each cheque. A default action can be defined for all cheques where a specific action is not defined. <p>If cheques are ejected, but not taken, retract and retain them and send message to Central as follows:</p> <ul style="list-style-type: none"> • If multiple bunches must be used to return all cheques and cheques are retracted before all have been presented, send a solicited error message • If cheques are retracted after all cheques have been presented and the status message has already been sent, send an unsolicited message to indicate that the cheques have been retracted • If the retracted cheques jam before reaching the reject bin, send an unsolicited error message to report a jam
Next State in Transaction Reply Command	Next State Screen	

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Table Note 111: Screens referenced by the Transaction Reply must contain only nested screens. The screens are displayed as follows:

- Nested screen 1 (TRANSACTION RESULT and PLEASE WAIT)
- Nested screen 2 (PLEASE REMOVE CHEQUES)
- Nested screen 3 (PLEASE WAIT FOR MORE CHEQUES)
- Nested screen 4 (CHEQUES BEING RETRACTED).

Table 10-35
Deposit Media First During Valuable Media
Exchange (Function ID 'f')

State	Screen	Operation	
Transaction Request	Transaction Request Screen (PLEASE WAIT)	Wait for transaction reply	See Table Note 112 and Table Note 113
	Transaction Reply Screen (PLEASE WAIT)	Deposit notes	See Table Note 114 and Table Note 115
		Return card (if specified)	See Table Note 116
	(TAKE CASH)	Dispense notes Wait for the consumer to take the notes (when retract is enabled and option 4a set to 1)	See Table Note 117 and Table Note 118
		Dispense the coins, print the receipt and journal data in parallel	See Table Note 118, Table Note 119, and Table Note 120
		Send status	
Next State in Transaction Reply Command	Next State Screen (for example SELECT TRANSACTION)		

Table Note 112 This function must only be used when notes are deposited and cash is to be dispensed within a single transaction reply. If only a note deposit is to be processed, the Deposit Notes and Print (function ID '_') must be used. If this function is used and no notes or coins are specified, the request will be rejected with a Specific Command Reject of B11).

Table Note 113 This function can also be used for the following:

- When the extended cash dispenser interface (option 76 set to 001) is used to support more than 4 cassette types.

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- When a dual dispenser is present.

Table Note 114 The inserted notes are deposited as the first step in the process and moved to the cash deposit bins as defined by the device configuration.

Table Note 115 If a solicited note deposit message is sent to the host, no cash (notes and/or coins) has been dispensed. Advance NDC waits for further instruction from the host, for example, to display an error message and print a receipt indicating that all the consumer's inserted notes have been captured by the SST and no cash has been dispensed.

Table Note 116 If card return during transaction processing is specified, the card is returned to the consumer and must be taken. If there is an error while processing the card, or the consumer does not take the card and it is captured, a solicited device status message for the card reader is sent and cash will not be dispensed. If the card is not to be returned during the transaction processing, cash will be dispensed after the inserted notes are deposited.

If the dispense fails then a solicited status message for the cash handler is sent. If the device is a combined cash handler and note deposit device, an unsolicited status message for the note acceptor will also be sent if its status is affected by the failure.

Table Note 117 When the notes specified in the Transaction Reply have been dispensed, any coins specified are dispensed at the point where a Ready 9 or Ready B status message would normally be sent for the cash dispense operation. Advance NDC Message Mode options 2 and 4 control when cash dispenser solicited messages are sent (both Ready 9 and error messages).

Advance NDC can be configured (Message Mode option 4a is set to 0) to send a solicited message, after the notes have been successfully presented or an error has occurred, up to and including the current operation, that is, without waiting for a cash retract operation or an auto-purge cycle.

Alternatively, Advance NDC can be configured (Message Mode option 4a is set to 1) to send a solicited message after an error occurs up to and including the current operation or after the notes have been retracted or taken. Within this function, any coins specified are dispensed at the point where a Ready 9 or Ready B status message would normally be sent for the cash dispense operation.

For details of how the flow of operations is affected by the settings for Message Mode options 2 and 4, see Table 10-36, "Deposit Media First During Valuable Media Exchange: Operational Flow" on page 10-89.

Table Note 118 If a cash dispenser solicited status message is sent to the host, no coins have been dispensed.

Table Note 119 If there is a failure during the coin dispense, a solicited status message for the coin dispenser is sent. Printing will continue as the print and coin dispense operations are performed in parallel.

Table Note 120 The receipt data specified by the host will be printed even if there is a problem dispensing coins. The host can send additional receipt data in the Transaction Reply sent in response to a solicited coin dispenser message.

Table 10-36
Deposit Media First During Valuable Media
Exchange: Operational Flow

Option 2A	Option 4A	Cash Deposited	Notes Presented	Notes Taken	Notes Retracted	Coins Dispensed	Print Operations	Message Sent
0 (retract enabled)	0	✓	✓	✓	✗	✓ (coin dispense starts after notes presented)	✓	Ready 9
0	0	✓	✓	✗	✓	✓ (coin dispense starts after notes presented)	✓	Unsolicited Notes Retract; Ready 9
0	1	✓	✓	✓	✗	✓ (coin dispense starts after notes taken)	✓	Ready 9
0	1	✓	✓	✗	✓	✗ (no coins dispensed as notes not taken)	✗	Solicited Notes Retract

Central to Terminal Messages
Transaction Reply Command

Option 2A	Option 4A	Cash Deposited	Notes Presented	Notes Taken	Notes Retracted	Coins Dispensed	Print Operations	Message Sent
1	— (Ignored)	✓	✓	✓	✗	✓ (coin dispense starts after notes presented)	✓	Ready 9
1	— (Ignored)	✓	✓	✗	✗	✓ (coin dispense starts after notes presented)	✓	Ready 9

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Interactive Transaction Response

The Interactive Transaction Response (ITR) message may be sent in response to a Transaction Request in order to obtain more information from the cardholder. This facility allows Central to communicate directly with the keyboard and display in those situations where state table sequencing is inappropriate. For example, a cardholder account selection can be handled in this way. Central can establish which accounts are available to the cardholder and build the screen accordingly. The message defines screen data and active keys.

Keyboard data is returned in a Transaction Request message. For details, see “Transaction Request Messages” on page 9-2.

Support for Touch-Screen Emulation

The SST may support touch-screen FDK emulation instead of physical FDKs. In this case, eight, fixed, touch areas are defined on screen, which the consumer touches instead of pressing the corresponding FDK. The touch areas are enabled and disabled in exactly the same way as the FDKs. For details, see “FDK Emulation” on page 4-2.

Alternatively, the terminal may support full touch-screen keyboards. In this case, touch areas are defined on the screen for all the required keys. The cardholder touches these instead of pressing a key on the keypad or an FDK. For details, see Chapter 4, “Keyboard Data and Layouts”.

Support for Voice-Guided Sessions

In a voice-guided session, the host can send a message with one of two formats used in field ‘j’, as follows:

- Direct Audio Text format.

The text to be spoken is included in the field. The text must not contain special characters, such as screen control characters. The specified text is not repeated. To repeat the text, it must be repeated in this field. Field ‘i’ is not adjusted for a voice-guided session.

- Indirect Audio Text format.

The text to be spoken is contained in the voice guidance XML configuration file and referenced from this field. The text specified in the XML file is not repeated. To repeat the text, multiple Text elements must be used or the recorded voice file must contain repeated audio messages. Field ‘i’ is adjusted as

specified in the XML configuration file. For details of the XML configuration file, refer to the *APTRA Advance NDC, Developer's Guide*.

Message Coordination Number (MCN)

If the MCN (field 'e2' in Table 10-37, "Interactive Transaction Response" below) is present, the Message Sequence Number (field 'e1') must also be present. If Message Sequence Numbers are not normally populated, field 'e1' must be set to 000.

If field 'e2' is present, its content will be compared with the MCN in the current Transaction Request. If the MCNs do not match, the Interactive Transaction Response will be rejected by default. This can be changed through Enhanced Configuration Parameter option 34.

The host can override validation of the MCN by either omitting field 'e2' or setting it to 0.

For details of the MCN in Transaction Requests and host responses, see field 'g' of the Transaction Request message on page 9-3.

For details of Enhanced Configuration Parameter option 34, see "Option 34 – MCN Range" on page 7-11.

Table 10-37
Interactive Transaction Response

Field	Number of Characters	Mandatory/Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '3' - Data Command
c	1	O	Response Flag. This field is included for future use and is ignored by the SST.
FS	1	M	Field Separator.
d	3	O	Logical Unit Number (LUNO). This field is included for future use and is ignored by the SST.
FS	1	M	Field Separator.
e1	3	O	Message Sequence Number. This field is included for future use and is ignored by the SST
e2	1	O	Message Coordination Number. See "Message Coordination Number (MCN)" above.
FS	1	M	Field Separator.

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Field	Number of Characters	Mandatory/Optional	Description																				
f	1	M	<p>Message Sub-Class. The message sub-class is:</p> <p>‘2’ - Interactive Transaction Response</p>																				
g	1	M	<p>Display Flag. This one character field instructs the terminal display as follows:</p> <p>‘0’ - do not display cardholder keyboard entry</p> <p>‘1’ - display cardholder keyboard entry</p> <p>‘2’ - display ‘*’ for cardholder keyboard entry</p> <p>The keyed response is stored in General Purpose Buffer ‘B’ (minimum data length 1 character), which is the only buffer included in a Transaction Request message following the Interactive Transaction Response.</p> <p>For more information on general purpose buffers refer to the <i>APTRA Advance NDC, Developer’s Guide</i>.</p>																				
h	Var (10)	M	<p>Active Keys/Touch Areas. This is a variable length field which activates the required keys or touch areas for cardholder responses as follows:</p> <p>‘0’ - de-activate keys/touch areas</p> <p>‘1’ - activate keys/touch areas</p> <p>The first character of this field either activates or de-activates all numeric keys.</p> <table><tr><th>Char</th><th>All Numeric Keys</th></tr><tr><td>1</td><td>Numeric keys activator (0-9)</td></tr></table> <p>The next nine characters either activate or de-activate the function keys or touch areas as follows:</p> <table><tr><th>Char</th><th>Function Keys or Touch Areas</th></tr><tr><td>2</td><td>FDK A/FDK A touch area and Enter Key</td></tr><tr><td>3</td><td>FDK B/FDK B touch area</td></tr><tr><td>4</td><td>FDK C/FDK C touch area</td></tr><tr><td>5</td><td>FDK D/FDK D touch area</td></tr><tr><td>6</td><td>Cancel Key E</td></tr><tr><td>7</td><td>FDK F/FDK F touch area</td></tr><tr><td>8</td><td>FDK G/FDK G touch area</td></tr></table>	Char	All Numeric Keys	1	Numeric keys activator (0-9)	Char	Function Keys or Touch Areas	2	FDK A/FDK A touch area and Enter Key	3	FDK B/FDK B touch area	4	FDK C/FDK C touch area	5	FDK D/FDK D touch area	6	Cancel Key E	7	FDK F/FDK F touch area	8	FDK G/FDK G touch area
Char	All Numeric Keys																						
1	Numeric keys activator (0-9)																						
Char	Function Keys or Touch Areas																						
2	FDK A/FDK A touch area and Enter Key																						
3	FDK B/FDK B touch area																						
4	FDK C/FDK C touch area																						
5	FDK D/FDK D touch area																						
6	Cancel Key E																						
7	FDK F/FDK F touch area																						
8	FDK G/FDK G touch area																						

Central to Terminal Messages
Interactive Transaction Response

Field	Number of Characters	Mandatory/Optional	Description																		
			9 FDK H/FDK H touch area																		
			10 FDK I/FDK I touch area																		
			Trailing '0' characters may be omitted from this field. Note: If numeric keys are active and FDK A is also active (or FDK I if the option enabling the keys to the left of the cardholder screen is set), the Enter key will be active and equivalent to FDK A or FDK I. During a voice-guided session, the FDK, numeric, Clear, Cancel and Enter keys can be used. If this message indicates that one or more FDKs are active, the active FDKs are mapped to the numeric keyboard as follows:																		
			<table><tr><th>FDK</th><th>Numeric Key</th></tr><tr><td>A</td><td>1</td></tr><tr><td>B</td><td>2</td></tr><tr><td>C</td><td>3</td></tr><tr><td>D</td><td>4</td></tr><tr><td>F</td><td>8</td></tr><tr><td>G</td><td>7</td></tr><tr><td>H</td><td>6</td></tr><tr><td>I</td><td>5</td></tr></table>	FDK	Numeric Key	A	1	B	2	C	3	D	4	F	8	G	7	H	6	I	5
FDK	Numeric Key																				
A	1																				
B	2																				
C	3																				
D	4																				
F	8																				
G	7																				
H	6																				
I	5																				
			If this message defines both FDKs and numeric keys as active, this mapping is not done and the FDKs must be used during the voice-guided session.																		
FS	1	M	Field Separator.																		
i	3	M	Screen Timer Field. This three character field contains the time-out intervals from the cardholder screen display. The valid range is 001-255 ticks, to give a time-out from 0.8 to 204 seconds. Entering 000 gives indefinite display. If the timer expires, a code of 'T' is stored in the buffer and a Transaction Request message is sent.																		
FS	1	M	Field Separator.																		
j1	Var	M	Screen Data Field. This is a variable-length field that represents data to be displayed on the screen.																		

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Field	Number of Characters	Mandatory/Optional	Description
			<p>During a voice-guided session, the content of this field depends on the format used, as follows:</p> <ul style="list-style-type: none"> • Direct Audio Text format - this field contains audio data to use in place of the screen display data. The data is treated as a string to be spoken, nothing is displayed on the SST screen. This field must contain the text to be spoken, and not reference any <code>audioID</code> sub-elements in the voice guidance XML configuration file. No special characters can be used in the text. • Indirect Audio Text format - this field contains dynamic audio data with screen number and any other optional screen data. The Screen Data Field must contain a reference to a base screen with any other optional screen data and dynamic voice data. The base screen being updated must include placeholder tags to accommodate the dynamic audio placeholder data. There must be a corresponding <code>audioID</code> sub-element defined in the voice guidance XML configuration file. <p>For details of the XML configuration file for voice guidance, refer to the <i>APTRA Advance NDC, Developer's Guide</i>.</p>
GS	1	O	Group Separator.
j2	Var	O	Screen Update Data Field. This must be present if the preceding group separator is present. This field represents data which is displayed on the SST screen when the Direct Audio Text format is used.
k	Var	M	Trailer. Protocol-dependent.

EJ Commands

This section contains details of the following EJ commands:

- EJ Options and Timers
- Acknowledge EJ Upload Block
- Acknowledge and Stop EJ

The format and content of each command is described in the following sections, along with an explanation of continuous and batch upload methods.

Note: If the EJ is not configured, any EJ commands sent will be rejected with a command reject.

For details of the SST to host upload message, see “Upload EJ Data Message” on page 9-90.

EJ Options and Timers

This command may be sent by Central at any time to enable electronic journal upload, and to specify the options and timer values to be used. It may also be sent after receiving a power fail message from the SST to re-instate the EJ upload feature.

Table 10-38
EJ Options and Timers

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '6' - Electronic Journal
FS	1	M	Field Separator
FS	1	M	Field Separator
FS	1	M	Field Separator
c	1	M	Command Type. The command type is: '3' - Options and Timers

Field	Number of Characters	Mandatory/ Optional	Description
d	2	O	Option Number. Possible values are: Option 60 - EJ Upload Block Size. Maximum size of the data portion of the EJ Upload block. For details, see "Upload EJ Data Message" on page 9-90. Option 61 - Retry Threshold. The number of attempts to successfully send an EJ Upload block before the EJ is automatically disabled. See Table Note 121.
e	3	O	Option Value. For Option 60, the value range is 001-350. Default is 200. For Option 61, the value range is 000-999. Default is 000 (infinite retries).
Fields 'd' and 'e' are repeated if both options are being sent in the same message. No field separator is required between options, but a field separator is mandatory before field 'f', Timer Number.			
FS	1	M	Field Separator.
f	2	O	Timer Number. Possible value is: Timer 60 - EJ Acknowledgement Timer. Maximum time in seconds to wait for an acknowledgement message from Central before resending the block.
g	3	O	Timer Value. Range 000-255. Default is 255, 000 is infinite.

Table Note 121: If the value sent for Option 60 is out of the possible range, the safety value of 350 is substituted. The safety values for Option 61 and Timer 60 are the same as the default values.

Acknowledge EJ Upload Block

This command should be sent by Central each time a block of electronic journal data is received from the SST. It can also be sent unsolicited at any time to enable the EJ upload function. If this command is used to enable EJ upload instead of the EJ Options and Timers command, then the default option and timer values will be used.

If after sending an EJ block to Central, the SST does not receive an acknowledgement within the specified time, the SST will send the block again. On receipt of the acknowledgement message for the final EJ data block to be sent, the SST will erase the acknowledged data from its *ejdata.log* file.

Table 10-39
Acknowledge EJ Upload Block

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '6' - Electronic Journal
FS	1	M	Field Separator
FS	1	M	Field Separator
FS	1	M	Field Separator
c	1	M	Command Type. The command type is: '1' - Acknowledge Upload Block <i>See Table Note 123</i>
d	6	M	Last Character Received. Range 000000-999999. <i>See Table Note 122.</i> The value in this field should be the same as the value in the Last Character This Block field in the last Upload EJ Data message sent by the SST (see page 9-90). If the Last Character Received is not equal to the value of the Last Character This Block in the last upload block sent by the SST, and if EJ upload is in progress, the SST will not count this as an acknowledgment, and will continue to wait for an acknowledgment without resetting its timer. If the Last Character Received field contains '000000' then Advance NDC will resend the last block again.

Table Note 122: The Last Char Previous Block and Last Char This Block values are based on a modulus 1,000,000 character count which starts at zero following a cold start of the SST. The count is incremented for each character written to the electronic journal. The count is not re-set for a warm start, that is, a power fail or reset during which the persistent memory is preserved.

Table Note 123: If the Acknowledge EJ Block command is being sent to enable the EJ upload function after a power fail or a communications loss then the Last Character Received field can be any value, but the recommended value is '000000'. This will cause the SST to enable the EJ upload function, then transmit its current EJ data, starting from the last unacknowledged block.

Acknowledge and Stop EJ

This command acknowledges the last EJ upload block received by Central, and in addition indicates that EJ upload is to cease. This will disable the EJ upload function until Central sends a new

Acknowledge EJ Upload Block command or EJ Options and Timers command.

The Acknowledge and Stop EJ command may also be sent to disable EJ upload at any time (that is, not in response to an upload message).

If Central disables EJ upload, EJ data will accumulate at the SST until Central re-enables the upload function. This procedure can be used to control the upload of EJ data at peak line load times, as can lengthening the time period before sending an acknowledgement message. This time delay is configured in the EJ Options and Timers command.

Table 10-40
Acknowledge and Stop EJ

Field	Number of Characters	Mandatory/ Optional	Description
a	Var	M	Header. Protocol-dependent.
b	1	M	Message Class. The message class is: '6' - Electronic Journal
FS	1	M	Field Separator.
FS	1	M	Field Separator.
FS	1	M	Field Separator.
c	1	M	Command Type. The command type is: '2' - Acknowledge and Stop EJ
d	1	M	Last Character Received. Range 000000-999999. <i>See</i> Table Note 124. The value in this field should be the same as the value in the Last Character This Block field in the last Upload EJ Data message sent by the SST. If it is not, EJ upload will be disabled and when it is re-enabled the SST will send the last upload block again.

Table Note 124: The Last Char Previous Block and Last Char This Block values are based on a modulus 1,000,000 character count which starts at zero following a cold start of the SST. The count is incremented for each character written to the electronic journal. The count is not re-set for a warm start, that is, a power fail or reset during which the persistent memory is preserved.

Continuous Upload

Continuous upload is the normal method of operation when the EJ upload function has been enabled. Central should acknowledge each uploaded block as soon as it is known to be properly stored, and the SST should mark EJ data in the *ejdata.log* file as being sent as

soon as it has been properly acknowledged. Then the next block of EJ data will be sent as soon as the SST is able to send it.

In normal circumstances, the only occasion for Central to be involved in a recovery situation is if the SST Retry Count (option 61 in the EJ Options and Timers command) is other than '000' - infinite. In this situation, the SST may automatically disable the EJ upload after the specified number of failed attempts to transmit a data block. Central must be able to recognise this event and re-enable the EJ upload. An automatic disablement may be identified by the fact that transactions are received but no accompanying upload data is seen.

Batch Upload

Batch upload can be used to restrict EJ uploads to certain times of the day, outside of which the EJ upload is disabled. The recommended approach to using batch upload is as follows:

- 1 Central puts the SST out of service, to ensure that no more transaction data can be added to the electronic journal log file while the upload is in progress.
- 2 Central then enables the EJ upload.
- 3 The EJ upload proceeds, controlled by acknowledgement messages from Central, until all the EJ data has been sent to Central.
- 4 When the last message has been received, Central acknowledges the message and then disables EJ upload.
The last message can usually be recognised by the fact that it is the only message with a block length less than the maximum block length set in the EJ Options and Timers message. It is possible for the last message to be exactly the same length as the maximum block length set; in this case the EJ upload will be terminated due to a time-out, as described in the next section.
- 5 Once the EJ upload is disabled, Central returns the SST to In-service mode.

Batch Upload Failure

If during the batch upload, the SST fails to send a new upload block within a reasonable time, this may be evidence of either of the following:

- A communications failure
- The final data block being exactly equal to the maximum block length, and therefore not recognised as being the final block.

In either case, Central should send a Print Immediate command to the SST with a short message, such as 'END OF DAY', to be printed on the journal.

Central should then wait for this data to be sent back in an Upload EJ Data message with a short block size. If the message is received, EJ upload can terminate normally as described above. If nothing is received, it is evidence of a communications problem. In this case either the upload can be terminated or another Print Immediate attempted.

Message Validation

Validation checks are performed on all messages received from Central.

Valid Message Classes

The following are the valid message classes that come from the SST to Central and from Central to the SST.

SST to Central

The valid message classes that are sent from the SST to Central are 1, 2, 5 and 8.

Central to SST

The valid message classes that are sent from Central to the SST are 1, 3, 4, 6, 7 and 8.

Note: Message class 8 enables EMV smart card configuration. For details, refer to the *EMV Integrated Circuit Card (ICC) Reference Manual*.

Command Reject Causes

The situations which cause a command reject are as follows:

- Illegal message sub-class
- Illegal message identifier
- Illegal terminal command code
- Illegal terminal command modifier
- Field separator in the wrong position
- Insufficient fields in the message, for example, an incomplete Interactive Transaction Reply message
- Insufficient memory to hold the FIT entry (FIT number too large)
- The dispense amount requested is larger than the number of notes and/or coins reported in the Hardware Configuration message
- The Message Coordination Number in a Transaction Reply or an Interactive Transaction Response (ITR) does not match the number in the Transaction Request and is not '0'
- Invalid function ID in Transaction Reply command. An invalid function ID is one not supported by the APTRA Advance NDC software or one requiring the use of a device that is not part of the hardware configuration.

Note: Commands requesting a receipt or journal print will not be rejected because of an unconfigured printer.

- An encryption key change message is received before the original key has been entered at the terminal
- More than 13 print fields in a Transaction Reply command
- Date/Time data invalid in date and time load command.

When the specific command reject option is set, these errors will generate an equivalent specific command reject.

Default operations include the following:

- Entry to the default Close state. For example, non-existent state number
- Conversion of illegal parameters to default legal values. For example, non-numeric ASCII characters changed to numeric values by converting the top four bits to 3 hex. 'A' (41 hex) becomes '1' (31 hex)
- Redundant information is ignored. For example, non-existent timer
- Default display. For example, if the screen does not exist the screen number is displayed on the cardholder screen.

The following are the conditions under which the specific command reject value/qualifier combinations are produced.

Table 10-41
 Specific Command Reject Value/Qualifier
 Combinations

Value	Qualifier	Description
A		Message format errors.
	01	<p>Message length error. An incomplete message is found under the following conditions:</p> <p>Report Logs/Tallies missing the group number.</p> <p>Load configuration ID incomplete or missing ID field.</p> <p>Option/Timer - incomplete number/value field in configuration message.</p> <p>Customer/Transaction Data Elements are incomplete, have the wrong length or are missing an intervening group separator</p> <p>Truncated MAC Field Selection Load, with expected MAC data missing.</p> <p>The Dispenser Currency Cassette Mapping Table is incomplete.</p>

Value	Qualifier	Description
	02	Field Separator not found or found unexpectedly in the following circumstances: Found in the middle of an option/timer number and value field in configuration message. Not found when skipping the first three field separators in a Transaction Reply message. Not found at the end of the coinage field. Not found in MAC Field Selection Load Data. Mandatory last field separator not found or found unexpectedly in a Transaction Reply message.
	03	Too many print groups in the Transaction Reply message. More than 13 print groups are present in a Transaction Reply message.
	04	A group separator is missing or found unexpectedly. A group separator is required between fields 'j' and 'j1' as well as between 'af2' and 'af3' of the Transaction Reply message. There is a trailing group separator after the last Customer/Transaction Data Element buffer (field bd4)
	06	Invalid dispense message, wrong format for current mode or a request has been made to dispense from multiple dispensers.
	07	Malformed XML
	08	XML does not conform to XML schema
	09	Inconsistent configuration download, for example a message part received out of order. The download must be restarted.
B		Field Value Errors.
	01	Illegal Message Class. Message class was not '1', '2', '3', '4', '6' or '7', or message class was '7' and exit support was not detected. If an SST is not configured for EMV, message class '8' is not supported.
	02	Illegal Message Sub-Class or Identifier on a Configuration Load Message with class '3'. The following will cause this report:

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Value	Qualifier	Description
		Message sub-class outside the range '1' - '4'.
		Message identifier outside the range '1' - '6', 'A' - 'C' or 'E'.
03		Illegal Load Key Message Identifier. Within a load encryption key data message: The modifier field is outside the range '1' - '9'.
04		Illegal Terminal Command Code: Returned if the command code is outside the range '1' - '?'.
05		Illegal Terminal Command Modifier. Within a legal terminal command, if a modifier is required: Report tallies modifier outside the range 'A' - 'N' or 'V' or 'Y' or '\ ' or '['. Report error log modifier outside the range 'A' - 'C'. The terminal command code is 7 and the command modifier is outside the range 0-7.
06		Invalid Function ID in Transaction Reply command: Function ID is outside the range '1' - '9', 'A', 'B', 'C', 'F', 'O', 'P', 'Q', 'S', 'T', 'b', 'c', 'e', 'f', '*', '-', "'", ':', '# ' or '%'.
07		Data Field contains non-numeric data. This is found in the following circumstances: Encryption key change message key data. Coinage field has at least one non-numeric character present. Option/Timer number or value in configuration message. A field in the range 'ae5' to 'ae10', or 'af2', 'as2' or 'bd3' in the Transaction Reply message contains a non-numeric character.
08		Numeric value out of range: In a FIT message, a FIT data value is greater than 255. A field in the range 'ae3' to 'ae10' or 'af2' in the Transaction Reply message contains a value exceeding the maximum.

Value	Qualifier	Description
		One or more of the Customer/Transaction Data Elements (fields bd3 and bd4) contain invalid values.
09		Invalid Message Coordination Number (MCN). In a Transaction Reply or an Interactive Transaction Response, the MCN is not zero and does not match the value in the Transaction Request.
10		Illegal FIT number. A FIT in a FIT load message is not in the range of the reserved pool size. Legal values are 000-999.
11		Too many notes in Transaction Reply command. The total number of notes requested exceeds the limit of 40.
12		Reserved
13		Unrecognised cheque destination. Returned if the destination specified in field 'as2' of the Transaction Reply is not one of the allowed values, or if the field is null.
14		Reserved
15		Unrecognised buffer identifier. Returned if the Transaction Reply contains a buffer identifier not currently supported.
16-19		Reserved
20		No data supplied to endorse cheque in cheque processor.
21		Reserved
22		Invalid key size sent in an Encryption Key Change message, or an Extended Encryption Key Change message. The key size may be incorrect (not 018 hex, 030 hex or 120 hex), not matching the key data length, or invalid for the current key entry mode.
23		RSA Signature Verification Failed.
24		Signature or Encryption Key PKCS#1 Packing Failed.
25		Signature or Encryption Key PKCS#1 Unpacking Failed.
26		Invalid Signature or Encryption Key PKCS#1 Pad Block Type.
27		Fixed Header Decryption Failed.
28		Null Byte After Padding Missing.

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Value	Qualifier	Description
	29	Invalid Pad Byte Count.
	33	Invalid Cassette Type (range 1 to 255).
	34	Invalid/Incomplete Cheque Identifiers
	35	Passbook Update not Supported in Specified Transaction Reply Function
C		Illegal Message Type for Current Mode.
	01	Message type only accepted while terminal is in In-Service mode and is expecting a Transaction Reply. The reject is caused by receipt of a Transaction Reply at other times while the terminal is In-Service.
	02	<p>Message cannot be accepted while diagnostics is in progress. This reply is designed to draw attention to the fact that these programs are being executed. It applies to the following messages:</p> <p>Download messages for customisation.</p> <p>Transaction Replies (not Print Immediate).</p>
	03	<p>Message cannot be accepted while in Out-of-Service or Supply modes. The following messages cannot be accepted in these modes:</p> <p>Transaction Replies (not Print Immediate).</p> <p>Interactive Transaction Response.</p>
	04	<p>Message unacceptable in current mode.</p> <p>The following messages cannot be accepted while in In-Service mode:</p> <p>Terminal commands '4', '5', '6', '8', '9', ':\'. Interactive Transaction Response when not in Transaction Request State.</p> <p>Also applies to terminal command '?' when attempting to enable Supervisor 'Dump Images' but terminal is performing a transaction.</p>
		Dispenser Currency Cassette Mapping table.
	05 - 09	Reserved.
	10	Message not accepted while processing a Transaction Reply.
	11	Reserved.

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Value	Qualifier	Description
	12	Cannot process a document while a statement print function is being carried out. Reported on 5665 only.
	13	Cannot perform a statement print function while processing a document. Reported on 5665 only.
	14	Reserved.
	15	Cannot perform a communications encryption key change during a cardholder transaction, or when the terminal is in suspend mode, or when the operator is initiating the execution of supervisory or settlement transactions.
	16	Reserved.
	17	Key change operation cannot be accepted in restricted mode.
	18	Key entry mode not authorised
D		Hardware Failure.
	01	Encryption Failure during key change message.
	02	Time-of-Day clock failure during data/time set command or invalid data sent.
	03-05	Reserved.
	06	Insufficient disk space.
	07	File I/O Error
	08	File Not Found
E		Not Supported.
	01	Not supported by software. The requested function is not supported by the software version in use. An example is a DLL required to complete the transaction reply processing is missing
	02	Not supported by hardware. The hardware is not present or cannot support the request. Examples are: <ul style="list-style-type: none"> – The Bunch Note Acceptor (BNA) function has been requested but there is no BNA present. – Sideways printing on receipt has been requested but the option is not available.

Value	Qualifier	Description
03 - 04		Reserved.
05		Journal printer backup is inactive.
06		The response message format definition is not compatible with the data format/length that has to be returned in response to a command request.

Other Invalid Parameters

Any other invalid parameter in a received message will be accepted and the appropriate default operation will occur, but system integrity will not be lost. As the operation is largely unpredictable, NCR recommends that you ensure that Central validation occurs before a message is sent, or check the terminal operation before going live.

Exits

If a rule file specifies a DLL that cannot be loaded, or a routine that cannot be accessed, the following will occur:

- The error is traced, using trace messages T93 or T94.
See Appendix A, "Reserved Screens".
- If the error occurs during the execution of a user defined Exit State, Advance NDC will also put the terminal into a default Close state.

This will affect the following:

- Messages of class 7, subclass 1, from Central to an Exit, if the file *MISCONT* specifies an inaccessible DLL name or routine name with Point of Use 7
- Messages of classes 1, 2, 3 or 4 if the file *VCCONT* specifies an inaccessible DLL name or routine name as an intercept routine.

Messages Received in Wrong Operational Mode

The following tables describe what action is taken if a message is received by the terminal when it is in one of the following modes:

- Power-Up
- Out-of-Service
- Supply
- In-Service

The action taken will depend on which mode the terminal is in at the time of receiving the message. The messages include:

- Customisation Data Commands
- Transaction Reply Commands
- Terminal Commands.

Customisation Data Commands

Table 10-42
 Actions for Customisation Data Commands

For more details of these commands, see “Customisation Data Commands” on page 10-7.

Command Mode	Power-Up	Out-of-Service	Supply	In-Service
State Table Load	-	A	A	R
Screen/Keyboard Data Load	-	A	A	R
Configuration Parameters Load	-	A	A	R
Interactive Transaction Response	-	R	R	A2
FIT Data Load	-	A	A	R
Encryption Key Change	-	A	A	A3
Extended Encryption Key Change	-	A	A	A3
Configuration ID Number Load	-	A	A	R
Enhanced Configuration Parameters Load	-	A	A	R

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Command Mode	Power-Up	Out-of-Service	Supply	In-Service
PIN Data Load	-	A	A	R
Date and Time Load	-	A	A	R
MAC Field Selection Load	-	A	A	R
Dispenser Currency Cassette Mapping Table Load	-	A	A	R

R - Command Reject.

A - Accept for processing. Response is Ready ('9') status.

A2 - Accept for processing. Response is Transaction Request if in Transaction Request state, else response is Command Reject.

A3 - Accept in In-Service mode only if a transaction is not taking place.

Transaction Reply Command Actions

Table 10-43
Actions for Transaction Reply Commands

For more details of the Transaction Reply command, see "Transaction Reply Command" on page 10-52.

Command Mode	Power-Up	Out-of-Service	Supply	In-Service (Not TREQ State)	In-Service (TREQ State)
Print Immediate	-	A	A1	R	A
Other	-	R	R	R	A

R - Command Reject.

A - Accept for processing. If completed successfully, the response is a Ready '9' or Ready 'B' status. If a device error, the response is a device fault status message. If a format error, the response is a Command Reject.

A1 - If the mode was entered from Out-of-Service, hold until Out-of-Service is re-entered and then process as A. Otherwise, the response is a Command Reject. If another Print Immediate is received, the first one is overwritten. There is no additional response.

Actions for Terminal Commands

Table 10-44
 Actions for Terminal Commands

For details of the SST commands, see “Terminal Commands” on page 10-3.

Command Mode	Power-Up	Out-Of-Service	Supply	In-Service
Go In-Service	-	A1	A2	A
Go Out-of-Service	-	A	A2	A3
Configuration ID Request	-	C	C	C
Configuration Information Request	-	D	D	D
Counters Request	-	D	P	R
Date/Time Request	-	D	P	R

D - Response is requested information.

P - Hold until supply mode is exited and then process according to the mode entered. Note that the messages are not stacked and a new request overwrites the previous request to which no response is sent.

R - Response is Command Reject. In order to use these requests, the terminal should be put out-of-service. This is to avoid the information being updated by cardholder activity while the messages are being created.

A - Response is Ready ('9') status.

A1 - Change mode to In-Service. Response is Ready ('9') status.

A2 - Hold until Supply mode is exited and then process. Response is Ready ('9') status. Note that if more than one command is received while in Supply mode, only the last is recognised. The others are dropped, and no response is given.

A3 - Mode change to Out-of-Service when terminal is idle at the Card Read state. Response is Ready ('9').

C - Response is the terminal state message containing the Configuration ID.

Note: While In-Service, a received Config ID request will be processed and responded to immediately, whether the SST is in idle or a cardholder session. All other terminal commands are held until the terminal is idle and then processed. Commands are not stacked and a new request, other than a Config ID, overrides the previous request to which no response is sent.