

# **MagneSafe I-65**

## **INSERTION READER**

### **TECHNICAL REFERENCE MANUAL**

**Manual Part Number: 99875541 Rev 8**

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## REVISIONS

Rev Number	Date	Notes
1.01	5 Apr 2011	Initial Release
2.01	13 Apr 2011	Updated Figure 2-5
3.01	22 Apr 2011	Added Figure 2-7. Panel Cutout Detail For S- Bezel Mounting
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6.01	12 July 2011	Added 21165076 & 21165077; updated maximum current entries to include readers without latch.
7.01	1 Feb 2012	Updated figures to show panel mounting dimensions for international bezel models
8.01	28 Feb 2012	Updated the International Metal Bezel paragraph

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

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

Cet appareil numérique de la classe B est conforme 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.

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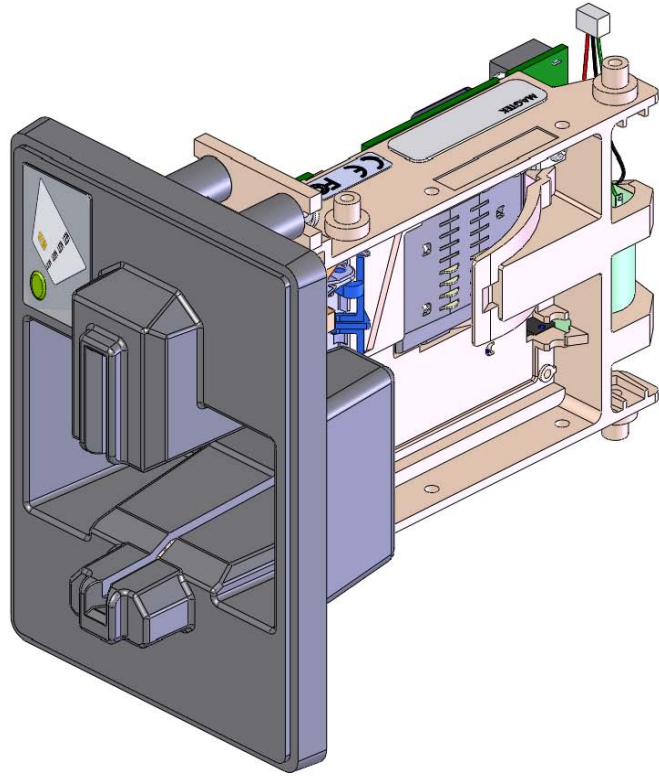
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**Figure 1-1. MagneSafe I-65 with Front Mount International Bezel**



## SECTION 1. FEATURES AND SPECIFICATIONS

The MagneSafe I-65™ Insertion Reader, shown in Figure 1-1, performs the following major functions:

- Reads magnetic stripe cards
- Reads encoded data that meets ANSI/ISO/AAMVA standards
- Reads up to three tracks of card data
- Supplies 54 byte MagnePrint™ value
- Encrypts all track data and the MagnePrint value
- Provides clear text confirmation data including card holder's name, expiration date, and a portion of the PAN as part of the Masked Track Data
- Communicates with ISO smart cards and many popular memory cards
- Supports one on-board SAM (Security Access Module)
- Includes an integrated USB interface
- Optionally supports Contactless Smart Card communication

The Reader communicates to a host using an RS-232 or USB interface with a defined protocol and command set. The 3-track Reader has an industry standard mechanical footprint. The MagneSafe I-65 is designed for self-service applications such as ATMs, vending machines, kiosks, and fuel pumps.

### CONFIGURATIONS

Unless otherwise specified in the table below, all of the MagneSafe I-65 readers include the following capabilities:

- MagneSafe features including key management, encryption and MagnePrint
- USB and RS-232 interface
- Smart Card connector with 8-contacts
- Single SAM socket
- Debris Gate
- Card retention latch with power fail release
- Single 3-track head with integrated encryption and MagnePrint
- Card Seated Switch integrated into the contact block
- Bezel with built-in red/green LED

## MagneSafe I-65, USB/RS-232 Insertion Reader

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See **Appendix A** for a description of the options. Part numbers for the basic configurations are shown in the following table.

Part Number	Description
21165073	Front or Side Mounting chassis; International Plastic Bezel; Contactless smart card ready*
21165074	Side Mounting chassis; Plastic S-Bezel; Contactless smart card ready*
21165075	Front or Side Mounting chassis; International Plastic Bezel; Contactless smart card with included Contactless module, antenna and cable
21165076	Same as 21165073 but with a metal bezel
21165077	Same as 21165075 but with a metal bezel

\* Contactless interface is integrated but the Contactless module, antenna and cable must be ordered separately

## ACCESSORIES

Other part numbers that may be shipped with the unit include the following:

Part Number	Description
16051408	RS232 / Power cable – 6 foot, IntelliStripe 65 host port to 9-pin D female RS232 and 2.5mm power jack
16051433	USB-A to USB mini-B cable (gray)
21162302	Power Fail Latch Release Capacitor
21165520	MagTek Contactless antenna with LEDs (must be mounted away from reader bezel)
30037472	Demo Software, IntelliStripe Picture Demo (CD)
30037473	MagTek MCP Drivers (CD)
51300004	OTI Contactless communication module (mounts on “Contactless Ready” models)
51300005	OTI Contactless antenna with LEDs (must be mounted away from reader bezel)
51300006	OTI coax antenna cable – 30cm (does not support LEDs)
51300007	OTI ribbon antenna cable – 19cm (supports LEDs)
51300012	Same as 51300004 but with SAM socket
64300080	Power Supply – Auto-ranging 100V-250V, regulated, 12VDC, 2.5mm plug. Requires adapter to mate with power outlet; use Adapter/Power Cord (71100001) for North American applications.
71100001	Power Outlet Adapter/Cord for North American applications (used with 64300080)
99510015	Demo Software, IntelliStripe Picture Demo (Web – ref <a href="http://www.magtek.com/">http://www.magtek.com/</a> )
99510016	MagTek MCP Drivers (Web – ref <a href="http://www.magtek.com/">http://www.magtek.com/</a> )

## RELATED DOCUMENTS

This document (P/N 99875541) is from a hardware perspective only. Other MagTek documents that cover the command set, communications protocol, and API (Application Program Interface) are as follows:

Part Number	Description
99875161	IntelliStripe 65, Command Reference Manual
99875163	MCP, Serial Transport Protocol Reference Manual
99875164	MagTek Communication Protocol, Driver Reference Manual

ISO Documents: 7810, 7811, 7816 are available from ANSI at:  
Phone: 212-642-4900 or [www.ansi.org](http://www.ansi.org)

## STANDARD FEATURES

Standard features of the MagneSafe I-65 are as follows:

- Multiple bezel styles allow for optimized mounting and integration
- Rugged High-impact plastics with durable read head
- 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
- On board SAM (Security Access Module)
- RS-232 and USB interfaces
- On board intelligence for transporting large blocks of data using a defined protocol and command set
- Status LED
- Program Flash upgradeable

## OPTIONS

Any of these options may be selected:

- Smart Card Contacts (8) for reading ISO contact locations
- Front Card Gate prevents dust and debris from entering the unit
- Card Latch physically latches the card inside the Reader ensuring optimum conditions for a smart card interface session
- Power-Fail Latch Release Mechanism–In case of a power failure, the latch releases the card automatically (requires external capacitor)
- On board Contactless Smart Card support
- Drivers available for all Windows Operating System platforms

## SMART CARD INTERFACE

The Reader supports ISO7816 T=0 and T=1 cards not requiring  $V_{PP}$ , with a speed range of 9600 bps to 115200 bps. It also supports a variety of common memory card types. See IntelliStripe 65 Command Reference Manual (P/N 99875161) for more details.

## MAGNETIC STRIPE READER

The Reader can read up to three tracks of magnetic stripe card data. The Mag-stripe can be configured to support all popular track combinations. See IntelliStripe 65 Command Reference Manual (P/N 99875161) for more details.

## **LATCH**

The Reader contains a latch that can be used to prevent the user from withdrawing the card prematurely. See IntelliStripe 65 Command Reference Manual (P/N 99875161) for more details.

The power fail unlatch option disengages the latch during a power failure. This option is triggered when the power to the reader fails. 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.

## **ON BOARD SAM INTERFACE**

The Reader provides a socket for one on board SAM. The SAM complies to ISO 7816-3 (1997) electrical requirements and do not require  $V_{PP}$ . T=0 and T=1 are fully supported with a speed range from 9600 bps to 115200 bps. See IntelliStripe 65 Command Reference Manual (P/N 99875161) for more details.

## **SENSING SWITCHES**

The Reader emulates a sensing switch for card latch. Physical sensors are provided to indicate that a card is inserted in the reader; and the card is seated and ready for smart card communication.

### **Card Present Switch**

The card present switch activates when the card is inserted part way into the Reader.

### **Card Seated Switch**

A switch is operated when a card is fully inserted into the Reader (card is at the fully rearward position).

### **Card Latch Switch**

See IntelliStripe 65 Command Reference Manual (P/N 99875161) for more details.

## **STATUS LED**

When the unit is powered up, the Status LED will blink green. This indicates that the unit is in its standard operating mode.

## **FLASH UPGRADABLE**

The unit's firmware is in-system Flash Upgradeable. This allows the unit to be upgraded to new smart card specifications.

## **RS-232 INTERFACE**

The device can communicate to the host through an RS-232 interface. Once the host communicates to the device on this interface the device will no longer be able to communicate on any other interface until it is power cycled or reset. The device uses 8 data bits, 1 stop bit, even parity. The device can automatically sync to baud rates 9600, 14400, 19200, 28800, 38400, 57600 and 115200. See MCP Driver Reference Manual (P/N 99875164), MCP Serial Transport Protocol Reference Manual (P/N 99875163) and IntelliStripe 65 Command Reference Manual (P/N 99875161) for more details.

## **USB INTERFACE**

The device can communicate to the host through a USB interface. Once the host communicates to the device on this interface the device will no longer be able to communicate on any other interface until it is power cycled or reset. The device uses vendor identifier 0801 (hex) and product identifier 000A (hex). The device contains a manufacturer string descriptor with a value of “MagTek”. The device contains a product string descriptor with a value of “IntelliStripe 65”. The device contains a programmable serial number string descriptor. The device does not get its power from the USB port; it needs to be self powered. When using the USB port, power must be applied directly to the PCB via the power connector or the host connector. See MCP Driver Reference Manual (P/N 99875164), MCP Serial Transport Protocol Reference Manual (P/N 99875163) and IntelliStripe 65 Command Reference Manual (P/N 99875161) for more details.

**SPECIFICATIONS**

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

**Table 1-1. Specifications**

<b>DATA FORMAT SPECIFICATION</b>	
<b>Reader Configuration</b>	Data Format Specification*
Mag-Stripe Functions Track 1,2,3 only	ISO/AAMVA/ JIS formats ISO 7810, 7811, JIS x 6302 Type 2
Smartcard Functions	ISO 7816 T=0 and T=1 protocols, many popular memory cards EMVCo Level 1 Approval
* ISO (International Standards Organization), AAMVA, (American Association of Motor Vehicle Administrators), JIS (Japanese Industrial Standard)	
<b>OPERATIONAL</b>	
Card Speed	3 IPS (7,62 cm/sec) to 50 IPS (127, cm/sec)
Recording Method	Two-frequency coherent phase (F2F)
MTBF	Head: 1,000,000 passes (500,000 Insertion Cycles) SC contacts: 1,000,000 insertions
<b>ELECTRICAL</b>	
Input Voltage	12.0 VDC $\pm$ 5%
Current	
With latch	500mA max
Without latch	400mA max
Idle	70mA idle
With contactless, add	500mA
<b>MECHANICAL</b>	
Chassis Mounting Options	
Front Flange	See Section 2, Figure 2-3
Side Mounting Studs	See Section 2, Figure 2-3
Side Mounting Holes	See Section 2, Figure 2-3
Dimensions (Core Chassis)	
Overall Length	4.70" (119,4mm)
Mounting Depth	3.80" (96,5mm) when mounted with front flanges
Height	1.40" (35,6mm)
Width	2.60" (66,0mm) without mounting bosses or flanges
Weight	5.02 oz (142.2gr)
<b>ENVIRONMENTAL</b>	
Temperature	
Operating	-4°F to 122°F (-20°C to 60°C) (without contactless smartcard option) -4°F to 122°F (-20°C to 50°C) (with contactless smartcard option)
Storage	-4°F to 158°F (-20°C to 70°C)
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

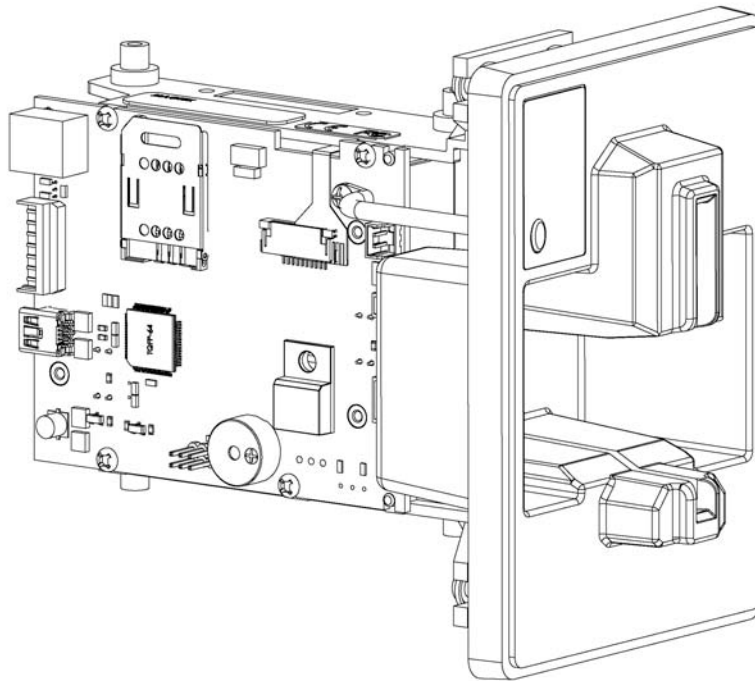
The Installation of the MagneSafe I-65 Insertion Reader includes mechanical and electrical connections.

### BEZELS

There are three types of Bezels for this product: the International Front Mount Plastic Bezel, the Plastic Rear Mount S-Bezel, and the International Front Mount Metal Bezel. The type of bezel used is relevant to the mounting options described below. Appendix B contains illustrations and engineering drawings describing the three bezels.

#### International Front Mount Plastic Bezel

The International Front Mount Plastic Bezel is larger than the S-Bezel and requires a larger panel opening.

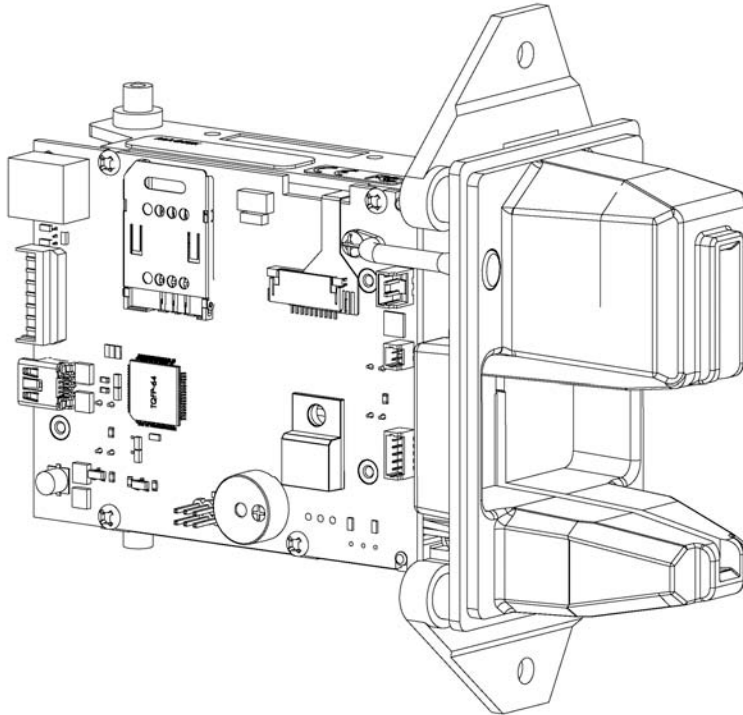


**Figure 2-1. Unit with International Bezel**

International Bezels are mounted to the Reader Chassis by the Front Flange only. The dimensions of the recommended panel opening for mounting are shown in Figure 2-4.

## Plastic Rear Mount S-Bezel

The Rear Mount S-Bezel is smaller than both International Bezels and requires a smaller panel cutout. A reader with this bezel installed is mounted from the rear of the panel.



**Figure 2-2. Unit with Rear Mount S-Bezel**

The dimensions of the recommended panel opening for mounting are shown in Figure 2-6.

## International Front Mount Metal Bezel

The International Front Mount Metal Bezel is nearly identical to the plastic version and it mounts the same way. The metal bezel requires self-tapping screws, 3.5mm or #6, for mounting. The maximum thread depth is 5.5mm or 0.219 in. The exact length of the mounting screws will depend on the thickness of the plate that the reader is being mounted to. The metal bezel is more durable and can be used to withstand higher static electricity situations since it tends to discharge the card before it reaches any sensitive electronics. The dimensions of the recommended panel opening for mounting are shown in Figure 2-4.

## MECHANICAL MOUNTING AND BEZELS

Mounting options for the Reader are as follows:

- Front Flanges only (for International Bezels)
- Side Mounting Studs only (for Plastic Rear Mount S-Bezel)
- Side Mounting Holes only
- Front Flanges and Side Mounting Studs together



Descriptions of the mounting options are discussed below and shown in Figure 2-3. Mounting dimensions are shown in Figure 2-4 - Figure 2-7.

### Front Flange

Two molded flanges toward the front of the chassis connect the Reader by four screws and washers. The International-style Bezels are used with the Front Flange.

### Side Mounting Studs

There are four molded studs. Two are located on each side of the chassis.

### Side Mounting Holes

Four molded holes are available when studs are not provided. Holes are positioned in line with the centerline of the stud with molded nut retaining features.

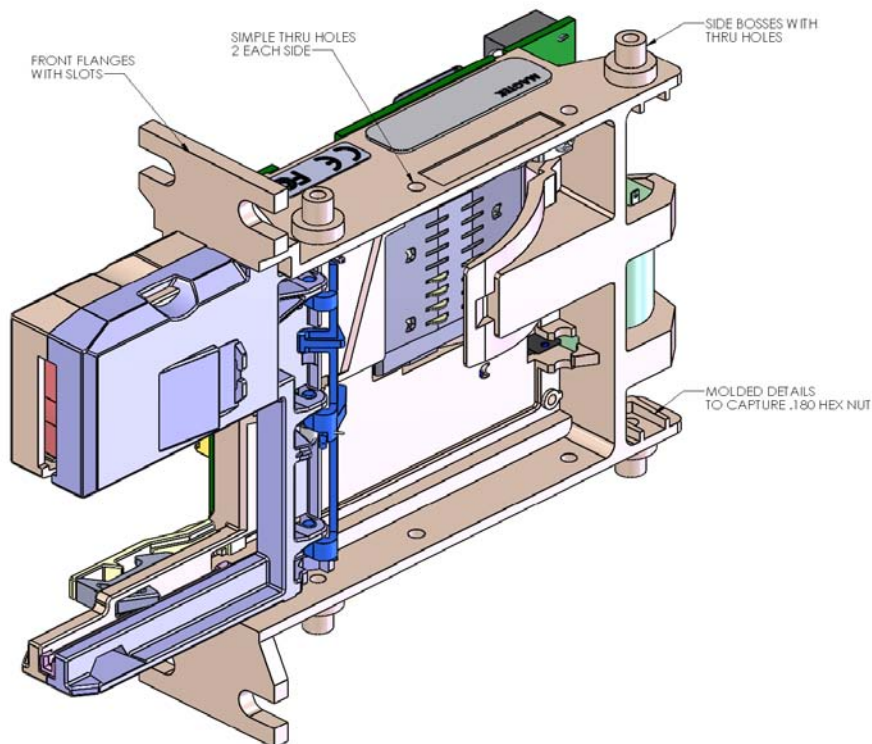


Figure 2-3. Chassis Mounting Features



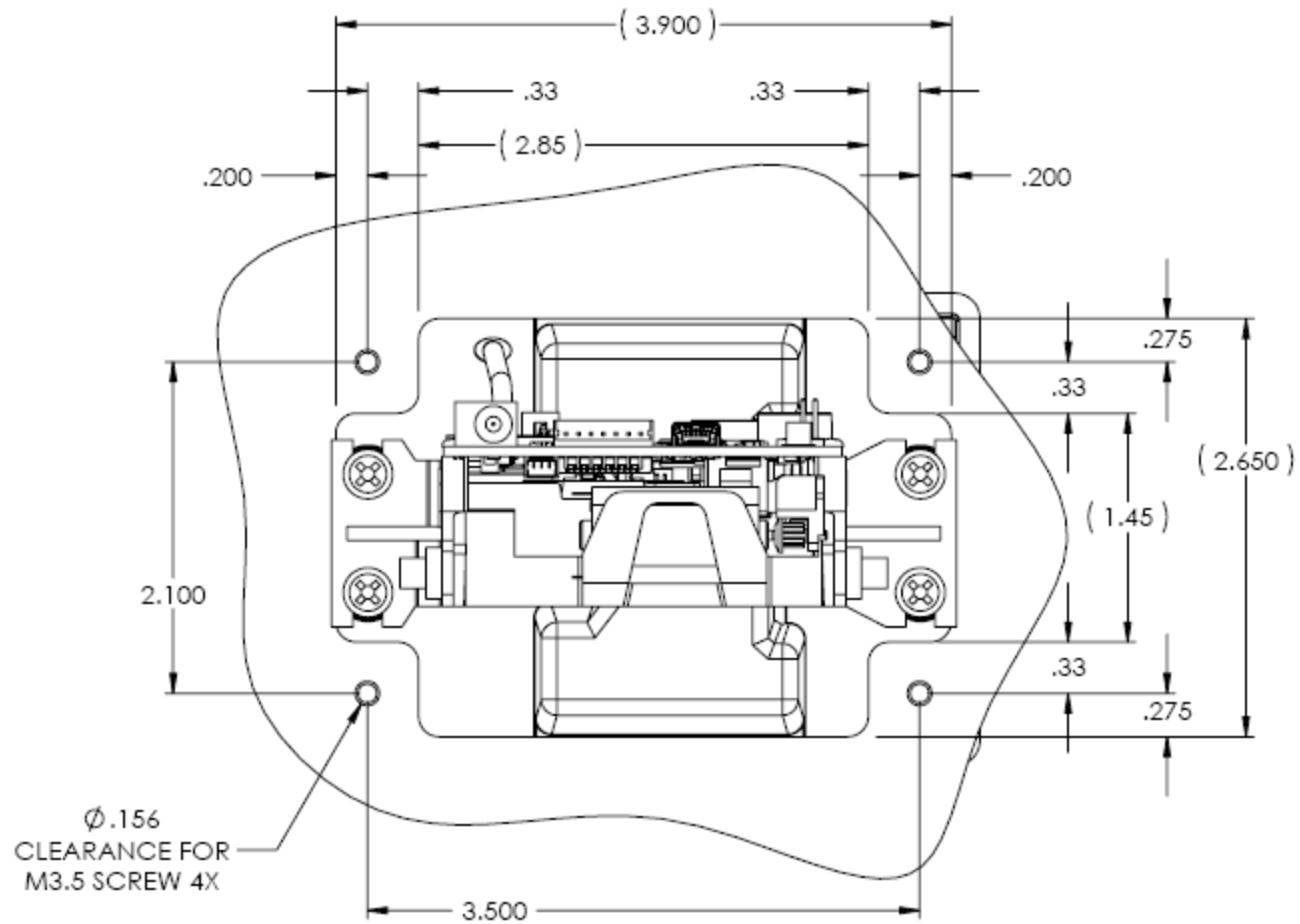


Figure 2-4. Panel Cutout Dimensions For International Bezel Mounting

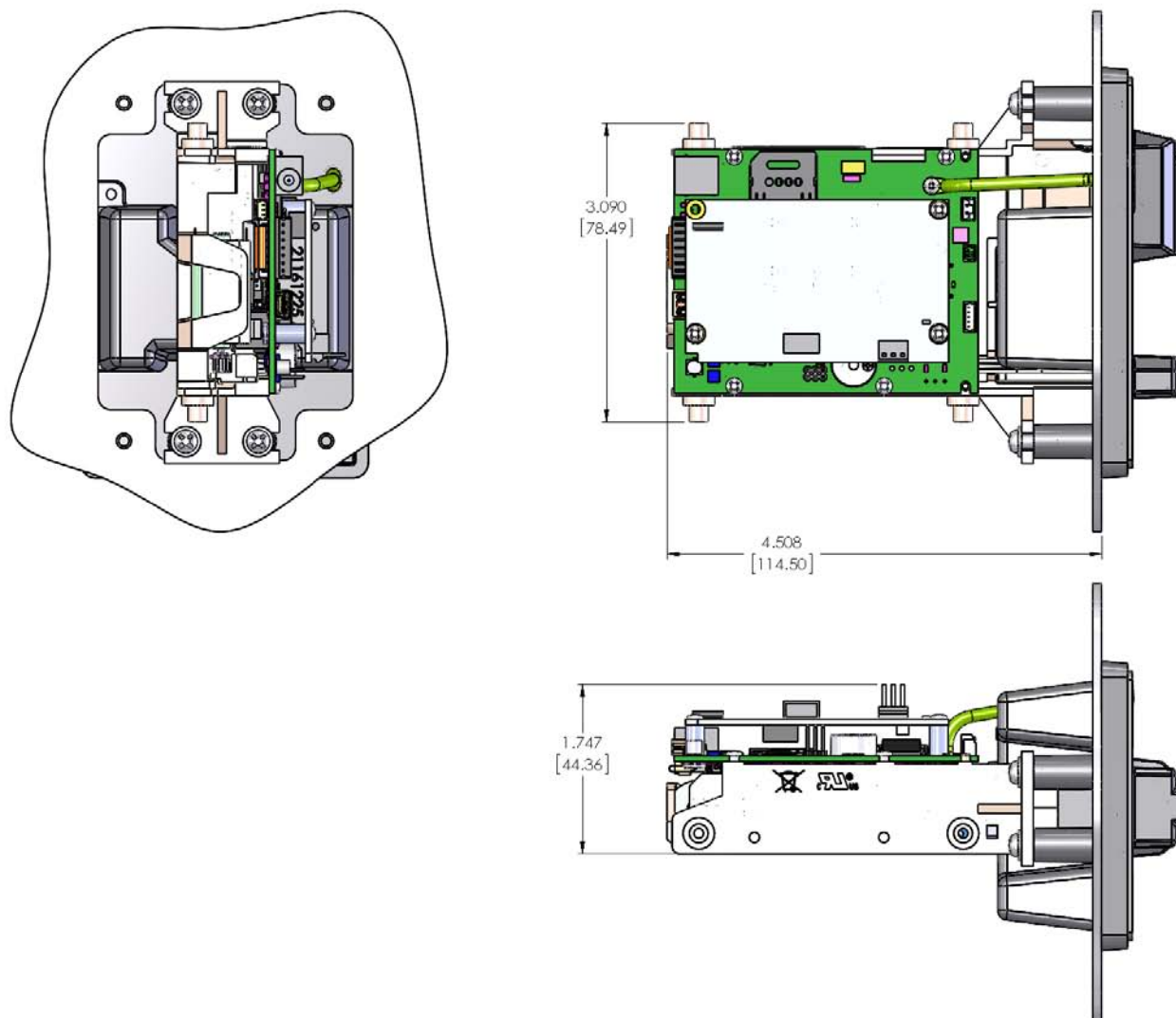


Figure 2-5. Mounting with Contactless Module Installed

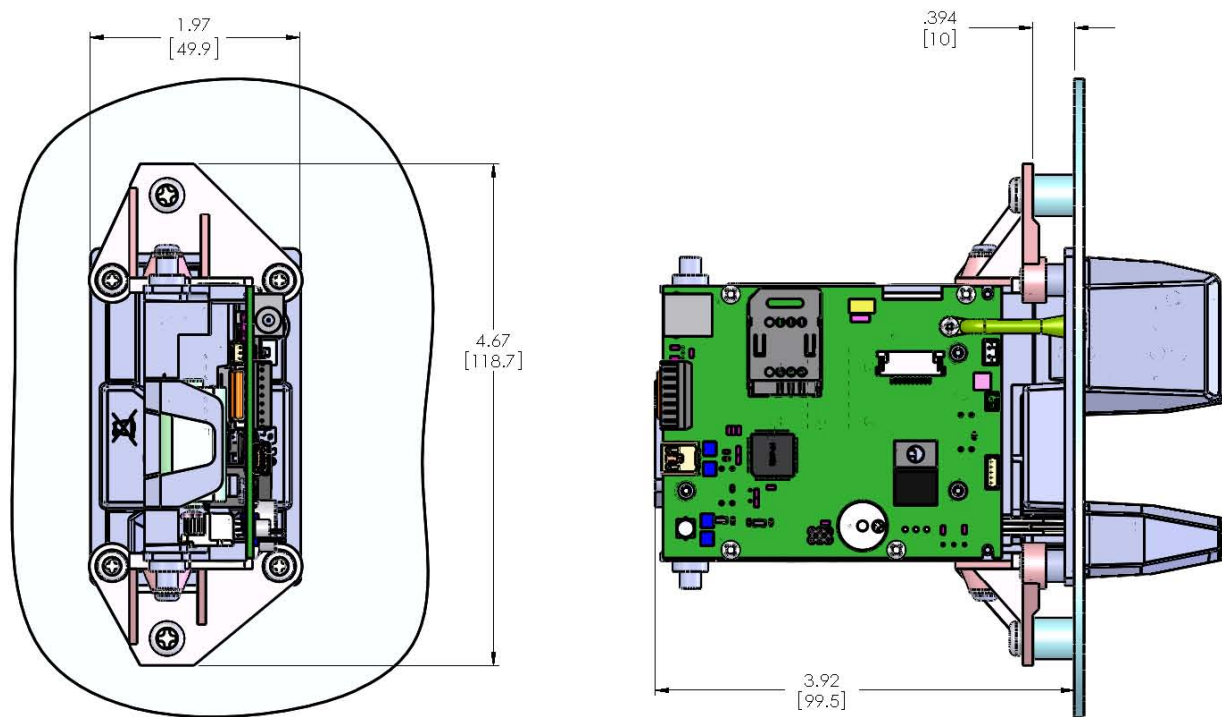
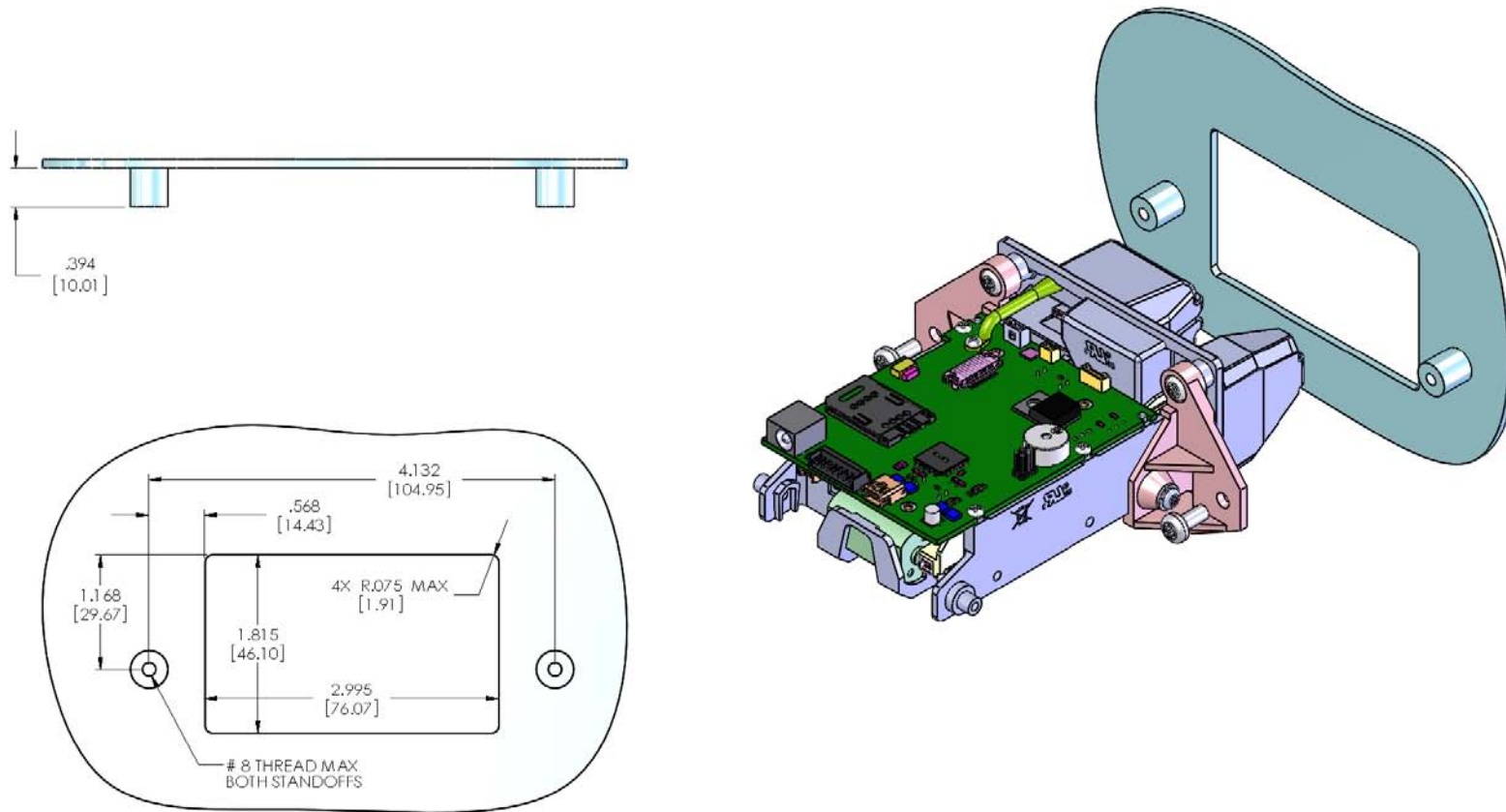


Figure 2-6. S- Bezel Dimensions



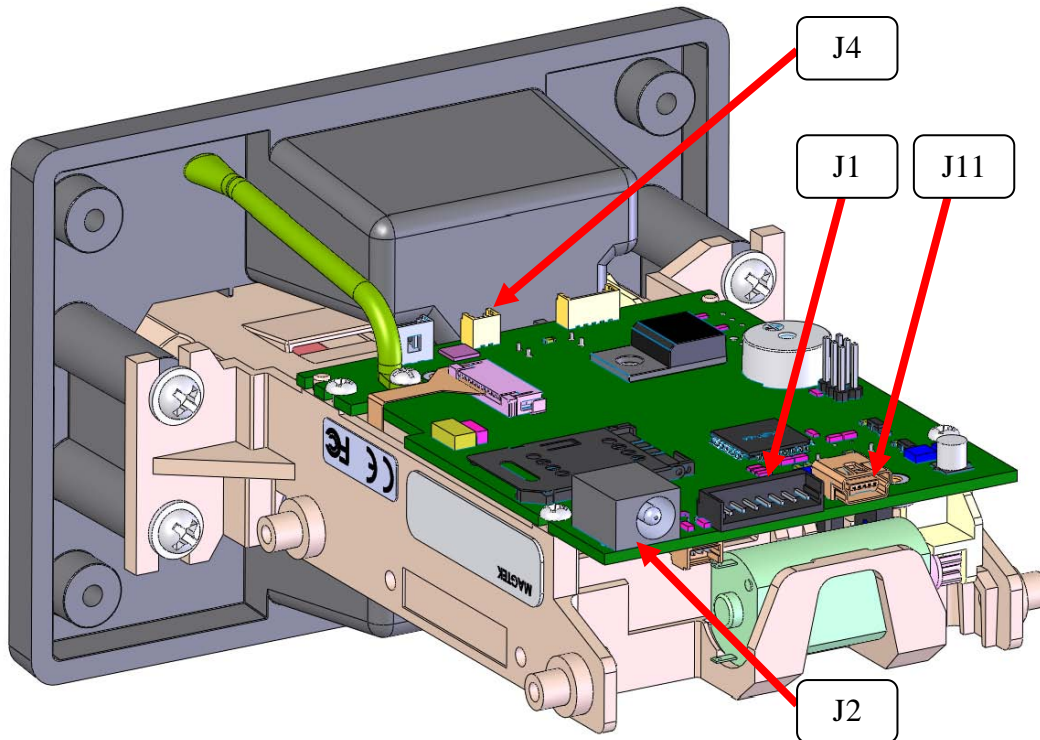
PANEL CUTOUT DETAIL FOR MAGNESAFE I-65 WITH S-BEZEL

**Figure 2-7. Panel Cutout Detail For S- Bezel Mounting**

## ELECTRICAL CONNECTIONS

### Connectors

Figure 2-8 shows the positions of the rear connectors for power and communication.



**Figure 2-8. Power and Communication Connections**

#### Host Connector - RS-232

The RS-232 connector, J1, connects to the host's power and RS-232 signals. Figure 2-8 shows the location of the 7-pin RS-232 Connector. Table 2-1 lists the pin numbers of the connector. If the RS-232 connection is used, the power can be supplied through the jack on the RS-232 cable (see Figure 2-13) or via the J2 Power Connector.

#### Host Connector - USB

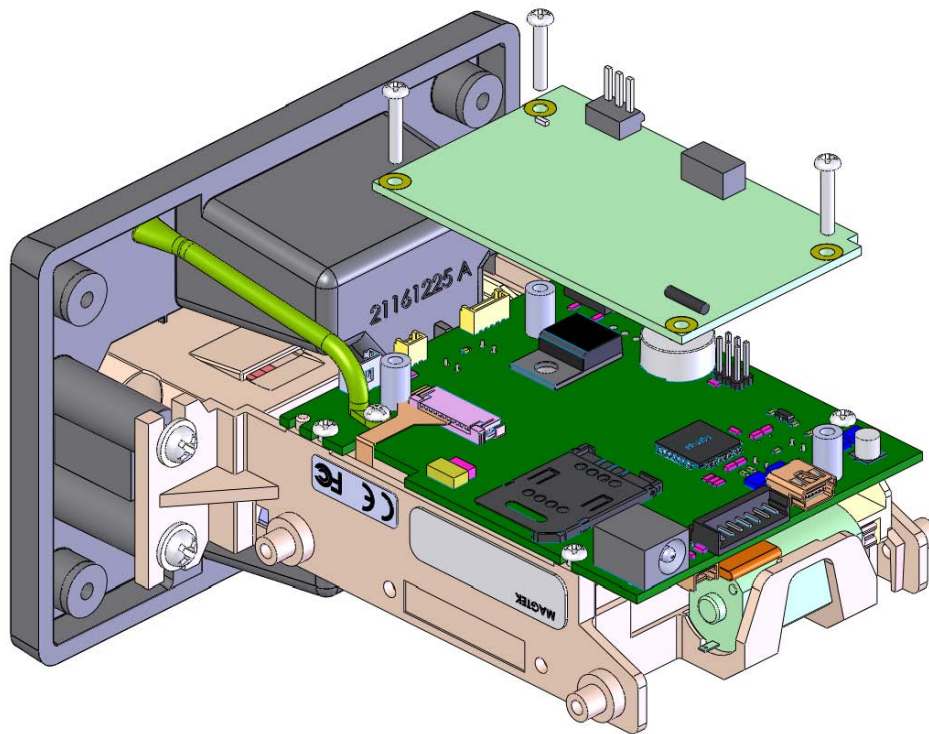
The USB connector, J11, connects to the host's USB port. When using the USB connection, power must be supplied via the J2 Power Connector on the back of the MagneSafe I-65. If the USB connection is used, the power must be supplied to the J2 Power Connector.

#### Power-Fail Capacitor Connector

The Power-Fail Capacitor connector, J4, connects to an optional external capacitor that is used to unlatch the card during a power failure. Pin 1 connects to the positive side of the capacitor and pin 2 connects to the negative side (see Appendix A. Options).

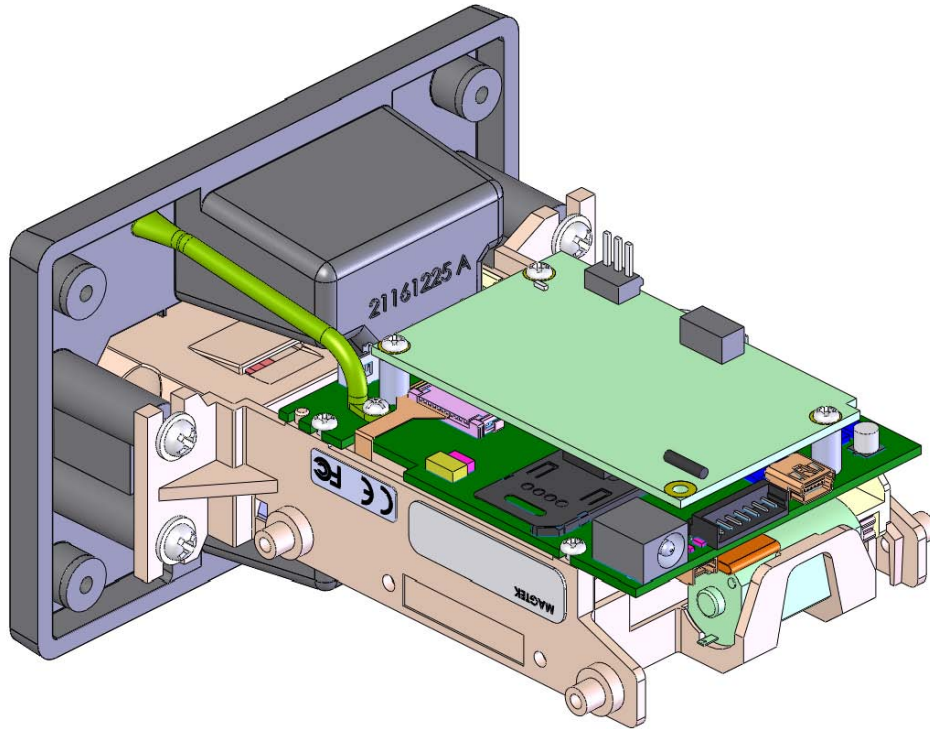
## Contactless Module

Some models of the MagneSafe I-65 include the ability to add a contactless smart card module. The contactless module and its interface cable can be ordered separately from MagTek. Figure 2-10 shows how the module is attached to the MagneSafe I-65 circuit board.

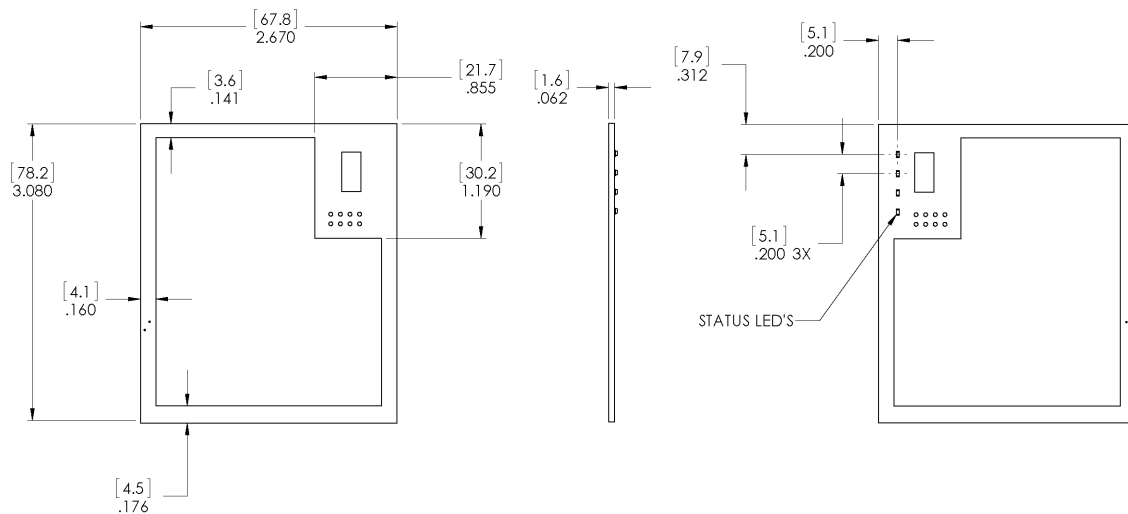


**Figure 2-9. Installing Contactless Module on Contactless Ready Model**





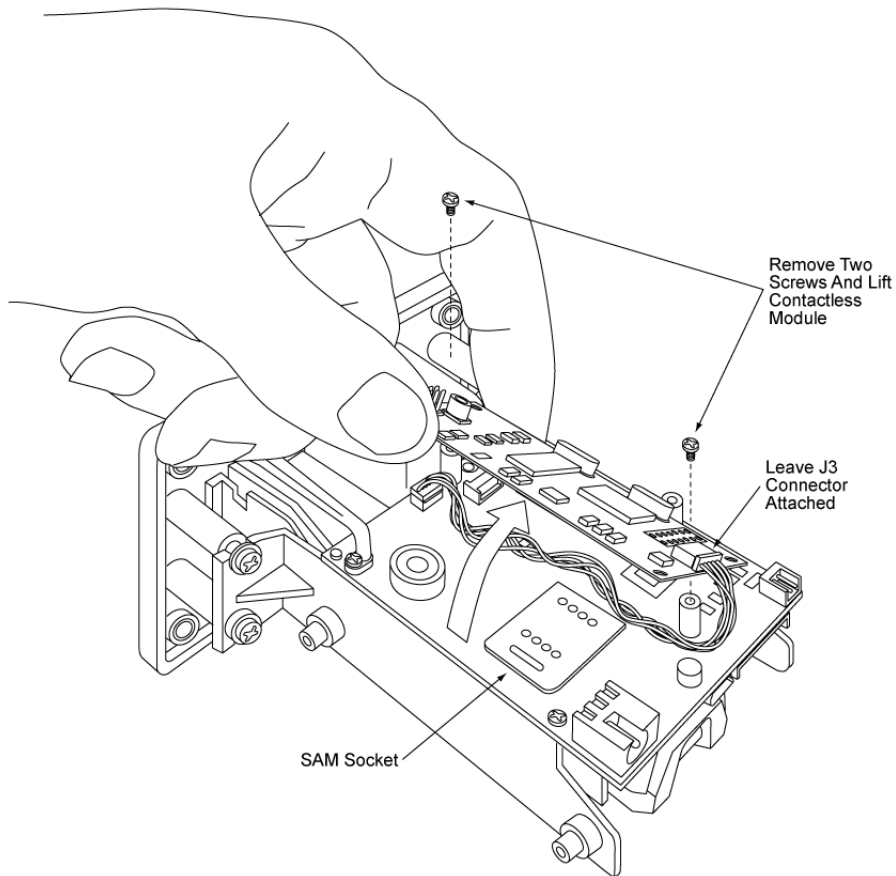
**Figure 2-10. Contactless Module Installed**



**Figure 2-11. MagTek Antenna (21165520) Dimensions**

### Accessing SAM Module

If the contactless module is installed, it must be removed temporarily in order to access the SAM module. The three screws holding the contactless module onto the MagneSafe I-65 circuit board will have to be removed in order to reach the SAM module which is located under the contactless module (see Figure 2-12).



NOTE: Three screws are attached to the module—not just 2 as shown.

**Figure 2-12. Removing Contactless Module to Access SAM Socket**

### RS-232 Cable

Figure 2-13 shows the cable (P/N 16051408) that connects the MagneSafe I-65 (7-Pin Connector) to the host (9-pin Connector). The length of the cable is 6' (1.8m).



**Figure 2-13. RS-232 Cable with power connection**

Table 2-1 lists the connector pin numbers and signal names.

**Table 2-1. Pin List for RS-232 MagneSafe I-65 Cable**

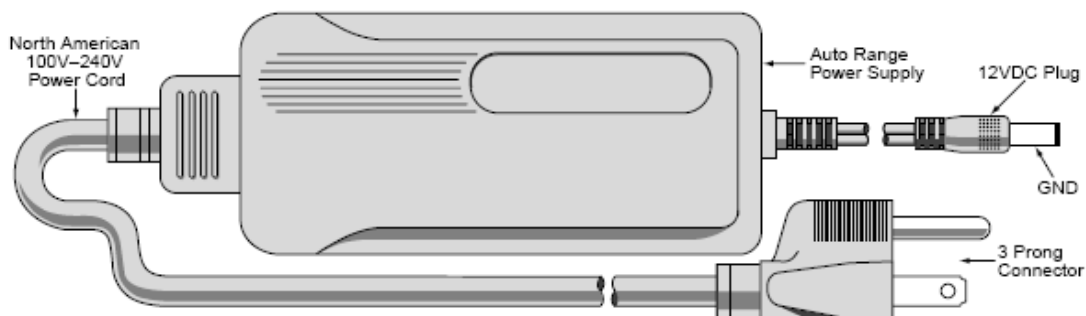
Molex 7 Pin (51065-0700)		DE-9 Female		2.5mm Power Jack	
Pin Number	Signal Name	Pin Number	Signal Name		
1	TXD	2	RXD		
2	+12V			CENTER PIN	+12V
3	PWR GND			SHELL	GND
4	RXD	3	TXD		
5	RTS	8	CTS		
6	CTS	7	RTS		
7	SIGNAL GND	5	GND		
		6	DSR		
		4	DTR		

### USB Cable

The USB cable is available in Pearl White (P/N 16051430) and MagTek Gray (P/N 16051433). It connects the Host (USB-A plug) to the MagneSafe I-65 (USB mini-B plug). The overall length of the cables is 6' (1.8m).

### Power Supply

Figure 2-14 shows the Power Supply (P/N 64300080) 100-240V, regulated, 12VDC @ 1.5 Amps, 2.5 mm power jack. The AC power cord (P/N 71100001) is for use in North America. Other users must supply their own cord (requires an IEC-320-C13 connector at the power supply).



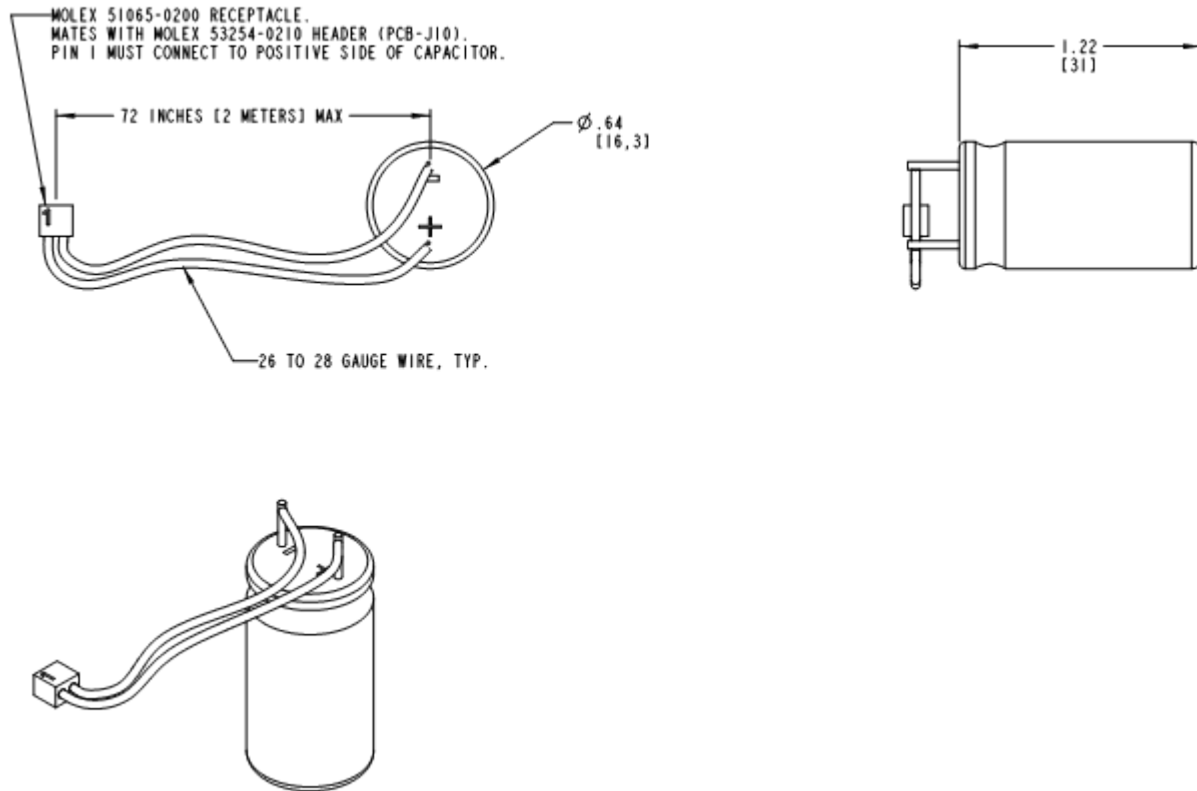
**Figure 2-14. Power Supply with power cord**



## APPENDIX A. OPTIONS

### POWER-FAIL LATCH RELEASE OPTION

The externally mounted power-fail capacitor (available from MagTek as part number 21162302) is shown in Figure A-1.



**Figure A-1. Latch Release Capacitor**

The power fail unlatch option disengages the latch during a power failure event. This option is triggered when the main input power to the reader fails. 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 the case of power failure, the capacitor automatically opens the latch, which releases the card. The users must determine the wire length required for their specific application. The power fail capacitor range is 3300uF to 15000uF with a rated voltage greater than the applied reader input voltage.



## APPENDIX B. BEZEL CONFIGURATION AND MOUNTING

Three bezel configurations are described in this appendix: the International Plastic and Metal Bezels and the slim rear-mount S-Bezel. The International Bezels require a larger panel opening for installation. The International Bezels are suited to applications requiring metric screws.

### INTERNATIONAL BEZEL MOUNTING

The International Bezels (P/N 21161224 or 21161225) are attached to the reader by four screws (mounting inserts M3.5 x 5 minimum depth). 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. See Figure 2-4 for a drawing showing suggested panel mounting dimensions.

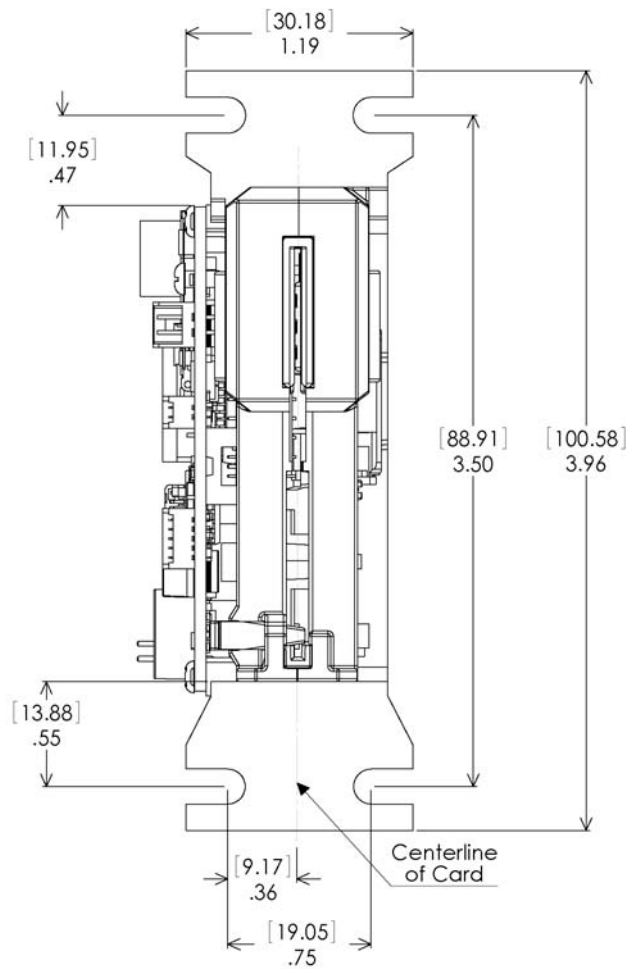


Figure B-1. Flanges for International Bezel Mounting