

HCR360

Programmer's Manual

Magnetic Stripe Card Reader

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AGENCY APPROVED

- Specification for FCC class B
- Specification for CE class B, CISPR 22 class B

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

You are cautioned that any change or modifications to the equipment not expressly approved by the party responsible for compliance could void your authority to operate such equipment.

WARRANTY

This product is served under one-year warranty to the original purchaser. Within the warranty period, merchandise found to be defective would be repaired or replaced. This warranty applies to the products only under the normal use of the original purchaser, and in no circumstances covers incidental or consequential damages through consumers' misuse or modification of the products.

PREFACE

This manual provides detailed information relating to the overall operational, electrical, mechanical, environmental and functional aspects of the HCR360. This document should be read and understood prior to initial operation of the product.

For ease of installation and programming use, we have addressed everything from its attractive features to its various configurations.

When designing the HCR360, we selected what we feel are the most useful features and functions. If in some cases you find that your specific needs differ from our existing products, we welcome your comments and suggestions.

Custom-designed models are also available.

If further questions do arise, please call for technical support, our FAE will assist you in any way we can.

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Chapter1: Introduction

This document describes the requirements, operation, and usage of the HCR360 series Magnetic Stripe Card Reader. The HCR360 series can be field upgraded by downloading a new program into the flash memory of the reader. This user guide should be read and understood prior to initial operation of the reader.

1.1 General

The HCR360 series is an intelligent manually operated insert reader for Magnetic Stripe Card. This unit can simultaneously read up to three tracks of magnetic data. Commands and data are processed through an RS-232 interface. The reader includes diagnostic commands for system troubleshooting and setting commands for system configuration.

1.2 Features

- Can read up to three tracks of magnetic data simultaneously (ISO, AAMVA, DMV, and custom data).
- Reads Magnetic Stripe Card on insert or withdrawal or both directions (Dependent on Configuration).
- RS232 compatible communicates with host at speeds from 1200 bps to 115.2k bps.
- The CTS signal of host will be High when card seated. The CTS signal will be Low if card withdrew.
- Uses AMC US11/2 communication protocol to talk with the host.
- Gives the host control over the optional bicolor LED.
- Debris opening, such as coin or paper, to either fall from or be forced out of the card slot.
- Allows host to request status, unit serial number, user info field, and configuration information.
- Contain FLASH memory. Downloads to FLASH memory is through the serial port (firmware downloadable).
- Configuration setting command can change configuration in EEPROM.

1.3 Part Number Description

The brief configuration of HCR360 part number are shown as below:

HCR360-12 Dual track 1&2

HCR360-23 Dual track 2&3

HCR360-33 Triple track 1&2&3

NOTE: Optional configuration is available.

Chapter2: Configuration

This section shows the dimensions, accessories and setup for the HCR360.

2.1 Dimensions of HCR360

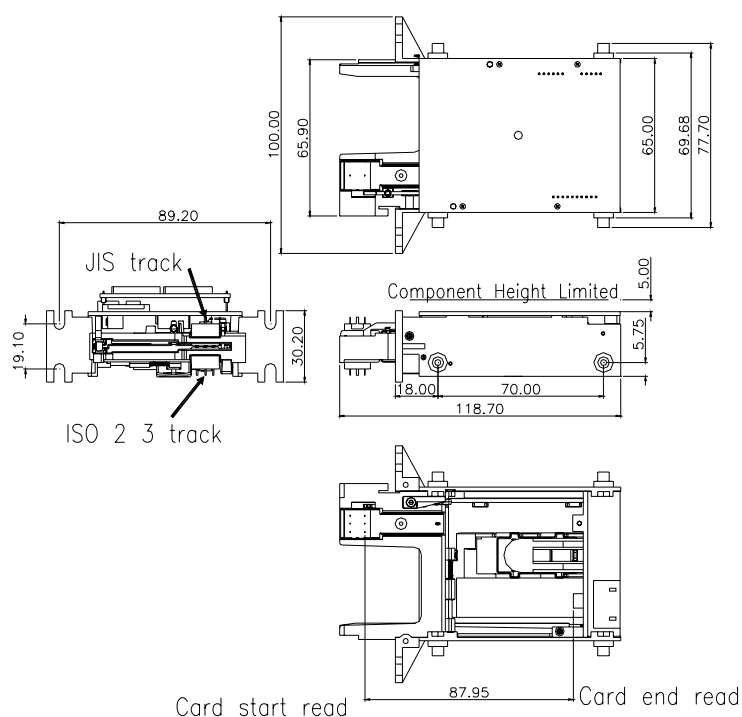


Figure 2-1 Dimensions of HCR360

2.2 Accessories

The following accessories should be enclosed in your package.

1. Interface cable (DB9, 1.5M)
2. Adapter
 - Input: AC 120V or 230V
 - Output: DC 12V, 250mA
3. Programmer's manual or Simple manual

2.3 Installation

1. Turn OFF power to your computer.
2. Connect HCR360 DB9 of interface cable to a free serial port of the computer.
3. Fit power cord into DB9 connector of interface cable.
4. Plug in the power adapter to proper AC outlet; see instruction on adapter of the proper voltage.
5. Turn ON power to the computer.

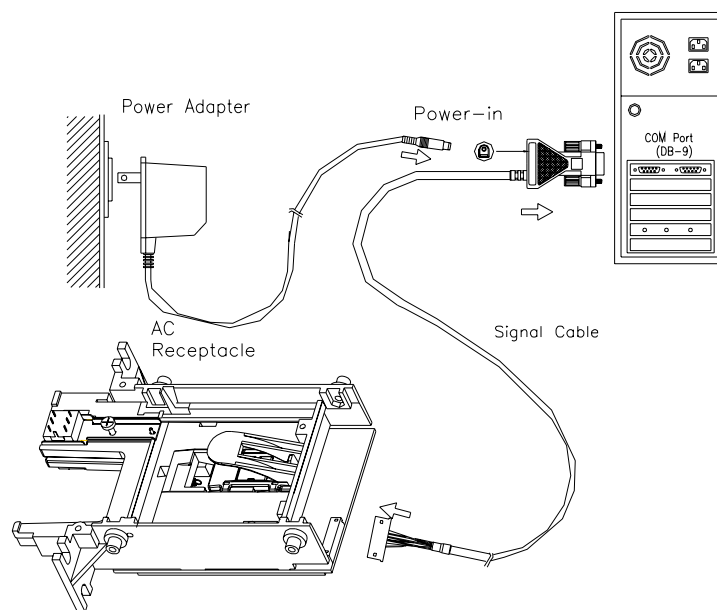


Figure 2-2 Installing HCR360

Chapter3: Specifications

3.1 Magnetic Card Specifications

Card Type

ISO standard card (ISO 7810 and 7811)

CA old DMV

AAMVA

Read high or low coercivity magnetic stripes (300-4000oe)

Thickness

0.76mm $\pm$ 0.08mm

Card Format

Track 1 & 3: 210 bpi

Track 2: 75 bpi

Card Operation Speed

Test Card	Speed (IPS)
ISO standard card	4-40
* Jitter	5-35
** Low Amplitude	5-35

NOTE:

*Jitter card: Reliable reading of magnetic stripes encoded with bit cell length variations within 15% of normal as defined by ISO 7811.

**Low amplitude: Reliable reading of magnetic stripes encoded at 60% or more of the encoding amplitude as defined by ISO 7811.

3.3 Mechanical Specifications

Body Material

PC+20%GF+6 %(W) TEFR

Dimension

Length: 118.7mm

Width: 100mm

Height: 30.2mm

Weight

Approx. 100g

Magnetic Head Life

Over 1M swipes

Power Required

DC 9~15V, 250mA

Power Consumption

Stand_by: 50mA

Working: 100mA, 250mA (max.)

Communication

Standard RS232 signal levels

Ripple

250mVp-p Max.

Dielectric Strength

250VDC for 1 minute

Insulation Resistance

10M Ω min. at 250VDC

3.4 Environmental Specifications

Temperature

Operating: -10 to 50°C

Storage: -30 to 70°C

Humidity

Operating: 15 to 90% (non condensing)

Storage: 10 to 90% (non condensing)

3.5 Pin Assignment

PCB-J1 Pin Assignment

Pin #	
1	GND
2	TXD
3	RXD
4	12VDC
5	RTS
6	CTS
7	Shield

DB9 Cable Pin Assignment

DB9	SIGNAL	DIRECTION	PCB-J1	SIGNAL
1				
2	RXD	← Serial data to host	2	TxD
3	TXD	→ Serial data from host	3	RxD
4				
5	GND		1	GND
6				
7	RTS	→ Clear to Send Data	6	CTS
8	CTS	← Request to Send Data	5	RTS
9				

3.6 Communication

Synchronization

The interface receives and transmits serial asynchronous data at voltage levels compatible with the RS232 specification.

Signal

Logic 1 = -3 volts to -15 volts

Logic 0 = +3 volts to +15 volts

Baud Rate

Default: 38400

Optional: 1200, 2400, 9600, 19200, 38400, 57600, 115200

Word Length

Default: 8 data bits

Optional: 7 data bits. (Only Uses in USI1 protocol)

Parity

Default: None

Optional: None, Even, Odd, Mark, Space. (Only Uses in USI1 protocol)

Stop Bit

Default: 1

HCR360 Factory Default Setting

Communication protocol: 38400bps, 8 data bits, none parity, 1 stop bit

Track setting: 3 track enable

MSR Prefix: disable

Chapter4: Basic Description

4.1 Transmission Parameters

Each character is transmitted using a ten-bit character frame: one start bit, 8 data bits, no parity, and 1 stop bit. The factory default communication BAUD rate between the host and the original HCR360 reader is 38400 bps. Other speeds may be chosen using the configuration program. The other available speeds are 115.2k, 57.6k, 19.2k, 9600, 4800, 2400 and 1200 bps.

4.2 Transaction Protocols

HCR360 supports the USI1/2 communications protocol to talk with the host.

USI1/2 is a protocol developed by American Magnetics, which has features allowing it to be used for multi-dropping and for large (up to 64K bytes) messages. Though HCR360 does not support multi-dropping at this time, a future variation of the device may. This protocol is described in Chapter 5: USI1/2 Protocol.

4.3 Power On/Reset

When HCR360 power is up the device checks the validity of the memory to make sure it is functioning correctly. The power up will by default send a 3AH (‘:’) to the host to indicate that a power cycle has occurred. The reader can be configured to send any character except a 00H on power up. If configured with a 00H the reader will send no character to the host on power up. If a reset command is sent to the reader a 3AH (‘:’) to the host to indicate that a reset has occurred and the reader initialization has been completed.

Chapter5: USI1/2 Protocol

5.1 Transport layer

Each message to or from the reader shall be formatted in frames according to the following protocol rules. A maximum of 100 milliseconds is allowed between successive bytes of a message; if more than 100 ms elapses without a new byte, the message is considered spurious and is ignored. The receiver then starts to look for a new message.

USI1 Message Frame

Header	Data	Trailer	
STX	COMMAND or RESPONSE	ETX	BCC

STX is the value 02H and is used to signal the start of a message.

COMMAND or **RESPONSE** is the message being sent. This is either a command to the reader or a response from the reader. Any value except the ETX character may be sent as part of COMMAND.

ETX is the value 03H and is used to signal the start of a message.

BCC is the block check character. Its value is computed by exclusive-or the value of all preceding bytes in the message starting with the STX byte to the ETX byte inclusive.

That is $BCC = STX \oplus COMMAND \text{ or } Response \oplus ETX$

USI2 Message Frame

Header				Data	Trailer
SOH	ADDR	LENH	LENL	COMMAND or RESPONSE	BCC

OR

Header				Data	Trailer	
SOH	ADDR	00H	00H	COMMAND or RESPONSE	EOT	BCC

SOH is the value 01H and is used to signal the start of a message.

ADDR is the address of the intended recipient. This field is reserved and should always be 00H.

LENH and **LENL** give the length of the Data portion of the message. If the values of LENH and LENL are zero, the length of the data portion is determined by the presence of the EOT byte.

COMMAND or **RESPONSE** is the message being sent. This is either a command to the reader or a response from the reader. If LENH and LENL are not equal to zero, any values may be sent in the COMMAND field. If LENH and LENL are both zero, any value except the EOT character may be sent as part of COMMAND.

EOT is optional. It is present only in messages where LENH and LENL is both equal to zero. In these messages, EOT signals the end of the data portion of the message. The value of EOT is 04H. NOTE: Specifying the length in LENH and LENL is the recommended method.

BCC is the block check character. Its value is computed by exclusive-or the value of all preceding bytes in the message starting with the SOH byte to the EOT byte inclusive.

That is $BCC = SOH \oplus ADDR \oplus LENH \oplus \dots$

5.2 USI1/2 Host to Reader Command

There are two groups of commands, which can be sent to the reader.

1. The first is used to manipulate the reader (LED, status, etc.).
2. The second is used to manage Magnetic Stripe Card operations.

The reader responses to the host are contained in the sections with the commands unless there was a problem such as a communication error that see the Responses to the Host.

5.3 Reader Command Description

% (25H) – Retransmit

COMMENT Retransmits the last message sent by the reader.

NOTE Command is turned off in self-arm mode.

70 (3730H) or 90 (3930H) – Serial Number Report

COMMENT Transmit serial number information.

The Serial number will be stored in the EEPROM and stored as an eight-digit ASCII character array.

EXAMPLE “00000000”

71 (3731H) or 91 (3931H) – Copyright Report

COMMENT Transmit version and copyright information.

Send this when you want to know the version and copyright of HCR360 firmware currently loaded. The response is an ASCII string giving the firmware date (yymmdd), reader type and the firmware version number followed by the firmware copyright statement. The firmware copyright statement is absent in OEM version.

EXAMPLE “031226,HCR 3600151A:V1.A”

72 (3732H) or 92 (3932H) – Reader Model Number Report

COMMENT Transmit reader configuration information.

The model number will be stored in the reader code area and stored as a three to eight-digit ASCII string.

EXAMPLE “HCR360”

73 (3733H) or 93 (3933H) – Reader PCB Number Report

COMMENT Transmit reader PCB number.

The PCB number will be stored in the EEPROM and stored as an eight-digit ASCII character array.

EXAMPLE “360-REV4”

76 (3736H) or 96 (3936H) – Boot loader Version Number Report

COMMENT Transmit bootloader version number.

EXAMPLE “1.0”

77 (3737H) or 97 (3937H) – Reader Configuration Data Report

COMMENT Transmit the reader configuration data.

The data from the reader configuration area will be transmitted to the host as hex values with the command “77” [offset] [num]. The reader will return any or all the bytes from the reader configuration. The offset is an optional byte and the available value is from 0x00 to 0x3F. The num is an optional byte specifying the number of configuration bytes to be returned. If the offset and length bytes are omitted then the current configuration starting at offset 0 is transmitted.

EXAMPLE:

```
BE 0C 05 00 00 00 00 61 30 33 31 31 32 38 00 7D
28 54 4B 31 3A 3A 45 6E 64 29 28 54 4B 32 3A 3A
45 6E 64 29 28 54 4B 33 3A 3A 45 6E 64 29 00 00
00 00 00 00 00 00 00 00 3A 48 43 52 33 36 30 00
```

78 (3738H) or 98 (3938H) – Reader Customer Configuration Data Report

COMMENT Transmit the reader customer configuration data.

The data from the reader customer configuration area of the EEPROM will be transmitted to the host as hex values with the command “78” [offset] [num]. The reader will return any or all the bytes from the reader configuration. The offset is an optional byte and the available value is from 0x00 to 0x3F. The num is an optional byte specifying the number of configuration bytes to be returned. If the offset and length bytes are omitted then the current configuration starting at offset 0 is transmitted.

EXAMPLE:

```
31 30 30 30 30 30 30 30 33 36 30 2D 52 45 56 33
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

79 (3739H) or 99 (3939H) – Reader Manufacturing Configuration Data Report

COMMENT Transmit the reader manufacturing configuration data.

The data from the reader manufacturing configuration area of the flash will be transmitted to the host as hex values with the command “79” [offset] [num]. The reader will return any or all the bytes from the reader configuration. The offset is an optional byte and the available value is from 0x00 to 0x7F. The num is an optional byte specifying the number of configuration bytes to be returned to the host. If the offset and length bytes are omitted then the current configuration starting at offset 0 is transmitted.

EXAMPLE:

```
BE 0C 05 00 00 00 00 61 30 33 31 31 32 38 00 79
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 3A 48 43 52 33 36 30 00
```

NOTE: Commands 70 to 79 were same as 90 to 99 and supported for previous version reader compatible.

8 (38H) – Slot Switches' Report

COMMENT Report the status of the slot switches. The response is in the range of the ‘p’ to ‘s’ as follows:

- p (70H) Neither switch activated.
- q (71H) Front switch activated (card present).
- r (72H) Rear switch activated, illegal condition, hardware problem.
- s (73H) Front and Rear switches activated (card present and seated).

The reader can be configured to automatically return the slot switch report without needing to send the slot switch report request. Sending the slot switch command when in auto sensor report mode will return the current value.

9 (39H) – Version Report

COMMENT Transmit version information.

Send this when you want to know the version of HCR360 firmware currently loaded. The response is an ASCII string giving the firmware date (yymmdd), reader type and firmware version number.

EXAMPLE “031226,HCR360:V1.B”.

? (3FH) – Select Verbose Responses Command

COMMENT Most error responses until the reader receives a reset command will include a short descriptive message.

\$ (24H) – Reader Status Request

COMMENT Interrogate the reader about its operational status. Two bytes of status information will be returned.

First Status Byte

Bit	Value: 0	Value: 1
0:0	Card not present	Card present
0:1	Card not seated	Card seated
0:2	Unused	Unused
0:3	Unused	Unused
0:4	Non automatic slot switch report	Automatic slot switch report
0:5	No Magnetic Stripe Card data	Magnetic Stripe Card data
0:6	Not armed to read	Armed to read
0:7	Unused	Unused

Second Status Byte

Bit	Value: 00	Value: 01	Value: 10	Value: 11
1:0 - 1:1	Green LED OFF	Green LED ON	Green LED flash	Unused
1:2 - 1:3	Red LED OFF	Red LED ON	Red LED flash	Unused
1:4 – 1:7	Reserved for future use, always zero			

L (4CH) – Green LED ON

l (6CH) – Green LED OFF

M (4DH) – Red LED ON

m (6DH) – Red LED OFF

((28H) – Green LED flash

) (29H) – Red LED flash

COMMENT 1.Turn green/red LED ON/OFF/Flash, as specified.
2.Transmits an acknowledgement "^" (5EH).

NOTE These commands are disabled in the self-arm mode.

(23H) – Configuration Request

COMMENT Return standard one byte or extended 16-byte string with configuration.

NOTE Using the configuration setting command to select standard or extended format.

Standard One Configuration Byte

Bit	Value: 0	Value: 1
0	Track 1 not present	Track 1 present
1	Track 2 not present	Track 2 present
2	Track 3 not present	Track 3 present
3	Latch not present	Latch present
4	ICC connector not present	ICC connector present
5	Power fail unlatch not present	Power fail unlatch present
6	Reserved for future use, always 0.	
7	Reserved for future use, always 0.	

Extended Configuration Bytes (16 bytes)

Byte	0	1	2	3	4	5	6	7-15
Remark	Equip. 0	Equip. 1	Protocol	Speed	Address	Unused	Unused	Reserved, set to 00H

Protocol: 0=USI2; 6=USI1.

Speed: 0=1200, 1=2400, 2=4800, 3=9600, 4=19.2k, 5=38.4k, 6=56k, and 7=115.2k bps.

Address: Always 00H.

Equip. 0 — Extended Configuration Byte 0

Bit	Value: 0	Value: 1
0	User card connector not present	User card connector present
1	Reserved for future use, always 0	
2	SAM Board not present	SAM Board present
3	CTS not present	CTS present
4	Track 1 not present	Track 1 present
5	Track 2 not present	Track 2 present
6	Track 3 not present	Track 3 present
7	Latch not present	Latch present

Equip. 1 — Extended Configuration Byte 1

Bit	Value: 0	Value: 1
0	Power fail not present	Power fail present
1 - 7	Reserved for future use, always 0.	

<7FH> – Warm Reset

COMMENT Abort all current actions and cause the device to execute all initialization functions. The device will respond as it would for a "power up" cycle, but always returning a ":" (3AH).

<09H> – Configuration Setting

COMMENT This command is used to set configuration in EEPROM.

FORMAT The command (09H) is followed by an at least 3 byte configuration setting command to set the configuration in EEPROM. The HCR360 configuration can be set by this command or by the Configuration Setting Protocol. Please see "HCR360 Configuration Guide" for details.

EXAMPLE To set "Self-arming mode enable" send the following four bytes: <09>"SAE"(09H, 53H, 41H, 45H).

Following are brief introduction of configuration commands, please refer to "HCR360 Configuration Guide" for detail information.

- BRx** (42h 52h x) — Set Baud Rate. x = '0' ~ '7'.
- BL0** (42h 4Ch 00h) — Enter Boot loader mode. (Warning: Don't use this command)
- DFx** (44h 46h x) — Set configuration to the Manufacture Default Setting. x = 00H ~ 02H.
- ECx** (45h 43h x) — Extended Configuration Report Enable/Disable. x is 'E' or 'D'.
- ESx** (45h 53h x) — ES & SS Enable/Disable. x is 'E' or 'D'.
- EV0** (45h 56h 00h) — EEPROM verify.
- FAx** (46h 41h x) — Set Track 1 Prefix Code, x can be up to 5 bytes.
- Fax** (46h 61h x) — Set Track 1 Suffix Code, x can be up to 5 bytes.
- FBx** (46h 42h x) — Set Track 2 Prefix Code, x can be up to 5 bytes.
- Fbx** (46h 62h x) — Set Track 2 Suffix Code, x can be up to 5 bytes.
- FCx** (46h 43h x) — Set Track 3 Prefix Code, x can be up to 5 bytes.
- Fcx** (46h 63h x) — Set Track 3 Suffix Code, x can be up to 5 bytes.
- IRx** (49h 52h x) — Set Read Direction while in Self-Arming mode, x = '0' ~ '2'
- LCx** (4Ch 43h x) — LRC Enable/Disable, x = 'E' or 'D'. NOTE: The LRC will be always disabled while the SS/ES was disabled.
- PHx** (50h 48h x) — Set Power On character, by default x is '!'.
- PNx** (50h 4Eh x) — Set PCB Number, x up to 8 bytes.
- PTx** (50h 54h x) — Set RS232 parity. x= '0' - '4' (30h – 34h).(Only uses in USI1 Protocol).
- RE0** (52h 45h 00h) — Read all of EEPROM Data.
- RP0** (52h 50h 00h) — Respond current used baud rate and Protocol.
- SAx** (53h 41h x) — Self-Arm Mode Enable/Disable, x is 'E' or 'D'.
- SEx** (53h 45h x) — Self-Arm Mode data send by current protocol wrapped Enable/Disable, x is 'E' or 'D'.
- SPx** (53h 50h x) — Set Track Separator. x = any one character.
- SRx** (53h 52h x) — Set Sensor Reporting Enable/Disable, x = 'E' or 'D'.
- SNx** (53h 4Eh x) — Set Serial Number, x is an 8-digits ASCII string.
- TAx** (54h 41h x) — Set Track 1 ID, x = any one character.
- TBx** (54h 42h x) — Set Track 2 ID, x = any one character.
- TCx** (54h 43h x) — Set Track 3 ID, x = any one character.
- TKx** (54h 4Bh x) — Set Transmitting Data Tracks

5.4 Magnetic Stripe Card Command Description

P (50H) – Arm to Read

- COMMENT**
1. Clear read data buffers.
 2. Transmit command acknowledgement (“^” 5EH).
 3. Wait for card insert/withdrawal.
 4. Transmit read acknowledgement (“^” Magnetic Stripe Card or ">" other media type) after card insert/withdrawal.

After an "Arm to Read" command is received and acknowledged the only commands that will be accepted for execution are: <ESC> (Abort), "\$" (Status), LED control commands, and Reset command.

In self-arm mode, it is not necessary to send this command, if sent it will temporarily override self-arm mode.

p (70H) – Arm to Read (Used for Manufacturing Test Only)

- COMMENT**
1. Clear read data buffers.
 2. Transmit command acknowledgement (“^” 5EH).
 3. Wait for card insert/withdrawal.
 4. If Magnetic Stripe Card media is detected a "(" (28H) byte is sent, when media detect goes inactive a ")" (29H) byte is sent.
 5. If another media detected transmit read acknowledge ">" after card insert/withdrawal.

This is similar to the 'P' command but send '(' at start of magnetic stripe card data and ')' at end.

<ESC> (1BH) – Abort Arm to Read

- COMMENT**
1. Clear read data buffers.
 2. Abort Arm to Read Command.
 3. Transmit command acknowledge (“^” 5EH).

Q (51H) – Transmit Track 1 data

R (52H) – Transmit Track 2 data

S (53H) – Transmit Track 3 data

- COMMENT**
1. Detect the card type (ISO/AAMVA/DMV) automatically and process data in the read buffer using detected card type format.
 2. If error is detected, transmit proper error response (*' or '+'), refer to “USI1/2 Responses to

the Host”.

3. Else, transmit data in ASCII.

q (71H) – Transmit track 1 data

r (72H) – Transmit track 2 data

s (73H) – Transmit track 3 data

COMMENT

1. Process data in the read buffer for the specified track and format.
2. If no errors transmit data in ASCII.
3. If error is detected, transmit proper error response (*' or '+'). Refer to “USI1/2 Responses to the Host”.

FORMAT These command characters are followed by an ASCII number(1, 2 or 3) representing the ISO track format for processing the Magnetic Stripe Card data.

These commands allow a track to be transmitted with a different track's ISO format. For example to transmit track 1's data using ISO track 2 format send "q2" (71, 32H).

I (49H) – Transmit "Error Data"

COMMENT

1. If the previous read command resulted in an error (response was '*', e.g. no end sentinel, parity or LRC error), transmit the data regardless of the error(s).
2. If there was no error, transmit '+'.
3. If magnetic stripe card data detected but the track which previous read no data, transmit '^'.
4. If no any magnetic stripe card data detected, transmit '*'.

The "I" command allows you to recover data even if the reader detects data errors.

U (55H) – Transmit custom data, forward, track 1

V (56H) – Transmit custom data, forward, track 2

W (57H) – Transmit custom data, forward, track 3

COMMENT

1. Process the data in the read buffer for the specified track, based upon the "number of bits" character.
2. Transmits data formatted one byte per character.

FORMAT These commands may be either 2 or 3 bytes long.

To request custom data with no internal null characters allowed, use the two byte command, "transmit custom data" command, followed by an ASCII number (3,4,5,6,7 or 8), which specifies the number of bits per customer

character. For example: "U7"

To request custom data with internal null characters, use the three byte command, "transmit custom data" command, followed by an underline character '_' (5FH), and the ASCII number (3,4,5,6,7 or 8) for the number of bits per character. For example: "V_5"

u (75H) – Transmit custom data, reverse swipe , track 1

v (76H) – Transmit custom data, reverse swipe , track 2

w (77H) – Transmit custom data, reverse swipe, track 3

- COMMENT**
1. Process the reversed-bit data in the read buffer for the specified track, based upon the "number of bits" character.
 2. Transmit data in normal order. The data is formatted one byte per character.

FORMAT These commands may be either 2 or 3 bytes long.

To request custom data with no internal null characters allowed, use the two byte command, "transmit custom data" command, followed by an ASCII number (3,4,5,6,7 or 8), which specifies the number of bits per customer character. For example: "u7"

To request custom data with internal null characters, use the three byte command, "transmit custom data" command, followed by an underline character '_' (5FH), and an ASCII number (3,4,5,6,7 or 8) for the number of bits per character. For example: "v_5"

5.6 USI1/2 Responses to the Host

Code	Meaning	Description
^ (5EH)	Acknowledge	Acknowledges correct completion of most recent command.
* (2AH)	Error	Command was received correctly, but could not be completed.
+ (2BH)	No Magnetic Stripe Card Data	Command was received correctly.
? (3FH)	Communication Error	Command was not received correctly.
! (21H)	Invalid Command	Command is not a recognized.
: (3AH)	Power On report	The reader has just completed a power on.
~ (7Eh)	Unavailable	Hardware not available to complete this request.
> (3EH)	Non-Magnetic Stripe Card	If the reader is in arm to read and a card is inserted or extracted but no Magnetic Stripe Card data is detected.

Chapter6: Self-arm Mode

The reader can be configured to operate in a self-arm mode so that after a Magnetic Stripe Card media insertion or withdrawal, it automatically sends data that complies with ISO, AAMVA or DMV specification to the host. The green LED is ON while the reader is in the self-arm mode. No Host LED control is allowed in self-arm mode.

In the self-arm mode, the LED behaves as follows.

Reader Action	LED state
Waiting to read	Green
Reading	Yellow
Good read	Green
Bad read	Red blink

In addition, in the self-arm mode, the default is not to send any USI2 protocol information with the data. The user may choose to send this information by setting a bit in reader configuration.

Up to five bytes of programmable prefix and suffix, and one byte each of track ID and track separator per track are also supported through the configuration.

Transaction Data Format (without protocol enveloped):

<T1ID><T1Prefix><SS><TRACK1 DATA><ES><LRC><T1Suffix><Separator>

<T2ID><T2Prefix><SS><TRACK2 DATA><ES><LRC><T2Suffix><Separator>

<T3ID><T3Prefix><SS><TRACK1 DATA><ES><LRC><T3Suffix>

Tx ID: optional, one byte.

Prefix: optional, up to 5 bytes.

SS: Start sentinel, optional.

ES: End sentinel, optional.

LRC: optional

Suffix: optional, up to 5 bytes.

Separator: one byte, default is <0DH>