PORT POWERED
INSERTION READER
TECHNICAL REFERENCE MANUAL

Manual Part Number 99875129 Rev 19

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MAGTEK®

REVISIONS

Rev Number	Date	Notes
1	7 Dec 98	Initial Release
2	29 Mar 99	Title: Deleted Dual Head in order to add single head units; Section 1: Added 6 part numbers and Windows Driver reference, added transfer rates to specification; Section 2: Added Molex part number, added note to Table 2-1, removed connector J5 from Figure 2-2, and added note for optional cable; Section 3: Added Figure 3-4, Timing.
3	14 Jun 99	Title: Dropped MT-215 and RS-232; Sec 2, added Table 2-2, Pin List, and changed Figure 2-2 , added Pin Numbers for optional Cable 21040077.
4	1 Dec 99	Section 2: Updated J4 Connector Table.
5	11 Jan 00	Section 1: added Track 2-3 version to Table 1-1; Section 2: Clarified Fig 2-2 for connector uses with Tracks. Remove cable 21051498; add cables 21051499 and 21041469. Section 3: added Track 2-3 version to "Reader to Host Formats" and to "Timing for ID sign-on and Transmission Bursts."
6	14 Sep 00	Section 1: Specifications, changed all cm dimensions to mm. Corrected temperature ranges. Written to *SI, International System of Units*.
7	6 Oct 00	Section 1: Editorial; Section 3: Qualified Inquiry command for two models.
8	01 Jan 01	Front Matter: Changed copyright date; Changed warranty from 90 days to one year; added agency approvals to current manual.
9	20 Mar 01	Front Matter: Added Address for Warranty RMA. Changed Agency approvals to Class B. Section 2: Fig 2-1, Added to Back View "of Bezel". Section 3: Added Transmission examples. Added Appendix A. Bezel Design
10	01 Aug 01	Front Matter: Editorial corrections to CE and UL/CUL.
11	27 Nov 01	Sec 2, Fig 2-2: Added extended bezel illustration; Appendix A: Added extended bezel mechanical drawing
12	09 Sep 02	Front Matter: added ISO line to logo, changed Tech Support phone number, added new warranty statement. Editorial throughout. Sec 1: added two P/Ns to Configurations, added statement to unbuffered mode. Sec 3: Editorial; Clarified Table 3-2. Added new Appendix A, Optional Firmware Features. Changed Appendix A to B.
13	21 Feb 03	Sec 2: Note added after Figure 2-3 stating cable with tie wrap adds approximately .25 inch to length of unit.
14	13 Mar 03	Replaced some fonts so manual would print on all printers.
15	13 May 03	Front Matter: added ISO line to logo, changed Tech Support phone number, added new warranty statement.
16	26 Jun 03	Changed operating temperature to before (32 ºF) and after (-4 ºF) 1 Nov 03 shipping date.
17	9 May 07	Removed 21065131 & 21066008; modified specifications to reflect change-over to 21063619.
18	25 May 09	Added 21065142. Updated Limited Warranty and Agency approvals.
19	25 Oct 10	Clarified the PCB listing in Table 1-2

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This equipment has been tested and was found to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference with radio communications. However, there is no guarantee that interference will not occur in a particular installation.

FCC COMPLIANCE STATEMENT

This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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This digital apparatus does not exceed the Class B limits for radio noise from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Réglement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numériqué de la classe B est conformé à la norme NMB-003 du Canada.

CE STANDARDS

Testing for compliance with CE requirements was performed by an independent laboratory. The unit under test was found compliant with standards established for Class B devices.

UL/CSA

This product is recognized per Underwriter Laboratories and Canadian Underwriter Laboratories 1950.

RoHS STATEMENT

When ordered as RoHS compliant, this product meets the Electrical and Electronic Equipment (EEE) Reduction of Hazardous Substances (RoHS) European Directive 2002/95/EC. The marking is clearly recognizable, either as written words like "Pb-free", "lead-free", or as another clear symbol (Ⓟ̶ᵇ̶).

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FIGURES and TABLES

Magnetic Stripe
Up Or Down
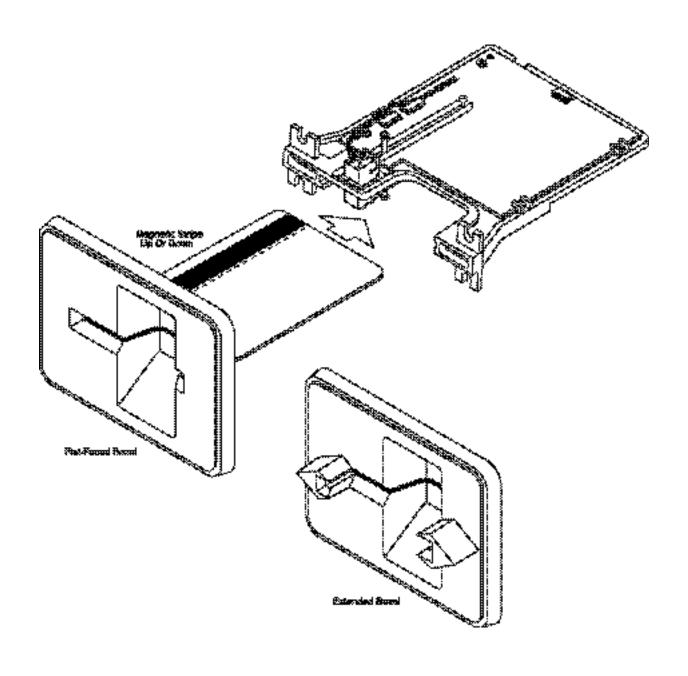
Flat-Faced Bezel

Extended Bezel

Figure 1-1. Port Powered Insertion Reader Configurations

SECTION 1. FEATURES AND SPECIFICATIONS

The Port Powered Insertion Reader can be single or dual head configuration. Figure 1-1 shows the Reader, the card orientation, and two bezel configurations. The dual head configuration can read the card on insertion and removal with the magnetic stripe facing up or down. The single head configuration can read the card on insertion and removal if the stripe is oriented to match the position of the head.

The Reader also has circuitry that automatically ensures that the ISO magnetic stripe is read in the case where a dual-stripe JIS (Japanese) credit card is inserted on the dual head unit.

The Reader conforms to the following specifications: ISO (International Standards Organization), ANSI (American National Standards Institute). The Reader conforms to specifications for Tracks 1 and 2 of the following 3-Track formats: AAMVA (American Association of Motor Vehicle Administrators) and CDL (California Drivers License).

FEATURES

Features of the Reader are as follows:

- Port Powered RS-232 Interface – No power pack required, powered from PC port with computers having an RS-232 interface.
- Card Present Opto-sensor – Detects if card is fully inserted in Reader.
- Single or Dual Read Head – Configuration can be Single or Dual Read Head.
- JIS Discrimination circuitry – On dual head modules, automatically detects if a dual-stripe JIS (Japanese Industrial Standard) card is inserted, and autoroutes the ISO data signals to microcontroller. This ensures that dual-head features still work for Japanese card holders.
- Mag-Stripe reading during insertion and removal of card – For reliable card reading.
- Open Chassis design – Provides superior debris clearing capability.
- Half-card Drop out – Allows half-sized credit cards and coins to be cleared from insert channel.
- Isolated PCB – Isolates electronics from debris and liquids.
- AGC (Automatic Gain Control) in MagTek's latest read IC – Enhances read performance with less susceptibility to RF interference.
- Beam-mounted Read-heads – Provides superior tracking of bowed or warped cards.
- Ruggedized Chassis and Bezel Material – Improves temperature and impact performance.
- Command Selectable Buffered or Unbuffered Modes – Provides greater versatility of operating modes.
- Command Selectable Framing Characters – Provides selection of STX, ETX, ESC, and CR.
- ASCII Message Format at 9600 bps.

CONFIGURATIONS

Table 1-1 lists the part numbers, single or dual head, head positions, and bezel types.

Table 1-1. Configurations*

Part Number	Single or Dual Head	Head Position**	Bezel	Track	Head Connector
21065085	Single	Head down /left	No Bezel	1-2	J3
21065086	Single	Head up/right	No Bezel	1-2	J2
21065087	Single	Head down/left	Extended Bezel	1-2	J3
21065088	Single	Head up/right	Extended Bezel	1-2	J2
21065089	Single	Head down/left	Flat Faced Bezel	1-2	J3
21065090	Single	Head up/right	Flat Faced Bezel	1-2	J2
21065091	Dual	Both	No Bezel	1-2	J2, J3
21065092	Dual	Both	Extended Bezel	1-2	J2, J3
21065093	Dual	Both	Flat Faced Bezel	1-2	J2, J3
21065097	Single	Head down/left	Flat Faced Bezel	2-3	J2
21065142	Dual	Both	Flat Faced Bezel	1,2,3	J2, J3

*   Cables not supplied. (See Section 2 for descriptions of cables.)
**   The magnetic stripe is inserted in the same orientation as the head position; for example,
      Head down/left means Magnetic Stripe down or left.

MODES OF OPERATION

The Reader can operate in either unbuffered or buffered mode. The modes are described below.
The note that follows applies to both modes.

Note

> *The insertion and removal of the card must be done in a*
> *continuous motion. If not, the Reader may not read the encoded*
> *data properly. In that case, the Reader responds by either*
> *transmitting the ASCII character "E" representing an error, or by*
> *not transmitting any character, which indicates that the Reader*
> *has not detected data and the card was not completely inserted.*

Unbuffered Mode

When a card is inserted and removed, a read attempt is made during both insertion and removal.
If the read is successful, data (including the two sentinel characters) is sent to the PC. The data
is transmitted immediately after removing the card and not retained in the Reader.
When operating in the unbuffered mode, the Reader does not need to receive commands from the
host in order to transmit data or status characters, and data, if available; however, the Reader
does respond to an "Inquiry Command" by sending status characters. The inquiry command that
requests the transmission is the ESCAPE (ESC) character followed by "I" (0x49).

In the unbuffered mode, data can be retrieved from the card after the card has been inserted and while it is blocking the rear sensor. Issuing an "Inquiry Command" (see Section 3) will retrieve data from the card.

Buffered Mode

When a card is inserted and removed, a read attempt is made during both insertion and removal. Upon removal of the card if the read is successful, data (including the two sentinel characters) is stored in a memory buffer on the Reader and is not transmitted until the Reader receives an "Inquiry Command" from the host. This command is the ESCAPE character followed by "I". The data or error status is available when the back sensor is blocked, however the Release Command will not clear the buffer. The Reader cannot read another card until the buffer is cleared. To clear the buffer, the Host must transmit the ESCAPE character followed by "R".

The unit will always output a 1 and enabled optional characters when the back sensor is first blocked. It will output a 0 and enabled optional characters when the card has been withdrawn. See Section 3, Table 3-4 for detailed examples.

RELATED DOCUMENTS

MagTek 99875125   The MagTek Device Drivers for Windows, Part Number 30037385; may be used with the Port Powered Insertion Reader. The title of the manual is *MagTek Device Drivers For Windows Programming Reference Manual*.

The Port Powered Insertion Reader will read cards that meet the standards defined by ISO (International Standards Organization):

ISO 7811   Identification Cards - Mag-stripe Cards, Tracks 1-3
ISO 7810   Identification Cards - Physical Specifications (ID-1 Cards)

Available from ANSI   Phone 212-642-4900, www.ansi.org

SPECIFICATIONS

The Specifications are listed in Table 1-2.

Table 1-2. Specifications

OPERATING		
Reference Standards	ISO7810 and 7811; JIS B9561	
Power Input	From RS-232 Interface	
Interface Signal	RS-232 compatible	
Message Format	ASCII	
Tracks (tracks 1-2 versions)	Reads ISO Tk1 and Tk2 data locations	
Tracks (tracks 2-3 versions)	Reads ISO Tk2 and Tk3 data locations	
Track Card Speed	3 to 100 IPS (7,6 to 250 cm/sec)	
Head Life	500,000 Insertion Cycles (1,000,000 head passes)	
ELECTRICAL		
	Printed Circuit Board 21063608 (2-Track Models)	**Printed Circuit Board 21063619 (3-Track Models)**
DTR Voltage (Input) V_{DTR}	+5 to +15 VDC operating +16 VDC absolute maximum -25 VDC absolute maximum	+5 to +15 VDC operating +/-20 VDC absolute maximum
Transmit Data (TXD)	+/-5 VDC minimum	+/-(V_{DTR} – 0.4 V) VDC minimum
Receive Data (RXD)	+/-15 VDC operating +/-25 VDC absolute maximum	+/-15 VDC operating +/-20 VDC absolute maximum
Communication (bursts of 5 ms transmit with 10 ms idle between bursts)	Transfer Rate: 9600 bps, 33% duty cycle; 8 data bits, no parity, 1 stop bit	Transfer Rate: 9600 bps, 33% duty cycle; 8 data bits, no parity, 1 stop bit
DTR Current Or Auxiliary Supply Current (Positive supply to unit)	See below	* 3.7 mA minimum required under all operating conditions with cable capacitance limited to 1000pF (and practically unlimited inrush current)
Power On	12 mA Max (and practically unlimited inrush current)	See above.
Transmitting	11 mA typical, 5 ms duration	See above.
Quiescent	6 mA typical, continuous	See above.
RXD Current	Within RS-232 specified limits (does not function as a negative supply to unit)	Average current approximates that of a normal RS-232 load. (Negative supply to unit)
Output Cable	Not Specified	See note "*" below.
ENVIRONMENTAL		

Temperature
     Operating
	Units shipped prior to Nov 1, 2003:
	   32 ºF to 131 ºF (0 ºC to 55 ºC)
	Units shipped after Nov 1, 2003:
	   -4 °F to 158 °F (-20 °C to 70 °C)
		-40°F to 158°F (-40°C to 70°C)

Storage	-40 ºF to 176 ºF (-40 ºC to 80 ºC)	-40ºF to 176ºF (-40ºC to 80ºC)

Humidity
     Operating
     Storage
	10% to 90% noncondensing
	Up to 100% noncondensing	

MECHANICAL			
Dimensions	Without bezel	With Flat-faced Bezel	With Extended Bezel
Length	4.4" (111.8 mm)	4.58" (116.3 mm)	5.09" (129.3 mm)
Width	3.51" (89.2 mm)	4.00" (101.6 mm)	4.00" (101.6 mm)
Height	1.24" (31.5 mm)	3.00" (76.2 mm)	3.00" (76.2 mm)
Bezel Thickness	Flat Faced: 0.31" (7.9mm); Extended: 0.82" (20.8 mm)		
Weight	Without bezel	With Flat-faced Bezel	With Extended Bezel
	2.25 oz (65 gr)	3.85 oz (109 gr)	4.02 oz (114 gr)

* The 3.7 mA figure is for continuous data transmission at 33% duty cycle while reading a card with both heads at once (stripe on each side). Typical capacitance from TXD is about 1000 pF for our standard 2 m cable. Minimum DTR current 'I_T' required for continuous transmission at 33% duty cycle, while reading a card with both heads, with cable capacitance 'C' is approximately:

$$I_T = (3.5 \text{ mA}) + (10 \text{ V}) * 33\% *(9600 \text{ Hz}) / 2 * C.$$

Maximum transmission burst time 'T' at 33% duty cycle for RS-232 compatibility is approximately:

$$T = (64 \text{ μF}) * (5 \text{ V} - 3.4 \text{ V}) / (I_T - I_S),$$ where I_S is the current supplied by the DTR line (T is unlimited for $I_S > I_T$)

Subtract 1 mA from I_T if it is known that both heads will not be used simultaneously (this is guaranteed on single-head versions).

A note about "port-powered" readers: These readers operate off some combination of otherwise unused RS-232 lines, DTR and TXD from the host in this case. Per the RS-232 specification, these lines are only required to drive a 3 kΩ load at +/-5 V. This is a current of merely 5 V / 3 kΩ=1.67 mA per line. All "port-powered" readers fundamentally require more current than 1.67 mA (consider that at least 1.67 mA must be supplied to a 3 kΩ load, and some extra current is needed for the circuit that does so). Thus these readers are not technically guaranteed to work unless multiple unused lines are used for power and/or some duty cycle limit is imposed on transmitting while employing an energy storage device (a capacitor). In practice, however most ports can easily supply the 2.7 mA at +5 V required by this *new* reader on DTR and the near-specification average TXD (from host) current at -5 V. This *new* reader is MagTek's lowest current "port-powered" reader to date. Strictly speaking, some RS-232 ports may not supply the required current, and this is the reason for including a current consumption specification for a "port-powered" device. The current drive capability of an RS-232 port is not typically specified, so experimentation may be required in a particular application. If more current is needed for the positive supply, RTS may be paralleled with DTR (both host-referenced) in the cabling to the unit. If this is done, the host must of course hold RTS high.

SECTION 2. INSTALLATION

This section describes cabling information, mounting dimensions and PCB layout.

The installation consists of mounting the Reader and connecting the cable. The head may be on top of the PCB, under the PCB, or if the unit has dual heads, both. The head, or heads, are installed in the factory to customer specifications.

CONNECTORS

The connector pin list is shown in Table 2-1. The mating connector for J4 is Molex 51021-0400. The terminals are Molex 50058-8000.

Table 2-1. J4 Connector - RS232

PIN NUMBER	SIGNAL (HOST AS REFERENCE)
J4-1	RXD (To PC)
J4-2	TXD (From PC)
J4-3	DTR (From PC)
J4-4	GND

All pins must be connected as shown.

OPTIONAL RS-232 CABLE

Optional serial cables, part numbers 21051499 (black) or 21041469 (white), are available. One end connects to J4 and the other end is a DE-9 female. The pin list for the cable connectors is shown in Table 2-2.

Table 2-2. Pin List for Cables 21051499 and 21041469

P1	SIGNAL	COLOR	P2
1	NC*	--	--
2	RXD	YELLOW	1
3	TXD	GREEN	2
4	DTR	ORANGE	3
5	GND	BROWN	4
6-9	NC*	--	--

All pins must be connected as shown.
*   NC = No connection

MOUNTING

Figure 2-1 shows the dimensions for mounting when using a flat-faced MagTek Bezel.
Figure 2-2 shows the dimensions for mounting when using an extended MagTek Bezel. In these configurations, the top view and the side view show the head mounted under the PCB with connector J2 used. Note that for newer units (using PCB 21063619), the printed circuit board is reduced in size from that shown, and the location of J4 is shifted.

The other head configurations are shown in Figure 1-1.

Note

> *For users who are interested in designing their own bezel, please refer to the dimensions provided in Appendix A.*

Figure 2-3 shows the board layout and indicates the cable connections for all head positions.
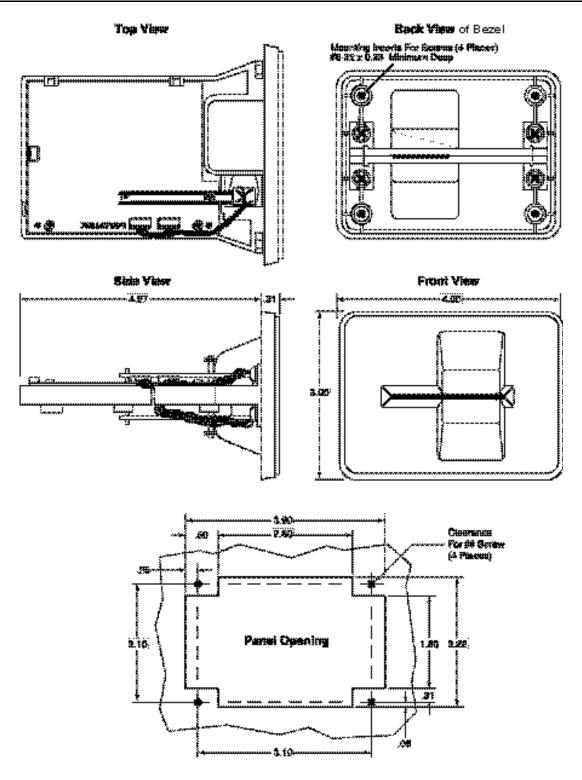
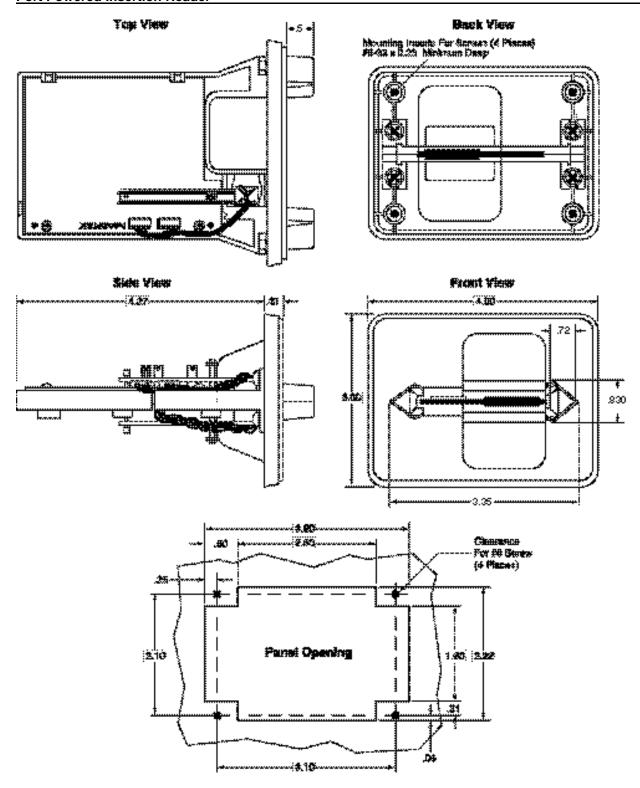**Figure 2-1. MagTek Flat-Faced Bezel Mounting Dimensions**

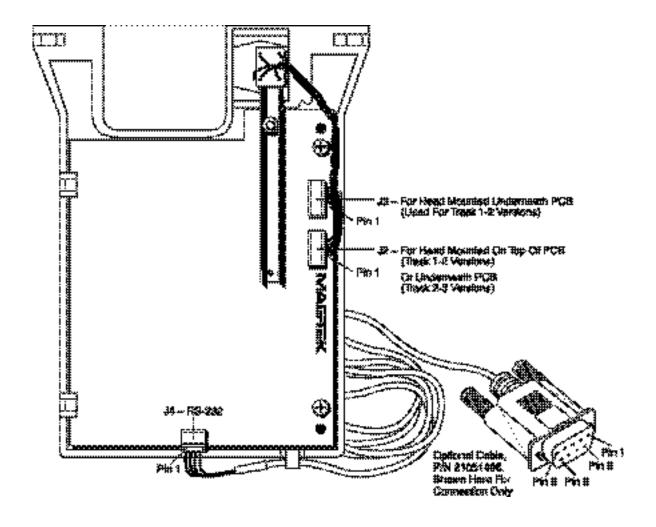**Figure 2-2. MagTek Extended Bezel Mounting Dimensions**

Figure 2-3. Board Layout and Cable Connections

Note

*As shown in Figure 2-3, there is also a cable with a tie wrap,
which may add to the length of the unit. If used as shown,
approximately 0.25 inch is added to the length of the unit.*

CARD INSERTION AND ORIENTATION

The Reader can be mounted in two positions as shown in Figure 2-4. On the left panel of the illustration, the card is inserted with the magnetic stripe to the left. On the right panel of the illustration, the card is inserted with the magnetic stripe up. These are the mounting positions that permit any foreign object inserted into the slot to drop out of the reader.

The card may be inserted with the magnetic stripe either facing up or down, and data is read in either the forward or reverse direction as indicated in the illustration. For forward read, the start sentinel is read first; for reverse read, the start sentinel is read last.
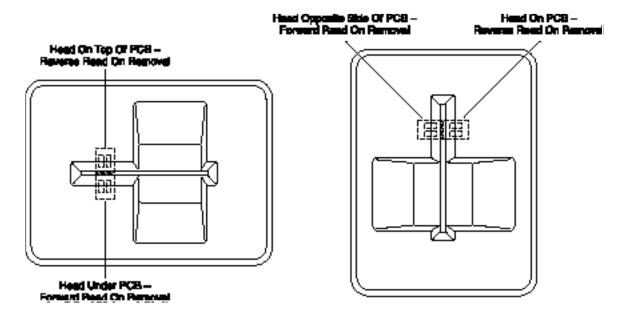

Figure 2-4. Card Insertion and Orientation

Although the card is read during insertion, the data will not be transmitted until the card is withdrawn. If an error is encountered during insertion, the card will be read again as the card is removed. In either case, the device will indicate that the card has been inserted when the rear sensor is blocked.

SECTION 3. COMMANDS, FORMATS, TIMING

This section includes commands, message formats, and transmission timing.

The MagTek Device Drivers for Windows, part number 30037385, may be used with the Port Powered Insertion Reader. When these drivers are used, refer to *MagTek Device Driver for Windows, Programming Reference Manual*, Part Number 99875125.

When power is applied, the Reader transmits a sign-on ID message. About 150 milliseconds after DTR is applied, the Reader sends the part number of the firmware in the following form: 21088819A01. The first 8 characters indicate the firmware number; the letter is the revision, which is followed by a revision sublevel of 01 to 99.

Since the input voltage is supplied by a relatively low source of power, the Reader depends on its input capacitor to maintain proper charge during all operations. In order to reduce the drain on this internal power source during data transmission, the output data is transmitted in 5 to 6 millisecond bursts with a 10-millisecond gap between bursts to allow the capacitor to recharge. The PC software should be able to tolerate this 10-millisecond space between characters.

HOST TO READER COMMANDS

All commands transmitted from the Host to the Reader must be preceded by the ASCII "ESCAPE" character (0x1B). These command messages may contain other framing characters that are ignored by the Reader. Table 3-1 describes the commands and responses. Table 3-2 lists setting and clearing options and the responses.

Table 3-1. Commands and Responses

HOST COMMANDS			READER RESPONSES
COMMAND PREFIX	USE EITHER CHARACTER		
<ESC> (0X1B)	I (0x49)	+ (0x2B)	Inquiry command causes the Reader to transmit data, error, or status message. This command works in both the buffered and unbuffered modes.
<ESC> (01B)	R (0x52)	- (0x2D)	Release command causes the Reader to clear its memory buffer of any data present. This command works only in the Buffered mode.

With firmware part number 21088819 Revision D or above and firmware part number 21088823 Revision B or above, the Inquiry command (I/+) will transmit data after the card has been inserted even if not in the buffered mode. This allows a card to remain in the slot during the transaction. If not in the buffered mode, the card data will also be transmitted when the card is removed. (Refer to Tables 3-3 and 3-4 for examples.)
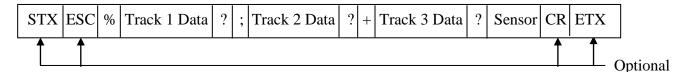
Table 3-2. Options and Reader Responses

COMMAND PREFIX	TO SET OPTION	TO CLEAR OPTION (DEFAULT)	READER FUNCTION
<ESC> (0x1B)	S (0x53)	s (0x73)	Send STX
<ESC> (0x1B)	E (0x45)	e (0x65)	Send ETX
<ESC> (0x1B)	C (0x43)	c (0x63)	Send CR
<ESC> (0x1B)	P (0x50)	p (0x70)	Send ESC
<ESC> (0x1B)	B (0x42)	b (0x62)	Buffered Mode

Note

If DTR is dropped and restored, the setup options are returned to the default state.

READER TO HOST FORMATS

The following diagram represents the format of the data transmitted to the Host:

STX	ESC	%	Track 1 Data	?	;	Track 2 Data	?	+	Track 3 Data	?	Sensor	CR	ETX

Optional

Where optional characters

STX (0x02)	=	Start of text character
ESC (0x1B)	=	Escape character
CR (0x0D)	=	Carriage return character
ETX (0x03)	=	End of Text

are used to frame data.

%	=	Start Sentinel Track 1
;	=	Start Sentinel Track 2
+	=	Start Sentinel Track 3
?	=	End Sentinel

The LRC character is not transmitted.

Track 2 data may be represented as follows:

SS	Track 2 Data	ES	Card Sensor

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Where

SS	=	Start Sentinel: "%" for Track 1; ";" for Track 2; "+" for Track 3
Data	=	Track Data in track order
		that is, Track 1 then Track 2 or Track 2 then Track 3
ES	=	End Sentinel: "?"
Sensor =		"0" no card in reader
		"1" card present in reader (rear sensor blocked)

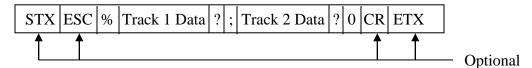If there is an error in one of the tracks, the "Track Data" field will be replaced with "E" (0x45).

An example of a card insertion or removal is as follows:

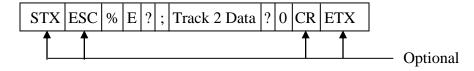| STX	ESC	1	CR	ETX

Optional

Where

1	=	Sensor blocked
0	=	Sensor unblocked

The following is an example of a good read on withdrawal of a card:

STX	ESC	%	Track 1 Data	?	;	Track 2 Data	?	0	CR	ETX

Optional

Where 0 represents the sensor unblocked.

The following is an example of a bad read on Track 1 and a good read on Track 2 on withdrawal of a card:

STX	ESC	%	E	?	;	Track 2 Data	?	0	CR	ETX

Optional

Where

E (0x45)	=	Error
Track 2 Data	=	Good read Track 2 Data
0	=	Sensor unblocked

TIMING FOR ID SIGN-ON AND TRANSMISSION BURSTS

Timing for the ID Sign-on and transmission bursts (5 ms with 10 ms between bursts) are shown in Figure 3-1.
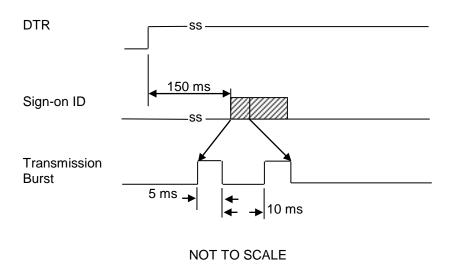

NOT TO SCALE

Figure 3-1. Timing For ID Sign-on and Transmission Bursts.

The firmware controls the operation of ID Sign-on and Transmission bursts. The ID sign-on is

> 21088819Ann (Track 1-2)
> 21088823Ann (Track 2-3)
> 21088851Ann(Track 1,2,3)

Where:

> 210888xx is the firmware part number,

> A is the alpha revision, and

> nn is the number sub-revision.

TRANSMISSIONS EXAMPLES

The following tables show transmission examples:

Table 3-3. Transmission Data Examples Not in Buffered Mode

Action	Port Powered Insert Reader Data	PC Data
Card Inserted	1 (0x31)	
PC Sends Inquiry (if the application needs data before card removed)		<ESC> I (0x1B, 0x49)
Bad read on insert so reader sends error plus card status	%E?;E?11 (0x25, 0x45, 0x3F, 0x3B, 0x45, 0x3F, 0x31, 0x31)	
Card removed	%<track 1 data>?;<track 2 data>?0	
Card Inserted	1 (0x31)	
PC Sends Inquiry (if the application needs data before card removed)		<ESC> I (0x1B, 0x49)
Sends card data plus card status	%<track 1 data>?;<track 2 data>?11	
Card removed (card data is always transmitted when the card is removed if not in buffered mode)	%<track 1 data>?;<track 2 data>?0	

Table 3-4. Transmission Data Examples in Buffered Mode With STX and ETX Included

Action	Port Powered Insert Reader Data	PC Data
PC Sets Buffered Mode		<ESC>B (0x1B, 0x42)
PC Sets STX		<ESC>S (0x1B, 0x53)
PC Sets ETX		<ESC>E (0x1B, 0x45)
Card Inserted	<STX>1<ETX> (0x02, 0x31, 0x03)	
PC Sends Inquiry		<ESC>I (0x1B, 0x49)
If bad read on insert, reader just sends status	<STX>1<ETX> (0x02, 0x31, 0x03)	
If good read on insert, sends card data	<STX>%<track 1 data>?;<track 2 data>?1<ETX>	
Card removed	<STX>0<ETX> (0x02, 0x30, 0x03)	
PC Sends Inquiry		<ESC>I (0x1B, 0x49)
Sends card data	<STX>%<track 1 data>?;<track 2 data>?0<ETX>	
PC Sends Inquiry		<ESC>I (0x1B, 0x49)
Sends card data (data remains in buffer until a release command has been received)	<STX>%<track 1 data>?;<track 2 data>?0<ETX>	
Buffer cleared (released)		<ESC>R (0x1B, 0x52)
PC Sends Inquiry		<ESC>I (0x1B, 0x49)
Sends status	<STX>0<ETX> (0x02, 0x30, 0x03)	

APPENDIX A. OPTIONAL FIRMWARE FEATURES

JIS PORT POWERED INSERT READER

Port Powered Insert Reader part number 21065131 (using firmware 21088827) supports both ISO and JIS card reading. By default, it reads the JIS information on track 2. In order to read ISO tracks 1 and 2, disable the JIS collection command by sending <ESC>j (see table A-1).

Table A-1. Options for 21088827 Firmware (JIS Reader)

COMMAND PREFIX	TO SET OPTION (DEFAULT)	TO CLEAR OPTION	READER FUNCTION
<ESC> (0x1B)	J (0x4A)	j (0x6A)	Enable JIS

HALF CARD READER

Port Powered Insert Reader part number 21066008 (using firmware 21088828) supports reading of ISO-formatted tracks 1 and 2 with short tracks (maximum of 51 characters on track 1 and 25 characters on track 2). Additionally, the reader incorporates a Red/Green LED. Either LED can be turned on independently or both can be turned off; the default is off.

Table A-2. Options for 21088828 Firmware (Half Card Reader)

COMMAND PREFIX	TO SET OPTION	TO CLEAR OPTION (DEFAULT)	READER FUNCTION
<ESC> (0x1B)	G (0x47)	n/a	Turn Green LED on
<ESC> (0x1B)		O (0x4F)	Turn both LEDs off
<ESC> (0x1B)	L (0x4C)	n/a	Turn Red LED on

APPENDIX B. BEZEL DESIGN

The engineering drawings in this section are for customers interested in designing their own bezel. The examples shown are a typical designs from MagTek.

Please note that the bezel is an active part of the Reader; therefore the bezel design is important for card alignment and the performance of the Reader.
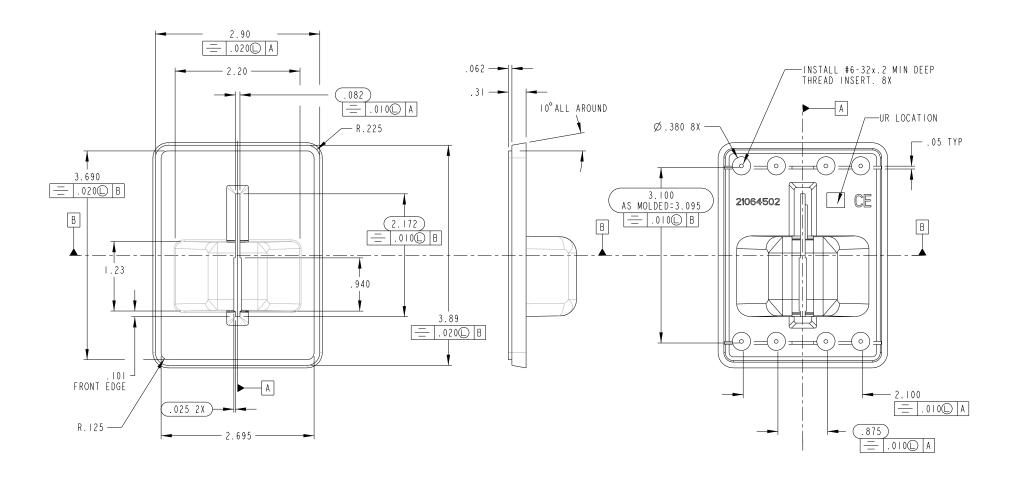
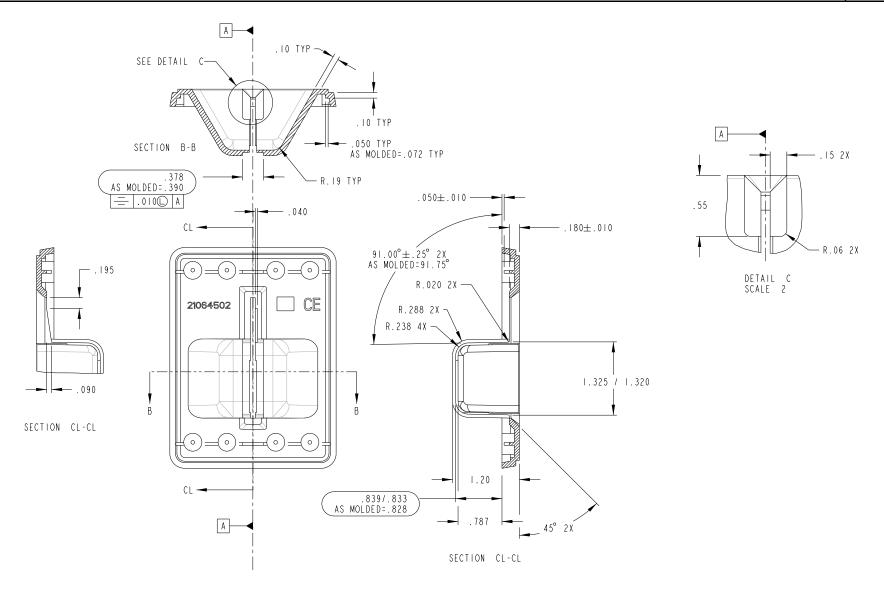**Figure B-1. Dimensions for Flat-Faced Bezel Design, Sheet 1**

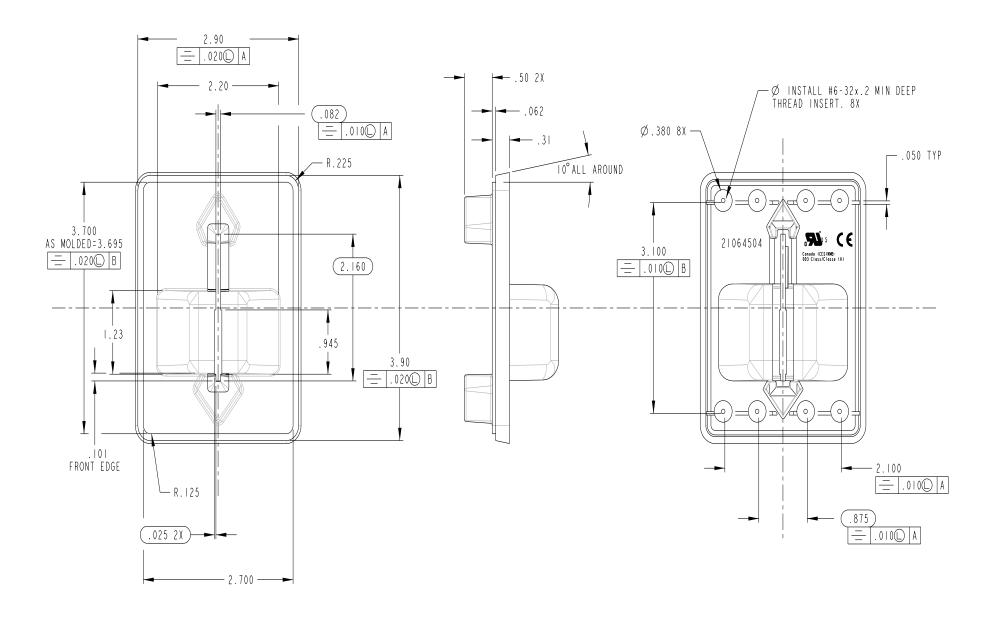**Figure B-2. Dimensions for Flat-Faced Bezel Design, Sheet 2**

Figure B-3. Dimensions for Extended Bezel Design, Sheet 1

SEE DETAIL C

.10 TYP

.10 TYP

SECTION B-B

.050 TYP
AS MOLDED=.078 TYP

.378
AS MOLDED=.390
.010 Ⓛ A

R.19 TYP

.15 2X

DETAIL C
SCALE 2

.55

R.06 2X

SPI B-1. SAME AS
21064501 BEZEL.

.040

CL

.183

.090

SECTION CL-CL

B

21064504

Ⓢ us

CE

Canada ICES/NMB-
003 Class/Classe (A)

B

CL

.040

.180
AS MOLDED=.185

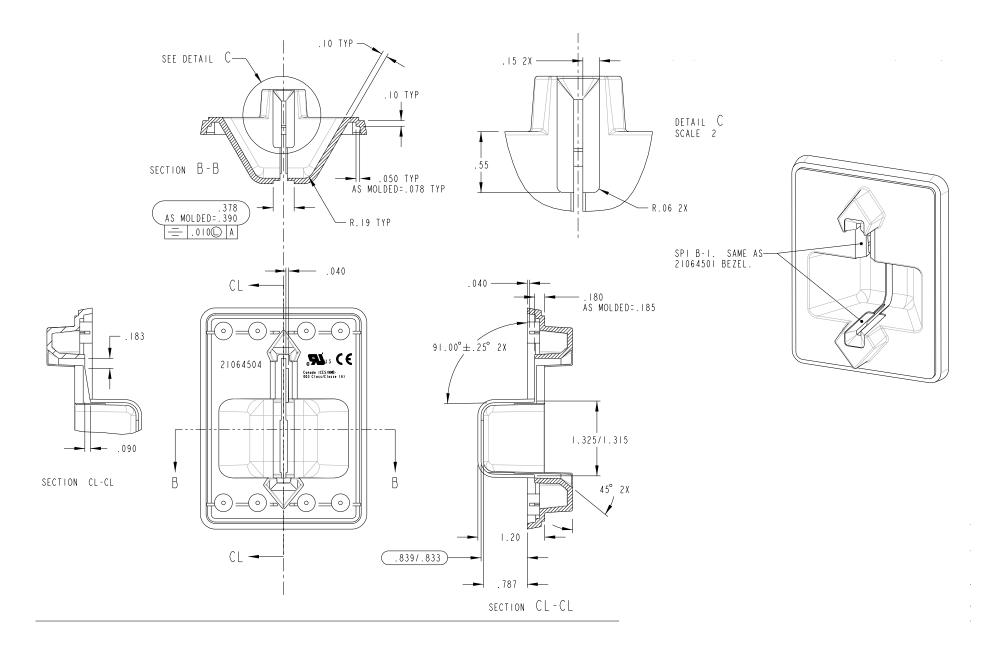91.00°±.25° 2X

1.325/1.315

45° 2X

1.20

.839/.833

.787

SECTION CL-CL

Figure B-4. Dimensions for Extended Bezel Design, Sheet 2

25