

INTELLISTRIPE 320 COMMAND REFERENCE MANUAL

Manual Part Number 99875168 Rev 11

FEBRUARY 2009

MAGTEK[®]

1710 Apollo Court

Seal Beach, CA 90740

Phone: (562) 546-6400

FAX: (562) 546-6301

Technical Support: (651) 415-6800

www.magtek.com

Information in this document is subject to change without notice. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of MagTek, Inc.

MagTek is a registered trademark of MagTek, Inc.

IntelliStripe is a registered trademark of MagTek, Inc.

REVISIONS

Rev Number	Date	Notes
1	15 May 00	Initial Release
2	18 Oct 00	Section 7: Transport cooling mode changed from 10 to 5 secs. Added Appendix B, Memory Cards. The first is SLE 4442/4432 Memory Card Control.
3	13 Nov 00	Added support for SLE 4428/4418 and SLE 4428/4418 Memory Card Controls.
4	12 Jul 01	Sec 7, Notify Indicator Change 0 to 1 Property and Notify Indicator Change 1 to 0 Property, Values: changes to bits 1-2, 3, and 4-31; text changed in 1-2 and 4-31.
5	23 Oct 01	Section 5. Editorial Corrections throughout. Appendix B. Added support for the SLE4404 Memory Card and I ² C™ Cards families.
6	2 May 02	Section 4: Added Decode JIS Type 2 Property; Changed Decode Status Definitions in CMD ID 81 and 82, Added JIS to Card Encode Type in CMD 81 and 82. Appendix B: Completely revised SLE 4404 Memory Card Control.
7	22 May 02	Section 5: Added description at the end of "Card Types" including list of card types.
8	5 Sep 06	Removed Warranty information; added support for: saving properties, acquiring MagnePrint, adjusting sensor timing for eject, enabling power fail eject, controlling the buzzer, and adjusting host communication properties
9	18 Sep 06	Added Section 10 for OTI SCI1000 Contactless Smart Card Application
10	01 Jun 08	Included information about the Contactless Smart Cards that are supported and Mifare commands.
11	10 Feb 09	Added description of Warm Reset command for Smart Cards. The Warm Reset feature has existed for a long time but it had not been documented in the manual.

TABLE OF CONTENTS

SECTION 1. APPLICATION MESSAGES	1
OVERVIEW.....	1
MESSAGE FORMAT	1
Message Header	1
Data Field	4
SECTION 2. GENERIC COMMANDS	5
GET PROPERTY COMMAND.....	5
SET PROPERTY COMMAND	7
SAVE PROPERTY COMMAND	8
SECTION 3. DEVICE APPLICATION	9
GET/SET/SAVE PROPERTY COMMANDS	9
MODEL NUMBER PROPERTY.....	10
SOFTWARE ID PROPERTY	11
SOFTWARE RESET COMMAND	12
SECTION 4. MAGNETIC STRIPE APPLICATION	13
GET/SET/SAVE PROPERTY COMMANDS	13
NOTIFY READ STATE PROPERTY	14
NOTIFY READ TRACK PROPERTY.....	15
DECODE JIS TYPE 2 PROPERTY	16
CLEAR DATA COMMAND	17
GET TRACK 123 DECODE DATA COMMAND	18
GET TRACK DECODE DATA COMMAND	20
GET MAGNEPRINT DATA COMMAND.....	22
SECTION 5. SMART CARD APPLICATION	25
GET/SET/SAVE PROPERTY COMMANDS	25
RESPONSE CODES USED THROUGHOUT THE APPLICATION.....	25
NOTIFICATIONS IN THE SMART CARD APPLICATION	25
Request/Response/Notification Model	26
Example Request/Response/Notification Sequence.....	26
THE CONDRPT PROPERTY	27
ERROR/WARNING CONDITION TEMPLATES.....	27
CARD TYPES	29
PROPERTIES.....	31
ATR MAP STRUCTURE – MICROPROCESSOR CARDS ONLY	39
POWER UP COMMAND	41
POWER DOWN COMMAND.....	44
T=0 ERROR / WARNING CONDITION TEMPLATES	44
T=1 ERROR / WARNING CONDITION TEMPLATES	45
WARM RESET COMMAND	46
TPDU, CARD TO IFD COMMAND.....	47
TPDU, IFD TO CARD COMMAND	48
APDU EXCHANGE COMMAND.....	49
SELECT CONNECTOR COMMAND	51
SECTION 6. LED APPLICATION	53

GET/SET/SAVE PROPERTY COMMANDS	53
LED STATE PROPERTY	53
SECTION 7. TRANSPORT APPLICATION	55
GET/SET/SAVE PROPERTY COMMANDS	55
INDICATORS PROPERTY	55
NOTIFY INDICATOR CHANGE 0 TO 1 PROPERTY	58
NOTIFY INDICATOR CHANGE 1 TO 0 PROPERTY	59
AUTO CONSUME PROPERTY	60
MSR DIRECTION PROPERTY	61
EJECT MIDDLE SENSOR TO MOTOR OFF DELAY PROPERTY	62
POWER FAIL DETECT PROPERTY	63
CONSUME CARD COMMAND	64
EJECT CARD COMMAND	65
SECTION 8. BUZZER APPLICATION	67
GET/SET/SAVE PROPERTY COMMANDS	67
TONE SEQUENCE 1 PROPERTY	68
TONE SEQUENCE 2 PROPERTY	69
TONE SEQUENCE 3 PROPERTY	70
TONE SEQUENCE 4 PROPERTY	71
PLAYBACK TONE SEQUENCE COMMAND	72
SECTION 9. HOST COMMUNICATIONS APPLICATION	73
GET/SET/SAVE PROPERTY COMMANDS	73
USB SERIAL NUMBER PROPERTY	74
RS232 PLUG AND PLAY SUPPORT ENABLE PROPERTY	75
USB PRODUCT PROPERTY	76
MCP ERROR RECOVERY ENABLE PROPERTY	77
MCP EDC CHECK ENABLE PROPERTY	79
MCP AUTO BAUD ENABLE PROPERTY	80
FIXED BAUD RATE PROPERTY	81
RESET DETECTED PROPERTY	82
PROTOCOL PROPERTY	83
SECTION 10. OTI SCI 1000 CONTACTLESS SMART CARD APPLICATION	85
GET/SET/SAVE PROPERTY COMMANDS	85
NOTIFY CONTACTLESS MAGSTRIPE PROPERTY	85
CONTACTLESS AUTOMATIC RF CONTROL PROPERTY	86
Auto Mode	87
Example Notification Sequence	88
RF ON Command	89
RF OFF COMMAND	89
Sending OTI Module Transparent Commands	90
APPENDIX A. EXAMPLE HOST APPLICATION	91
APPENDIX B. MEMORY CARD SUPPORT	93
SLE 4442/4432 MEMORY CARD CONTROL	93
Properties	93
Power Up	94
APDU Exchange Command	94
Read Binary APDU	94

Update Binary APDU.....	95
Verify APDU (Programmable Security Code)	96
SLE 4428/4418 MEMORY CARD CONTROL.....	97
Properties	97
Power Up.....	97
APDU Exchange Command.....	97
Read Binary APDU.....	98
Read Protection Status APDU	98
Update Binary APDU.....	99
Update Binary With Protection APDU	100
Verify APDU (Programmable Security Code)	101
SLE 4404 MEMORY CARD CONTROL.....	102
Properties	102
Power Up.....	103
APDU Exchange Command.....	103
Special handling for C4 and RST	103
Read Binary APDU	104
Write Binary APDU	104
Erase Binary APDU	105
Verify/Erase Application Zone APDU	106
i ² C™ MEMORY CARD CONTROL.....	107
Properties	107
Power Up.....	108
APDU Exchange Command.....	108
Read Binary APDU.....	109
Update Binary APDU.....	109
GEMPLUS GAM326 MEMORY CARD CONTROL.....	110
Properties	110
Power Up.....	111
APDU Exchange Command.....	111
Read Binary APDU.....	112
Write Binary APDU	112
Erase Counter APDU	113
Internal Authenticate APDU	114
APPENDIX C. MIFARE COMMANDS.....	117
INDEX	121

SECTION 1. APPLICATION MESSAGES

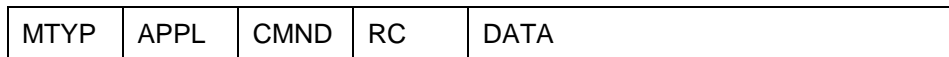
This section describes the format of application messages and defines the protocol for using these messages.

OVERVIEW

Application messages are the blocks of information exchanged between two applications. They consist of a header and data. The message format and contents are independent of the transport mechanism by which the messages are exchanged. Each message has a length that is provided by the transport mechanism for messages being received or is supplied to the transport mechanism for messages being transmitted. The transport mechanism is outside the scope of this document.

MESSAGE FORMAT

The following diagram illustrates the message format:



Message Header

The message header contains four one-byte fields: Message Type, Application ID, Command ID and Result Code. The header is followed by zero or more bytes of data. The existence and format of the data depends on the Application ID and Command ID.

The following sections describe each field of the header.

Message Type

This field specifies the message type: request, response or notification. The table below defines the encoding of the message type:

Bits	Value	Definition
7-6	00	Request message type.
	01	Response message type.
	10	Notification message type.
	11	Reserved for future use.
5-0	–	Reserved for future use.

Requests are the messages sent by a host application to a device application. The device performs the requested operation and sends a response message to the host application. The device can service only one request at a time. If a request is pending, no further requests should be sent to the device until a response is received.

IntelliStripe 320 Command Reference

Responses are the messages sent as a reply to a previously sent request. The response contains the result of the requested operation. The device application must send each response within a pre-determined finite amount of time from receiving the request. This device will send all responses within 5 seconds.

Notifications are sent by a device application when it needs to notify the host application that the device's state has changed or that some external event has occurred (i.e., a magnetic card has been inserted). The device can send a notification at any time. The device does not expect a response or any specific action from the host application.

For device operations that take long or indefinite amount of time, the host application usually sends a request that initiates the operation. The device sends a response, indicating it has started the operation. When the operation completes, the device sends a notification message to the host application.

Application ID

This field specifies the application ID. The application ID identifies the device application that a message corresponds to. A device application is a functional subsystem in the device. For example, a device might contain a magnetic stripe, transport, and a smart card functional subsystem. Each application in a device has a unique application ID and a defined command set.

The following application ID values are defined:

App ID (Hex)	Definition
00-7F	This range is for generic applications. A generic application has a common command set for different device models.
80-FF	This range is for custom applications. A custom application has a unique command set for a particular device model.

Command ID

This field specifies the command ID. The Command ID has a different meaning for each of the three message types:

- For requests, the command ID defines the operation to be carried out by the device application.
- For responses, the command ID defines the operation that was carried out by the device application (always the same value as the Command ID from the request).
- For notifications, the command ID specifies the event that has occurred in the device application.

The following command ID values are defined:

Value (Hex)	Definition
00-7F	This range is for generic commands. A generic command has a common meaning for different device applications. The existence of generic commands allows standardizing on commonly used commands across multiple device applications. Device applications are not required to support all generic commands. Generic commands are defined further elsewhere in this document.
80-FF	This range is for custom commands. A custom command has a unique meaning for a particular device application. Custom commands are defined further elsewhere in this document.

Result Code

This field specifies the result code. The result code has different meaning for each of the three message types:

For requests, the result code is currently undefined and should be set to 0.

For responses, the result code defines the result of the operation that was carried out by the device application.

For notifications, the result code specifies the result of the event that has occurred in the device application.

IntelliStripe 320 Command Reference

The following result codes are defined:

Value (Hex)	Definition
00-7F	This range is for generic result codes. A generic result code has a common meaning for different device applications. The following values are currently defined: 0 – success 1 – failure 2 – warning 3 – bad message header 4 – bad application id 5 – bad command id 6 – bad parameter 7 – timeout 8 – busy
80-FF	This range is for custom result codes. A custom result code has a unique meaning for a particular device application.

Data Field

If there is additional data associated with the application message, it is contained in this field. The length of this field is equal to the length of the message minus the length of the message header.

SECTION 2. GENERIC COMMANDS

This section defines the commands that are generic to all device applications. Not all device applications support these commands.

GET PROPERTY COMMAND

Command ID: 00 (Hex)

Description:

This command is used to retrieve the value of an application property.

Request Message Data:

Byte	Field	Description
1	Property Type	Property Type definition follows
2	Property ID	Property ID identifies the property

Property Type definition:

The bits are identified by numbering the least significant bit 0 and the most significant bit 7.

Bits	Value	Definition
7-4	0	Reserved for future use.
3-0	0	Property type – None. The property type is unspecified.
	1	Property type Dword – 32-bit integer.
	2	Property type String – zero-terminated ASCII string.
	3	Property type Boolean – 8-bit integer (1 – TRUE, 0 – FALSE)
	4	Property type Binary – binary data.
	5–15	Property types reserved for future use.

If a property type other than NONE is used, the type will be checked with the type of the property ID being requested. If these types do not match, then the command will fail.

Response Message Data:

Byte	Field	Description
1	Property Type	Property Type definition follows
2	Property ID	Property ID identifies the property
3	Property Value	Value of the property

The property type field is the same as defined in the request message data. Only valid property types are returned. The property type None is never returned. If the property type is Dword, the format of the property value is in the Intel LSB,MSB (Little Endian) layout. For example Dword value 0x12345678 is formatted as 0x78 0x56 0x34 0x12. Four bytes are always returned.

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Failure = 01 (Hex)

The command failed.

SET PROPERTY COMMAND**Command ID: 01 (Hex)****Description:**

This command is used to modify the value of an application property.

Request Message Data:

Byte	Field	Description
1	Property Type	Property Type definition follows
2	Property ID	Property ID identifies the property
3	Property Value	Value of the property

Property Type definition:

The bits are identified by numbering the least significant bit 0 and the most significant bit 7.

Bits	Value	Definition
7-4	0	Reserved for future use.
3-0	0	Reserved for Future use.
	1	Property type Dword – 32-bit integer.
	2	Property type String – zero-terminated ASCII string.
	3	Property type Boolean – 8-bit integer (1 – TRUE, 0 – FALSE)
	4	Property type Binary – binary data.
	5–15	Property types reserved for future use.

The property type None, defined in the get property command, is not allowed. Valid property types are required or the command will fail. If the property type is Dword, the format of the property value is in the Intel LSB,MSB (Little Endian) layout. For example Dword value 0x12345678 is formatted as 0x78 0x56 0x34 0x12. All four bytes are required.

Response Message Data: None**Response Message Result Codes:**

Success = 00 (Hex)

The command completed successfully.

Failure = 01 (Hex)

The command failed.

SAVE PROPERTY COMMAND

Command ID: 02 (Hex)

Description:

This command is used to save the current property value as the power up / reset default value. This command can be used to modify the property default values so that the properties do not have to be initialized to other values after a power cycle or reset. Typically the set property command is sent first to set the property to the desired power up / reset value. After which, the save property command is sent to save the property in non-volatile memory so that it can then be used as the new default value after a power cycle or reset. Not all properties support this command. See the description of each property to see if this command is supported or not.

Request Message Data:

Byte	Field	Description
1	Property Type	Property Type definition follows
2	Property ID	Property ID identifies the property
3	Security Code 1	55 (hex)
4	Security Code 2	AA (hex)

Property Type definition:

The bits are identified by numbering the least significant bit 0 and the most significant bit 7.

Bits	Value	Definition
7-4	0	Reserved for future use.
3-0	0	Property type – None. The property type is unspecified.
	1	Property type Dword – 32-bit integer.
	2	Property type String – zero-terminated ASCII string.
	3	Property type Boolean – 8-bit integer (1 – TRUE, 0 – FALSE)
	4	Property type Binary – binary data.
5–15		Property types reserved for future use.

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Failure = 01 (Hex)

The command failed.

SECTION 3. DEVICE APPLICATION

Application ID: 00 (Hex)

Description:

This application deals with device functionality.

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Save Property Command ID: 02 (Hex)

Description:

These commands are used to get, set and save the value of application properties. Details of these commands are described in the Generic command section of this document. The following describes each property this application supports.

MODEL NUMBER PROPERTY

Property ID: 00 (Hex)

Property Type: String

Maximum Length: 33 (including terminating zero)

Power Up/Reset Value: “IntelliStripe 320”

Get/Set/Save support: Get

Description:

This property is used to get the devices model number.

Values:

The value is fixed at “IntelliStripe 320”.

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	00	00	00	02	00

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 23
Value (Hex)	40	00	00	00	02	00	49 6E 74 65 6C 6C 69 53 74 72 69 70 65 20 33 32 30 00 “IntelliStripe 320” (ASCII)

SOFTWARE ID PROPERTY**Property ID:** 01 (Hex)**Property Type:** String**Maximum Length:** 33 (including terminating zero)**Power Up/Reset Value:** Software dependent**Get/Set/Save support:** Get**Description:**

This property is used to get the devices software ID.

Values:

The value is fixed and is software dependent. For example, the software ID could be “16051337A01” where “16051337” is the software part number, “A” is the software revision and “01” is the software version.

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	00	00	00	02	01

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 18
Value (Hex)	40	00	00	00	02	01	31 36 30 35 31 33 33 37 41 30 31 00 “16051337A01” (ASCII)

SOFTWARE RESET COMMAND

Command ID: 80 (Hex)

Description:

This command is used to reset the device. This will put the device in its power up state. The device should be allowed time to power up before trying to communicate with the device. The maximum time it would take the device to reset would be 5 seconds.

Request Message Data: None

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	00	80	00

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	00	80	00

SECTION 4. MAGNETIC STRIPE APPLICATION

Application ID: 01 (Hex)

Description:

This application deals with decoding and presenting magnetic stripe card data. This application works closely with the transport application, which deals with card transportation and magnetic stripe data acquisition. The transport application must be used to acquire magnetic stripe data before any data is available to decode and present by the magnetic stripe application.

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Save Property Command ID: 02 (Hex)

Description:

These commands are used to get, set and save the value of application properties. Details of these commands are described in the Generic command section of this document. The following describes each property this application supports.

NOTIFY READ STATE PROPERTY

Property ID: 00 (Hex)

Property Type: Dword

Power Up/Reset Value: 0 (OFF)

Get/Set/Save support: All

Description:

If the notify read state is not set to OFF, then a notification message will be sent to the host when a card is read. The notification message will have the same syntax as the command response of the command that corresponds to the notify read state. The only difference is that the message header will contain a notification message type instead of a response message type. Note that when the Notify Read State is set to GET TRACK DECODE DATA, the track number is obtained from the Notify Read Track Property.

Values:

Value	Notify Read State
0	OFF
1	GET TRACK 123 DECODE DATA
2	GET TRACK DECODE DATA

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 10
Value (Hex)	00	01	01	00	01	00	02 00 00 00 (GET TRACK DECODE DATA)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	01	01	00

NOTIFY READ TRACK PROPERTY**Property ID:** 01 (Hex)**Property Type:** Dword**Power Up/Reset Value:** 2 (Track 2)**Get/Set/Save support:** All**Description:**

This property contains the track number that is used when the Notify Read State property is set to the GET TRACK DECODE DATA state. This is the track that is sent in the notification message when a card is read.

Values:

Value	Notify Read Track
1	TRACK 1
2	TRACK 2
3	TRACK 3

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 10
Value (Hex)	00	01	01	00	01	01	03 00 00 00 (TRACK 3)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	01	01	00

DECODE JIS TYPE 2 PROPERTY

Property ID: 15 (Hex)

Property Type: Boolean

Power Up/Reset Value: 0 (False)

Get/Set/Save support: All

Description:

If this property is set to true then cards encoded to JIS X 6302 type 2 standards can be decoded.

Values:

Value	Decode JIS Type 2
0	False
1	True

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7
Value (Hex)	00	01	01	00	03	15	01 (True)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	01	01	00

CLEAR DATA COMMAND

Command ID: 80 (Hex)

Description:

This command is used to clear all magnetic stripe data so that the data can no longer be acquired from the device. After this command is issued, no magnetic stripe data will be available until a card is read.

After a card is read, the magnetic stripe data is held in the device until:

1. Another card read occurs.
2. A Clear Data command is issued.
3. The device is power cycled or reset.

Request Message Data: None

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	01	80	00

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	01	80	00

GET TRACK 123 DECODE DATA COMMAND

Command ID: 81 (Hex)

Description:

This command is used to get decoded information related to a magnetic stripe read for tracks 1, 2 and 3. This command always returns data from the most current magnetic stripe data acquisition. This command is used to get decode status, card encode type, 3 track data lengths and decoded card data for 3 tracks. Each track of decoded data starts with a start sentinel and ends with an end sentinel and is converted to ASCII format. The ASCII representation of the start and end sentinels vary depending on the encode format.

Request Message Data: None

Response Message Data:

Byte	Field	Description
1	Decode Status	Decode status definition follows
2	Card Encode Type	Card Encode Type definition follows
3	Track 1 Data Length	Length of track 1 data
4	Track 2 Data Length	Length of track 2 data
5	Track 3 Data Length	Length of track 3 data
6 - ?	Track 1, 2, 3 Data	Track 1 followed by track 2 then track 3 decoded data

Decode Status definition:

The bits are identified by numbering the least significant bit 0 and the most significant bit 7.

Bit	Field	Description
0	Track 1 error	Indicates track 1 decode error if set to 1
1	Track 2 error	Indicates track 2 decode error if set to 1
2	Track 3 error	Indicates track 3 decode error if set to 1
3-7	RFU	Reserved for future use

A decode error is only indicated if a valid start sentinel exists on the track and the track cannot be decoded. If a track cannot be decoded and if it does not have a decode error it is considered blank.

Card Encode Type definition:

Value	Encode Type	Description
0	ISO/ABA	ISO/ABA encode format
1	AAMVA	AAMVA encode format
2	CADL	CADL encode format. Note that some versions of this reader can only read track 2 for this format. They can not read tracks 1 and 3. However, this format is obsolete. There should no longer be any cards in circulation that use this format. California is now using the AAMVA format.
3	Blank	The card is blank
4	Other	The card has a non-standard encode format. For example, ISO/ABA track 1 format on track 2.
5	Undetermined	The card encode type could not be determined because no tracks could be decoded.
6	None	No decode has occurred. This type occurs if no magnetic stripe data has been acquired since the data has been cleared or since the device was powered on.
7	JIS Type 2	JIS X 6302 Type 2 encode format

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	01	81	00

Example Response:

Field	MTYP	APPL	CMND	RC	DCD STAT	ENCD TYP
Byte	1	2	3	4	5	6
Value (Hex)	40	01	81	00	00	00

Field	TK1 LEN	TK2 LEN	TK3 LEN	TK123 DATA
Byte	7	8	9	10 - 153
Value (Hex)	37	22	37	Track1 Track2 Track3

GET TRACK DECODE DATA COMMAND

Command ID: 82 (Hex)

Description:

This command is used to get decoded information related to a magnetic stripe read for a single track. This command always returns data from the most current magnetic stripe data acquisition. This command is used to get decode status, card encode type and decoded card data for a given track. The track of decoded data starts with a start sentinel and ends with an end sentinel and is converted to ASCII format. The ASCII representation of the start and end sentinels vary depending on the encode format.

Request Message Data:

Byte	Field	Description
1	Track Number	Number of desired track. This value should be 1, 2 or 3.

Response Message Data:

Byte	Field	Description
1	Track Number	Number of retrieved track. Always the same as requested track.
2	Decode Status	Decode status definition follows
3	Card Encode Type	Card Encode Type definition follows
4 - ?	Track Data	Track decoded data

Decode Status definition:

The bits are identified by numbering the least significant bit 0 and the most significant bit 7.

Bit	Field	Description
0	Track 1 error	Indicates track 1 decode error if set to 1
1	Track 2 error	Indicates track 2 decode error if set to 1
2	Track 3 error	Indicates track 3 decode error if set to 1
3-7	RFU	Reserved for future use

A decode error is only indicated if a valid start sentinel exists on the track and the track cannot be decoded. If a track cannot be decoded and if it does not have a decode error it is considered blank.

Card Encode Type definition:

Value	Encode Type	Description
0	ISO/ABA	ISO/ABA encode format
1	AAMVA	AAMVA encode format
2	CADL	CADL encode format. Note that some versions of this reader can only read track 2 for this format. They can not read tracks 1 and 3. However, this format is obsolete. There should no longer be any cards in circulation that use this format. California is now using the AAMVA format.
3	Blank	The card is blank
4	Other	The card has a non-standard encode format. For example, ISO/ABA track 1 format on track 2.
5	Undetermined	The card encode type could not be determined because no tracks could be decoded.
6	None	No decode has occurred. This type occurs if no magnetic stripe data has been acquired since the data has been cleared or since the device was powered on.
7	JIS Type 2	JIS X 6302 Type 2 encode format

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Bad Parameter = 06 (Hex)

The command failed due to a bad parameter in the request message data field

Example Request:

Field	MTYP	APPL	CMND	RC	TRACK
Byte	1	2	3	4	5
Value (Hex)	00	01	82	00	02

Example Response:

Field	MTYP	APPL	CMND	RC	TRACK	DCD STAT	ENCD TYP	TK DATA
Byte	1	2	3	4	5	6	7	8 - 41
Value (Hex)	40	01	82	00	02	00	00	Track2

GET MAGNEPRINT DATA COMMAND

Command ID: 86 (Hex)

Description:

This command is used to get MagnePrint™ information for the most recently read card.

Note 1: This command available only on units with MagnePrint feature.

Request Message Data: None

Response Message Data:

Byte	Field	Description
1-4	MagnePrint status	<p>MagnePrint status. Byte 1 LSB is status bit 0. Byte 4 MSB is status bit 31</p> <p>MagnePrint status is defined as follows:</p> <ul style="list-style-type: none"> Bit 0 = This is a MagnePrint-capable product Bits 1 through 15 = Product revision & mode Bit 16 = STATUS-only state Bit 17 = Noise too high or “move me” away from the noise source (used only in STATUS-only) Bit 18 = Swipe too slow Bit 19 = Swipe too fast Bit 20 = Unassigned Bit 21 = Actual Card Swipe Direction (0 = Forward, 1 = Reverse) Bits 22 thru 31 = Unassigned (always set to Zero) <p>Note that bits 16 and 17 will never be set because they would only be set if noise was too high during the swipe and in that case this command will fail setting the result code to 86 (Hex) to indicate the noisy condition. In this case, no response message data will be available.</p>
5-58	MagnePrint™ data	MagnePrint™ data

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

MagnePrint™ Not Installed = 84 (Hex)

The MagnePrint™ feature is not installed on this device. Note that some versions of this reader will return result code 05 (Hex) if MagnePrint is not installed.

Result code 05 (Hex) indicates that this command is not available.

Data cleared = 85 (Hex)

MagnePrint™ data was cleared by a Clear Read Data command.

Excess noise = 86 (Hex)

The MagnePrint™ circuit is sensing excessive electrical noise in the environment, no MagnePrint™ data is available. Moving the reader away from noise sources (monitors, speakers, etc.) may solve this problem. Note that this result indicates that the noisy condition was present at the time the card was swiped. It is not a real time indication that noise is present. For a real time indication that noise is present see the Indicators property in the Transport application.

Data not available = 87 (Hex)

There is no MagnePrint™ data available for this card format. This could occur when swiping a blank card.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	01	86	00

Example Response:

Field	MTYP	APPL	CMND	RC	STATUS	DATA
Byte	1	2	3	4	5-8	9-62
Value (Hex)	40	01	86	00	MagnePrint status	MagnePrint™ data

SECTION 5. SMART CARD APPLICATION

Application ID: 02 (Hex)

Description:

This application deals with smart card communications.

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Save Property Command ID: 02 (Hex)

Description:

These commands are used to get, set and save the value of application properties. Details of these commands are described in the Generic command section of this document. The following describes each property this application supports.

RESPONSE CODES USED THROUGHOUT THE APPLICATION

Two Response Codes are used throughout most of the application and have the same meaning in all cases.

80 (Hex) – This Response Code is used in conjunction with the Request/Response/Notification Model for all commands. It means command has not yet completed and that a Notification message will be sent later when the command has completed.

08 (Hex) – This Response Code may be used with any command and indicates either:

- The Smart Card Application can not find hardware to execute on, or
- The Smart Card Application is busy executing a previous command.

NOTIFICATIONS IN THE SMART CARD APPLICATION

The Smart Card Application attempts to respond to all requests in a timely manner. Because different Smart Cards may take longer than others to respond to a given request, it is not possible to predict how long it will take to complete a request. Because of this, we have adopted a Request/Response/Notification model for most commands to the Smart Card Application. The Get and Set Property commands are excluded from this model.

Request/Response/Notification Model

When the Smart Card Application receives a Request, it initiates the requested action. If the action completes in a timely manner, a Response message is sent informing the Host Application of completion. If the request does not complete in a timely manner, a Response message is sent indicating that the command has not yet completed (Response Code 80 (Hex)) and that a Notification message will be sent later when the command has completed. The Notification message is identical in every way except for its Command Type to the Response message that would have been sent if the request had completed in a timely manner.

Example Request/Response/Notification Sequence

Request message (Power Up Command):

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	02	80	80

Response message (RC = 80 means Request Initiated, Notification to follow):

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	02	80	80

Notification message (Card Powered Up OK, Data is ATR):

Field	MTYP	APPL	CMND	RC	PVAL
Byte	1	2	3	4	5-8
Value (Hex)	80	02	80	00	3B 60 00 0A

THE CONDRPT PROPERTY

This property is used to give a detailed status of the Power Up Command, the TPDU, Card To IFD Command, the TPDU, IFD To Card Command, and the APDU Exchange Command. It consists of the following fields:

Bytes	Meaning
0	Ignore
1	Primary Status 0x80 = No Errors 0x01 = Parameter Errors, details follow in Secondary Status 0x01 = Header Block less than required length 0x04 = Length of Data not consistent with Lc 0x06 = Requested Data larger than available buffer space 0x82 = Card Handling Errors, details follow in Secondary Status 0x01 = Card Not In Connector 0x02 = Card Not Powered 0x05 = Card Not Responding (I ² C™ cards only) 0x03 = Abnormal Condition Report, details follow in Accumulator
2	Secondary Status, as defined above.
3 – 6	Accumulator is a bit map field documenting the abnormal conditions encountered during the process. The meaning of the individual bits depends on the command that produced the accumulator contents, see the definitions in the corresponding command descriptions.
7 – 10	Error Conditions Template – the actual Error Conditions Template used, in conjunction with the Warning Conditions Template, to formulate the Accumulator contents.
11 – 14	Warning Conditions Template – the actual Warnings Conditions Template used, in conjunction with the Error Conditions Template, to formulate the Accumulator contents.

ERROR/WARNING CONDITION TEMPLATES

In dealing with Smart Cards, there are numerous situations that can arise in operation that might be considered abnormal. We define three basic manners of handling these situations:

Errors – These are situations that are considered disastrous. When they are encountered, the card is deactivated immediately and the Result Code Failure (01 Hex) is returned.

Warnings – These are situations that are considered noteworthy, but may not require the card to be deactivated. The operation requested was able to complete. When these situations are encountered the Result Code Warning (02 Hex) is returned.

Ignore – These are situations that are considered of no importance. The operation requested was able to complete. When these situations are encountered the Result Code Success (00 Hex) is returned.

Of course the operation requested may complete without encountering any abnormal situations at all. When this happens the Result Code Success (00 Hex) is returned.

Criteria for treating abnormal situations may change from application to application. One way of dealing with changing criteria is via Error/Warning Condition Templates. Each template is 4 bytes long. Each bit can be used to define a particular condition. If the bit is set in an Error Conditions Template and the condition is encountered, it is considered an Error and the card is deactivated with the Result Code Failure (01 Hex) being returned. Bits set in the Error Conditions Template override bits set in a corresponding Warning Conditions Template. If the bit is set in the Warning Conditions Template (and not in the corresponding Error Conditions Template) and the condition is encountered, it is considered a Warning and the operation is allowed to proceed, but a Result Code of Warning (02 Hex) will be returned when the operation completes. If the bit is not set in either the Error or Warning Conditions Template and the condition is encountered, the condition is Ignored, the operation is allowed to proceed, and a Response Code of Success (00 Hex) is returned.

As conditions are encountered, they are recorded in an Accumulator bit map. Each bit in the Accumulator bit map corresponds directly to the bits in the Error and Warning Conditions Template. The Accumulator bit map does not distinguish between Errors, Warnings, and Ignored conditions; it simply records the occurrence of the conditions. The Accumulator is part of the CondRpt property.

Different operations use different Error/Warning Conditions Templates.

CARD TYPES

Multiple card types are supported. The default card type (after power up) is 0x00, which supports microprocessor cards (T=0/T=1). The card type may be selected by the host application by setting the desired type in Property 01 (Card Type). The specified card type is used on all connectors until a new card type is set via the Set Property command.

There are two major categories of card types. The first are ISO 7816-3(1997) Microprocessor cards. Most Microprocessor cards available today comply with 7816-3 and this manual does not address their functionality in depth. The second category is Memory or Synchronous cards. There are numerous Memory cards available in the market. Some of them conform to ISO 7816-10, some don't. There are no standards for command sets used to control these cards. The protocols and commands used to control these cards vary widely. In an effort to promote ease of use, we attempt to provide a command set similar in appearance and structure to the command set specified for the control of Microprocessor cards in ISO 7816-4. For the user this means there will be some consistency of principles of operation between the different Memory cards and Microprocessor cards.

Memory cards are controlled using three basic commands, Power Up, Power Down, and APDU Exchange. Some of the operating conditions can be specified via Properties documented in the Properties table later in this section and in *Appendix B. Memory Card Support*. The details of the Power Up and APDU Exchange commands vary somewhat depending on the type of Memory card being used and are documented in a later section of this manual. The Power Down command functions identically for Microprocessor and Memory cards.

Control of many memory cards depends on the manufacturer's specifications for the card, and it would be challenging/impossible to implement a well designed application without the manufacturer's specifications. Many manufacturers release specifications only with Non Disclosure Agreements, so MagTek may not be able to provide such documentation to users. It is assumed that the user has access to the manufacturer's specifications for the card type being used.

Currently supported values of the Card Type Property are:

Value	Card Type
0x00	ISO 7816-3(1997) Microprocessor Cards (T=0/T=1)
0x01	SLE 4428/4418 (or compatible) Memory Cards
0x02	SLE 4442/4432 (or compatible) Memory Cards
0x03	SLE 4404 family Memory Cards (includes many similar cards)
0x05	I ² C™ Cards
0x06	Gemplus GAM326 Memory Card

PROPERTIES

Reset Values marked with * are per ISO 7816-3(1997), or EMV 4.1. Changing these properties is not advisable unless the card you are operating is non-standard.

General Properties used by the whole application. In order for these properties to influence a card session, they must be set before the card session begins. Once set, these property values will persist for the current connector until a device reset, or until they are changed by further property settings.						
Name	ID (Hex)	Type	Length	Reset Value	Get/Set/Save	Description
CondRpt	00	Binary	15	N/A	Get	Operation Condition Report. This property only has meaning if the most recent request was Power Up, Exchange APDU, or Exchange TPDU. This property gives detailed information on the operation and is most useful if the RC in the response was either Failure or Warning. See Error / Warning Condition Templates section for a detailed explanation of this property.
CardType	01	Binary	1	0x00	Get/Set	Card Type See Card Types in this section for values
Volts	02	Binary	1	0x03*	Get/Set	Card Voltages allowed: 0x01 = 5 volts only 0x02 = 3 volts only 0x03 = 5 and 3 volts
UART-ID	03	Binary	11	N/A	Get	ID of Smart Card UART
Microprocessor Card Setup Properties, used to control the Power Up sequence. In order for these properties to influence a card session, they must be set before the card session begins. Once set, these property values will persist for the current connector until a device reset, or until they are changed by further property settings.						
Name	ID (Hex)	Type	Length	Reset Value	Get/Set	Description
Initial ETU	15	Dword	2	372*	Get/Set	Initial value for ETU, in card clocks. Used to set bit time.
Initial CWT	16	Dword	2	449*	Get/Set	Maximum time, in 2 ms units, to wait between characters during the ATR. In EMV Mode this property is set to 472 yielding 10080 etus.
Initial BWT	18	Dword	2	6*	Get/Set	Maximum time, in 2 ms units, to wait for first character of ATR after Reset
Default EGT	19	Dword	1	0*	Get/Set	Default EGT, used if card sends no EGT info in TC1.
Default BGT	1A	Dword	1	22*	Get/Set	Default BGT, always used.
Power Up Error Conditions Template	1B	Binary	4	(Hex)* 0F 00 00 00	Get/Set	Used to define which conditions shall be considered errors when powering up the card. The options in this bit-map are defined in the description of the Power Up command.

IntelliStripe 320 Command Reference

Power Up Warning Conditions Template	1C	Binary	4	(Hex)* 70 d0 47 00	Get/Set	Used to define which conditions shall be considered warnings when powering up the card. The options in this bit-map are defined in the description of the Power Up command.
Power Up Warm Reset Conditions Filter Template	1D	Binary	4	(Hex)* 00 00 00 00	Get/Set	Used in combination with an EMV Cold / Warm Power Up sequence. When a warm reset is necessary, the Warning Conditions Template is ANDed with the inverse of the Warm Reset Conditions Filter Template, then the resulting Warning Conditions Template is copied to the Error Conditions Template just before the Warm Reset occurs. The effect is to allow conditions which were considered warnings during the Cold Reset to be ignored during the Warm Reset. See the description of the Power Up command for more information.
PPS Allowed	1E	Boolean	1	TRUE*	Get/Set	If a card sends an ATR allowing more than one protocol and/or speed, the value of this property indicates whether a PPS sequence should be performed. If this property is set to TRUE, a PPS will be performed, otherwise it will not be sent.
Protocol Selection Allowed	1F	Boolean	1	TRUE	Get/Set	This property indicates if a PPS sequence is allowed to select a different protocol. If it is set TRUE and a PPS sequence is performed, the sequence will not attempt to select a different protocol.
Speed Selection Allowed	20	Boolean	1	TRUE	Get/Set	This property indicates if a PPS sequence is allowed to select a different speed. If it is set to TRUE and a PPS sequence is performed, the sequence will not attempt to select a different speed.
Force PPS1 Transmission	21	Boolean	1	FALSE	Get/Set	This property is only referenced when performing a PPS sequence. If it is TRUE, the PPS sequence will always include a PPS1 byte. If it is FALSE a PPS1 byte would only be included if a speed change were required. This property exists to allow the user to tailor the PPS sequence for cards with special requirements. Unless your card is having problems with PPS, we recommend you leave this property FALSE.
Reset Delay	22	Dword	1	2*	Get/Set	Time to hold RST low in either a Cold or Warm Reset sequence. The units are increments of 200 card clocks. The default value of 2 yields 400 clocks per ISO 7816-3(1997). In EMV Mode this property is set to 205, yielding 41,000 clocks.
Abort on Parity Error in ATR	23	Boolean	1	FALSE*	Get/Set	If this property is TRUE and a parity error is detected in the ATR, the card is powered down immediately and the Power Up request fails. If it is FALSE and a parity error occurs in the ATR, the IFD will request the byte from the card again.

ATR Secondary Timeout	24	Dword	2	0*	Get/Set	If this property is zero, there is no limit on the total time an ATR takes to complete. If this property has a non-zero value, it specifies (in 2 ms intervals) the maximum time allowed from the start of the first byte of the ATR to the reception of the last byte in the ATR. If this time is exceeded, the card is deactivated and the Power Up request fails. In EMV Mode this property is set to 939, which yields 20160 etus.
EMV Reset Rules	25	Boolean	1	FALSE*	Get/Set	If this property is TRUE, EMV Reset Rules are followed in the Power Up sequence. If this property is FALSE, only a Cold Reset is performed. In EMV Mode this property is TRUE. See EMV specification for details of operation.
TC2 Minimum	26	Binary	1	0x01*	Get/Set	This property gives the minimum value allowed for TC2 in the ATR. A lower value will cause an Error or Warning depending on the contents of the Error and Warning Condition Templates.
TC2 Maximum	27	Binary	1	0xFF*	Get/Set	This property gives the maximum value allowed for TC2 in the ATR. A higher value will cause an Error or Warning depending on the contents of the Error and Warning Condition Templates. In EMV Mode this property has the value 10. TC2 is used to calculate the Work Waiting Time in T=0.
TA3 Minimum	28	Binary	1	1*	Get/Set	This property gives the minimum value allowed for TA3 in the ATR. A lower value will cause an Error or Warning depending on the contents of the Error and Warning Condition Templates. In EMV Mode this property has the value 16. TA3 gives IFSC, the maximum number of bytes in the INF field of a T=1 message.
TA3 Maximum	29	Binary	1	254*	Get/Set	This property gives the maximum value allowed for TA3 in the ATR. A higher value will cause an Error or Warning depending on the contents of the Error and Warning Condition Templates. TA3 gives IFSC, the maximum number of bytes in the INF field of a T=1 message.
BWI Maximum	2A	Binary	1	9*	Get/Set	This property gives the maximum value allowed for BWI in the ATR. A higher value will cause an Error or Warning depending on the contents of the Error and Warning Condition Templates. BWI is found in TB3 of the ATR and is used to calculate the Block Wait Time (BWT) for T=1. In EMV Mode this property is 4.
CWI Maximum	2B	Binary	1	15*	Get/Set	This property gives the maximum value allowed for CWI in the ATR. A higher value will cause an Error or Warning depending on the contents of the Error and Warning Condition Templates. CWI is found in TB3 of the ATR and is used to calculate the Character Wait Time (CWT) for T=1. In EMV Mode this property is 5.

IntelliStripe 320 Command Reference

EMV TD2 Rules	2C	Boolean	1	FALSE*	Get/Set	This property indicates whether the Power Up sequence should use EMV rules for screening TD2. If the property is TRUE, the EMV rules are used (protocol T=14 may be designated, though it will not be used). If the property is FALSE, TD2 with T=14 will cause an Error or Warning depending on the contents of the Error and Warning Condition Templates. This property is TRUE in the EMV Mode.
Parity Error Repeat Count	2D	Dword	1	5*	Get/Set	In T=0 there is a mechanism for requesting retransmission of a character with incorrect parity. This property sets the total number of receptions/transmissions allowed for a single character in T=0.
Operating Mode	2E	Binary	1	0	Get/Set	This property defines the Operating Mode for microprocessor cards. Changing this changes numerous other properties. This property should only be changed when no cards are currently activated. Values are as follows: 0 – ISO 7816-3(1997) Mode 1 – EMV 4.1 Mode Trying to set this property to any other value will get a RC of failure. Setting this property sets the Operating Mode of all connectors in the device.
PPS Delay	30	Dword	4	2	Get/Set	This property defines the delay between receiving an ATR from a card and transmitting a PPS request to a card. This delay is in 10ms units. So the default value of 2 is equivalent to 20ms. Valid values for this delay are 0 – 254 (0 – 2540ms).

Microprocessor Card Operating Properties, used to monitor Microprocessor Card operations. Settings of these properties only apply to the current card session.

Name	ID (Hex)	Type	Length	Reset Value	Get/Set	Description
Protocol	38	Binary	1	N/A	Get	This property gives the protocol number in use for the current card session.
Proposed Protocol	39	Binary	1	N/A	Get	This property gives the protocol number the card proposed for use pending a PPS sequence.
Speed	3A	Dword	2	N/A	Get	This property gives the speed (in clocks/ETU) for the current card session.
Proposed Speed	3B	Dword	2	N/A	Get	This property gives the speed (in clocks/ETU) the card proposed for use pending a PPS sequence.
Proposed FI/DI	3C	Binary	1	N/A	Get	This property gives the FI and DI from TA1 which were used to calculate the Proposed Speed property.

Actual EGT	3D	Dword	1	N/A	Get	This property is the EGT value for the current session. If TC1 was transmitted in the ATR it was calculated from TC1, otherwise it was calculated from the Default EGT property.
Actual Class	3E	Binary	1	N/A	Get	This property gives the Class Indicator as reported by the card in the ATR, or in the absence of a Class Indicator from the card, the default (Class A only).
Actual Specific Mode	3F	Boolean	1	N/A	Get	This property gives the specific mode indication as reported by the card in the ATR, or in the absence of the Specific Mode byte (TA2), the default value: FALSE = Negotiable Mode (default) TRUE = Specific Mode
ATR Map	40	Binary	67	N/A	Get	This property gives a detailed analysis of the ATR as received from the card. For details see ATR Map Structure.
T=0 Microprocessor Card Setup Properties, used to control the T=0 protocol operations. In order for these properties to influence a card session, they must be set before the card session begins. Once set, these property values will persist for the current connector until a device reset, or until they are changed by further property settings.						
Name	ID (Hex)	Type	Length	Reset Value	Get/Set	Description
Initial T=0 Error Conditions Template	51	Binary	4	(Hex)* 0F 00 00 00	Get/Set	Used to define which conditions shall be considered errors when running with the T=0 protocol. See Error / Warning Condition Templates for further discussion. See T=0 Error / Warning Conditions for specific coding.
Initial T=0 Warning Conditions Template	52	Binary	4	(Hex) 00 00 00 00	Get/Set	Used to define which conditions shall be considered warnings when running with the T=0 protocol. See Error / Warning Condition Templates for further discussion. See T=0 Error / Warning Conditions for specific coding.
T=0 INS Mask	53	Binary	1	0xFE*	Get/Set	This property defines the mask that is ANDed with an INS byte returned from the card. If the INS byte, or its inverse, matches the result, the INS byte is considered to be a valid procedure byte. In the EMV Mode, this property is set to 0xFF, requiring all bits to match.
T=0 Microprocessor Card Operating Properties, used to control the T=0 protocol operations. Settings of these properties only apply to the current card session.						

IntelliStripe 320 Command Reference

Name	ID (Hex)	Type	Length	Reset Value	Get/Set	Description
T=0 Actual WWT	60	Dword	2	N/A	Get	This is the Work Wait Time, in units of 2 ms, being used for T=0 operations for this card.
T=0 Actual Error Conditions Template	61	Binary	4	(Hex)* 0F 00 00 00	Get/Set	Used to define which conditions shall be considered errors when running with the T=0 protocol. See Error / Warning Condition Templates for further discussion. See T=0 Error / Warning Conditions for specific coding.
T=0 Actual Warning Conditions Template	62	Binary	4	(Hex) 00 00 00 00	Get/Set	Used to define which conditions shall be considered warnings when running with the T=0 protocol. See Error / Warning Condition Templates for further discussion. See T=0 Error / Warning Conditions for specific coding.
T=0 Actual INS Mask	63	Binary	1	0xFE*	Get/Set	This property defines the mask that is ANDed with an INS byte returned from the card. If the INS byte, or its inverse, matches the result, the INS byte is considered to be a valid procedure byte. In the EMV Mode, this property is set to 0xFF, requiring all bits to match.
<p>T=1 Microprocessor Card Setup Properties, used to control the T=1 protocol operations. In order for these properties to influence a card session, they must be set before the card session begins. Once set, these property values will persist for the current connector until a device reset, or until they are changed by further property settings.</p>						
Initial NAD	6F	Binary	1	0x00*	Get/Set	This property is the NAD byte sent in a T=1 protocol frame. Leave it at 0x00 unless your card is special.
Initial IFSD Adjustment Allowed	70	Boolean	1	TRUE*	Get/Set	This property indicates whether an IFSD adjust S(IFSD Req, 254) message will be sent to the card after the ATR has been received (in T=1 Protocol). If TRUE, the message is sent, if FALSE, no message is sent. If the S(IFSD Req, 254) message is not sent, the card would assume the default IFSD of 32. This may be undesirable.
Initial Resynch Allowed	71	Boolean	1	TRUE*	Get/Set	This property indicates whether T=1 handling is allowed to send a RESYNCH message when it has certain protocol errors (see 7816-3(1997). If it is TRUE, the RESYNCH message is allowed. If it is FALSE, the message is not permitted. In EMV Mode this property is set to FALSE.
Initial Chaining Allowed	72	Boolean	1	TRUE*	Get/Set	This property indicates whether T=1 handlind is allowed to chain messages longer than IFSC to the card. If TRUE, chaining is allowed. If FALSE, chaining is not allowed and any request longer than IFSC will fail.

Initial T=1 Error Conditions Template	73	Binary	4	(Hex)* C1 0B 60 03	Get/Set	Used to define which conditions shall be considered errors when running with the T=1 protocol. See Error / Warning Condition Templates for further discussion. See T=1 Error / Warning Conditions for specific coding.
Initial T=1 Warning Conditions Template	74	Binary	4	(Hex)* 3E F4 9E 00	Get/Set	Used to define which conditions shall be considered warnings when running with the T=1 protocol. See Error / Warning Condition Templates for further discussion. See T=1 Error / Warning Conditions for specific coding.
Initial Use EMV NAD Rules	75	Boolean	1	FALSE*	Get/Set	TRUE indicates to validate NAD according to EMV rules. FALSE indicates to ignore NAD received from cards. In EMV Mode this property is TRUE.
IFSD Allowed after ATR	76	Boolean	1	TRUE*	Get/Set	TRUE indicates an S(Req IFSD(254)) should be sent to the card after the ATR has been received. FALSE indicates no S(Req IFSD) should be sent. In all cases, the effective IFSD is 254 as the IFD always accepts full length messages.
T=1 Microprocessor Card Operating Properties, used to control the T=1 protocol operations. Settings of these properties only apply to the current card session.						
Actual NAD	88	Binary	1	0x00*	Get/Set	This is the NAD byte per ISO 7816-3(1997).
Actual CWT	89	Dword	2	N/A	Get	This is the current CWT, in units of 2 ms, calculated per ISO 7816-3(1997).
Actual BWT	8A	Dword	2	N/A	Get	This is the current BWT, in units of 2 ms, calculated per ISO 7816-3(1997).
Actual EDC	8B	Binary	1	N/A	Get	This is the EDC indicator per ISO 7816-3(1997).
Current Session Resynch Allowed	8C	Boolean	1	N/A	Get/Set	Similar to the Initial Resynch Allowed property, but applies to the current session only.
Current Chaining Allowed	8D	Boolean	1	N/A	Get/Set	Similar to the Initial Chaining Allowed property, but applies to the current session only.
Current IFSC	8E	Dword	1	N/A	Get	The IFSC in use for the current session.
Current Output Sequence Number	8F	Dword	1	N/A	Get	This is the sequence number of the next I-block that will be sent to the card.
Current Input Sequence Number	90	Dword	1	N/A	Get	This is the sequence number expected in the next I-block that will be received from the card.
Current T=1 Error Conditions Template	91	Binary	4	N/A*	Get/Set	Used to define which conditions shall be considered errors when running with the T=1 protocol. See Error / Warning Condition Templates for further discussion. See T=1 Error / Warning Conditions for specific coding. The values are initialized from the Initial T=1 Error Conditions Template property.

IntelliStripe 320 Command Reference

Current T=1 Warning Conditions Template	92	Binary	4	N/A*	Get/Set	Used to define which conditions shall be considered warnings when running with the T=1 protocol. See Error / Warning Condition Templates for further discussion. See T=1 Error / Warning Conditions for specific coding. The values are initialized from the Initial T=1 Warning Conditions Template property.
Current Use EMV NAD Rules	93	Boolean	1	N/A	Get/Set	TRUE indicates to validate NAD according to EMV rules. FALSE indicates to ignore NAD received from cards. In EMV Mode this property is TRUE. The value is initialized from the Initial Use EMV NAD Rules property.

Note: Other Property IDs are specified in *Appendix B. Memory Card Support*.

ATR MAP STRUCTURE – MICROPROCESSOR CARDS ONLY

The ATR Map structure is retrieved by reading property 40 (Hex). This property gives a detailed analysis of the ATR as received from the card. The structure is as follows:

Bytes	Meaning
0	TS character, as received from the card
1	T0 character, as received from the card
2	TA1 Present? 0 = no, 1 = yes
3	TA1 value If TA1 Present = 1, as received from the card If TA1 not present, set to 0x11
4	TB1 Present? 0 = no, 1 = yes
5	TB1 value If TB1 Present = 1, as received from the card If TB1 Present = 0, set to 0x25
6	TC1 Present? 0 = no, 1 = yes
7	TC1 value If TC1 Present = 1, as received from the card If TC1 Present = 0, set to 0X00
8	TD1 Present? 0 = no, 1 = yes
9	TD1 value If TD1 Present = 1, as received from the card If TD1 Present = 0, ignore the value
10	TA2 Present? 0 = no, 1 = yes
11	TA2 value If TA2 Present = 1, as received from the card If TA2 Present = 0, ignore the value
12	TB2 Present? 0 = no, 1 = yes
13	TB2 value If TB2 Present = 1, as received from the card If TB2 Present = 0, ignore the value
14	TC2 Present? 0 = no, 1 = yes
15	TC2 value If TC2 Present = 1, as received from the card If TC2 Present = 0, set to 0x0A
16	TD2 Present? 0 = no, 1 = yes
17	TD2 value If TD2 Present = 1, as received from the card If TD2 Present = 0, ignore the value
18	TCK Present, 0 = no, 1 = yes
19	TCK value If TCK Present = 1, as received from the card If TCK Present = 0, ignore the value
20	Number of history bytes received from the card
21 – 36	History bytes as received from the card. The bytes start at position 21 and continue for the count specified in location 20. Ignore additional bytes
37	T=0 Available? 0 = no, 1 = yes
38	T=1 Available? 0 = no, 1 = yes
39	TAi for T=1 Present? 0 = no, 1 = yes

IntelliStripe 320 Command Reference

Bytes	Meaning
40	TAi for T=1 value If TAi for T=1 Present = 1, as received from the card If TAi for T=1 Present = 0, 0x20
41	TBi for T=1 Present? 0 = no, 1 = yes
42	TBi for T=1 value If TBi for T=1 Present = 1, as received from the card If TBi for T=1 Present = 0, 0x4D
43	TCi for T=1 Present? 0 = no, 1 = yes
44	TCi for T=1 value If TCi for T=1 Present = 1, as received from the card If TCi for T=1 Present = 0, 0x00
45	T=15 Present? 0 = no, 1 = yes
46	TAi for T=15 Present? 0=no, 1=yes
47	TAi for T=15 value If T=15 Present = 1, as received from the card If T=15 Present = 0, 0x01
48	Convention, 0 = direct, 1 = inverse
49	FI, see ISO 7816-3(1997)
50	DI, see ISO 7816-3(1997)
51	II, see ISO 7816-3(1997)
52	PI1, see ISO 7816-3(1997)
53	N, see ISO 7816-3(1997)
54	Specific Mode Indicator, 0 = Negotiable, 1 = Specific
55	Specific Protocol
56	Specific Mode Implicit Parameters Requested? 0 = no, 1 = yes
57	Specific Mode Changeable, 0 = Changeable, 1 = Not Changeable
58	PI2 Present? 0 = no, 1 = yes
59	PI2 value If PI2 Present = 1, as received from the card If PI2 Present = 0, ignore the value
60	WI
61	Clock Stop Allowed Indication 0 = never 1 = stop clock low 2 = stop clock high 3 = stop clock high or low Note: This is an indication of what stop clock modes are possible for the card, the IFD does not put a capable card into the clock stop mode.
62	Classes supported by the card 1 = 5 volts only 2 = 3 volts only 3 = both 5 and 3 volts
63	IFSC being supported by the card
64	CWI
65	BWI
66	Error Detection Code 0 = LRC 1 = CRC

POWER UP COMMAND**Command ID:** 80 (Hex)**Description:**

This command is used to power up a smart card in the currently selected connector. If it is available, the ATR from the card is returned.

Request Message Data: None**Response Message Data:**

Byte	Field	Description
1-n	ATR	Answer to Reset as received from the card.

Response Message Result Codes

Code (Hex)	Meaning
00	Success, the command completed without problems
01	Failure, the command was not able to complete, see CondRpt property for details. See below for Error/Warning Conditions Template construction.
02	Warning, the command completed, but some problems arose, see CondRpt property for details. See below for Error/Warning Conditions Template construction.

Error/Warning Conditions Template Construction – Microprocessor Cards Only

The Error/Warning Condition Templates (Power Up Error Conditions Template and Power Up Warning Conditions Template properties respectively) have the following structure:

Byte	Bit	Meaning
0	0	Unrecoverable Receive Error. This condition indicates a receive error that could not be corrected by the permitted number of parity correction retries.
0	1	Timeout On Receive. This condition indicates a receive timeout.
0	2	Specific f/d ratio required but not supported. This condition arises when a card sends the TA2 byte and the values of FI and DI in TA1 require an f/d ratio the IFD can not support. The IFD supports f/d ratios as low as 31, which is equivalent to an I/O rate of 129kbs.
0	3	Specific protocol required but not supported. The card has required a protocol which the IFD does not support. The IFD supports T=0 and T=1.
0	4	Requested f/d ratio not supported, may be negotiable. The card has requested an f/d ratio that is not supported, but it has indicated that it may negotiate via Warm Reset.
0	5	Requested protocol not supported, may be negotiable. The card has requested a protocol that is not supported, but it has indicated that it may negotiate via Warm Reset.

IntelliStripe 320 Command Reference

Byte	Bit	Meaning
0	6	TCK not present or incorrect. This condition only appears when the ISO/EMV rules require a TCK and the card does not send it.
0	7	Card requests VPP. This condition occurs only if the card requests VPP. This IFD does not support VPP.
1	0	Card started ATR early. This condition occurs when a card starts the ATR too earlier than allowed by ISO or EMV rules.
1	1	Invalid TS. This condition indicates that the TS character had a value other than 0x3B or 0x3F.
1	2	Unknown Interface Byte. This condition occurs when an interface byte not defined by ISO 7816-3 or EMV is sent as part of the ATR.
1	3	Invalid Protocol Sequence. This condition occurs when the ATR specifies protocols in a non-ascending order.
1	4	Specific Mode requesting Implicit Parameters. This condition happens when the card sends TA2 with bit b5 (see ISO 7816-3(1997)) set.
1	5	TC2 present with T=0. This condition indicates that TC2 was sent in an ATR that does not support T=0.
1	6	IFSC out of allowed range. This condition indicates that the card requested an IFSC out of the range permitted by current rules. The current range is specified by properties TA3 Minimum and TA3 Maximum.
1	7	Invalid EDC type requested. The card has requested an unsupported EDC type. At this time the IFD only supports LRC.
2	0	PPS sequence failed. The IFD was unable to complete a successful PPS sequence. In order to operate this card, it may be necessary to change one or more of the following properties: PPS Allowed Protocol Selection Allowed Speed Selection Allowed Force PPS1 Transmission See your card's documentation for more details.
2	1	Parity Error in ATR.
2	2	EGT out of range. The EGT calculated from N in the ATR is larger than 254 ETUs.
2	3	TD2 not according to EMV rules. Indicates that TD2 does not conform to EMV rules. The condition is only detected if the property EMV TD2 Rules is set to TRUE.
2	4	T=15 received. This condition only indicates that the card sent a byte specifying T=15.
2	5	TB2 received. This condition only indicates that the card sent a TB2 byte.
2	6	TC2 outside of allowed range. The card sent a TC2 byte out of the allowed range. The allowed range is specified in properties TC2 Minimum and TC2 Maximum.
2	7	EMV TB3 error. This condition indicates that for a card requesting T=1 either TB3 was absent or the values specified for BWI or CWI were out of range. See EMV, ICC, I-4.3.3.10
3	0-7	Reserved for Future Use

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	02	80	00

Example Response:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5-8
Value (Hex)	40	02	80	00	3B 60 00 00

POWER DOWN COMMAND

Command ID: 81 (Hex)

Description:

This command is used to power down a smart card in the currently selected connector.

Request Message Data: None

Response Message Data: None

Response Message Result Codes

Code	Meaning
00	Success.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	02	81	00

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	02	81	00

T=0 ERROR / WARNING CONDITION TEMPLATES

Byte	Bit	Meaning
0	0	Timeout On Receive. This condition indicates a receive timeout.
0	1	Unrecoverable Receive Error. This condition indicates a receive error that could not be corrected by the permitted number of parity correction retries.
0	2	Invalid Procedure Byte received from card.
0	3	Unrecoverable Transmit Error. This condition indicates a transmit error that could not be corrected by the permitted number of parity correction retries.
0	4-7	Reserved for Future Use
1-3	All	Reserved for Future Use

T=1 ERROR / WARNING CONDITION TEMPLATES

Byte	Bit	Meaning
0	0	Timeout On Receive. This condition indicates a receive timeout.
0	1	Parity Error in received data. This condition indicates that there was a parity error in a message received from the card.
0	2	I/O errors in a message received from the card. These errors could be Length, EDC, or an invalid PCB.
0	3	The card rejected a message with the indication: Error Free
0	4	The card rejected a message with the indication: EDC Error
0	5	The card rejected a message with the indication: Other Error
0	6	Reserved for Future Use.
0	7	Card Aborted a chain being sent by the IFD.
1	0	Card Aborted a chain being sent by the Card.
1	1	Input Buffer Overflow. The card tried to send a chain of messages that is larger than the available buffer space.
1	2	The card sent an I-Block message (or chain) with no content in the INF field.
1	3	The card was sending chained data when a Resynch sequence was required, the chained data from the card was lost.
1	4	The IFD was not sending a chained message to the card and the card sent an R-Block requesting a message other than the one we are trying to send. This is a protocol error on the part of the card.
1	5	Invalid Sequence Number in an I-Block received from a card.
1	6	The IFD was sending a chained message to the card and the card sent an R-Block requesting a message other than the one we are trying to send.
1	7	Reserved for Future Use
2	0	Invalid S-Block Response Type from the card. An S-Block was sent to the card and it responded with an S-Block of the wrong type.
2	1	Invalid S-Block Response Data from the card. An S-Block was sent to the card and it responded with an S-Block with an invalid INF field.
2	2	Invalid S-Block Request Type from card. The card sent an S-Block Request with an invalid Type.
2	3	Invalid S-Block Request Data from card. The card sent an S-Block Request with an invalid INF field.
2	4	Resynch needed, completed successfully.
2	5	Resynch needed, but not performed because it is disabled (property Initial Resynch Allowed or Current Session Resynch Allowed).
2	6	Resynch not attempted, protocol had not yet started.
2	7	Reserved for Future Use
3	0	Resynch failed.
3	1	S-Block exchange failed, no more retries.
3	2-7	Reserved for Future Use

WARM RESET COMMAND

Command ID: 82 (Hex)

Description:

This command is used to perform a Warm Reset on a smart card in the currently selected connector. If it is available, the ATR from the card is returned.

Request Message Data: None

Response Message Data:

Byte	Field	Description
1-n	ATR	Answer to Reset as received from the card.

Response Message Result Codes

Code (Hex)	Meaning
00	Success, the command completed without problems.
01	Failure, the command was not able to complete, see CondRpt property for details. See below for Error/Warning Conditions Template construction.
02	Warning, the command completed, but some problems arose, see CondRpt property for details. See below for Error/Warning Conditions Template construction.

Error/Warning Conditions Template Construction – Microprocessor Cards Only

See Error/Warning Conditions Template Construction for the Power Up command.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	02	82	00

Example Response:

Field	MTYP	APPL	CMND	RC	PVAL
Byte	1	2	3	4	5-8
Value (Hex)	40	02	82	00	3B 60 00 00

TPDU, CARD TO IFD COMMAND**Command ID:** 83 (Hex)**Description:***Note*

Unless your card can not operate in the APDU mode, it is recommended not to use this command, as it is not compatible with EMV Rules nor the intended ISO 7816-4 application usage.

This command is used to send a TPDU to a card requesting data from the card. It is the user's responsibility to assure that the INS byte specifies a card command which will result in data being returned to the IFD. The TPDU is sent to the card and the reply is collected according to ISO 7816-3(1997) rules.

Request Message Data:

Byte	Field	Description
1	CLA	CLA byte per card's specification
2	INS	INS byte per card's specification
3	P1	P1 byte per card's specification
4	P2	P2 byte per card's specification
5	P3	P3, number of bytes expected in response from the card, per ISO 7816-3(1997)

Response Message Data:

Byte	Field	Description
1-n	TPDU Response	Response TPDU received from the card. SW1/SW2 are at the end.

Response Message Result Codes

Code (Hex)	Meaning
00	Success, the command completed without problems
01	Failure, the command was not able to complete, see CondRpt property for details. See T=0 or T=1 Error/Warning Condition Templates for Template construction.
02	Warning, the command completed, but some problems arose, see CondRpt property for details. See T=0 or T=1 Error/Warning Condition Templates for Template construction.

IntelliStripe 320 Command Reference

Example Request:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5-9
Value (Hex)	00	02	83	00	00 B0 81 00 02

Example Response:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5-8
Value (Hex)	40	02	83	00	0B 03 00 00

TPDU, IFD TO CARD COMMAND

Command ID: 84 (Hex)

Description:

Note

Unless your card can not operate in the APDU mode, it is recommended not to use this command, as it is not compatible with EMV Rules nor the intended ISO 7816-4 application usage.

This command is used to send a TPDU to a card with data for the card, or with no data for the card and no data expected in response from the card. It is the user's responsibility to assure that the INS byte specifies a card command which will not result in data being returned to the IFD. The TPDU is sent to the card and the SW1/SW2 reply is collected according to ISO 7816-3(1997) rules.

Request Message Data:

Byte	Field	Description
1	CLA	CLA byte per card's specification
2	INS	INS byte per card's specification
3	P1	P1 byte per card's specification
4	P2	P2 byte per card's specification
5	P3	P3, number of Data bytes to send to the card
6-n	Data	Data to be sent to the card

Response Message Data:

Byte	Field	Description
1-2	TPDU Response	SW1/SW2.

Response Message Result Codes:

Code (Hex)	Meaning
00	Success, the command completed without problems

- 01 Failure, the command was not able to complete, see CondRpt property for details. See T=0 or T=1 Error/Warning Condition Templates for Template construction.
- 03 Warning, the command completed, but some problems arose, see CondRpt property for details. See T=0 or T=1 Error/Warning Condition Templates for Template construction.

Example Request:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5-11
Value (Hex)	00	02	84	00	00 A4 02 0C 02 00 01

Example Response:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5-6
Value (Hex)	40	02	84	00	90 00

APDU EXCHANGE COMMAND

Command ID: 85 (Hex)

Description:

This command is used to exchange an APDU with a card. See ISO 7816-4 and EMV for information on APDU structure. This command functions differently for T=0 and T=1 protocols:

For T=0, the Command APDU is mapped onto TPDU's and the exchange is managed according to EMV rules, returning a Response APDU.

For T=1, the Command APDU is sent directly to the card and the Response APDU is returned.

For Memory cards, the Command APDU is interpreted and the appropriate Control Sequence is sent to the card. A Response APDU is returned.

Request Message Data:

Byte	Field	Description
1-n	Command APDU	Command APDU per ISO 7816-4 and EMV

Response Message Data:

Byte	Field	Description
1-n	Response APDU	Response APDU per ISO 7816-4 and EMV

IntelliStripe 320 Command Reference

Response Message Result Codes:

Code (Hex)	Meaning
00	Success, the command completed without problems
01	Failure, the command was not able to complete, see CondRpt property for details. See T=0 or T=1 Error/Warning Condition Templates for Template construction.
02	Warning, the command completed, but some problems arose, see CondRpt property for details. See T=0 or T=1 Error/Warning Condition Templates for Template construction.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	02	85	00

Field	DATA
Byte	5-11
Value (Hex)	00 A4 02 0C 02 00 01

Example Response:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5-6
Value (Hex)	40	02	85	00	90 00

SELECT CONNECTOR COMMAND

Command ID: 86 (Hex)

Description:

The IFD supports up to 8 connectors numbered 0-7. Connector 0 is the User Connector, and is used by default when the system starts. Connectors 1-7 may be used for Secure Access Modules (SAMs) as part of application infrastructure.

This command allows the application to select the connector to be used in commands that follow. The connector assignment stays in effect until it is changed by another Select Connector Command or the device is power cycled.

Request Message Data:

Byte	Field	Description
1	Connector Number	The number, in Hex, to be selected

Response Message Data: None

Response Message Result Codes

Code	Meaning
00	Success

Example Request:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5
Value (Hex)	00	02	86	00	02

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	02	86	00

SECTION 6. LED APPLICATION

Application ID: 81 (Hex)

Description:

This application deals with the host controlled LED.

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Save Property Command ID: 02 (Hex)

Description:

These commands are used to get, set and save the value of application properties. Details of these commands are described in the Generic command section of this document. The following describes each property this application supports.

LED STATE PROPERTY

Property ID: 00 (Hex)

Property Type: Dword

Power Up/Reset Value: 0 (OFF)

Get/Set/Save support: All

Description:

Changing this property changes the LED state. The LED state can be retrieved by getting this property.

Values:

The lowest order byte governs the color of the LED as follows:

Value	LED State
0	OFF
1	RED
2	GREEN

The next byte signals whether the LED will blink and the frequency of the blink. Blinking will only be active if the specified color is Red or Green. A value of zero specifies solid color with no blinking. A value in the range of 1 – 254 specifies, at 10 milliseconds per count, how long both the on and off period of the LED should be. A value of 255 is not allowed and will result in an error.

Example Set Property Request: Green LED Blinking, 100 msec on, 100 msec off

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 – 10
Value (Hex)	00	81	01	00	01	00	02 64 00 00 (GREEN)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	81	01	00

SECTION 7. TRANSPORT APPLICATION

Application ID: 82 (Hex)

Description:

This application deals with card transportation and magnetic stripe data acquisition. This application works closely with the Magnetic Stripe application. The Magnetic Stripe application deals with decoding and presenting magnetic stripe card data.

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Save Property Command ID: 02 (Hex)

Description:

These commands are used to get, set and save the value of application properties. Details of these commands are described in the Generic command section of this document. The following describes each property this application supports.

INDICATORS PROPERTY

Property ID: 00 (Hex)

Property Type: Dword

Power Up/Reset Value: Dependent on indicator states

Get/Set/Save support: Get

Description:

This property is used to get the transport indicators. These indicators are used to determine the state of the transport and the location of any cards present in the transport.

Values:

The bits are identified by numbering the least significant bit 0 and the most significant bit 31.

Bits	Indicator	Description
0	Front Card Present	Set to 1 if a card is present anywhere in the front (insertion) end of the card transport, or else cleared to 0. This bit can be used to indicate the beginning of a card insertion or the end of a card withdrawal. Note that once a standard sized card is transported completely to the rear of the reader, this indicator is no longer set.
1	Middle Card Present	Set to 1 if a card is present anywhere in the middle of the card transport, or else cleared to 0. This bit can be used to indicate that a card is in a position from which it can be ejected. If this bit is set, then a standard sized card should be in contact with the transport rollers and thus be in a position from which it can be ejected. Note that this bit is still set once a standard sized card is transported completely to the rear of the reader.
2	Rear Card Present	Set to 1 if a card is present at the rear of the card transport else cleared to 0. This bit can be used to indicate that the transport has completely transported the card into the reader, and that the card is in a position from which smart card communications can occur.
3	Auto Transporting	Set to 1 if the transport is transporting a card automatically, or else cleared to 0. The transport is automatically transporting when it transports a card due to an auto transport property being set such as the Auto Consume property. The Auto Transporting bit would not be set if the transport is consuming a card in response to a consume card command. This bit can be used to verify that the transport is idle before taking action on the card position indicators.
4	Transport Cooling	Set to 1 if the transport is cooling else cleared to 0. When this bit is set, the transport will temporarily not be functional. This cooling mechanism is to ensure that the transport is not damaged by excessive stalling of the motor by the card user or by the host software. A stall occurs when a card is held in position while the transport tries to move the card. The transport will give up trying to move the card in 0.5 to 2 seconds. If 2 stalls or blind ejects occur within a 5-second period, then the transport goes into a cooling mode in which it will not function for 5 seconds during which time this bit is set.
5 - 6	RFU	Reserved for future use.
7	*MagnePrint Noise	Set to 1 if the MagnePrint™ circuit is sensing excessive electrical noise in the environment, else cleared to 0. If this bit is set MagnePrint™ data may not be available. Moving the reader away from noise sources (monitors, speakers, etc.) may solve this problem. Note that the reader will not check for noise until after a card swipe occurs. So a card has to be swiped to initiate noise detection. If noise is detected after the swipe, the reader will continue to check for noise until the noise is no longer present. If no noise is detected after the swipe, the reader will not check for noise again until after the next swipe.
8-31	RFU	Reserved for future use

* Available only on units with MagnePrint feature

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	82	00	00	01	00

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 10
Value (Hex)	40	82	00	00	01	00	06 00 00 00 (Middle and Rear Card Present)

NOTIFY INDICATOR CHANGE 0 TO 1 PROPERTY**Property ID:** 01 (Hex)**Property Type:** Dword**Power Up/Reset Value:** 0**Get/Set/Save support:** All**Description:**

This property is used to control notification messages sent in response to a transport indicator changing from a 0 to a 1 state. If the bit corresponding to an indicator is set, then a notification message will be sent from the device to the host in response to that indicator changing from a 0 to a 1 state. The notification message will have the same syntax as the get property command response of the indicator property. The only difference is that the message header will contain a notification message type instead of a response message type. If more than one indicator changes state at the same time, only one notification message will be sent that contains the state of all the indicators.

Values:

The bits are identified by numbering the least significant bit 0 and the most significant bit 31.

Bits	Indicator	Description
0	Front Card Present	If set to 1, a notification message will be sent in response to a 0 to 1 transition of the front card present indicator. If cleared to 0, no notification will be sent.
1-2	RFU (0)	Reserved for future use (Must be zero)
3	Auto Transporting	If set to 1, a notification message will be sent in response to a 0 to 1 transition of the auto transporting indicator. If cleared to 0, no notification will be sent.
4 – 6	RFU	Reserved for future use
7	*MagnePrint Noise	If set to 1 a notification message will be sent in response to a 0 to 1 transition of the MagnePrint™ noise indicator. If cleared to 0, no notification will be sent.
8-31	RFU	Reserved for future use

* Available only on units with MagnePrint feature

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 10
Value (Hex)	00	82	01	00	01	01	01 00 00 00 (Front Card Present)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	01	00

NOTIFY INDICATOR CHANGE 1 TO 0 PROPERTY**Property ID:** 02 (Hex)**Property Type:** Dword**Power Up/Reset Value:** 0**Get/Set/Save support:** All**Description:**

This property is used control notification messages sent in response to a transport indicator changing from a 1 to a 0 state. If the bit corresponding to an indicator is set, then a notification message will be sent from the device to the host in response to that indicator changing from a 1 to a 0 state. The notification message will have the same syntax as the get property command response of the indicator property. The only difference is that the message header will contain a notification message type instead of a response message type. If more than one indicator changes state at the same time, only one notification message will be sent that contains the state of all the indicators.

Values:

The bits are identified by numbering the least significant bit 0 and the most significant bit 31.

Bits	Indicator	Description
0	Front Card Present	If set to 1, a notification message will be sent in response to a 1 to 0 transition of the front card present indicator. If cleared to 0, no notification will be sent.
1-2	RFU (0)	Reserved for future use (Must be zero)
3	Auto Transporting	If set to 1, a notification message will be sent in response to a 1 to 0 transition of the auto transporting indicator. If cleared to 0, no notification will be sent.
4 – 6	RFU	Reserved for future use
7	*MagnePrint Noise	If set to 1 a notification message will be sent in response to a 1 to 0 transition of the MagnePrint™ noise indicator. If cleared to 0, no notification will be sent.
8-31	RFU	Reserved for future use

**Available only on units with MagnePrint feature*

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 10
Value (Hex)	00	82	01	00	01	02	01 00 00 00 (Front Card Present)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	01	00

AUTO CONSUME PROPERTY**Property ID:** 03 (Hex)**Property Type:** Boolean**Power Up/Reset Value:** 0 (Disabled)**Get/Set/Save support:** All**Description:**

This property is used to enable and disable card auto consuming. When auto consuming is enabled, the reader will attempt to consume a card when the card is being inserted into the mouth of the reader. The transport attempts to consume a card into the transport to a position where smart card communications can occur and magnetic stripe reading is complete. The reader will not attempt to consume a card if a card is already present in the transport. When the reader is attempting to automatically consume a card, the Auto Transporting indicator is set. If the consume attempt is successful and the card is standard size, the Rear Card Present indicator and the Middle Card Present indicator will be set to show that the card is completely consumed. If the Middle Card Present indicator is set and the consume attempt is unsuccessful, then the card should be ejected. After a card is ejected or a consume fails, the card needs to be completely removed from the reader before the reader attempts to automatically consume a card again.

Values:

Value	State	Description
0	Disabled	Cards will not be automatically consumed.
1	Enabled	Cards will be automatically consumed.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7
Value (Hex)	00	82	01	00	03	03	01 (Enabled)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	01	00

MSR DIRECTION PROPERTY**Property ID:** 04 (Hex)**Property Type:** Dword**Power Up/Reset Value:** 1 (Consume)**Get/Set/Save support:** All**Description:**

This property is used to control the magnetic stripe read direction.

Values:

Value	State	Description
0	Both	The reader can read during both card consuming and ejecting.
1	Consume	The reader can only read during card consuming.
2	Eject	The reader can only read during card ejection.

Note

If the front-gate option is installed, the IntelliStripe 320 Reader will be incapable of reliably reading mag-stripe cards during the card-ejection cycle. (Reliable mag-stripe reading will only be possible during the card-insertion cycle). If mag-stripe reading is required during the card-ejection cycle, then the product must be ordered without the front-gate option.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7 - 10
Value (Hex)	00	82	01	00	01	04	01 00 00 00 (Consume)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	01	00

EJECT MIDDLE SENSOR TO MOTOR OFF DELAY PROPERTY**Property ID:** 05 (Hex)**Property Type:** Dword**Power Up/Reset Value:** 51 (.5 inches)**Get/Set/Save support:** All**Description:**

This property is used to control the distance that the card ejects past the middle sensor when using the card eject command with the normal eject type option. The units of this property is milli-seconds. Once the card unblocks the middle sensor during card ejection, a timer will start counting down a number of milli-seconds equal to the value of this property. Once this timer hits zero the motor will be shut off. To convert the distance you desire the card to stop past the middle sensor to milli-seconds, multiply the desired number of inches by 100. The card moves at about 1 inch per 100ms. The value of this property can range from 0 to 255ms.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	82	01	00	01	05

Field	PVAL
Byte	7 - 10
Value (Hex)	33 00 00 00 (51ms or .5 inches)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	01	00

POWER FAIL DETECT PROPERTY**Property ID:** ff (Hex)**Property Type:** Boolean**Power Up/Reset Value:** 1 (Enabled)**Get/Set/Save support:** All**Description:**

This property is used to enable and disable power fail detection. When power fail detection is enabled, the device will monitor its supply voltage. If the supply voltage falls significantly out of the specified range, the device will eject any cards that are present, provided a power fail eject capacitor is connected to the device, then it will wait for the supply voltage to return to normal after which it will perform a power up reset cycle.

Values:

Value	State	Description
0	Disabled	Power fail detect disabled.
1	Enabled	Power fail detect enabled.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	82	01	00	03	ff

Field	PVAL
Byte	7
Value (Hex)	01 (Enabled)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	01	00

CONSUME CARD COMMAND

Command ID: 80 (Hex)

Description:

This command attempts to consume a card into the transport to a position where smart card communications can occur and magnetic stripe reading is complete. A card must be present at the front (insertion) end of the transport when this command is executed in order for it to succeed. The reader will not attempt to consume a card if a card is already present in the transport. If the consume attempt is successful and the card is standard sized, the Rear Card Present indicator and the Middle Card Present indicator will be set to show that the card is completely consumed. If the Middle Card Present indicator is set and the consume attempt is unsuccessful then the card should be ejected.

Request Message Data: None

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Transporting Failed = 80 (Hex)

The transport operation failed to complete successfully.

Transport Busy = 81 (Hex)

The command failed because the transport is busy transporting a card. This could occur if the transport is set to Auto Consume.

Transport Cooling = 82 (Hex)

The command failed because the transport is cooling. This occurs if the transport is temporarily disabled due to too many stalls. See the transport indicators property for more details.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	82	80	00

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	80	00

EJECT CARD COMMAND

Command ID: 81 (Hex)

Description:

This command attempts to eject a card from inside the transport to a position where the card can be removed by the user and where magnetic stripe reading is complete. A card must be present at the middle or rear of the transport when this command is executed in order for it to succeed. If the eject attempt is successful and the card is standard sized, the Rear Card Present indicator and the Middle Card Present indicator will be clear to show that the card is completely ejected from inside the transport. Also the Front Card Present indicator will be set until the user removes the card from the reader. If the reader is set to auto consume, it will not auto consume a card until the user removes the ejected card from the reader.

The card can be ejected three different ways. The way the card is ejected is specified by the optional eject type parameter. If this parameter is omitted, the card will be ejected normally. The eject type parameter is defined below.

Note

If the front-gate option is installed, the IntelliStripe 320 Reader will be incapable of reliably reading mag-stripe cards during the card-ejection cycle. (Reliable mag-stripe reading will only be possible during the card-insertion cycle). If mag-stripe reading is required during the card-ejection cycle, then the product must be ordered without the front-gate option.

Request Message Data: Optional 1 byte eject type field. The eject type field can be 0 for normal, 1 for long or 2 for blind. If this optional field is omitted, the eject type will default to normal.

When the eject type is set to normal (0), the reader will attempt to eject the card, using the sensors, to a final position at which it is located so that it is no longer under the read head and so that it is still under the motor drive roller. In this position the card can either be pulled out by the user or consumed back into the reader in case the reader needs to make another read attempt. This option stops the card in a position where the rear edge of the card is .5 inches in front of the middle sensor. This distance can be adjusted by modifying the eject middle sensor to motor off delay property.

When the eject type is set to long (1), the reader will attempt to eject the card, using the sensors, to a final position at which it is located so that it is no longer under the read head or the motor drive roller. In this position the card can be pulled out by the user but it can not be consumed back into the reader without user intervention. This option stops the card in a position where the rear edge of the card is 1.5 inches in front of the middle sensor or until the card is no longer under the motor drive roller. This option was added for customers that have bezels too deep for the normal eject option to eject the card out far enough for the users to grab onto it.

When the eject type is set to blind (2), the reader will attempt to eject the card without using any sensors. This option can be used to attempt to eject a card that has jammed in the unit or that is in the unit but is invisible to the sensors. This option will simply run the motor in the eject direction for a fixed time period that would normally drive a card out of the device. Since no sensors are used for this option the card may be ejected past the motor driver roller and depending on the bezel used, it may eject completely out of the unit.

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Transporting Failed = 80 (Hex)

The transport operation failed to complete successfully.

Transport Busy = 81 (Hex)

The command failed because the transport is busy transporting a card. This could occur if the transport is set to Auto Consume.

Transport Cooling = 82 (Hex)

The command failed because the transport is cooling. This occurs if the transport is temporarily disabled due to too many stalls or blind ejects. See the transport indicators property for more details.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	82	81	00

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	82	81	00

SECTION 8. BUZZER APPLICATION

Application ID: 07 (Hex)

Description:

This application deals with the buzzer.

Note

The buzzer is an optional feature intended to be used primarily with the contact-less smartcard option. It is not installed on all configurations.

The buzzer is used two distinct ways. First, it is used as a stand-alone application giving the host the ability to generate tone sequences to guide users through operations on the device. Second, it is used by the Contactless Card Application to indicate a media being read.

When it is being used by the Contactless Card Application, it is unavailable to the host.

The following table shows the available tones by name, designator, and frequency.

TONE	DESIGNATOR	FREQUENCY
Silent	0	N/A
Low	1	1500 Hz
Medium	2	2000 Hz
High	3	2500 Hz

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Set Property Command ID: 02 (Hex)

Description:

These commands are used to get, set and save the value of application properties. Details of these commands are described in the Generic command section of this document. The following describes each property this application supports.

tone SEQUENCE 1 PROPERTY

Property ID: 01 (Hex)

Property Type: Binary

Length: 20

Power Up/Reset Value: 0110 0220 0330 0000 0000 0000 0000 0000 0000 0000 0000 (low tone for 160 ms, medium tone for 320 ms, high tone for 480 ms)

Get/Set/Save support: All

Description:

This property specifies an audible tone that may be played when the host chooses. The property is implemented as ten sets of Tone Information Bytes (TIB) as follows:

Byte	Usage
1	TIB0, designates tone 0 = Silent 1 = Low 2 = Medium 3 = High Other values may not result in a tone
2	TIB1, duration of tone in units of 10 milliseconds (e.g. 3 = 30 milliseconds). Setting this byte to zero terminates the Tone Sequence without processing further entries

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	07	00	00	04	00

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	40	07	00	00	04	00

PVAL
7-26
01 10 02 20 03 30 00 00 00 00 00 00 00 00 00 00 00 00 00 00

TONE SEQUENCE 2 PROPERTY**Property ID:** 02 (Hex)**Property Type:** Binary**Length:** 20**Power Up/Reset Value:** 0330 0220 0110 0000 0000 0000 0000 0000 0000 0000 0000 (high tone for 480 ms, medium tone for 320 ms, low tone for 160 ms)**Get/Set/Save support:** All**Description:**

This property specifies an audible tone that may be played when the host chooses. The property is implemented as ten sets of Tone Information Bytes (TIB) as follows:

Byte	Usage
1	TIB0, designates tone 0 = Silent 1 = Low 2 = Medium 3 = High Other values may not result in a tone
2	TIB1, duration of tone in units of 10 milliseconds (e.g. 3 = 30 milliseconds). Setting this byte to zero terminates the Tone Sequence without processing further entries

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	07	00	00	04	01

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	40	07	00	00	04	01

PVAL
7-26
03 30 02 20 01 10 00 00 00 00 00 00 00 00 00 00 00 00 00 00

tone SEQUENCE 3 PROPERTY

Property ID: 03 (Hex)

Property Type: Binary

Length: 20

Power Up/Reset Value: 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 (silent)

Get/Set/Save support: All

Description:

This property specifies an audible tone that may be played when the host chooses. The property is implemented as ten sets of Tone Information Bytes (TIB) as follows:

Byte	Usage
1	TIB0, designates tone 0 = Silent 1 = Low 2 = Medium 3 = High Other values may not result in a tone
2	TIB1, duration of tone in units of 10 milliseconds (e.g. 3 = 30 milliseconds). Setting this byte to zero terminates the Tone Sequence without processing further entries

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	07	00	00	04	02

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	40	07	00	00	04	02

PVAL
7-26
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

TONE SEQUENCE 4 PROPERTY**Property ID:** 04 (Hex)**Property Type:** Binary**Length:** 20**Power Up/Reset Value:** 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 (silent)**Get/Set/Save support:** All**Description:**

This property specifies an audible tone that may be played when the host chooses. The property is implemented as ten sets of Tone Information Bytes (TIB) as follows:

Byte	Usage
1	TIB0, designates tone 0 = Silent 1 = Low 2 = Medium 3 = High Other values may not result in a tone
2	TIB1, duration of tone in units of 10 milliseconds (e.g. 3 = 30 milliseconds). Setting this byte to zero terminates the Tone Sequence without processing further entries

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	07	00	00	04	03

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	40	07	00	00	04	03

PVAL
7-26
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

PLAYBACK TONE SEQUENCE COMMAND**Command ID:** 80 (Hex)**Description:**

This command is used playback a specific tone sequence. On receipt of the command, the playback sequence is started and success is reported.

Request Message Data:

Byte	Usage
1	Specifies which tone sequence to play back. Use the property number of the desired tone sequence.

Response Message Data: None**Response Message Result Codes:**

Success = 00 (Hex)

The command completed successfully.

Example Request: (Playback Tone Sequence 2)

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5
Value (Hex)	00	07	80	00	02

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	07	80	00

SECTION 9. HOST COMMUNICATIONS APPLICATION

Application ID: 08 (Hex)

Description:

This application deals with host communications.

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Save Property Command ID: 02 (Hex)

Description:

These commands are used to get, set and save the value of application properties. Details of these commands are described in the Generic command section of this document. The following describes each property this application supports.

USB SERIAL NUMBER PROPERTY

Property ID: 00 (Hex)

Property Type: String

Maximum Length: 32 (including terminating zero)

Power Up/Reset Value: 00 (Null string “”)

Get/Set/Save support: All

Description:

This property is the USB serial number. The USB serial number is reported to the host in the USB serial number string descriptor during USB device enumeration. This serial number can be used to distinguish one USB device from another in a system. For example, if two IntelliStripe 65 devices are connected to the same host using USB ports, the USB serial numbers can be used to distinguish one device from the other as long as the serial numbers are not set to the same value.

MagTek’s MCP USB driver uses the USB serial number, if present, as part of the device instance name so that if multiple devices with the same model number are connected to the same system they can be distinguished from one another. For example, if a device that has its USB product set to “IntelliStripe 65” has no serial number its device instance name will be “IntelliStripe 65”. If it has serial number “123”, its device instance name will be “IntelliStripe 65.123”. See the host communications application’s USB product property for more information.

After setting the USB serial number to a new value, the serial number needs to be saved with the save property command and then the device needs to be power cycled or reset before the new serial number value is used as the USB serial number string descriptor. If MagTek’s MCP USB driver is being used, it needs to be closed and then opened using the new device instance name before communicating further.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	08	01	00	02	00

Field	PVAL
Byte	7 - 10
Value (Hex)	31 32 33 00 (“123”)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

RS232 PLUG AND PLAY SUPPORT ENABLE PROPERTY

Property ID: 01 (Hex)

Property Type: Boolean

Power Up/Reset Value: 00 (hex) (False)

Get/Set/Save support: All

Description:

This property enables or disables RS232 plug and play support. This support is enabled if this property is set to 1 (true) or disabled if this property is set to 0 (false).

This property is typically only enabled if the RS232 interface of this device is being used to communicate to a PCSC driver on the Windows operating system.

If this property is enabled, the device will transmit a string on the RS232 port when the CTS signal with respect to the device is asserted (goes from negative to positive) by the host according to the Plug and Play External COM Device Specification Version 1.00.

The transmitted string will have the following format.

Field Data (hex)	Field Name	Description
28	Begin PnP	“(“ indicates PnP IDs will follow
01,24	Pnp Rev	Identifies PnP version 1.0
45,4B,41	EISA ID	“EKA” MagTek manufacturer ID
30,30,30,42	Product ID	“000B” IntelliStripe 320 product ID
29	End PnP	”)” indicates PnP IDs complete

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7
Value (Hex)	00	08	01	00	03	01	00 (false)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

USB PRODUCT PROPERTY

Property ID: 02 (Hex)

Property Type: String

Maximum Length: 64 (including terminating zero)

Power Up/Reset Value: 49 6E 74 65 6C 6C 69 53 74 72 69 70 65 20 33 32 30 00 (“IntelliStripe 320”)

Get/Set/Save support: All

Description:

This property is the USB product. The USB product is reported to the host in the USB product string descriptor during USB device enumeration.

MagTek’s MCP USB driver uses the USB product as part of the device instance name. For example, if a device has no serial number and it’s USB product is set to “IntelliStripe 320” then it’s device instance name will be “IntelliStripe 320”. If it has serial number “123”, its device instance name will be “IntelliStripe 320.123”. See the host communications application’s USB serial number property for more information.

After setting the USB product to a new value, the USB product needs to be saved with the save property command and then the device needs to be power cycled or reset before the new USB product value is used as the USB product string descriptor. If MagTek’s MCP USB driver is being used, it needs to be closed and then opened using the new device instance name before communicating further.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	08	01	00	02	02

Field	PVAL
Byte	7 - 23
Value (Hex)	49 6E 74 65 6C 6C 69 53 74 72 69 70 65 20 33 32 30 00 (“IntelliStripe 320”)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

MCP ERROR RECOVERY ENABLE PROPERTY

Property ID: 03 (Hex)

Property Type: Boolean

Power Up/Reset Value: 01 (hex) (True)

Get/Set/Save support: All

Description:

This property enables or disables the MCP error recovery feature. This feature is enabled if this property is set to 1 (true) or disabled if this property is set to 0 (false).

Disabling this property will greatly reduce the development effort required to implement the MCP protocol. In fact, disabling this property will reduce the protocol to simply sending and receiving I-frames with the exception of the optional auto baud synchronization S-frame sequence. However, disabling this property will also disable the error recovery feature of the protocol. The error recovery feature of the protocol allows the protocol to automatically recover from minor communication channel problems without requiring intervention from the application layer. Users that have reliable communications channels do not need the error recovery feature, so most users do not require this feature. Users that are writing their own MCP USB drivers are encouraged to disable this property to help simplify the driver development effort. If this property is disabled and it is not made non-volatile by using the Save property command, then this property should be set as the first I-frame sent to the device after power up to avoid having to implement any of the error recovery aspects of the protocol.

Disabling this property will change the following aspects of the MCP protocol from the devices perspective.

- The protocol will no longer automatically recover from minor communications channel problems.
- The device will no longer check the send and receive sequence numbers received from the host. The host is no longer required to maintain these sequence numbers. They can always be set to zero.
- The device will no longer require the host to acknowledge I-frames that it sent. The device will assume that the host received the I-frame correctly. The host is no longer required to send R-frames. The device will never send the host a polling R-frame. The block wait timeout (BWT) is no longer used. The device will no longer send the host an R-frame if it takes longer than 250ms (BWT) to begin sending a response I-frame due to a request I-frame (command) that takes some time to complete.
- The device will no longer require the host to establish a connection by sending a RESYNC S-frame request. The device will be ready to accept I-frames as soon as baud synchronization is completed.

The device will still enforce the protocols character wait timeout (CWT) and so should the host. This is required to reset the nodes receive handler in case of an error. The host should still enforce a 5 second message response timeout so that it can detect and handle errors.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7
Value (Hex)	00	08	01	00	03	03	01 (true)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

MCP EDC CHECK ENABLE PROPERTY**Property ID:** 04 (Hex)**Property Type:** Boolean**Power Up/Reset Value:** 01 (hex) (True)**Get/Set/Save support:** All**Description:**

This property enables or disables MCP EDC (error detection code) checking. This feature is enabled if this property is set to 1 (true) or disabled if this property is set to 0 (false). Disabling this property will cause the device to no longer check the header EDC and the frame EDC for R-frames and S-frames. This property has no affect on the I-frame EDC checking because this is controlled by the I-frames PCB field. When this property is disabled, the EDC fields are still required, however they can be set to any value.

Disabling this property will simplify the protocol a bit, but it will also reduce the error detection/recovery feature of the protocol. This property can be useful when sending commands to the device manually so that the EDC does not have to be calculated manually. This property can also be useful during MCP protocol driver development.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7
Value (Hex)	00	08	01	00	03	04	01 (true)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

MCP AUTO BAUD ENABLE PROPERTY

Property ID: 05 (Hex)

Property Type: Boolean

Power Up/Reset Value: 01 (hex) (True)

Get/Set/Save support: All

Description:

This property enables or disables MCP auto baud synchronization. This feature is enabled if this property is set to 1 (true) or disabled if this property is set to 0 (false). When this property is disabled, the device will no longer require the host to perform the auto baud synchronization sequence. Instead, the device will use the fixed baud rate specified by the host communication applications fixed baud rate property. After changing this property, the property will also need to be saved in non-volatile memory (Save property command) and the device will need to be power cycled or reset before the change will take affect.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7
Value (Hex)	00	08	01	00	03	05	01 (true)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

FIXED BAUD RATE PROPERTY

Property ID: 06 (Hex)

Property Type: Dword

Power Up/Reset Value: 0a (hex) (57600 baud)

Get/Set/Save support: All

Description:

This property contains the value of the RS232 interfaces fixed baud rate. The MCP protocol does not use this property unless its host communications applications MCP auto baud enable property is set to false. After changing this property, the property will also need to be saved in non-volatile memory (Save property command) and the device will need to be power cycled or reset before the change will take affect.

Values:

Value (hex)	Baud Rate
05	9600
06	14400
07	19200
08	28800
09	38400
0A	57600
0B	115200

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	08	01	00	01	06

Field	PVAL
Byte	7 - 10
Value (Hex)	0a 00 00 00 (57600 baud)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

RESET DETECTED PROPERTY

Property ID: 07 (Hex)

Property Type: Boolean

Power Up/Reset Value: 01 (hex) (True)

Get/Set/Save support: Get/Set

Description:

This property can be used to determine if the device has been reset. To use this property, first set it to false, then monitor it periodically, if its value changes to true, then the device has been reset.

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID	PVAL
Byte	1	2	3	4	5	6	7
Value (Hex)	00	08	01	00	03	07	00 (false)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

PROTOCOL PROPERTY**Property ID:** 08 (Hex)**Property Type:** Dword**Power Up/Reset Value:** 00 (hex) (MCP)**Get/Set/Save support:** All**Description:**

This property contains the value of the communications protocol used by this device. The communications protocol is independent of the communications interface that is used. For example, both the RS232 and USB interfaces can use any protocol. After changing this property, the property will also need to be saved in non-volatile memory (Save property command) and the device will need to be power cycled or reset before the change will take affect.

Values:

Value (hex)	Protocol
00	MCP
01	ASCII Hex

MCP Protocol:

This binary protocol is described in MagTek's MCP Serial Transport Protocol reference manual, part number 99875163. This is the default protocol used by this device. MagTek's MCP Windows Driver for the RS232 and USB interfaces uses this protocol. This protocol is rather complicated, however, it can be extremely simplified by adjusting some of the other properties found in this application such as the Error Recovery Enable property.

ASCII Hex Protocol:

This is a very simple ASCII based protocol. This protocol is very simple to implement. For the RS232 interface, a terminal emulation application such as Window's HyperTerminal can be used to communicate to the device using this protocol. USB drivers can be designed to use this protocol if they follow the pipe structure described in the USB section of MagTek's MCP Serial Transport Protocol reference manual, part number 99875163. Since this is an ASCII based protocol used to send Binary data, it is twice as slow as the binary MCP protocol because it requires twice as many bytes to be sent.

Only the following ASCII characters are valid for this protocol. All other characters will be ignored by the device.

IntelliStripe 320 Command Reference

Value (Hex)	Code/Char
0D	Carriage Return <CR>
18	Cancel <CAN>
30-39	1-9
41-46	A-F
a-f	a-f

Command requests should be sent to the device as they are defined in this manual followed by a carriage return. Each binary byte should be sent as two ASCII hex characters. For example, the binary byte 5A (hex) should be sent as the two ASCII characters 5 (35 hex) and A (41 hex). The device will send Command responses and notification messages to the host as they are defined in this manual followed by a carriage return. The device will only send upper case letters A thru F. The host is free to also send lower case a thru f in addition to upper case A thru F.

The device is also free to send the cancel character (18 hex) at anytime to cancel anything that may be in the devices receive buffer prior to sending the carriage return. However, this cannot be used to cancel a command that is in progress. The host should wait at least 50ms before sending anything else to the device after sending this cancel character. The device will not respond to the cancel character. The cancel character could be useful when the host application first starts or after a communications error occurs to make sure that the device is in a known state.

If the device is using the ASCII protocol, the host would send the following sequence of bytes (in hex) to send the following example request:

30 30 30 38 30 31 30 30 30 31 30 38 30 30 30 30 30 30 30 30 30 30 30 30 0D

If the device is using the ASCII protocol the device would send the following sequence of bytes (in hex) to send the following example response:

34 30 30 38 30 31 30 30 0D

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	08	01	00	01	08

Field	PVAL
Byte	7 - 10
Value (Hex)	00 00 00 00 (MCP)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	08	01	00

SECTION 10. OTI SCI 1000 CONTACTLESS SMART CARD APPLICATION

Application ID: 0E (Hex)

Description:

This application deals with communications with the OTI module. This module supports MasterCard-PayPass™, Visa-Wave™, AMEX-ExpressPay™, Discover and Mifare cards.

GET/SET/SAVE PROPERTY COMMANDS

Get Property Command ID: 00 (Hex)

Set Property Command ID: 01 (Hex)

Save Property Command ID: 02 (Hex)

Description:

These commands are used to retrieve and set the value of application properties. Details of these commands are described in the Generic Command Section of this document. The following describes each property this application supports.

NOTIFY CONTACTLESS MAGSTRIPE PROPERTY

Property ID: 00 (Hex)

Property Type: Boolean

Power Up/Reset Value: 1 (ON)

Get/Set support: Both

Description:

If the Notify Contactless Magstripe state is set to ON, then a notification message will be sent to the host when a Contactless Smart Card enters the operating field.

Values:

Value	Notify Answer To Request State
0	OFF
1	ON

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	0E	01	00	03	00
Field	PVAL					
Byte	7					
Value (Hex)	01 (NOTIFY ANSWER TO REQUEST STATE - ON)					

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	0E	01	00

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	0E	00	00	03	00

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	40	0E	00	00	03	00

Field	PVAL
Byte	7
Value (Hex)	01 (NOTIFY ANSWER TO REQUEST STATE - ON)

CONTACTLESS AUTOMATIC RF CONTROL PROPERTY

Property ID: 01 (Hex)

Property Type: Boolean

Power Up/Reset Value: 0 (OFF)

Get/Set support: Both

Description:

Due to close proximity of the antenna to the magnetic stripe read head, the RF field can prevent magnetic stripe data from being read correctly. The RF can be turned off automatically by the reader when reading magnetic stripe data in the withdrawal direction. This only works when the transport application MSR direction property is not set to non-directional. When the Contactless Automatic RF Control state is set to ON, the RF is automatically turned OFF just prior to withdrawing a card, after the card withdrawal completes, the RF will be turned back ON. If a card is partially inserted and pulled back out of the reader, the RF will turn OFF and after a timeout, will turn back ON.

The reader is not capable of automatically turning the RF off prior to a card insertion. However, this can be done manually by the host by using the RF OFF and RF ON commands to make sure the RF does not interfere with a read on insertion.

If a command is sent to the reader to turn RF OFF, then the automatic control of the RF will also be disabled until a command turning ON the RF is received.

Values:

Value	AUTOMATIC RF CONTROL PROPERTY
0	OFF
1	ON

Example Set Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	0E	01	00	03	01

Field	PVAL
Byte	7
Value (Hex)	01 (AUTOMATIC RF CONTROL - ON)

Example Set Property Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	0E	01	00

Example Get Property Request:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	00	0E	00	00	03	01

Example Get Property Response:

Field	MTYP	APPL	CMND	RC	PTYP	PID
Byte	1	2	3	4	5	6
Value (Hex)	40	0E	00	00	03	01

Field	PVAL
Byte	7
Value (Hex)	01 (AUTOMATIC RF CONTROL - ON)

Auto Mode

The contactless module is always in Auto Mode and will automatically read the card's equivalent magnetic stripe data when it comes within reading range. The reader will also sound a buzzer when the contactless card data is successfully read. This data is also sent to the host automatically.

Example Notification Sequence

On the assumption that the Notify Contactless Magstripe Property is ON, the application will send the message when a contactless card comes into the operating field.

Contactless Magstripe Notification message for Paypass, Visa Wave, ExpressPay and Discover:

On a successful read:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	80	0E	00	00

Field	DATA
Byte	5 – up to 124 (Variable Length)
Value (Hex)	DF 23 (LEN) (Track 1 Data) DF 22 (LEN) (Track 2 Data)

Contactless Magstripe Notification message for Mifare:

On a successful read:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	80	0E	00	00

Field	DATA
Byte	5 – up to 124 (Variable Length)
Value (Hex)	DF 0D (LEN) (UID)

Notes:

- (1) DF 23 is the header for Track 1
- (2) DF 22 is the header for Track 2
- (3) LEN number of bytes available for Track 1 or Track 2.
- (4) For Track 2 data, 2 characters are sent using one byte, the application software will have to convert each character into two bytes.
- (5) DF 0D is the header for a Mifare Card's UID. See appendix D to read Mifare cards.

RF ON Command

Command ID: 84 (Hex)

Description:

This command is used to turn the RF field ON.

Request Message Data: None

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	0E	84	00

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	0E	84	00

RF OFF COMMAND

Command ID: 85 (Hex)

Description:

This command is used to turn the RF field OFF. When this command is accepted by the reader, the automatic control of the RF will also be disabled

Request Message Data: None

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Example Request:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	0E	85	00

Example Response:

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	40	0E	85	00

SENDING OTI MODULE TRANSPARENT COMMANDS

Command ID: 81 (Hex)

Description:

This command is used to send additional commands to the OTI module through the IntelliStripe 65 interface.

Request Message Data: None

Response Message Data: None

Response Message Result Codes:

Success = 00 (Hex)

The command completed successfully.

Example Request:

This example sends the command to the OTI module to POLL and activate once.

Field	MTYP	APPL	CMND	RC
Byte	1	2	3	4
Value (Hex)	00	0E	81	00

Field	DATA
Byte	5 – 10
Value (Hex)	00 3E DF 7E 01 03

Example Response:

Field	MTYP	APPL	CMND	RC	DATA
Byte	1	2	3	4	5 – 7
Value (Hex)	40	0E	81	00	3E 00 00

APPENDIX A. EXAMPLE HOST APPLICATION

The following is an example of a very simple host application that uses the IntelliStripe 320 command set to read a magnetic stripe and communicate to a smart card. This example would not be used as a real application because it has no error handling. It is intended only to be used as a demonstration of how the command set can be used to build an application.

The steps are as follows:

1. Initialize device by setting MSR Direction transport property to Consume and setting Auto Consume transport property to Enabled.
2. Wait for a card to be consumed completely into the reader. Check Rear Card Present indicator inside a loop until it is set. The Rear Card Present indicator is obtained by issuing the Get Indicators transport property. For error handling, also check for the following case inside the loop. If the Auto Transporting indicator is clear and the Middle Card Present Indicator is set but the Rear Card Present indicator is not set then a card is stuck in the transport so go to step 5.
3. Issue the Get Track 123 Decode Data magnetic stripe command to get the magnetic stripe data.
4. Perform any required smart card communications.
5. Issue the Card Eject transport command to eject the card.
6. Go to step 2 to read another card.

APPENDIX B. MEMORY CARD SUPPORT

This appendix defines the commands needed to control supported Memory Cards

SLE 4442/4432 MEMORY CARD CONTROL

This section defines the commands needed to control the SLE 4442 and 4432 card types. It is assumed that the user has access to the manufacturer's specifications for this type of card.

According to Siemens, this card is divided into "Memories" which each have different uses. The word Memory as used in this section (always starting with uppercase M) should be interpreted as one of the Memories defined by Siemens. For command purposes we equate each Memory with a Short File ID (read about this in ISO 7816-4 if you like). The Short File IDs are:

- 00 – Main Memory
- 01 – Security Memory (4442 only)
- 04 – Protection Memory

Properties

With the addition of the SLE 4442/4432 support come a few properties the user *may* need access to. If the cards you are using are true SLE 4442/4432 cards, you should not need to manipulate these properties. If you are using a clone with a different mapping, you *may* need to change these properties.

Name	ID (Hex)	Type	Length	Reset Value	Get/Set /Save	Description
4442-ByteSizeMain	A0	Binary	2	256	Get/Set	Gives the size of Main Memory in bytes. Reads and Writes to Main Memory will be screened to assure they stay within these limits.
4442-ByteSizeSec	A1	Binary	1	4	Get/Set	Gives the size of Security Memory (4442 only). All commands directed to this Memory will be screened to assure they stay within these limits.
4442-ByteSizeProt	A2	Binary	1	32	Get/Set	Gives the size of Protection Memory. Reads and Writes to Main Memory will be screened to assure they stay within these limits.

Power Up

The Power Up command is issued as with Microprocessor cards and can get same Result Codes. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

APDU Exchange Command

The APDU Exchange Command is used to control logical operations of the card between Power Up and Power Down. The APDU is issued as with Microprocessor cards. The Result Codes are the same as for Microprocessor cards. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

Two SW1/SW2 Status Codes may apply to any APDU:

SW1/SW2	Meaning
6E00	CLA Not Supported
6D00	INS Not Supported

Read Binary APDU:

Command APDU:

CLA	INS	P1	P2	Le
00	B0	Adr1	Adr0	Len

CLA is always 00

INS is always B0

P1 is upper byte of address as follows:

80 reads Main Memory (Short File ID 0)

81 reads Security Memory (Short File ID 1) (SLE 4442 only)

84 reads Protection Memory (Short File ID 4)

P2 is lower byte of address within the requested Memory

Le is the number of bytes to read, 0-256, 0 indicates 256 bytes

Response APDU:

Data Field (from card)	SW1	SW2
------------------------	-----	-----

When reading from the Protection Memory, the high order bit of the first data byte returned represents the protection state of byte 0 in the Main Memory. The low order bit of the first data byte returned represents the protection state of byte 7, etc.

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6A82	Memory Not Found (P1 is invalid)
6B00	Offset outside of the Memory (Combination of P2 and Le is invalid)

Update Binary APDU

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
00	D6	Adr1	Adr0	Len	Data to be written

CLA is always 00

INS is always D6

P1 is upper byte of address as follows:

80 updates Main Memory (Short File ID 0)

81 updates Security Memory (Short File ID 1) (SLE 4442 only)

84 updates Protection Memory (Short File ID 4)

P2 is lower byte of address, address within the requested Memory

Lc is the number of bytes to write, 0-256, 0 indicates 256 bytes

Data Field contains the bytes to write. If the Memory being written is the Protection Memory, only bytes that are different from the values currently on the card are written, then protected. If a byte to be written is already protected, a status 6581 will be returned.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6581	Memory Failure, some bytes were not written
6A82	File Not Found (P1 is invalid)
6B00	Offset outside of the Memory (Combination of P2 and Lc is invalid)

Verify APDU (Programmable Security Code)

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
00	20	00	00	Len	Data to be verified

CLA is always 00

INS is always 20

P1 is 00

P2 is 00

Lc is the number of bytes for verification:

If the value is 00, the status 63Cx will be returned where x indicates the number of further retries allowed. This mode does not use up an attempt!

If the value is the one less than the value of Property A1, the PSC contained in the Data Field will be presented for verification.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors (PSC verified OK)
63Cx	Verification failed, x indicates number of further retries allowed
6A86	P1 and/or P2 not zero
6B00	Offset outside of the Memory (Lc is invalid)

SLE 4428/4418 MEMORY CARD CONTROL

This section defines the commands needed to control the SLE 4428 and 4418 card types. It is assumed that the user has access to the manufacturer’s specifications for this type of card.

This section will address the memory available on the card as a file. For compatibility of terminology with ISO 7816-4, we will assume that the memory is in an “implicitly selected” file after we power up the card.

Properties

With the addition of the SLE 4428/4418 support come a few properties the user *may* need access to. If the cards you are using are true SLE 4428/4418 cards, you should not need to manipulate these properties. If you are using a clone with a different mapping, you *may* need to change these properties.

Name	ID (Hex)	Type	Length	Reset Value	Get/Set /Save	Description
4428-AddressSecurity	A6	Binary	2	1021	Get/Set	Gives Byte Address on card of Security Area. The Security starts with a one byte Error Counter and continues with a Programmable Security Code (PSC). The PSC occupies all remaining bytes of the Security Area.
4428-LenSecurity	A7	Binary	1	3	Get/Set	Gives the length (in bytes) of the Security Area

Power Up

The Power Up command is issued as with Microprocessor cards and can get same Result Codes. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

APDU Exchange Command

The APDU Exchange Command is used to control logical operations of the card between Power Up and Power Down. The APDU is issued as with Microprocessor cards. The Result Codes are the same as for Microprocessor cards. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

IntelliStripe 320 Command Reference

Two SW1/SW2 Status Codes may apply to any APDU:

SW1/SW2	Meaning
6E00	CLA Not Supported
6D00	INS Not Supported

Read Binary APDU

Command APDU:

CLA	INS	P1	P2	Le
00	B0	Adr1	Adr0	Len

CLA is always 00

INS is always B0

P1 is upper byte of address to read and must not be greater than '03'

P2 is lower byte of address to read.

Le is the number of bytes to read

Response APDU:

Data Field (from card)	SW1	SW2
------------------------	-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6B00	Offset outside of the Memory (Combination of P2 and Le is invalid)

Read Protection Status APDU

This APDU will not be found in ISO 7816-4. That is why it has the CLA of D0 (Proprietary).

Command APDU:

CLA	INS	P1	P2	Le
D0	B8	Adr1	Adr0	Len

CLA is always D0

INS is always B8

P1 is upper byte of address to read protection status and must not be greater than '03'

P2 is lower byte of address to read protection status.

Le is the number of bytes of protection status to read

Response APDU:

Data Field (from card)	SW1	SW2
------------------------	-----	-----

Data indicates the protection status for the byte located at the corresponding address on the card. The value '00' indicates the location is protected and cannot be updated. A value '01' indicates the location is not protected and can be updated.

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6B00	Offset outside of the Memory (Combination of P2 and Le is invalid)

Update Binary APDU

Because of card functionality, this APDU should not be sent until at least one Read Binary APDU has been sent first.

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
00	D6	Adr1	Adr0	Len	Data to be written

CLA is always 00

INS is always D6

P1 is upper byte of address to write and must not be greater than '03'

P2 is lower byte of address to write.

Lc is the number of bytes to write, 0-1024

Data Field contains the bytes to write. If a byte to be written is already protected, a status 6581 will be returned.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6581	Memory Failure, some bytes were not written
6B00	Offset outside of the Memory (Combination of P2 and Lc is invalid)

Update Binary With Protection APDU

Because of card functionality, this APDU should not be sent until at least one Read Binary APDU has been sent first.

This APDU will not be found in ISO 7816-4. That is why it has the CLA of D0 (Proprietary).

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
D0	D8	Adr1	Adr0	Len	Data to be written

CLA is always D0

INS is always D8

P1 is upper byte of address to write and must not be greater than '03'

P2 is lower byte of address to write.

Lc is the number of bytes to write, 0-1024

Data Field contains the bytes to write. If a byte to be written is already protected, a status 6581 will be returned. Data is written first, then the Protect bit is written with comparison, assuring that the data being protected is the data you wanted to protect.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6581	Memory Failure, some bytes were not written
6B00	Offset outside of the Memory (Combination of P2 and Lc is invalid)

Verify APDU (Programmable Security Code)

Because of card functionality, this APDU should not be sent until at least one Read Binary APDU has been sent first.

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
00	20	00	00	Len	Data to be verified

CLA is always 00

INS is always 20

P1 is 00

P2 is 00

Lc is the number of bytes for verification:

If the value is 00, the status 63Cx will be returned where x indicates the number of further retries allowed. This mode does not use up an attempt!

If the value is the one less than the value of Property A7, the PSC contained in the Data Field will be presented for verification.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors (PSC verified OK)
63Cx	Verification failed, x indicates number of further retries allowed
6A86	P1 and/or P2 not zero
6B00	Offset outside of the Memory (Lc is invalid)

SLE 4404 MEMORY CARD CONTROL

This section defines the commands needed to control the SLE 4404 card type. There are many cards available that are similar to the SLE4404, and this device will support many of them. It is assumed that the user has access to the manufacturer’s specifications for this type of card.

This section will address the memory available on the card as a file. For compatibility of terminology with ISO 7816-4, we will assume that the memory is in an “implicitly selected” file after we power up the card.

Properties

With the addition of the SLE 4404 support comes a property the user *may* need access to.

Name	ID (Hex)	Type	Length	Reset Value	Get/Set/Save	Description
4404-BitOrder	AE	Boolean	1	0	Get/Set	A value of 0 causes the least significant bit of each byte to be sent or received first. A value of 1 causes the most significant bit of each byte to be sent or received first. This property DOES NOT APPLY to the Power Up command, which always reads the bytes least significant bit first.

Data is sent and received as bytes. When the 4404-BitOrder property is set to 0, the least significant bit of each byte represents the lowest addressed bit on the card. If we write the bytes 33 22 11 to a card at address 73, the card will end up with the following bit pattern on the card:

```
Address
73.....81.....89.....96
11001100 01000100 10001000
```

When the 4404-BitOrder property is set to 1, the most significant bit of each byte represents the lowest addressed bit on the card. If we write the bytes 33 22 11 to a card at address 73, the card will end up with the following bit pattern on the card:

```
Address
73.....81.....89.....96
00110011 00100010 00010001
```

Note: This property is new. Older versions of IntelliStripe products may not have this. The addition of this property is backwards compatible with such older products. Compatibility is achieved by having the Reset Value provide the same functionality as the older products. If you wish to use the msb first option, you will have to set this property to 1.

Power Up

The Power Up command is issued as with Microprocessor cards and can get same Result Codes. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

APDU Exchange Command

The APDU Exchange Command is used to control logical operations of the card between Power Up and Power Down. The APDU is issued as with Microprocessor cards. The Result Codes are the same as for Microprocessor cards. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

Two SW1/SW2 Status Codes may apply to any APDU:

SW1/SW2	Meaning
6E00	CLA Not Supported
6D00	INS Not Supported

Special handling for C4 and RST

Some of the cards that are controllable with as this card type use Contact 4 (C4) and the Contact 2 (RST) for special functions. For some cards, C4 may be used to put the card into a special “test” mode where it simulates an already personalized card, even if it has not completed personalization. For some cards, RST may be used during write/erase operations to stop the card internal address from incrementing.

The user is given control of C4 for all APDUs. This is accomplished by manipulating the lowest bit of the CLA byte. If the bit is 0, C4 will be maintained Low for the duration of the operation. If the bit is 1, C4 will be set High at the start of the operation and then returned to Low after the operation is completed.

Some of the APDUs give the user control over the RST contact. For these APDUs a value of 0 will force Contact 2 low, a value of 1 will force it high during selected portions of the operation.

It is expected that the user has access to the technical specifications of the card he is dealing with and thus knowledge of how to use these contacts.

Read Binary APDU

Command APDU:

CLA	INS	P1	P2	Le
D0/D1	B0	xx	Adr	Len

CLA is always D0 or D1 (the lowest bit specifies the state of C4)

INS is always B0

P1 is ignored

P2 is the address where the read will start

Le is the number of bytes to read, 0 will read 256 bytes

Response APDU:

Data Field (from card)	SW1	SW2
------------------------	-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors

Write Binary APDU

The Write Binary command performs a logical AND of the bits already present in the card with the bits given in the command APDU. For each bit that is 0 in the command APDU, if the corresponding bit on the card is 1, it will be written to 0. Bits in the command APDU that are set to 1 will be ignored, the state of the corresponding bit on the card will not be checked. If there is a need to set a bit on the card to the value of 1, it must be done using the Erase Binary command or the Verify command. These commands will cause erasure of more than one bit on the card, so be careful!

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
D0/D1	D0	See below	Adr	Len	Data to be written

CLA is always D0 or D1 (the lowest bit specifies the state of C4)

INS is always D0

P1 specifies RST and allows bit addressing within the specified starting byte. The bits shown with x are ignored.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RST	x	x	x	x	Bit address		

The bit address is added to the byte address to form the address of the first bit to be affected by the command. For every count over zero, the card internal address is incremented one. This allows effective addressing of a specific bit and may be useful for blowing fuses in some cards.

P2 is the address where the write will start

Lc is the number of bytes to write.

Data Field contains the bytes to write. If a bit to be written cannot be changed, a status 6581 will be returned.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6581	Memory Failure, some bits were not written

Erase Binary APDU

The Erase Binary command is used to erase parts of the card. For this type of card erased means that each bit = 1. Cards of this type are organized as 16 bit “frames”. Typically, if an erase operation is performed on any bit in the frame, all bits in the frame are erased. In order to erase successfully, security conditions may have to be met.

This command provides one of two methods for erasing data on the card. The other method is with the Verify command. When it is used to “verify” the erase password of one of the application zones, it causes that application zone to be erased (if security requirements have been satisfied).

Command APDU:

CLA	INS	P1	P2	Lc
D0/D1	0E	RST	Adr	0

CLA is always D0 or D1 (the lowest bit specifies the state of C4)

INS is always 0E

P1 specifies RST, all other bits are ignored

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RST	x	x	x	x	x	x	x

P2 is the address where the erase will occur

Lc should be zero, but is ignored (0 is used) if it is not.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6581	Memory Failure, some bits were not erased

Verify/Erase Application Zone APDU

This command is used to do two types of security operations on the card. First, it is used to present the User Code which unlocks further functionality. Second, it is used to erase/reload application zones by presenting the Memory Code.

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
D0/D1	20/22	Tries	Adr	Len	Data to be verified

CLA is always D0 or D1 (the lowest bit specifies the state of C4)

INS is either 20(Verify) or 22(Erase Application Zone)

P1 specifies Tries, the maximum number bits which will be searched for a '1' value to write to '0' in preparation for the erase sub-operation that completes the Verify/Erase command. For application zones that do not require writing of a bit to cause erasure, use a 00 in Tries. This will cause the erase operation to be performed on the next bit after presentation of the Memory Code.

P2 is the byte address of the code to be verified (usually called User Code or Memory Code). *NOTE: WHEN USING Lc=0, THIS ADDRESS MUST BE THE ADDRESS OF THE COUNTER TO BE EVALUATED (I.E. IN A 4404 THE USER CODE IS AT ADDRESS 08H AND THE CORRESPONDING ERROR COUNTER IS AT ADDRESS 0AH. TO EVALUATE THIS COUNTER THE COMMAND APDU WOULD BE: D0 20 04 0A 00).*

Lc is the number of bytes for verification:

If the value is 00, the status 63Cx will be returned where x indicates the number of further retries allowed, if x is F, there may be even more than 15 retries remaining. This mode does not use up any retries!

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion for Verify (INS 20). Verification was successful.
6200	Normal completion for Erase Application Zone (INS 22), no errors, but user must verify erasure. This status could be returned even though erasure did not occur.
63Cx	Verification failed, x indicates number of further retries allowed

I²C™ MEMORY CARD CONTROL

This section defines the commands needed to control basic I²C™ types of cards. There are two types of cards addressed, dependent on the amount of memory they contain.

We call the first type the 3 byte card because a 3 byte command frame is used to control it. These cards must contain 2048 bytes or less of data (byte address must fit in 11 bits). At this time we do not know of any cards containing 2048 or less bytes of data that use a 4 byte command frame, but if such a card is developed later, it would be classed as a 4 byte card.

We call the second type the 4 byte card because a 4 byte command frame is used to control it. These cards usually contain more than 2048 bytes of data and thus need an additional byte of address in the control frame.

If you are not sure which type of card you have, check the manufacturer's specifications to see how many bytes are used in the control frame for Byte Write, it will be either 3 or 4.

Properties

Support of I²C™ cards requires one property to specify the frame size. The default value for this property is to support the 3 byte cards. If you wish to work with the 4 byte cards, you should change this property.

Name	ID (Hex)	Type	Length	Reset Value	Get/Set/Save	Description
I ² C-3ByteCard	AA	Boolean	1	TRUE	Get/Set	TRUE specifies a 3 byte control frame, FALSE specifies a 4 byte control frame.

Power Up

The Power Up command is issued as with Microprocessor cards and can get same Result Codes. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

Note

When the Primary Status in the CondRpt Property is 0x82, a Secondary Status of 0x05 indicates that the card is not responding. This Secondary Status applies only to I²C™ card handling.

A 4 byte ATR is returned when the power up command is successful. Many I²C™ cards do not deliver an ATR on power up, but some do. If the value FFFFFFFFH is returned, the card did not deliver an ATR. The presence or absence of an ATR may not positively identify the card in the reader. If the ATR is different from FFFFFFFFH it probably does identify the card, see specifications for the various cards to determine which ATR identifies which card. If FFFFFFFFH is returned, the card may be an I²C™ card that does not deliver an ATR. The only way to be sure is to send a Read Binary to retrieve known data from a card you are familiar with.

APDU Exchange Command

The APDU Exchange Command is used to control logical operations of the card between Power Up and Power Down. The APDU is issued as with Microprocessor cards. The Result Codes are the same as for Microprocessor cards. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

Two SW1/SW2 Status Codes may apply to any APDU:

SW1/SW2	Meaning
6E00	CLA Not Supported
6D00	INS Not Supported
9000	Normal completion, no errors

Read Binary APDU

Command APDU:

CLA	INS	P1	P2	Le
00	B0	Adr1	Adr0	Len

CLA is always 00

INS is always B0

P1 is upper byte of address to read.

P2 is lower byte of address to read.

Le is the number of bytes to read

Note that if the address given is outside of the bounds of the card in the reader you may not get the expected results. If the sum of Le and the address is outside of the bounds of the card, some of the data will probably represent a wrap-around to the beginning of card memory.

Response APDU:

Data Field (from card)	SW1	SW2
------------------------	-----	-----

Update Binary APDU

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
00	D6	Adr1	Adr0	Len	Data to be written

CLA is always 00

INS is always D6

P1 is upper byte of address to write.

P2 is lower byte of address to write.

Lc is the number of bytes to write.

Data Field contains the bytes to write.

Note that if the address given is outside of the bounds of the card in the reader you may not get the expected results. If the sum of Lc and the address is outside of the bounds of the card, some of the data will probably represent a wrap-around to the beginning of card memory.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
6581	Memory Failure, some bytes were not written

GEMPLUS GAM326 MEMORY CARD CONTROL

This section defines the commands needed to control the Gemplus GAM326 card type. There may be other cards that are similar to the GAM326, and this device may support some of them. It is assumed that the user has access to the manufacturer's specifications for this type of card.

This section will address the memory available on the card as a file. For compatibility of terminology with ISO 7816-4, we will assume that the memory is in an "implicitly selected" file after we power up the card.

Properties

With the addition of the GAM326 support come properties the user *may* need access to.

Name	ID (Hex)	Type	Length	Reset Value	Get/Set/Save	Description
GAM326-BitOrder	B2	Boolean	1	1	Get/Set	A value of 0 causes the least significant bit of each byte to be sent or received first. A value of 1 causes the most significant bit of each byte to be sent or received first. This bit order applies to all operations, including the ATR returned from the Power Up command.
GAM326 value of M	B3	Dword	1	160	Get/Set	This is the value of M to be used in the Internal Authenticate command, see the card manufacturer's documentation for more information. A value of 0 is interpreted as 256.
GAM326 Counter Lowest Address	B4	Dword	1	8	Get/Set	This is the lowest address that will be accepted in an Erase Counter command.
GAM326 Counter Highest Address	B5	Dword	1	11	Get/Set	This is the highest address that will be accepted in an Erase Counter command.

Data is sent and received as bytes. When the GAM326-BitOrder property is set to 0, the least significant bit of each byte represents the lowest addressed bit on the card. If we write the bytes 33 22 11 to a card at address 72, the card will end up with the following bit pattern on the card:

Address
 72.....80.....88.....95
 11001100 01000100 10001000

When the GAM326-BitOrder property is set to 1, the most significant bit of each byte represents the lowest addressed bit on the card. If we write the bytes 33 22 11 to a card at address 72, the card will end up with the following bit pattern on the card:

Address
 72.....80.....88.....95
 00110011 00100010 00010001

Power Up

The Power Up command is issued as with Microprocessor cards and can get same Result Codes. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

APDU Exchange Command

The APDU Exchange Command is used to control logical operations of the card between Power Up and Power Down. The APDU is issued as with Microprocessor cards. The Result Codes are the same as for Microprocessor cards. When the Result Code indicates an Error or Warning, the Primary Status of the CondRpt Property will never be 0x03.

Two SW1/SW2 Status Codes may apply to any APDU:

SW1/SW2	Meaning
6E00	CLA Not Supported
6D00	INS Not Supported

Read Binary APDU

Command APDU:

CLA	INS	P1	P2	Le
00	B0	xx	Adr	Len

CLA is always 00

INS is always B0

P1 is ignored

P2 is the address where the read will start

Le is the number of bytes to read, 0 will read 256 bytes

The entire card can be read with one command. Bits that are “unreadable” will be returned with the electrical value the card imposes on the I/O line at the time of read sampling.

Response APDU:

Data Field (from card)	SW1	SW2
------------------------	-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors

Write Binary APDU

The Write Binary command performs a logical AND of the bits already present in the card with the bits given in the command APDU. For each bit that is 0 in the command APDU, if the corresponding bit on the card is 1, it will be written to 0. Bits in the command APDU that are set to 1 will be ignored, the state of the corresponding bit on the card will not be checked. Even though each specified bit will be written, the result of the operation is NOT verified and no errors are reported. The user may desire to Read the data to assure all intended bits have been written.

If there is a need to set a bit on the card to the value of 1, it must be done using the Erase Counter command. These commands may cause erasure of more than one bit on the card, so be careful!

Command APDU:

CLA	INS	P1	P2	Lc	Data Field
00	D0	xx	Adr	Len	Data to be written

CLA is always 00

INS is always D0

P1 is ignored

P2 is the address where the write will start
 Lc is the number of bytes to write.
 Data Field contains the bytes to write.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors

Erase Counter APDU

The Erase Counter command is used to erase counter bytes of the card. For this type of card erased means that each bit = 1.

If the specified address is not in the range specified by the Counter Lowest Address and the Counter Highest Address properties, the command will not be processed.

This command writes one bit of the addressed byte from 1 to 0 (if there are any 1 bits available) under control of the Erasure Mask. If a bit was actually written to 0 in the first step, the byte at the next address on the card is erased.

The Erasure Mask is formulated to indicate one or more bits that can be written to zero to initiate the erasure. Erasure will only be initiated if at least one zero bit in the Erasure Mask corresponds to a one bit on the card. The first correspondence will initiate erasure and subsequent correspondences will be written to zero until the entire Erasure Mask is processed.

The GAM326-BitOrder property dictates the order of bit processing.

If there is a need to erase multiple bytes of the Counter, multiple Erase Counter commands must be sent in the proper order. Determining the order is the user's responsibility.

Command APDU:

CLA	INS	P1	P2	Lc	Data
D0	0A	xx	Adr	01	Erasure Mask

CLA is always D0
 INS is always 0A
 P1 is ignored
 P2 is the address where the erase will occur
 Lc **must** be 01
 Data contains one byte giving the Erasure Mask.

Response APDU:

SW1	SW2
-----	-----

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6300	No bits to write, couldn't erase
6700	Lc gives incorrect length
6B00	P2 is incorrect

Internal Authenticate APDU

The Internal Authenticate is used to authenticate the card to the hosting terminal.

If the Internal Authenticate is performed with CBC enabled, the CBC mode remains in effect until the card is powered down.

The specified address is a *bit* address. It specifies the address of the bit where a Dummy Write is performed to start the Authentication operation. For more details, see the Gemplus documentation.

In the Authentication operation a value called M is used. This value is specified by agreement with Gemplus. The user has control over this value via the GAM326 value of M property

Command APDU:

CLA	INS	P1	P2	Lc	Data	Le
D0	88	CBC / Address	Address	06	xx xx xx xx xx xx	02

CLA is always D0

INS is always 88

P1 gives an indication of Cipher Block Chaining and the upper bits of the *bit* address to be used to start the Authentication operation:

Bits Usage

0 CBC indication, 0 = no CBC, 1 = CBC

1-7 Address bits

P2 is the low order byte of the *bit* address used to start the Authentication operation.

Lc gives the length of the data to be used as the Random Number in the Authentication operation, its value must always be 6.

Data is the Random Number to be used in the Authentication operation.

Le gives the length of the expected reply, which is always 2.

Response APDU:

MAC (2 bytes)	SW1 = 90	SW2 = 00
---------------	----------	----------

OR

SW1 = 67	SW2 = 00
----------	----------

If SW1/SW2 indicates normal completion (9000), the MAC field is 2 bytes long and is the result of the Authentication. If SW1/SW2 indicates a wrong length, the MAC is not included in the message

Possible SW1/SW2 combinations:

SW1/SW2	Meaning
9000	Normal completion, no errors
6700	Wrong length, Lc does not equal 6 or Le does not equal 2

APPENDIX C. MIFARE COMMANDS

Tag: DF 78

Len: VAR

Scope: DO

Object description: This object is used in order to send MIFARE command to the PICC. The Data consists of a 1-byte command Number (Op Code) and optional data bytes. Response will be in the same format including the Op Code before optional data.

Please note: When referring to “Mode” in the Table below, please use the scheme represented here:

Mode (binary) 0 0 0 0 0 AB KS1 KS2

AB – 0 authentication with key A, AB – 1 authentication with key B

KS1, KS2 key set: 00-set 0, 01-set1, 10-set2

Table 11 Mifare OPCODEs

OpCode	
A5	Name: Read
	Description: Read block command
	Data structure: Op Code (one byte), Block # (one byte)
	Data Response structure: Op Code (one byte), 16 bytes of Read block Data
A6	Name: Write
	Description: Write block (16 bytes) command
	Data structure: Op Code (one byte), Block # (one byte), 16 bytes of Write to block Data
	Data Response structure: Op Code (one byte)
A7	Name: Write Ultra Light
	Description: Write 4 bytes into selected Ultra Light block
	Data structure: Op Code (one byte), Block # (one byte), 4 bytes of Write to block Data
	Data Response structure: Op Code (one byte)
A9	Name: Load Key
	Description: Replace and load new key
	Data structure: Op Code (one byte), Mode (one byte), Sector # (one byte), Transport key (6 bytes), New key (6 bytes)
	Data Response structure: Op Code (one byte)
AA	Name: Increment
	Description: Increment value of block in RAM
	Data structure: Op Code (one byte), Block # (one byte), Value (4 bytes)
	Data Response structure: Op Code (one byte)

IntelliStripe 320 Command Reference

OpCode	
AB	Name: Decrement
	Description: Decrement value of block in RAM
	Data structure: Op Code (one byte), Block # (one byte), Value (4 bytes)
	Data Response structure: Op Code (one byte)
AC	Name: Transfer
	Description: Move RAM value to EE
	Data structure: Op Code (one byte), Block # (one byte)
	Data Response structure: Op Code (one byte)
AD	Name: HALTA
	Description: ISO 14443-3 Type A HALTA command in short frame.
	Data structure: Op Code (one byte)
	Data Response structure: Op Code (one byte)
AE	Name: Restore
	Description: Restore recent value of block
	Data structure: Op Code (one byte), Block # (one byte)
	Data Response structure: Op Code (one byte)
AF	Name: Decrement & Transfer
	Description: Implement the Decrement & Transfer functions together
	Data structure: Op Code (one byte), Block # (one byte), Value (4 bytes)
	Data Response structure: Op Code (one byte)
B0	Name: Authentication2
	Description: Authentication versus a PICC
	Data structure: Op Code (one byte), Mode (one byte), Key # (one byte), Sector # (one byte)
	Data Response structure: Op Code (one byte)
C0	Name: Read Macro
	Description: Enables Read operation of Multiple Blocks of one Sector
	Data structure: Op Code (one byte), Address (one byte) Bits 0-3 for Sector Number, Bits 4-7 for Block Mask (Bit 4 for Block 0 up to Bit 7 for Block 3) Auth2KeySel (one byte) 0 – Use Key A 1 – Use Key B
	Data Response structure: Op Code (one byte) Data Sequential Data of all requested Blocks, from Lowest to Highest - Each Block 16 bytes length.

OpCode	
C1	Name: Write Macro
	Description: Enables Write operation of Multiple Blocks of one Sector
	Data structure: Op Code (one byte), Address (one byte) Bits 0-3 for Sector Number, Bits 4-7 for Block Mask (Bit 4 for Block 0 up to Bit 7 for Block 3) Auth2KeySel (one byte) 0 – Use Key A 1 – Use Key B Data (16,32,48,64 bytes) Sequential Data to Write of all requested Blocks, from Lowest to Highest - Each Block must be 16 bytes length.
	Data Response structure: Op Code (one byte) Approve completion of Write operation
Other	RFU

EXAMPLE:

To use a Mifare 1K Classic Card

- (1) Load the key for the sector that will be used into the OTI module, this needs to be performed only once, it gets saved in the contactless reader’s flash memory.
- (2) Send a POLL command in the ACTIVATE ONCE only mode. Note that this will disable automatic reading of cards that have built-in applications (PayPass, VisaWave, ExpressPay, Discover)
- (3) After a card is detected, the UID will be sent back by the reader.
- (4) Send the AUTHENTICATE A command for the sector you want to read.
- (5) Read BLOCK.

Follow the same steps above for writing a block.

Examples:

Sending Load Transport key “BD DE 6F 37 83 83” and New key “FF FF FF FF FF FF” for Sector 0:

00 0E 81 00 3E DF 78 0F A9 00 00 BD DE 6F 37 83 83 FF FF FF FF FF FF

IntelliStripe 320 Command Reference

Send POLL – Activate Once:

00 0E 81 00 3E DF 7E 01 03

After a Mifare Card is detected, the reader will respond with the Mifare card's Unique ID in the DATA field:

3E FF 01 0D FC 0B DF 16 01 4D DF 0D 04 XX XX XX XX

UID Tag = DF 0D

Len = 04

Send the Authenticate A command for sector 0:

00 0E 81 00 3E DF 78 04 B0 00 00 00

Send the Read Block 0 command:

00 0E 81 00 3E DF 78 02 A5 00

Send the Read Block 2 command:

00 0E 81 00 3E DF 78 02 A5 02

Send the Write Block 2 command:

00 0E 81 00 3E DF 78 12 A6 02 00 00 00 00 00 00 00 00 00 00 11 11 11 11 11 11 11

INDEX

A

APDU Exchange Command, GAM326, Memory Card Control	111
APDU Exchange Command, I ² C, Memory Card Control	108
APDU Exchange Command, Memory Card Control SLE 4442/4432	94
APDU Exchange Command, SLE 4404, Memory Card Control	103
APDU Exchange Command, SLE 4428/4418, Memory Card Control	97
APDU Exchange Command, Smart Card Application	49
Application ID, Application Messages	2
Application Messages	1
ATR Map Structure, Smart Card Application	39
Auto Consume Property, Transport Application	60
Auto Transporting, Transport Application	56

B

Buzzer Application	67
--------------------------	----

C

Card Types, Smart Card Application	29
Clear Data Command, Magnetic Stripe Application	17
Command ID, Application Messages	2
CondRpt Property, Smart Card Application	27
Consume Card Command, Transport Application	64
Contactless Auto Mode	87
Contactless Automatic RF Control Property	86
Contactless Smart Card Application	85
Custom Applications, Application Messages	2
Custom Commands, Application Messages	3

D

Data Field	4
Decode JIS, Magnetic Stripe Application.	16
Device Application	9

E

Eject Card Command, Transport Application	65
Eject Middle Sensor to Motor Off Delay Property, Transport Application	62
Erase Binary APDU, SLE 4404, Memory Card Control	105
Erase Counter APDU, GAM326, Memory Card Control	113
Error/Warning Condition Templates, Smart Card Application	27
Example Host Application	91

F

Fixed Baud Rate Property, Host Communications Application	81
Front Card Present, Transport Application	56

G

GAM326, Memory card control	110
Generic Commands	5
Generic Commands, Application Messages	3
Generic Result Codes	4
Get MagnePrint Data Command	22
Get Property Command, Generic Commands	5
Get Track 123 Decode Data Command, Magnetic Stripe Application	18
Get Track Decode Data Command, Magnetic Stripe Application	20
Get/Set/Save Property Commands Device Application	9
Get/Set/Save Property Commands, Buzzer Application	67
Get/Set/Save Property Commands, Contactless Application	85

IntelliStripe 320 Command Reference

Get/Set/Save Property Commands, Transport Application	55
Get/Set/Save Property Commands, Host Communications Application.....	73
Get/Set/Save Property Commands, LED Application	53
Get/Set/Save Property Commands, Magnetic Stripe Application	13
Get/Set/Save Property Commands, Smart Card Application	25

H

Host Communications Application.....	73
--------------------------------------	----

I

I ² C Memory card control	107
Indicators Property, Transport Application	55
Internal Authenticate APDU, GAM326, Memory Card Control	114

J

JIS	16, 19, 21
-----------	------------

L

LED Application.....	53
LED State Property, LED Application	53

M

Magnetic Stripe Application	13
MCP auto baud enable Property, Host Communications Application.....	80
MCP EDC check enable Property, Host Communications Application.....	79
MCP Error recovery enable Property, Host Communications Application.....	77
Memory Cards	93
Message Format, Application Messages.....	1
Message Header, Application Messages.....	1
Message Type, Message Application	1
Middle Card Present, Transport Application	56
Mifare Commands	117

Model Number Property, Device Application	10
MSR Direction Property, Transport Application	61

N

Notification Message Type, Application Messages	1
Notifications, Application Messages	2
Notifications, Smart Card Application	25
Notify Contactless MagStripe Property	85
Notify Indicator Change 0 To 1 Property, Transport Application	58
Notify Indicator Change 1 To 0 Property, Transport Application	59
Notify Read State Property, Magnetic Stripe Application	14
Notify Read Track Property, Magnetic Stripe Application	15

O

Overview, Application Messages	1
--------------------------------------	---

P

Playback Tone Sequence Command, Buzzer Application	72
Power Down Command, Smart Card Application	44
Power Fail Detect Property, Transport Application	63
Power Up Command, Smart Card Application	41
Power Up, GAM326, Memory Card Control	111
Power Up, I ² C, Memory Card Control ...	108
Power Up, Memory Card Control SLE 4428/4418,	97
SLE 4442/4432	94
Power Up, SLE 4404, Memory Card Control	103
Properties, GAM326, Memory Card Control	110
Properties, I ² C, Memory Card Control ...	107
Properties, Memory Card Control SLE 4442/4432	93

Properties, Memory Card Control
 SLE 4428/4418, 97
 Properties, SLE 4404, Memory Card
 Control..... 102
 Properties, Smart Card Application 31
 Property ID, Generic Commands..... 5, 6, 7
 Property Type definition, Generic
 Commands..... 5, 7
 Property Type, Generic Commands.... 5, 6, 7
 Property Value, Generic Commands 6, 7
 Protocol Property, Host Communications
 Application 83

R

Read Binary APDU, GAM326, Memory
 Card Control 112
 Read Binary APDU, I²C, Memory Card
 Control..... 109
 Read Binary APDU, Memory Card Control
 SLE 4442/4432 94
 Read Binary APDU, SLE 4404, Memory
 Card Control..... 104
 Read Binary APDU, SLE 4428/4418,
 Memory Card Control 98
 Read Protection Status APDU, SLE
 4428/4418, Memory Card Control 98
 Rear Card Present, Transport Application 56
 Request Message Type, Application
 Messages 1
 Request/Response/Notification Model 26
 Requests, Application Messages..... 1
 Reset Detected Property, Host
 Communications Application..... 82
 Response Codes, Smart Card Application 25
 Response Message Type, Application
 Messages 1
 Result Code, Application Messages 3
 RF OFF Command..... 89
 RF ON Command 89
 RS232 plug and play support enable
 Property, Host Communications
 Application 75

S

Save Property Command, Generic
 Commands..... 8
 Select Connector Command, Smart Card
 Application 51
 Sending OTI Module Transparent
 Commands..... 90
 Set Property Command, Generic Commands
 7
 SLE 4404, Memory card control 102
 SLE 4428/4418 Memory Card Control..... 97
 SLE 4442/4432 Memory Card Control..... 93
 Smart Card Application 25
 Software ID Property, Device Application 11
 Software Reset Command, Device
 Application 12
 Special handling for C4 and RST, SLE
 4404, Memory Card Control 103

T

T=0 Error / Warning Condition Templates,
 Smart Card Application..... 44
 T=1 Error / Warning Condition Templates,
 Smart Card Application..... 45
 Tone Sequence 1 Property, Buzzer
 Application 68
 Tone Sequence 2 Property, Buzzer
 Application 69
 Tone Sequence 3 Property, Buzzer
 Application 70
 Tone Sequence 4 Property, Buzzer
 Application 71
 TPDU, Card To IFD Command, Smart Card
 Application 47
 TPDU, IFD To Card Command, Smart Card
 Application 48
 Transport Application 55
 Transport Cooling, Transport Application 56

U

Update Binary APDU, I²C, Memory Card
 Control..... 109
 Update Binary APDU, Memory Card
 Control

IntelliStripe 320 Command Reference

SLE 4442/4432	95
Update Binary APDU, SLE 4428/4418, Memory Card Control	99
Update Binary With Protection APDU, SLE 4428/4418, Memory Card Control	100
USB product Property, Host Communications Application.....	76
USB Serial Number Property, Host Communications Application.....	74

V

Verify APDU (Programmable Security Code, SLE 4428/4418, Memory Card Control.....	101
--	-----

Verify APDU (Programmable Security Code, SLE 4442/4432, Memory card control.....	96
Verify APDU, Memory card control SLE 4442/4432, (Programmable Security Code).....	96
Verify/Erase Application Zone APDU, SLE 4404, Memory card control.....	106

W

Warm Reset Command	46
Write Binary APDU, GAM326, Memory Card Control	112
Write Binary APDU, SLE 4404, Memory Card Control	104