IntelliStripe 60
TTL INSERTION READER
TECHNICAL REFERENCE MANUAL

Manual Part Number: 99875135 Rev 20

OCTOBER 2010

REVISIONS

Rev Number	Date	Notes
1	12 Aug 99	Initial Release
2	22 Nov 99	Section 1: Changed Specifications for storage temp from (-40°F to 176°F) to (-40°F to 158°F); Section 2: Added fraud detect enable to Fraudulent Card Detection System, added further description to Mag-Read Enable.
3	12 May 00	Section 1: Added Configurations. Adds Appendix B. Bezel. Adds Appendix C. PCB Design.
4	29 Nov 00	Changed fonts in Figures A-1, A-2, A-4, and A-5 in order to convert from the Word document to an Acrobat 4.0 PDF document. The font worked in Acrobat 3.0 but does not work in Acrobat 4.0.
5	01 Jan 01	Front Matter: Changed copyright date; Changed Warranty from 90 days to one year.
6	13 Feb 01	Appendix C, Figure -C1 added centerlines and dimensions to J1, J2, and J3.
7	27 Jul 01	Front Matter, Agency page: Changed FCC to Class B, editorial change to UL, CUL.
8	17 Aug 01	Section 2, Mechanical Mounting: Editorial. Changed two stand-off descriptions to "Optional stand-offs for …" Changed Front Flange description for clarity. Figure 2-2: In Side elevation view, removed callout on threaded stand-off for clarity.
9	24 Jun 02	Remove all Fraud Detect References.
10	06 Aug 02	Sec 1: Added Special Option, Revised Electrical and weight Specs, Added Related Documents; Specs, Table 1-1, Corrected input voltage, added Mag Read Output levels; Sec 2: Fig 2-4, added note to clarify mating connectors; To Table 2-1 made minor modifications, To Mag Stripe Readers, added not symbol to signals, added reverse logic to strobe, added recommendation to strobe, added ref to *I/O Interface manual;* To Mag-Read Enable added (Sleep Mode), to Table C-2 added colors. Appendix A: Added note to Fig A-3. Appendix B: Added colors to Table C-2, PCB Head Wiring.
11	23 Sep 02	Sec 1: Options, combined descriptions of card latch and power fail. Sec 2: added L3 and L4 descriptions to Latch control. Appendix A: Added L4 description and Figure A-4.
12	15 Nov 02	Sec 2: After Fixed Connector, 26-pin added note for strain relief. Appendix B: Added International Metal Bezel. Appendix C: Added screws and torque for mounting PCB.
13	16 May 03	Front Matter: added ISO line to logo, changed Tech Support phone number, added new warranty statement.
14	21 Apr 04	Appendix B, International Metal Bezel Mounting: added description of Phillips or Torx®.
15	28 Sep 05	Updated Limited Warranty; removed references to CDL; corrected humidity rating; corrected typo for Latch Control signal (was shown as pin 20)
16	21 Aug 06	Replaced obsolete Molex connector 71220-1000 with 52207-1085 in Table C1
17	26 Feb 07	Added RoHS information. Added table to show all IntelliStripe 60 models.
18	23 Mar 07	Added 21160128 & 29. Updated Appendix D. Added to Related Documents with Triple Track ASIC w/ Shift-Out and Encrypting SPI IntelliHead. Added new FCC line.
19	20 Oct 08	Added I60 models to configuration table; updated company address.
20	14 Sep 10	Added 21160131, -132, -138, -139, & -140; updated configuration options

LIMITED WARRANTY

MagTek warrants that the products sold pursuant to this Agreement will perform in accordance with MagTek's published specifications. This warranty shall be provided only for a period of one year from the date of the shipment of the product from MagTek (the "Warranty Period"). This warranty shall apply only to the "Buyer" (the original purchaser, unless that entity resells the product as authorized by MagTek, in which event this warranty shall apply only to the first repurchaser).

During the Warranty Period, should this product fail to conform to MagTek's specifications, MagTek will, at its option, repair or replace this product at no additional charge except as set forth below. Repair parts and replacement products will be furnished on an exchange basis and will be either reconditioned or new. All replaced parts and products become the property of MagTek. This limited warranty does not include service to repair damage to the product resulting from accident, disaster, unreasonable use, misuse, abuse, negligence, or modification of the product not authorized by MagTek. MagTek reserves the right to examine the alleged defective goods to determine whether the warranty is applicable.

Without limiting the generality of the foregoing, MagTek specifically disclaims any liability or warranty for goods resold in other than MagTek's original packages, and for goods modified, altered, or treated without authorization by MagTek.

Service may be obtained by delivering the product during the warranty period to MagTek (1710 Apollo Court, Seal Beach, CA 90740). If this product is delivered by mail or by an equivalent shipping carrier, the customer agrees to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location, and to use the original shipping container or equivalent. MagTek will return the product, prepaid, via a three (3) day shipping service. A Return Material Authorization ("RMA") number must accompany all returns. Buyers may obtain an RMA number by contacting Technical Support at (888) 624-8350.

EACH BUYER UNDERSTANDS THAT THIS MAGTEK PRODUCT IS OFFERED AS IS. MAGTEK MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND MAGTEK DISCLAIMS ANY WARRANTY OF ANY OTHER KIND, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IF THIS PRODUCT DOES NOT CONFORM TO MAGTEK'S SPECIFICATIONS, THE SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED ABOVE. MAGTEK'S LIABILITY, IF ANY, SHALL IN NO EVENT EXCEED THE TOTAL AMOUNT PAID TO MAGTEK UNDER THIS AGREEMENT. IN NO EVENT WILL MAGTEK BE LIABLE TO THE BUYER FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF, OR INABILITY TO USE, SUCH PRODUCT, EVEN IF MAGTEK HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY.

LIMITATION ON LIABILITY

EXCEPT AS PROVIDED IN THE SECTIONS RELATING TO MAGTEK'S LIMITED WARRANTY, MAGTEK'S LIABILITY UNDER THIS AGREEMENT IS LIMITED TO THE CONTRACT PRICE OF THIS PRODUCT.

MAGTEK MAKES NO OTHER WARRANTIES WITH RESPECT TO THE PRODUCT, EXPRESSED OR IMPLIED, EXCEPT AS MAY BE STATED IN THIS AGREEMENT, AND MAGTEK DISCLAIMS ANY IMPLIED WARRANTY, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

MAGTEK SHALL NOT BE LIABLE FOR CONTINGENT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES TO PERSONS OR PROPERTY. MAGTEK FURTHER LIMITS ITS LIABILITY OF ANY KIND WITH RESPECT TO THE PRODUCT, INCLUDING ANY NEGLIGENCE ON ITS PART, TO THE CONTRACT PRICE FOR THE GOODS.

MAGTEK'S SOLE LIABILITY AND BUYER'S EXCLUSIVE REMEDIES ARE STATED IN THIS SECTION AND IN THE SECTION RELATING TO MAGTEK'S LIMITED WARRANTY.

FCC WARNING STATEMENT

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.

CANADIAN DOC STATEMENT

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 (⊘Pb).

TABLE OF CONTENTS
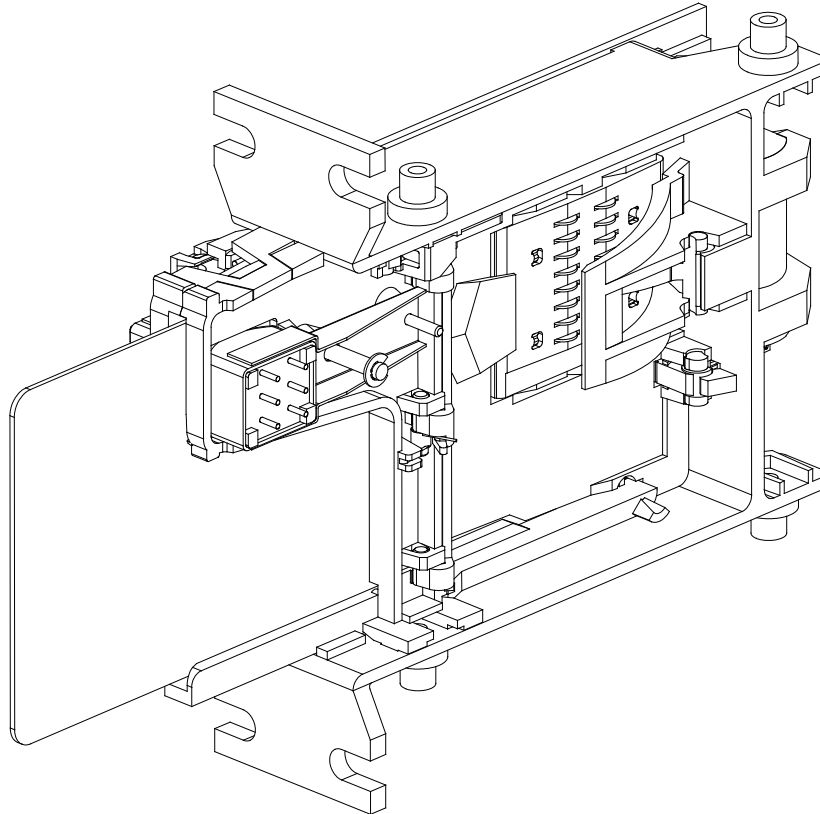
TABLES AND FIGURES

Figure 1-1. IntelliStripe 60

SECTION 1. FEATURES AND SPECIFICATIONS

The IntelliStripe 60™ is a hybrid TTL Insertion Reader that reads both magnetic stripe cards and smart cards. The Reader has an industry standard mechanical footprint and electrical interface. Some models are available with an encrypting IntelliHead (see H7 description).

The IntelliStripe 60 is designed for self-service applications such as payphones, vending machines, kiosks, and fuel pumps.

STANDARD FEATURES

Standard features of the IntelliStripe 60 are as follows:

- The basic chassis allows for flexible customizing of the options listed below
- Four different Chassis styles allow for optimized mounting and integration
- Rugged – High impact plastic with read heads attached to beam mounts
- Vandal Resistant – Open chassis design provides superior debris clearing; half-card drop-out allows half-size credit cards and coins to be cleared from insert channel

OPTIONS

Any or none of the options listed may be selected:

- Smart Card Contacts (8 or 16) for reading both ISO and CP8/AFNOR contact locations
- Single or Dual Heads for Mag-stripe reading – Optimizes card orientation for easier customer use
- Mag-stripe can be configured to support all popular track combinations
- Front Card Gate prevents coins, dust, moisture, and debris, from entering the unit – opens only when ISO-size card enters the unit
- Card Latch and Power-Fail Unlatch. The card latch physically restrains the card inside the Reader to prevent disruption of the smart card interface session. The power fail unlatch feature releases the card automatically if power is lost. There are two embodiments of the option, L3 and L4. These embodiments differ only in how power fail and latch voltage are applied to the Reader. (See Section 2, Latch Control and Appendix A, Options.)
- Bezel that attaches to the unit (See Appendix A)

SPECIAL OPTION

Mag Data (J12-15; J12-23, J12-25) can be converted to positive logic on most IntelliStripe 60's. Consult the factory for more information.

CONFIGURATIONS

The following part numbers are the available configurations. See Appendix D for information about each option code.

21160000	M3,C1,SG,1H,H4
21160008	M2,C1,SG,S1 (Bevel Guide))
21160016	B1,M2,C1,L3,1H,H4,S1
21160017	M2,C1,L3,1H,H4,S1
21160018	M3,C1,L3,1H,H4,S1
21160022	M2,C1,SG,S1
21160052	M3,C1,SG,L3,1H,H4,S1,PB
21160058	B1,M3,C1,SG,1H,H4,S1,PB
21160060	B1,M3,C1,SG,L3,2H,H4,S1,PB
21160071	M1,C1,SG,L3,1H,H4,S1
21160075	M3,C1,SG,L3,S1,PB
21160076	B1,M4,C1,SG,L3,1H,H4,S1
21160078	M1,C1,SG,1H,H3,S1
21160079	M1,C1,SG,S1
21160089	B1,M3,C1,L3,1H,H4,S1
21160091	M1,C1,SG,1H,H4,S1
21160092	B1,M3,C1,L4,S1,CT
21160097	B1,M2,C1,SG,1H,H1,S1,CT (Bevel Guide)
21160098	B1,M3,C1,SG,L3,1H,H4,S1
21160101	M2,SG,L3,1H,H4,S3
21160111	B1,M3,C1,SG,L4,S1,CT
21160112	B1,M3,C1,SG,L3,S1
21160113	M1,C1,SG,L3,1H,H3,S1
21160115	B1,M3,C1,SG,1H,H4,S1,CT,PB
21160121	M1,C1,SG,1H,H4,S1,MB
21160123	I60 M3,C1,SG,L3,1H,H4,S1
21160124	M1,C1,SG,1H,H4,S1 (Custom)
21160126	M1,C1,SG,L3,1H,H6,S1
21160128	M3,C1,SG,1H,H7
21160129	M1,C1,SG,1H,H7,S1
21160130	M4,SG,1H,H6
21160131	M4,C1,SG,1H,H6,S1 (Custom)
21160132	M1,C1,SG,2H,H5,S1 (Custom)
21160133	M2,C1,L3,1H,H7,S1
21160134	M2,C1,1H,H4,S1
21160136	M3,C1,SG,1H,H7,GK
21160137	M4,C1,1H,H6,S1
21160138	B1,M4,C1,SG,L3,1H,H4,S1 (Custom)
21160139	M1,C1,SG,L3,1H,H6,S1,MB
21160140	M1,C1,SG,1H,H7,S1 (Custom)

RELATED DOCUMENTS

The IntelliStripe 60, TTL 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.

For further information about magnetic stripe readers, refer to MagTek part number 99875148, *I/O Interface for TTL Magnetic Stripe Readers, Technical Reference Manual*.

This document presents the technical information from a hardware perspective only. Other documents that cover the command set, communications protocol, and API (Application Program Interface) are as follows:

Part Number Title

99875337   *Triple Track ASIC With Shift-Out, 3V, Specifications*

99875352   *Encrypting SPI IntelliHead Technical Reference Manual*

SPECIFICATIONS

Specifications for the Reader are listed in Table 1-1.

Table 1-1. Specifications

DATA FORMAT SPECIFICATIONS	
Reader Configuration	Data Format Specifications*
Track 2	ISO/ANSI/AAMVA/210bpi on TK2 formats
Track 1,2	ISO/ANSI/AAMVA/210bpi on TK2 formats
Track 2,3	ISO/ANSI/AAMVA formats
Track 1,2,3	ISO/ANSI/AAMVA formats

* ISO (International Standards Organization), ANSI (American National Standards Institute), AAMVA (American Association of Motor Vehicle Administrators)

OPERATIONAL	
Card Speed:	3 IPS (7.62cm/sec) to 50 IPS (127cm/sec)
Recording Method	Two-frequency coherent phase (F2F)

ELECTRICAL	
TTL Level (Non-Intelligent PCB):	
Input Voltage (J12-11):	
With Latch:	5.0 VDC $\pm$ 5%
No Latch:	2.7 VDC to 5.5 VDC
Reader Current:	Sleep Mode: 20 uA max. per read channel
	Normal Mode: 2 mA max. per read channel
Reader Output levels:	V_{ol} = 0.4 VDC @ 2.0 mA
J12-22 to J12-26	V_{oh} = Vcc -0.5 VDC @ 2.0 mA
and	
J12-15 to J12-16	
Latch Motor Voltage: (J12-19)	4.5 VDC to 8.5 VDC
Latch Motor Current: (J12-19)	Sleep Mode: 20 uA max.
	Normal Mode: 300 mA nominal for 40 msec
Power-Fail Unlatch Voltage:	Unlatches when the voltage at J12-11 drops below 4.5 VDC
Power-Fail Unlatch Current:	Sleep Mode: 10 uA max.
	Normal Mode: 500 mA nominal (via external capacitor).
	Note: Actual current may vary based upon applied motor input voltage.
	See Appendix A, Power-Fail Latch Release Assembly.

MECHANICAL	
Chassis Mounting Options	
Front Flange:	See Section 2, Figures 2-1 and 2-3
Side Mounting Studs:	See Section 2, Figures 2-1 and 2-3
Side Mounting Holes:	See Section 2, Figures 2-1 and 2-3
Standoffs on Top:	See Section 2, Figure 2-2
Dimensions (Core Chassis)	
Overall Length:	4.70" (119,4 mm)
Mounting Depth:	3.80" (96,5 mm) when mounted with front flanges
Height:	1.30" (33,0 mm)
Width:	2.60" (66,0 mm) without mounting bosses or flanges
Weight:	120 gr (4.2 oz) without bezel, with dual head, 8 pin contact, latch, gate, front mount flanges. 201 gr (7.1 oz) with bezel.
ENVIRONMENTAL	
Temperature	
Operating:	-25°C to 70°C (-13 °F to 158 °F)
Storage:	-40°C to 70°C (-40 °F to 158 °F)
Humidity	
Operating:	10% to 90% noncondensing
Storage:	10% to 90% noncondensing
Altitude	
Operating:	0-10,000 ft. (0-3,048 m.)
Storage:	0-50,000 ft. (0-15,240 m.)

SECTION 2. INSTALLATION

The Installation of the IntelliStripe 60 Insertion Reader includes mechanical and electrical connections.

MECHANICAL MOUNTING

Mounting options for the Reader are as follows:
- Front Flanges only
- Side Mounting Studs only
- Side Mounting Holes only
- Front Flanges and Side Mounting Studs together
- Optional standoffs for chassis or secondary PCB mounting

Chassis mounting features are shown in Figure 2-1. Standoff mounting is shown in Figure 2-2. Mounting dimensions are shown in Figure 2-3. Descriptions of the mounting options are as follows:

Front Flange

Two molded mounting flanges toward the front of the chassis provide slots for attachments. (See Figures 2-1 and 2-3.)

Side Mounting Studs

There are four molded studs. Two are located on each side of the chassis. Optional threaded inserts can be inserted in both ends of the studs with either imperial or metric sizes. (See Figures 2-1 and 2-3.)

Side Mounting Holes

Four molded holes are available when studs are not provided. Holes are positioned inline with the center line of the stud with molded nut retaining features. (See Figures 2-1 and 2-3.)

Stand-offs

Threaded stand-offs located on the upper side of the Reader are optional. Standoffs may be used for chassis or third party PCB mounting. (See Figure 2-2.)

I/O Connectors

The IntelliStripe 60 contains a fixed 26-pin I/O connector, which connects to the user's circuit. The Host manipulates and monitors the signals on the 26-pin header and implements the following functions:
- Enable/Disable and monitor status of TK 1, 2, 3 Mag-stripe read operations
- Smartcard read-write operations
- Monitors status of Card Present switch, Card Seated switch, and Card Latched switch (external pull-up resistors are required)
- Control of Card Latch mechanism

The Reader also has a Power-fail Latch eject, which is automatic and is not controlled nor monitored by the Host I/O 26-pin connector.

INTEGRAL HEX NUT RETAINER (4X)

FRONT FLANGE (2X)

SIDE BOSESS WITH THRU HOLE (4X)
BOSSES ARE INLINE ACROSS
BOTH SIDES OF CHASSIS.
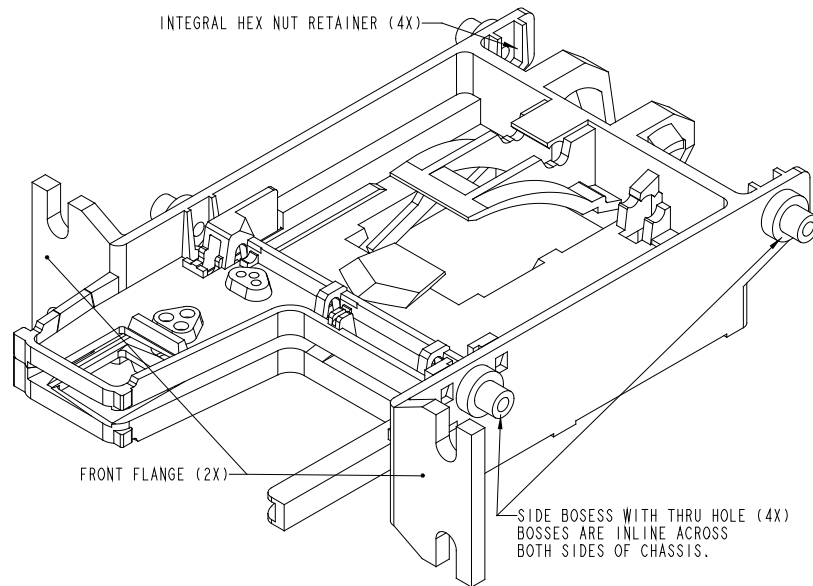
Figure 2-1. Chassis Mounting Features

.65
[16,5]
.10
[2,5]
2.200
[55,88]
2.375
[60,33]
1.550
[39,37]
.13 HEX STOCK
[3,2]
.190
[4,83]
.400
[10,16]

STANDOFF THREAD 4X
[M2.5 X .45 X 4.6 LONG]

0.100 = Dimensions in inches
[2,54] = Dimensions in millimeters
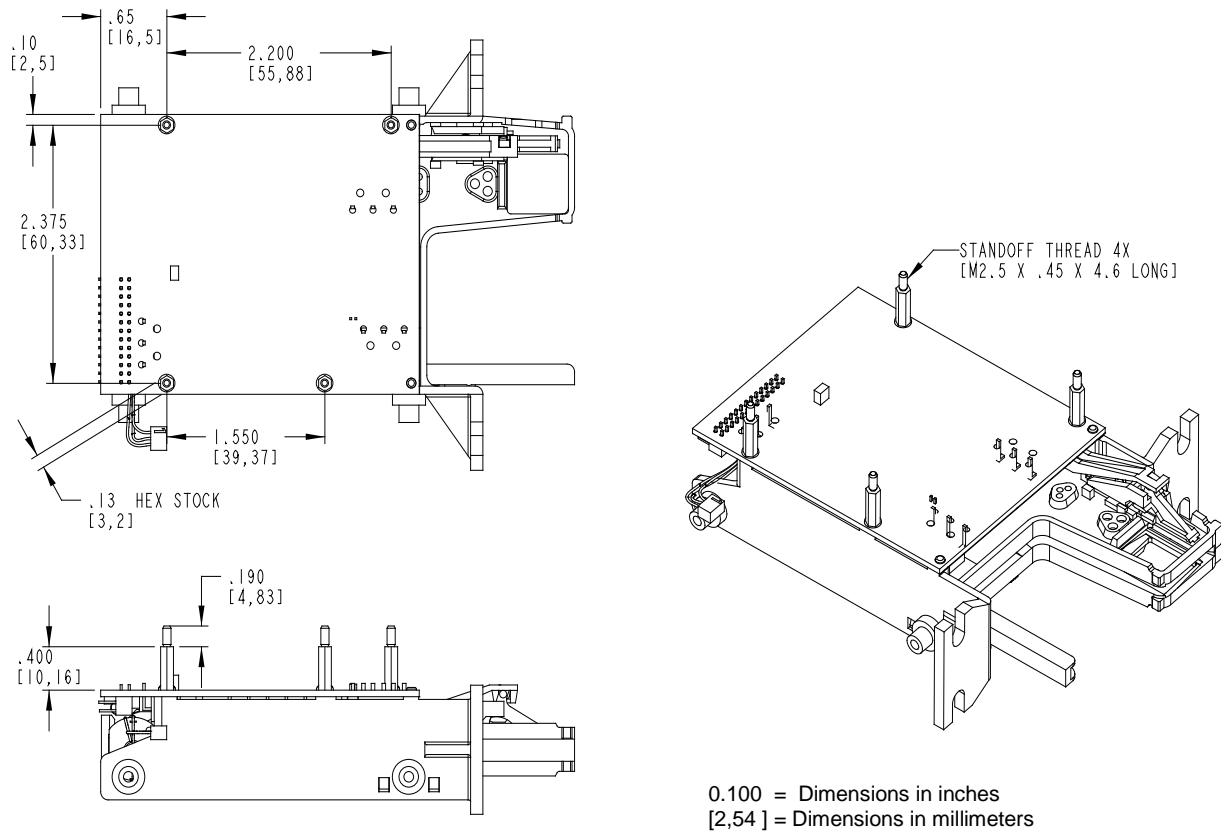
Figure 2-2. Stand-off Mounting
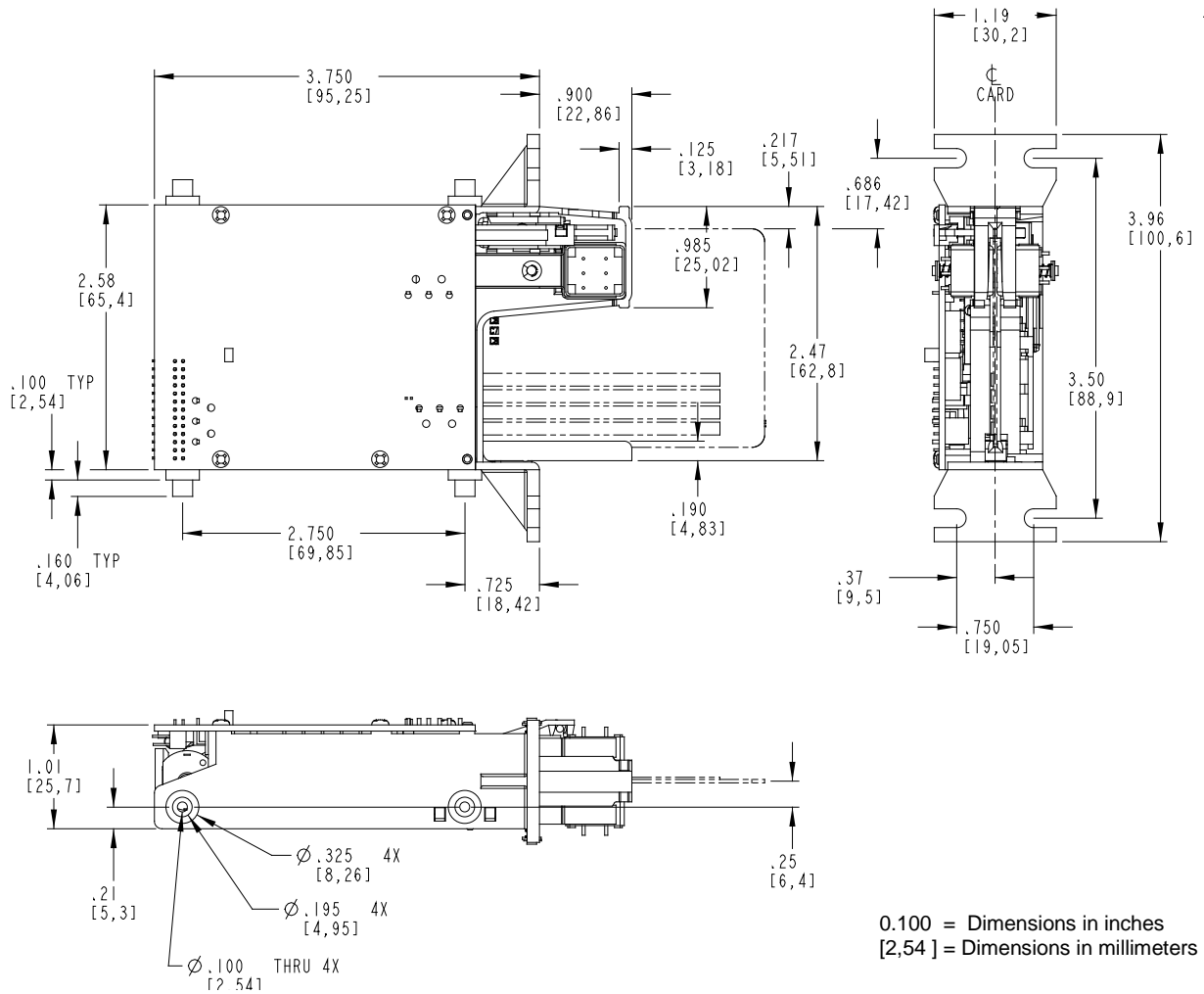
Figure 2-3. Dimensions for Mounting

Fixed Connector, 26-Pin

Figure 2-4 shows the location of the 26-pin Fixed Connector. Table 2-1 lists the I/O Fixed Connector pin numbers, Signal names, and the I/O direction with respect to the Reader (IN is in to the Reader, and OUT is out of the Reader).

Note

The 26-pin header is not a locking connector. If there is considerable cable movement, it is advisable to provide strain relief by using cable ties in appropriate places outside of the unit.
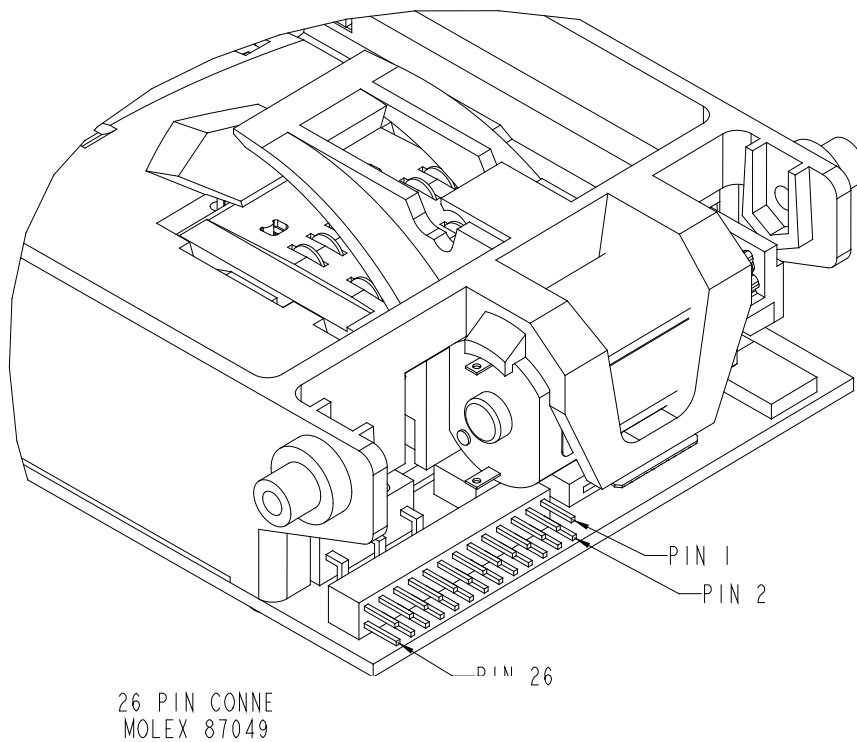
Figure 2-4. Fixed I/O connector Location and Pin Numbers

Table 2-1. Pin List for 26-pin I/O Connector (J12)

Pin Number	Signal Name	I/O Direction	Pin Number	Signal Name	I/O Direction
1	ICC-C1 Power	IN	14	NC, Reserved	
2	ICC-C2 Reset	IN	15[2]	Mag Data, Track 2	OUT
3	ICC-C3 Clock	IN	16[1]	Mag Strobe, Track 2	OUT
4	ICC-C4 RFU	-	17	Latch Motor Gnd (Common to Pin 5, 13)	IN
5	ICC-C5 Ground (Common to Pins 13, 17)	IN	18[1,3]	Card Latched Switch	OUT
6	ICC-C6 Programmable Power	IN	19	Latch Motor − Motor Voltage	IN
7	ICC-C7 Data	IN/OUT	20[1]	Mag Read Enable	IN
8	ICC-C8 RFU	-	21	NC, Reserved	
9[1,3]	Card Present Switch	OUT	22[1]	Mag Media Detect	OUT
10[1,3]	Card Seated Switch	OUT	23[2]	Mag Data Track 1	OUT
11	+VCC	IN	24[1]	Mag Strobe Track 1	OUT
12	Latch Control	IN	25[2]	Mag Data Track 3	OUT
13	Circuit Ground (Common to Pins 5, 17)	IN	26[1]	Mag Strobe Track 3	OUT

Notes: [1] = Active Low
[2] = Mag Data outputs on pins 15, 23, 25 are normally referenced as: Low = "1" bit, High = "0" bit.
[3] = 10K pull-up resistors required on pins 9, 10, 18

Flex Connector, 10 Pin

Figure 2-5 shows the location of the Flex Connector. Table 2-2 lists the I/O Flex Connector pin numbers, Signal names, and the I/O direction with respect to the Reader (IN is in to the Reader, and OUT is out of the Reader).

FLEX CIRCUIT PIN I
MATING CONNECTORS:
  MOLEX 71220-1000
  MOLEX 52207-1090
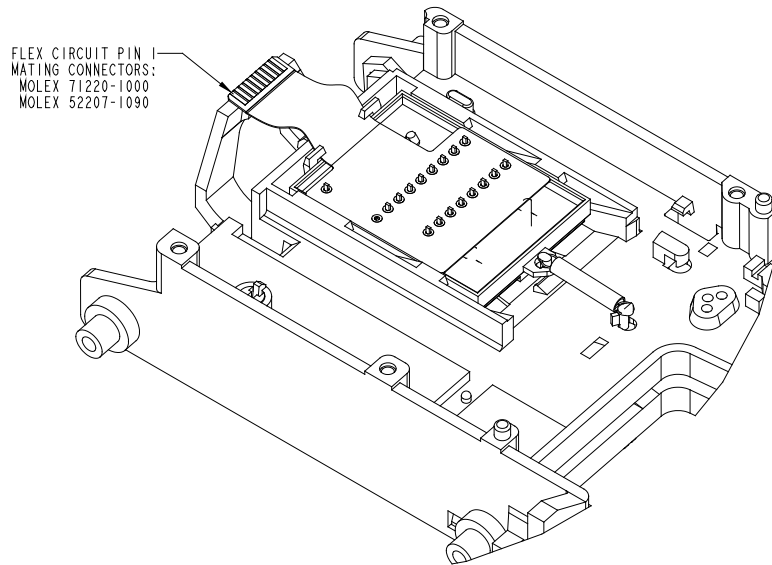
Figure 2-5. Flex I/O Connector Location and Pin Numbers

Table 2-2. Pin List for Flex Cable

Pin Number	Signal Name	I/O Direction
1	Card Seated	OUT
2	ICC-C8	Undefined*
3	ICC-C7 Data	IN/OUT
4	ICC-C6 Programmable Power	IN
5	ICC-C1 Power	IN
6	ICC-C2 Reset	IN
7	ICC-C5 Ground	IN
8	ICC-C3 Clock	IN
9	ICC-C5 Ground	IN
10	ICC-C4	Undefined*

*   Signals ICC-C8 and -C4 (pins 2 and 10) are undefined by ISO 7816.
    These contacts are often used with non-ISO memory-type cards.

10

TIMING

Figure 2-6 shows the timing for Mag-stripe decode operations when a card is inserted or withdrawn.
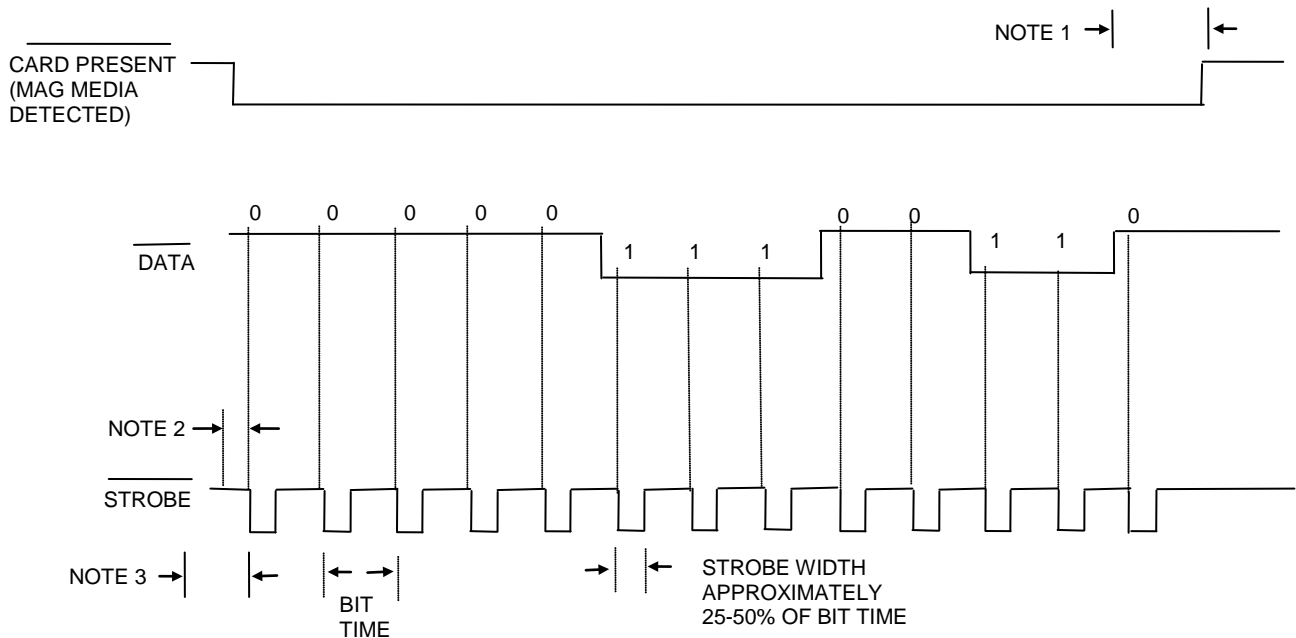
NOTES

1. TIME OUT OF THE CARD PRESENT SIGNAL OCCURS APPROXIMATELY 150 MS AFTER THE LAST STROBE TRANSITION.

2. DATA IS VALID 1.0 μS (MINIMUM) BEFORE THE NEGATIVE EDGE OF STROBE.

3. 6 OR 7 HEAD FLUX REVERSALS ARE IGNORED FOR LOW DENSITY CONFIGURATION AND 14 OR 15 FOR HIGH DENSITY CONFIGURATION.

Figure 2-6. Timing

SMART CARD READER

The TTL PCB provides connections to all 16 ICC contacts as defined by ISO and CP8/AFNOR specifications. Pins 1, 2, 3, 4, 5, 6, and 8 on the 26-pin I/O connector will provide a direct connection to the associated IC contact.

During self-test, the pin 7 Data contact will be "disconnected" from the data contact of the ICC card and allowed to "float".

11

MAGNETIC STRIPE READER

Mag-Stripe Functions

Data, Strobe, and Card Present (Media Detect) signals are provided with CMOS level signals that are brought out to the 26-pin I/O connector. The signals are routed as follows:

        Pin 15 = TK2 Data

        Pin 16 = TK2 Strobe

        Pin 23 = TK1 Data

        Pin 24 = TK1 Strobe

        Pin 25 = TK3 Data

        Pin 26 = TK3 Strobe

        Pin 22 = Mag Media Detect (Card Present)

Data

Data outputs will follow the MagTek standard where:
        Logic Low = "1" bit
        Logic High = "0" bit

To reverse the logic, move R36 to position R19.

Strobe

The strobe output is a clocking output. This output is normally high and falls low to indicate a valid time period for sampling of the Data output. It is recommended that data be loaded by the user with the leading edge (negative) of the strobe.

Card Present (Mag Media Detect)

This signal is available as an open-drain output, normally high. A low output indicates presence of flux reversals from one or all of the read heads. The Reader provides a 10K ohm pull-up resistor for this signal when the Mag read is enabled via pin 20 "Mag-Read Enable" line.

For further information about magnetic stripe readers, refer to MagTek part number 99875148, *I/O Interface for TTL Magnetic Stripe Readers, Technical Reference Manual*.

Mag-Read Enable (Sleep Mode)

This CMOS input controls the power to the Mag-stripe read circuits and can be used to reduce the power consumption of the Reader. The read circuits require no more than 2 ms to power up from the time that the **Mag Read Enable** (pin 20) line is taken to a valid logic low. Note that the Mag Read signals Mag Media Detect (pin 22), Mag Strobe Track 1 (pin 24), Mag Strobe Track 2 (pin 16), and Mag Strobe Track 3 (pin 26) will float when Mag reading is disabled by setting the Mag Read Enable line high (Default).

SENSING SWITCHES

The sensing switches provide outputs to the 26-pin I/O connector and are routed as follows:
> Pin 9 = Card Present Switch
> Pin 10 = Card Seated Switch
> Pin 18 = Card Latched Switch

The switch outputs are isolated from other circuits by the switch. An external interface pull-up resistor of 10K ohms, supplied by the Host interface, ensures proper sensing operation over the specified environmental range. The resistors should be connected to pins 9, 10, and 18.

Card Present Switch

A snap-action switch operates by the spring-loaded card guide at the entrance of the Reader. The switch is actuated when the card is inserted into the card slot. The signal at the interface I/O connector is normally open and is grounded when the card is inserted into the Reader.

Card Seated Switch

A snap-action switch is operated when a card is fully inserted into the Reader (card is at the fully rearward position). The signal at the interface I/O connector is normally open and is grounded when the card is inserted into the Reader.

On insertion of the card, there may be some spurious transitions (mechanical switch bounce) at the Card Seated output, which do not exceed 4 ms. These transitions occur before the ICC chip contacts stabilize (stable contact with ICC pads) within a maximum of 40 ms from the stable state of the Card Seated output.

The first transition from the Card Seated output on withdrawal of the card is guaranteed to occur 1 ms before the ICC contacts lift. During the period between the two events, the contact resistance can increase to (but not exceed) 100 ohms for C1, C5, and C8 contacts, and 500 ohms for C2, C3, C4, and C8 contacts. For C7 the limit is 700 ohms.

Subsequent to the first transition from the Card Seated sensor, there can be additional transitions because of the mechanical bounce of the Card Seated switch contacts.

Card Latch Switch

A snap-action switch is operated by the latch mechanism. The signal at the interface I/O connector is open when the latch is disengaged and is grounded when the latch is engaged.

Latch Control

The latch is controlled by the Latch Control signal (pin 12). The latch is engaged when the Latch Control signal transitions from ground to Vcc. The latch is disengaged when the Latch Control signal transitions from Vcc to ground. It takes about 40ms for the latch to completely engage or disengage.

13

There are two options for power-fail unlatch, designated L3 and L4. These options differ only in how the power-fail and motor voltage are applied to the board. The power-fail unlatch option disengages the latch during a power failure. This option is triggered when Vcc falls below 4.5 volts. An external backup capacitor is required for this option to function. For the L3 option, this capacitor can be connected to the reader through a header on the board. For the L4 option, the external capacitor is connected to the 26-pin I/O connector and power for the latch motor is provided through a Schottky diode from Vcc (pin 11).

APPENDIX A. OPTIONS

See Appendix D for a full list of all available options.

SMART CARD OPTION

The location and parts of the Landing Contact Assembly are shown in Figure A-1.
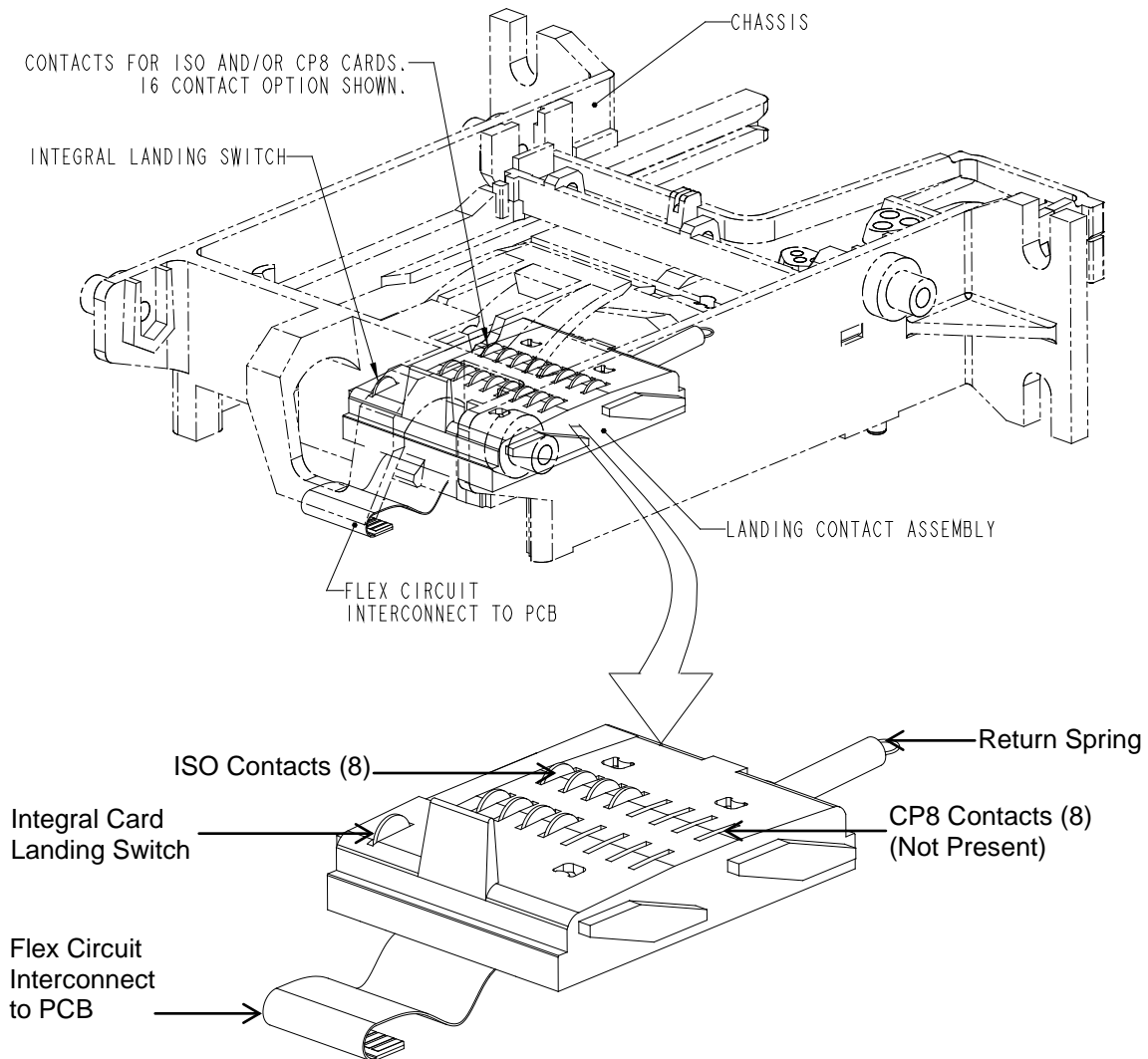
Figure A-1. Smart Card Landing Contact Assembly

The TTL PCB provides connections to all 16 ICC contacts as defined by ISO and CP8/AFNOR specifications. Pins 1, 2, 3, 4, 5, 6, and 8 on the 26-pin I/O connector will provide a direct connection to the associated IC contact. During self-test, the pin 7 Data contact will be "disconnected" from the data contact of the ICC card and allowed to "float".

CARD LATCH OPTION

The location and parts of the Card Latch Assembly are shown in Figure A-2.

CARD LATCH SWITCH

CARD LATCH

LATCH DRIVE LINK

LATCH DRIVE MOTOR

Actuator Link

Latch
Retainer

Spring
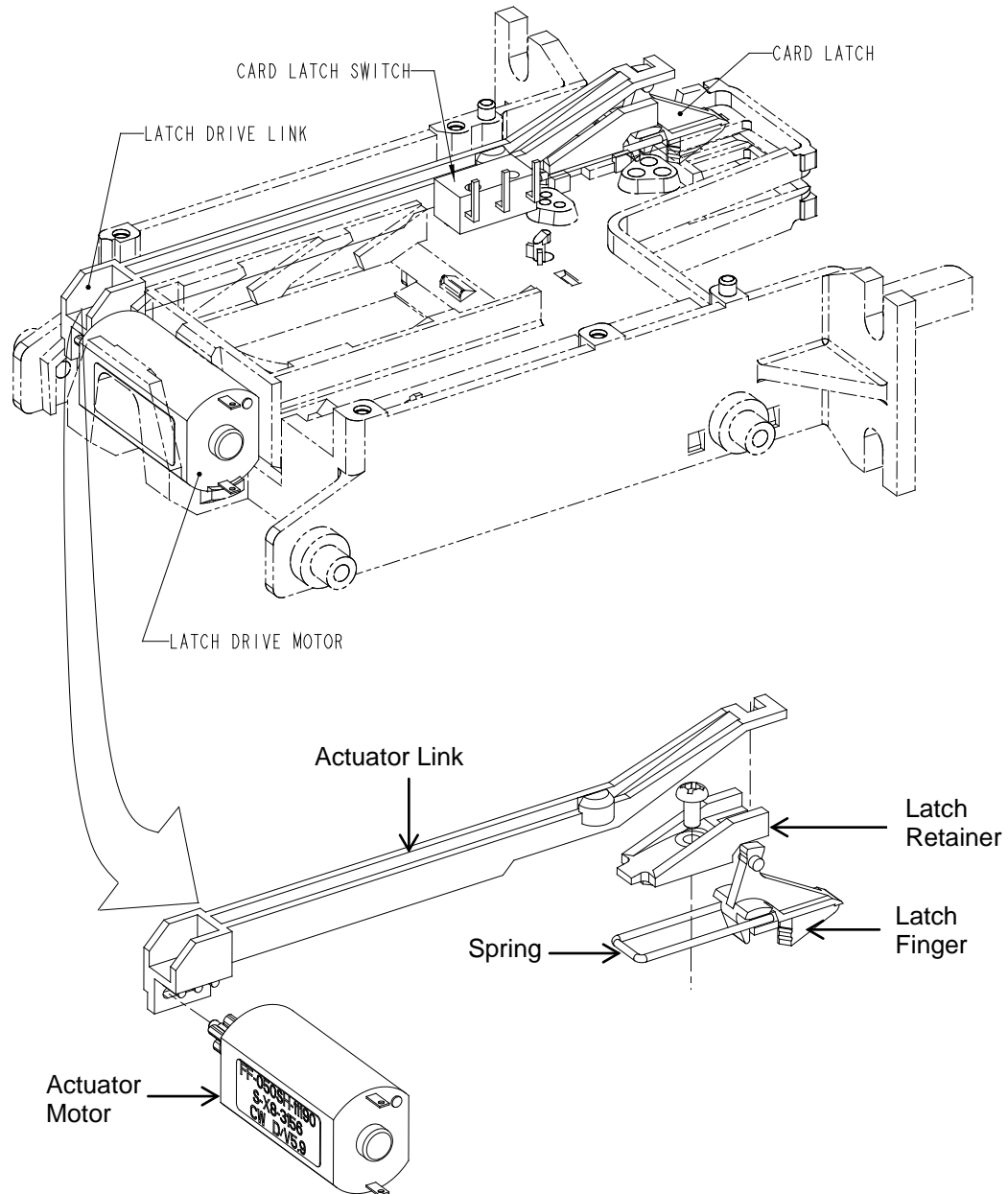
Latch
Finger

Actuator
Motor

Figure A-2. Card Latch Assembly

A snap-action switch is operated by the latch mechanism. The signal at the interface I/O connector is open when the latch is disengaged and is grounded when the latch is engaged.

The latch is controlled by the Latch Control signal. The latch is engaged when the Latch Control signal transitions from ground to Vcc. The latch is disengaged when the Latch Control signal transitions from Vcc to ground. It takes about 40ms for the latch to completely engage or disengage.

POWER-FAIL LATCH RELEASE OPTION, L3

The externally mounted Latch Release Capacitor is shown in Figure A-3.
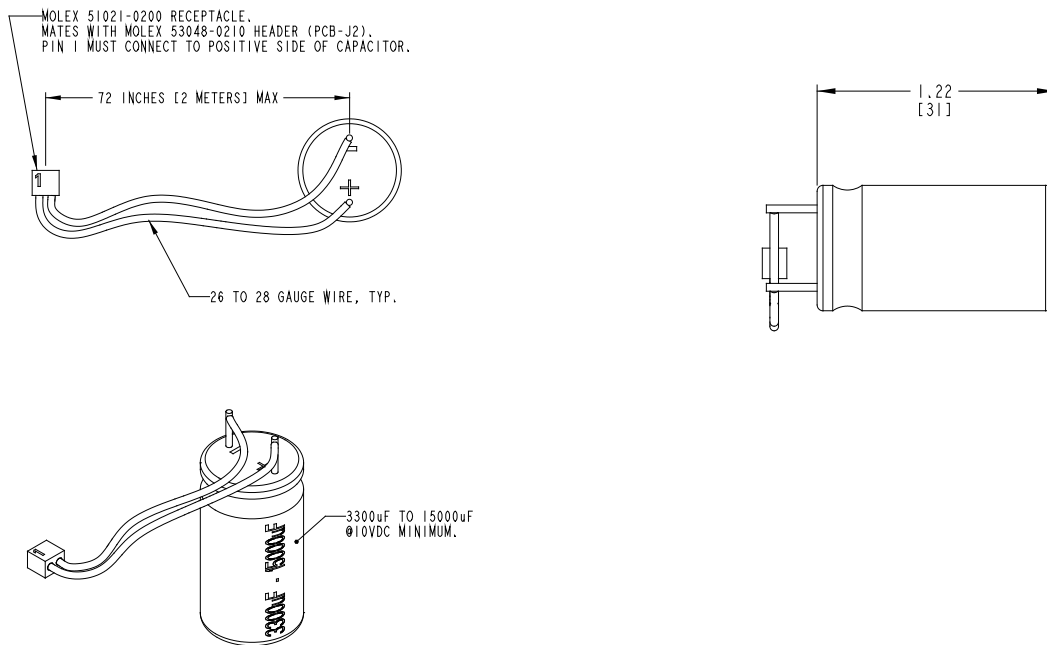
Note

See Appendix C, Figure C-1, for location of J2 on far side of PCB.

Figure A-3. Latch Release Capacitor

The power fail unlatch option disengages the latch during a power failure. This option is triggered when Vcc falls below 4.5 volts. An external backup capacitor is required for this option to function. This capacitor can be connected to the reader through a header on the board.

In case of power failure, the capacitor automatically opens the latch, which releases the card. The users must specify wire length required for their specific application. The power fail capacitor range is 3300uF to 15000uF with a rated voltage greater than the applied motor voltage. (The power-fail capacitor assembly is available as part number 21162301.)

POWER-FAIL LATCH RELEASE OPTION, L4

The power-fail unlatch option disengages the latch during a power failure. This option is triggered when Vcc falls below 4.5 volts. An external backup capacitor is required for this option to function. This capacitor is connected to the Reader as shown in Figure A-4. It should be noted that with this option a separate motor voltage is not required.
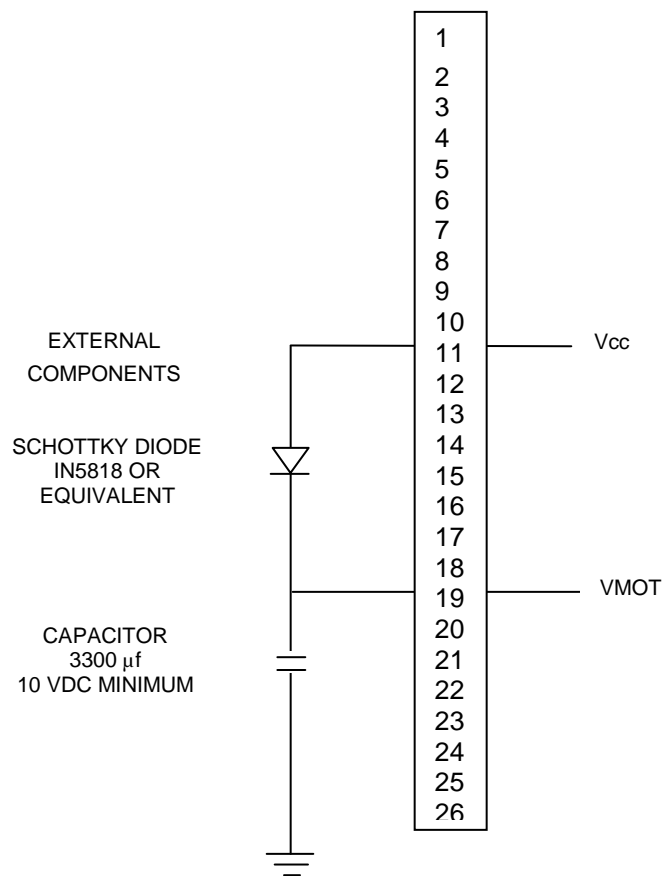
Figure A-4. Connector, 26-pin, J12

GATE OPTION

The location and parts of the Gate Assembly are shown in Figure A-5.
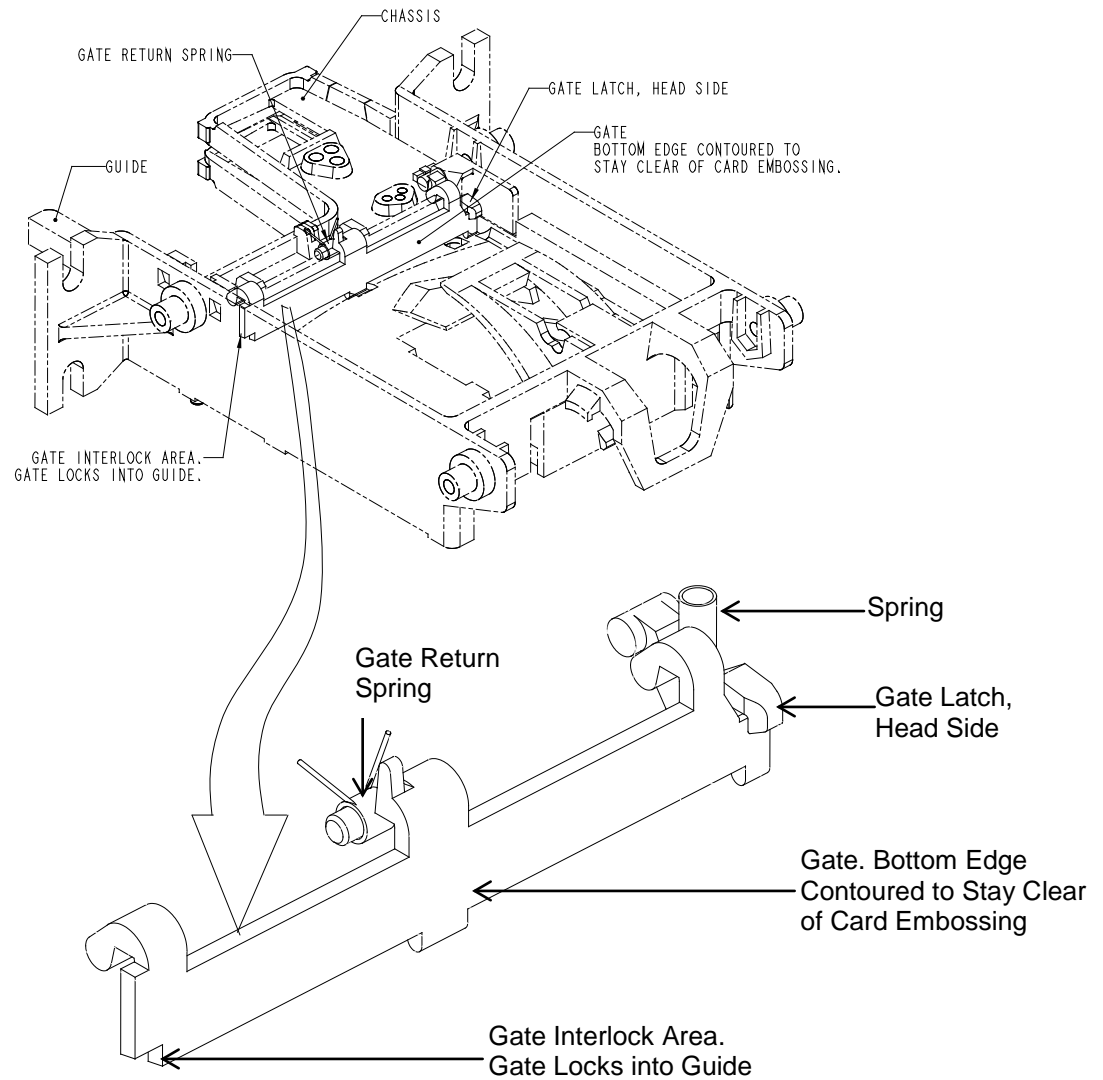
Figure A-5. Gate Assembly

APPENDIX B. BEZEL CONFIGURATION AND MOUNTING

The Bezel is attached to the unit by four screws (Mounting inserts M3.5 x 5 Minimum deep).
The four screws are inserted into the front flange slots to retain the unit to the bezel. Figure B-1
shows the position and the dimensions of the flanges.

Figure B-2 shows the orientation and dimensions of the bezel and recommended dimensions for
the panel opening. Four screws that mount the Bezel to the panel are also M3.5. The length of
the screws depends on the panel thickness, washers, and spacers used in mounting the panel.

Figure B-1. Flanges for Bezel Mounting

Top View

Capacitor Connector
Head (In 2 Head Unit)
PCB Board

Back View

Mounting Inserts For Screws (4 pl) #M3.5 x 5 Minimum Deep
26 Pin Connector
Motor

Side View

4.65"
118.11mm
26 Pin Connector
0.34"
8.64mm

Front View

4.24"
107.70mm
2.98"
75.69mm

0.35"
8.89mm
0.15"
3.81mm
2.10"
53.34mm
3.80"
96.52mm
2.80"
71.12mm
Clearance For M3.5 Screw (4pl)
Panel Opening
1.60"
40.64mm
2.30"
58.42mm
0.31"
7.87mm
0.10"
2.54mm
3.50"
88.90mm

Figure B-2. Bezel Mounting

INTERNATIONAL METAL BEZEL MOUNTING

The International Metal Bezel (P/N 21161204) is shown and described in Figure B-3. The Bezel also requires the front flanges for attaching the Bezel to the unit (see Figure B-1). Four screws are inserted into the front flange slots to retain the unit to the Bezel. These screws are thread cutting and may be either Phillips head or T10 Torx®.

Figure B-3 also shows the orientation and dimensions of the Bezel and recommended dimensions for the panel opening. Four screws that mount the Bezel to the panel are also M3.5. The length of the screws depends on the panel thickness, washers, and spacers used in mounting the panel.
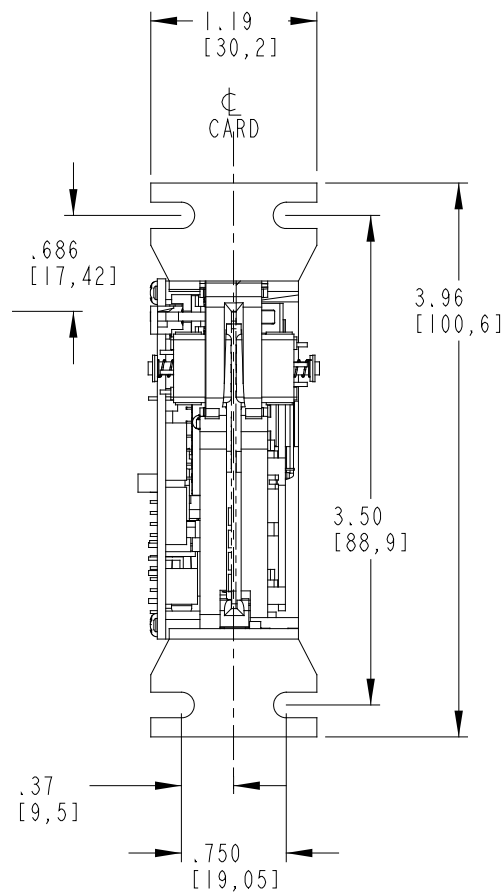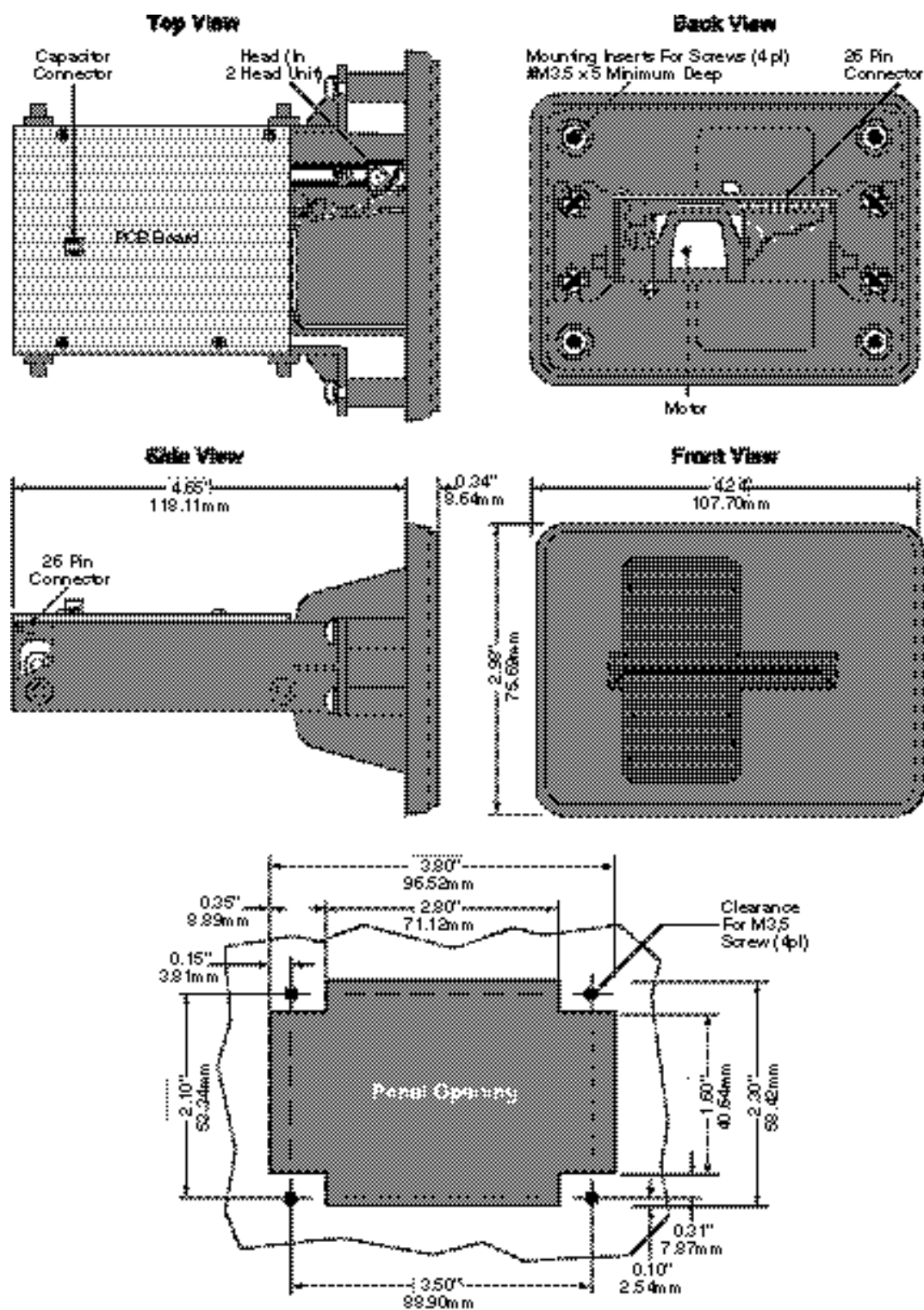
Compatibility

The Metal Bezel is not compatible with some units. The units compatible with the Metal Bezel are 1) front mount and 2) front and side mount together (M1 and M3). The units not compatible with the Metal Bezel are 1) side mount and 2) no mount (M2 and M4). Table B1 lists examples of units compatible with the Metal Bezel. Table B2 lists examples of units not compatible with the Metal Bezel.

Table B-1. Examples of Configurations Compatible with the Metal Bezel

Part Number	Model or Chassis	Mounting Options	Description
21161130	Chassis	M1 – Front Mounted	With flanges only
21161129	Chassis	M3 – Front and Side Mounted	With flanges and bosses
21160058	IntelliStripe 60	M3 – Front and Side Mounted	With flanges and bosses
21165048	IntelliStripe 65	M3 – Front and Side Mounted	With flanges and bosses

Table B-2. Examples of Configurations Not Compatible with the Metal Bezel

Part Number	Model or Chassis	Mounting Options	Description
21161131	Chassis	M2 – Side Mounted	With bosses only
21161132	Chassis	M4 – No Mount	No flanges/bosses
21165042	IntelliStripe 65	M2 – Side Mounted	With bosses only

Top View

Capacitor Connector

Head (In 2 Head Unit)

PCB Board

Back View

Mounting Inserts For Screws (4 pl) #M3.5 x 5 Minimum Deep

26 Pin Connector

Motor

Side View

4.58"
116.33 mm

0.25"
6.35 mm

26 Pin Connector

Front View

3.94"
100.08 mm

2.60"
66.04 mm

4.00"
101.60 mm

0.575"
14.60 mm

2.85"
72.39 mm

0.250"
6.35 mm

Clearance For #M3.5 x 5 Screw (4pl)

1.77"
44.96 mm

Panel Opening

1.188"
30.18 mm

2.42"
61.47 mm

0.291"
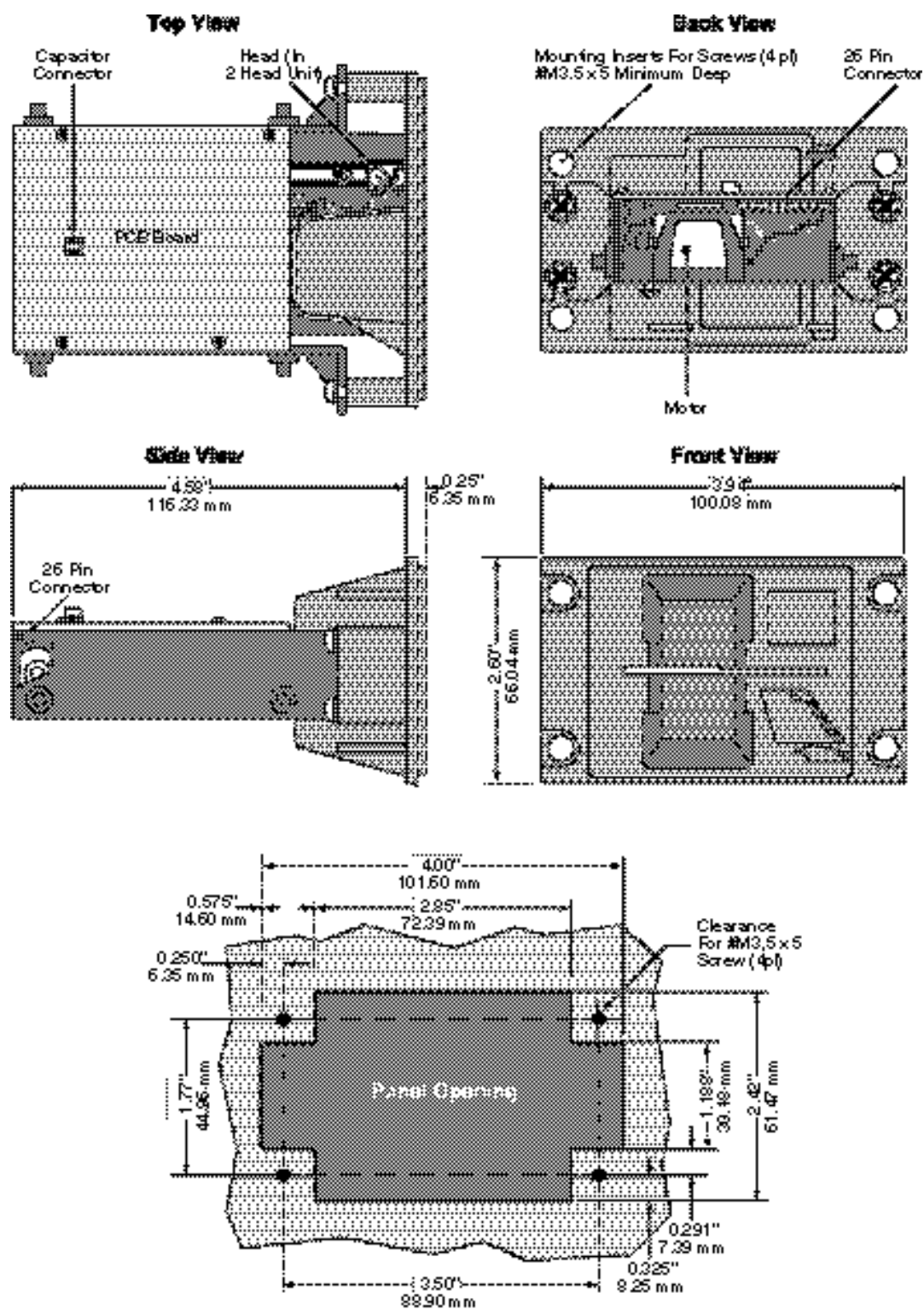7.39 mm

0.325"
8.25 mm

(3.50")
88.90 mm

Figure B-3. International Metal Bezel Mounting

24

APPENDIX C. PCB DESIGN

The dimensions for component and connector locations are shown in Figure C-1. Descriptions are listed in Table C-2. All locations and descriptions are recommended by MagTek for a PCB designed by the customer.

Parameters on the board are indexed from the centerline of pin locator at vertical and horizontal point .000. From this point, all other parameters are referenced.

Mounting screws (MH), P/N 45102003 are P/N 45102003, Phillips, 2-56 x 3/16, torque 1.25 in lbs.
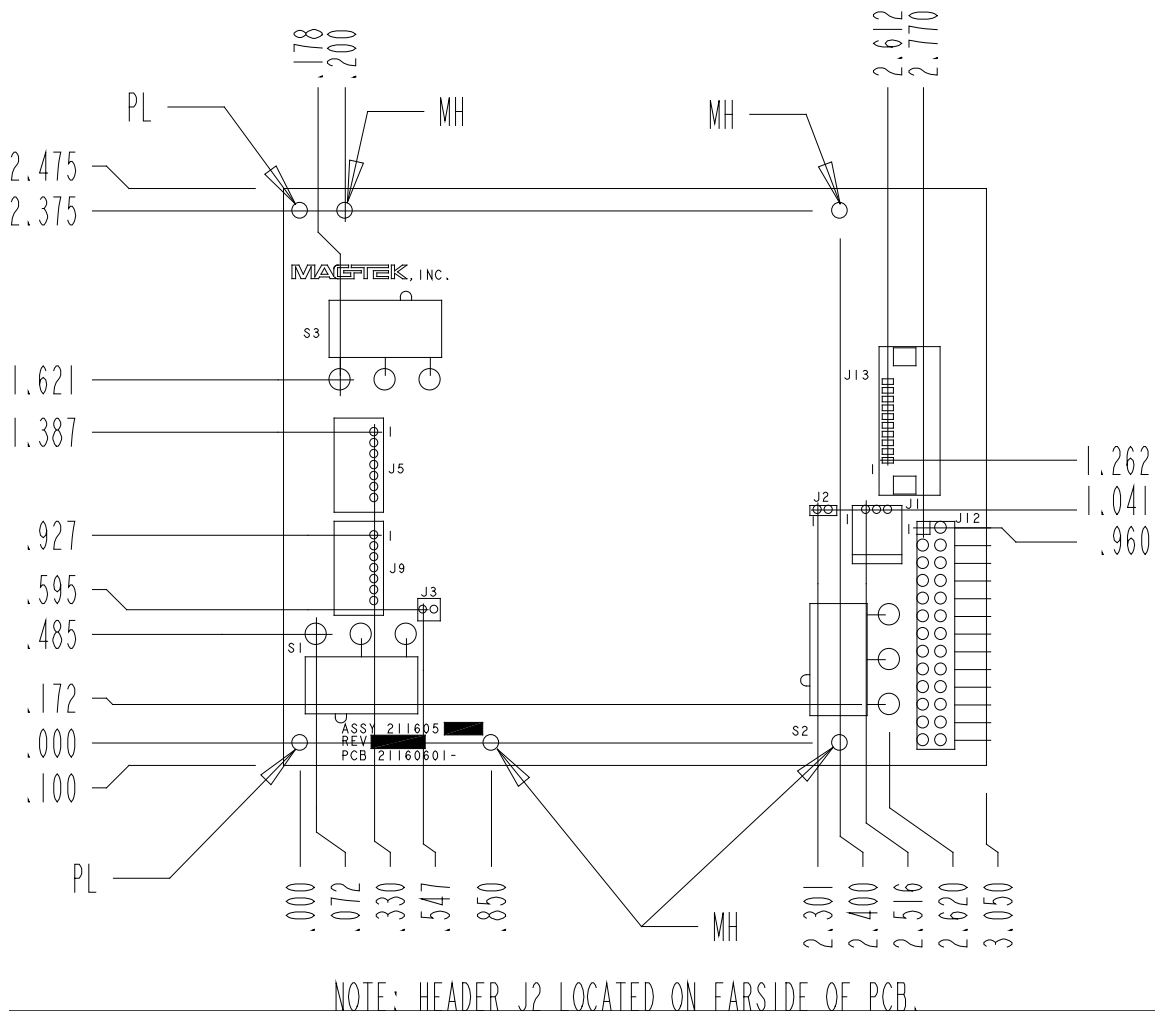
PARAMETERS

Figure C-1. PCB Design

Table C-1. Component and Connector Descriptions

Designation	Description	Manufacturer and P/N
J1	Connector, Latch Motor, 3 pin	Molex 53048-0310
J2	Connector, Power Fail Latch Release Capacitor, 2 pin	Molex 51021-0200 Receptacle, Mates with Molex 52048-0210 Header. Pin 1 must connect to positive side of capacitor.
J5	Connector, Secondary Head, 7pin	Molex 53048-0710. Mates with Molex 51021-0700
J9	Connector, Primary Head (facing opposite side of Smartcard contacts), 7 pin	Molex 53048-0710. Mates with Molex 51021-0700
J12	Connector, I/O, 26 pin	Molex 87049-2616. Mates with Receptacle 87381-2612
J13	Connector, Smartcard Contact, 10 pin	Molex 52207-1085*. Mates with MagTek Cable, Flex Circuit, 8 contacts (P/N 21161128), or MagTek Cable, Flex Circuit, 16 Contacts (P/N 21161122)
MH	Mounting Holes (4 places)	
PL	Pin-hole Locations (2 places)	
S1	Switch, Card Present (Mechanical)	Cherry DG23-C3LA, Soldered to Board
S2	Switch, Card Seated (Mechanical)	Cherry DG23-C2LA, Soldered to Board
S3	Switch, Card Latch Sensor (Mechanical)	Cherry DG23-C3LA, Soldered to Board

*   To insert flex cable, use a small screw driver to pull the locking tab out (on ear at each end of the tab). Then insert the cable (Chrome side up), and push locking tab in.

PCB HEAD WIRING

The 7-pin connector that is shipped with each head is

Connector, Molex 51021-700

The terminals are as follows:
21062367	50058-8000,7X
21062368	50058-8000,7X
21062344	50058-8000,3X

(Terminal Substitute Molex 50058-8100 may be used.)

Part numbers, Descriptions, and Pin-outs are listed in Table C-2.

Table C-2. PCB Head Wiring

Part number	Description	Color	Pin-out	Signal
21062367	Head Spring Assy, Tk 1, 2, 3, Primary	Red	1	Tk1
		Red	2	Tk1
		Green	3	Tk2
		Green	4	Tk2
		Yellow	5	Tk3
		Yellow	6	Tk3
		Black	7	GND
21062368	Head Spring Assy, Tk 1, 2, 3, Secondary	Red	1	Tk1
		Red	2	Tk1
		Green	3	Tk2
		Green	4	Tk2
		Yellow	5	Tk3
		Yellow	6	Tk3
		Black	7	GND
21062344	Head Spring Assy, Tk 2, 7PMLX, Primary		1	N/C
			2	N/C
		Red	3	Tk2
		Red	4	Tk2
			5	N/C
			6	N/C
		Black	7	GND

APPENDIX D. CONFIGURATION OPTIONS

OPTION	CHOICE	CODE
PRINTED CIRCUIT BOARD	Yes	B1
	None	
MOUNTING BRACKET CONFIG.	FRONT	M1
	SIDE	M2
	FRONT AND SIDE	M3
	NO MOUNT	M4
SMARTCARD IC CONTACTS	EIGHT CONTACTS	C1
	NO CONTACTS	
SECURITY GATE	YES	SG
	NO	
CARD LATCH	CARD LATCH W/SWITCH &PF	L3
	PF THROUGH MAIN CONN.	L4
	NO LATCH	
MAGNETIC HEAD CONFIG.	1 HEAD	1H
	2 HEADS	2H
	NO HEAD	
MAGNETIC HEAD TYPE	TRACK 2	H1
	TRACK 1 & 2	H2
	TRACK 2 & 3	H3
	TRACK 1,2, AND 3	H4
	Shift-Out IntelliHead	H6
	Encrypting SPI IntelliHead	H7
GROUND LUG ON HEAD	Wire Length 2" (50 mm)	GK
	No ground lug	
CARD SEATED SWITCH CONFIG.	CONTACT BLOCK	S1
	PCB WITH LEVER	S3
CONFORMAL COATING	YES	CT
	NO	
BEZEL TYPE	International Plastic Bezel (21161202)	PB
	International Metal Bezel (21161204)	MB
	No Bezel	