MODEL MT-215 TTL
SINGLE HEAD, 3-TRACK, INSERTION READER
TECHNICAL REFERENCE MANUAL

Manual Part Number 99875157 Rev 5

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MAGTEK®

REGISTERED TO ISO 9001:2000

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REVISIONS

Rev Number	Date	Notes
1	08 Dec 99	Initial Release
2	01 Jan 00	Front matter; Changed copyright date; Changed warranty from 90 days to one year;
3	16 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”. Added Appendix A, Bezel Design.
4	07 Aug 02	Sec 1, Related Documents: Added P/N 99875148. Specs: Added Output Signal Levels. Sec 2: Added text to Card Orientation regarding reverse read; Added Fig 2-3 and relevant text for timing.
5	21 May 03	Front Matter: added ISO line to logo, changed Tech Support phone number, added new warranty statement

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MagTek warrants that the products sold to Reseller 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 original purchaser unless the buyer is authorized by MagTek to resell the products, in which event, this warranty shall apply only to the first repurchase.

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FCC WARNING STATEMENT

This equipment has been tested and found to comply with the limits for 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 to 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 for 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 las classe B prescrites dans le Réglement sur le brouillage radioélectrique édicté par les ministère des Communications du Canada.

CE STANDARDS

Testing for compliance to CE requirements was performed by an independent laboratory. This equipment has been tested and demonstrated compliance to current European Union Directive 89/336/EEC for Class B disturbance level.

UL/CSA

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

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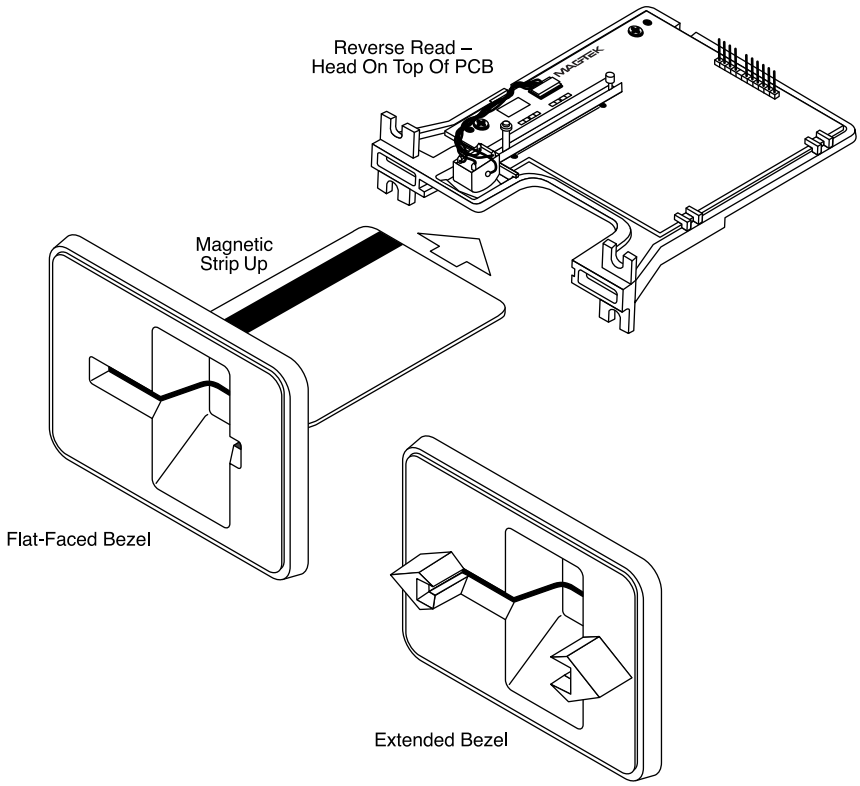


Figure 1-1. MT-215 TTL Single Head Insertion Reader with Bezels

SECTION 1. FEATURES AND SPECIFICATIONS

The MT-215, TTL, Single Head Insertion Reader is a manually operated, or push-in, Reader, which reads three tracks. As shown in Figure 1-1, there are three configurations of the Reader: without bezel, with extended bezel, and with flat-faced bezel. The single read head is mounted on top of the Reader (the same side as the connector) as shown in the illustration. The magnetic card can be read on insertion or removal; MagTek recommends reverse read (the start sentinel is read last) on withdrawal for greater accuracy.

The Reader will read cards conforming to the following specifications: ISO (International Standards Organization), ANSI (American National Standards Institute), AAMVA (American Association of American Motor Vehicle Administrators), and CDL (California Drivers License).

FEATURES

Features of the Reader are as follows:

- Single Read Head - Reads all three tracks in reverse read.
- Open Chassis design - provides superior debris clearing capability.
- Half-card Drop out - allows half-sized credit cards to clear from insert channel.
- Isolated PCB - isolates electronics from debris and liquids.
- AGC (Automatic Gain Control) in MagTek's latest F/2F decoder IC - enhances read performance with less susceptibility to RF interference.
- Beam-mounted Read-head - improves card-tracking capabilities.
- Ruggedized Chassis and Bezel Material - improves temperature and impact performance.

CONFIGURATIONS

Table 1-1 lists the configurations.

Table 1-1. Configurations

Part Number	Bezel
21065120	None
21065121	Flat-faced
21065122	Extended

SPECIFICATIONS

The specifications for the Reader are listed in Table 1-2.

Table 1-2. Specifications

OPERATING

Read-data Format Specifications Supported	ANSI/ISO/AAMVA/CDL/ 75 or 210 BPI on Track 1 (normally 210 BPI) ANSI/ISO/AAMVA/CDL/ 75 or 210 BPI on Track 2 (normally 75 BPI) ANSI/ISO/AAMVA/CDL/ 75 or 210 BPI on Track 3 (normally 210 BPI)
Power Requirements	Two Tracks: +5 VDC ±5% at 15mA Three Tracks: +5VDC ±5% at 20mA
Power Consumption	0.095 to 0.105 WATTS
Output Signal Levels	V_{ol} = 0.4 V @ 2.0 mA V_{oh} = Vcc -0.5 V @ 2.0 mA
Recording Method	Two-frequency coherent phase (F2F)
Speed	Card Speed: 3 to 50 IPS @ 75 or 210 BPI (7.6 to 127 cmps) TRK 1 or 3: 75 or 210 BPI (MagTek decode ASIC is density independent). TRK 2: 75 or 210 (MagTek decode ASIC is density independent).
MTBF	Electronics: 125,000 hours Head: 1,000,000 passes (500,000 Insertion Cycles)
I/O Connector	11-pin Header, 0.100" centers, single in line.

MECHANICAL

Dimensions (with Bezel)	Without bezel	With Flat-faced Bezel	With Extended Bezel
Length	4.40" (11.2cm)	4.58“ (11.63cm)	5.09" (12.93cm)
Width	3.51" (8.92cm)	4.00" (10.16cm)	4.00" (10.16cm)
Height	1.24" (3.15cm)	3.00” (7.62cm)	3.00” (7.62cm)
Bezel Thickness	Flat Faced: 0.31” (0.79cm); Extended: 0.82" (2.08cm)		
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.)

ENVIRONMENTAL

Temperature	
Operating	-30° C to 70°C (-26°F to 158°F)
Storage	-40°C to 80°C (-40°F to 176°F)
Humidity	
Operating	10% to 90% noncondensing
Storage	Up to 100% noncondensing
Altitude	
Operating	0-10,000 ft. (0-3,048 m.)
Storage	0-50,000 ft. (0-15,240 m.)

RELATED DOCUMENTS

The MT-215 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 or 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*.

SECTION 2. INSTALLATION

This section describes cabling information, mounting dimensions and timing.

PIN LIST AND CONNECTORS

Table 2-1 lists the connector pins and the required mating Connector.

Table 2-1. J3 Pin List

Pin Number	TK 1, 2, 3
1	Back Sensor
2	Data TK 2
3	Card Present
4	Strobe TK 2
5	Key
6	+5V
7	GND
8	Strobe TK 1
9	Data TK 1
10	Strobe TK 3
11	Data TK3

Mating Connector*: Molex 22-01-2111
*Molex Terminals 08-50-0114
*Molex Key 15-04-9209

MOUNTING

Figure 2-1 shows the dimensions for mounting when using a flat-faced bezel. The top view shows J1 and J3 connectors and pin 1 for both.

Note

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

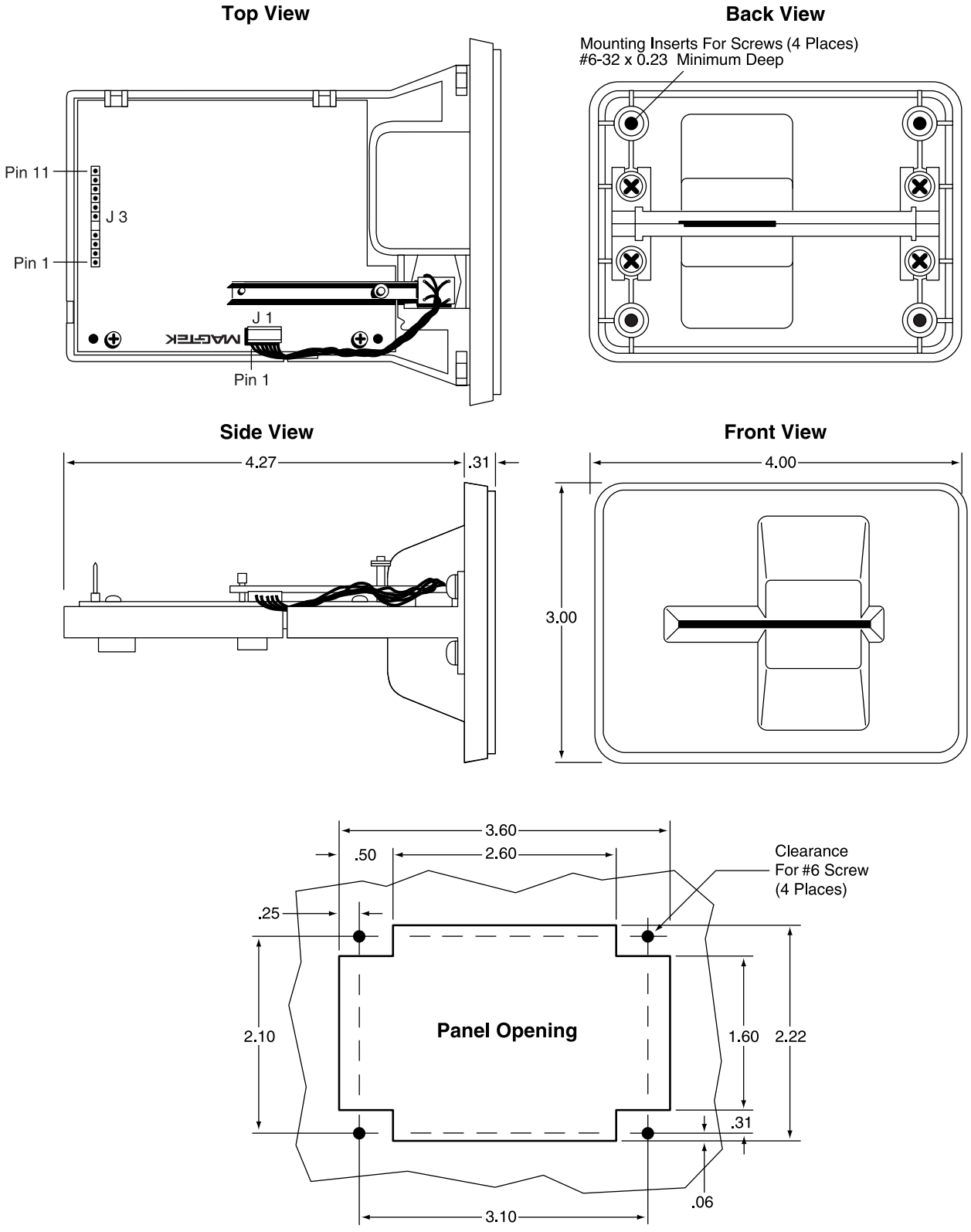


Figure 2-1. MagTek Bezel Mounting Dimensions

CARD INSERTION AND ORIENTATION

The Reader can be mounted in the positions shown in Figure 2-2. On the left panel of the illustration, the card is inserted with the magnetic stripe up. On the right panel of the illustration, the Reader is rotated 90^{o} clockwise, and the card is inserted with the magnetic stripe to the right. These are the mounting positions that permit any foreign object inserted into the slot to drop out of the reader. The head is always mounted on the same side as the PCB. For reverse read, the Start Sentinel is read last. See MagTek document *I/O Interface for TTL Magnetic Stripe Readers, Technical Reference Manual,* part number 99875148. For Reverse Read, the Start Sentinel is read last. For more information, see *I/O Interface for TTL Magnetic Stripe Readers, Technical Reference Manual, P/N* 99875148.

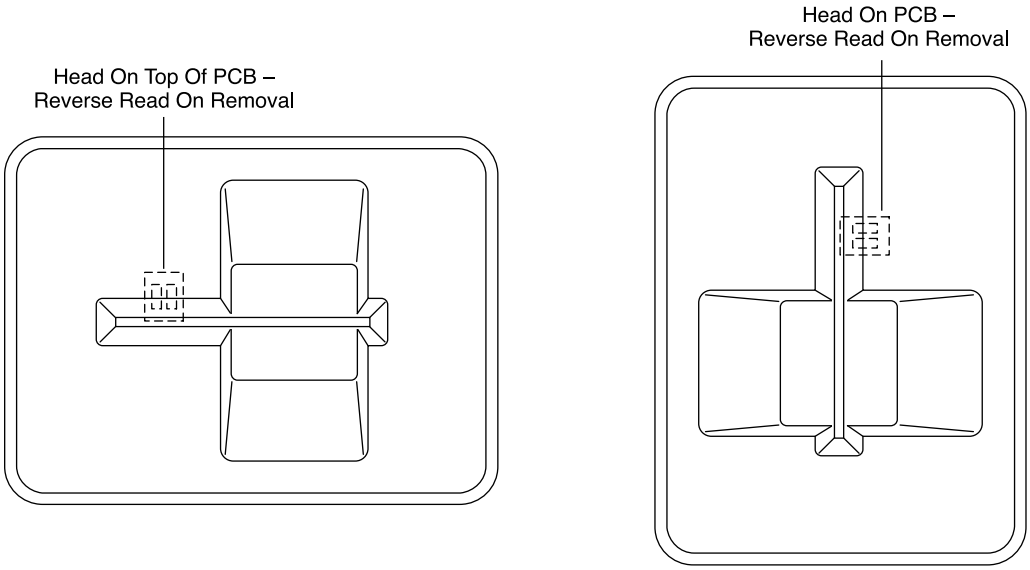
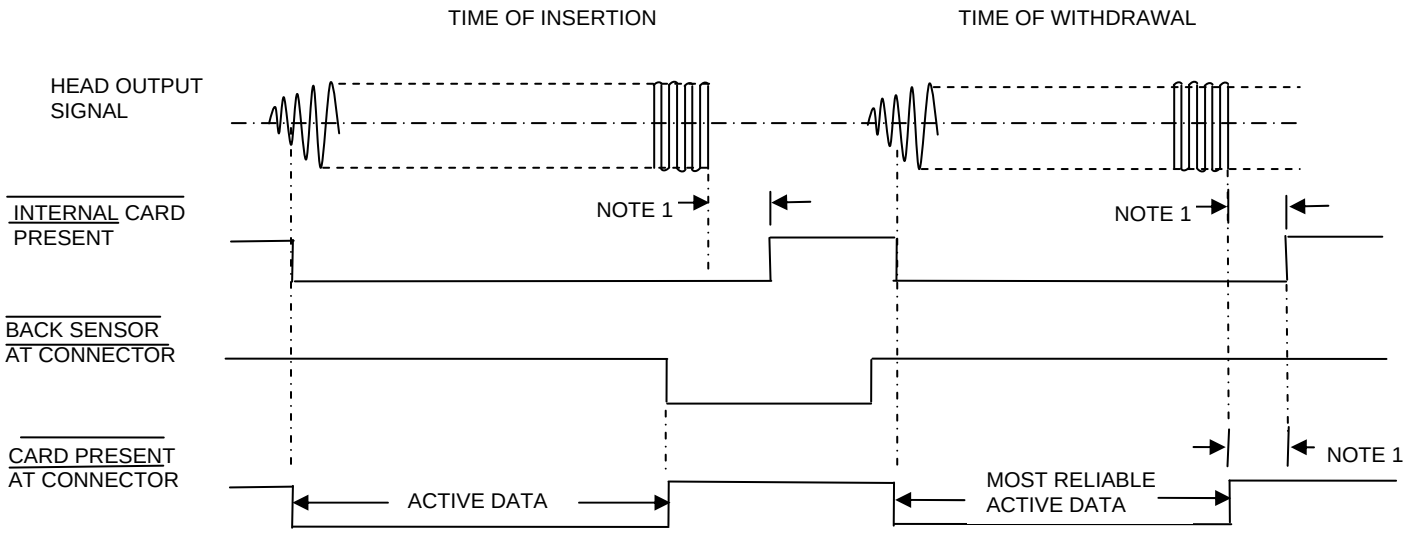


Figure 2-2. Card Insertion and Orientation

TIMING FOR BACK SENSOR AND CARD PRESENT

Figure 2-3 shows the timing for the Back Sensor and the Card Present signals.



NOT TO SCALE

NOTE 1:

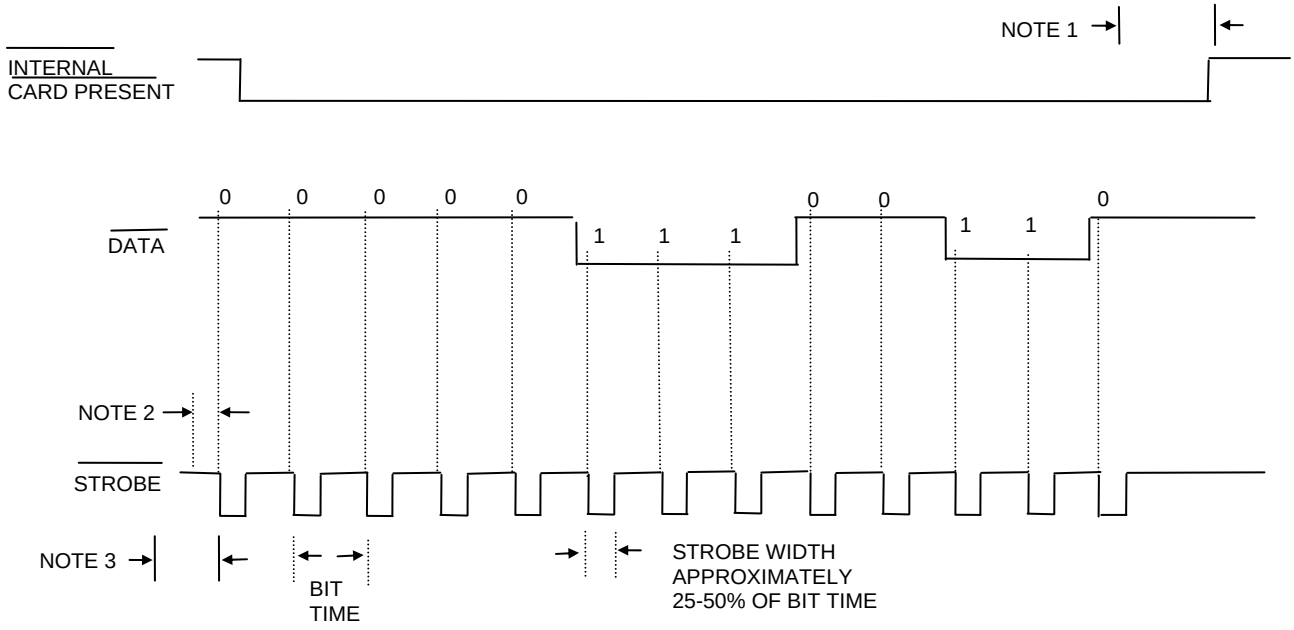
Time out of the internal card present signal occurs approximately 150 ms after the last strobe transition. The internal card present signal becomes active when the movement of an encoded magnetic stripe past the read head generates a signal. The back sensor and internal card present are gated together to reduce the dwell time needed before the read-on-withdrawal can be initiated.

Figure 2-3. Timing for Back Sensor and Card Present signals

While it is possible for the Card Reader to read data on either the insertion or withdrawal stroke, it should be noted that card reading is most reliable during the card withdrawal stroke. For this reason MagTek recommends that customer's software should be designed to emphasize data capture during the card withdrawal stroke. For the most reliable operation: Read the card upon insertion, when the card present goes high, check for errors, if no errors, output the data, start sentinel first, after the card is withdrawn. If an error is detected, clear the stored data and read the card on withdrawal, if no errors, output the data, start sentinel first, otherwise output an error indication or a try again message.

TIMING FOR DATA AND STROBE

Figure 2-4 shows the timing 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 2-4. Timing for Card Present, Data, and Strobe

Card Present

The Card Present signal is low when a recorded card is being moved across the read head. The Card Present signal is gated with the back sensor to ensure that Card Present will go high when the card is fully inserted into the Reader.

Data

The Data signal is valid while the Strobe is low. If the Data signal is high, the bit is a zero.

Strobe

The Strobe signal indicates when Data is valid. It is recommended that Data be loaded by the user with the leading edge (negative) of the Strobe.

APPENDIX A. BEZEL DESIGN

The engineering drawing in this section is for customers interested in designing their own bezel. The example shown is a typical design 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.

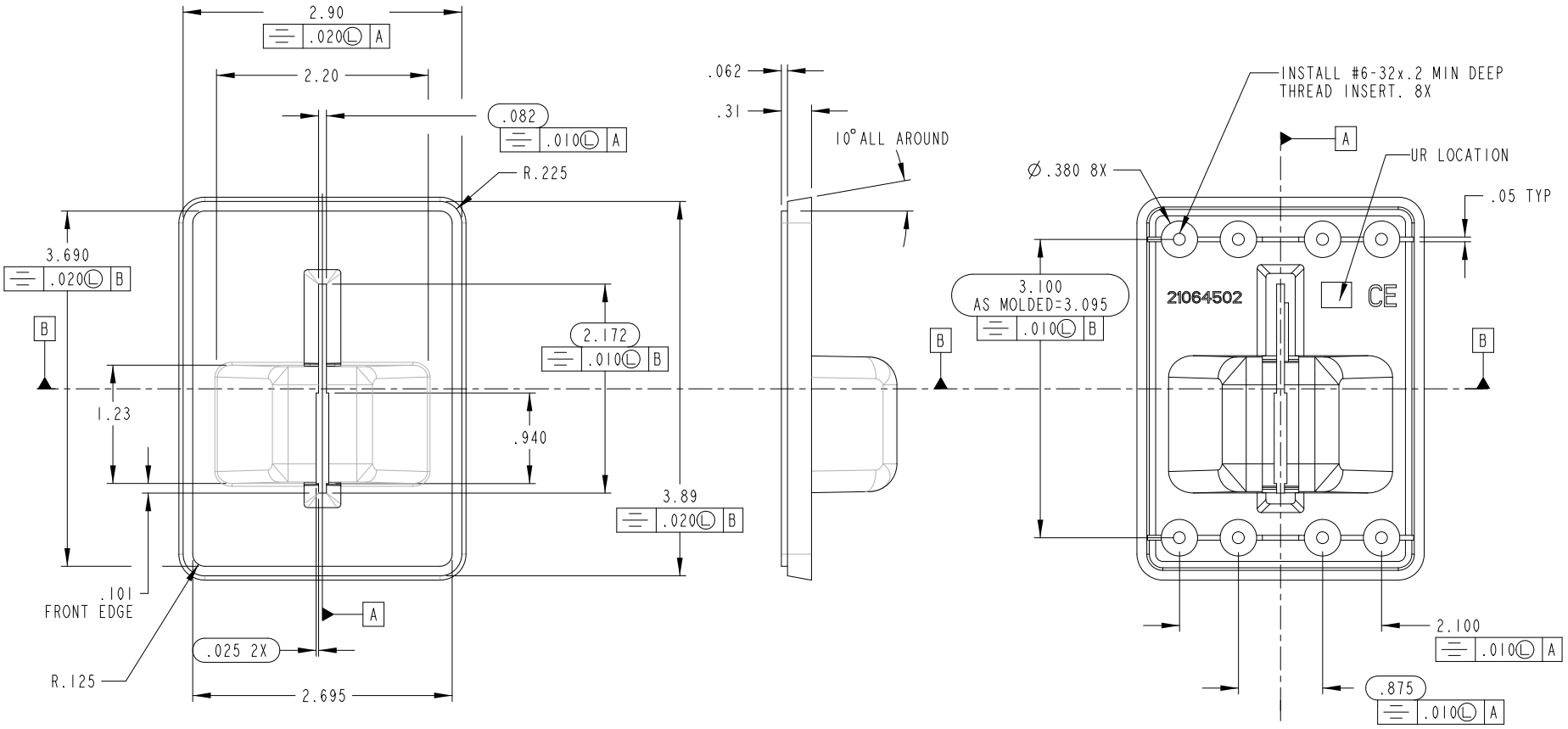


Figure A-1. Dimensions for Bezel Design Sheet 1

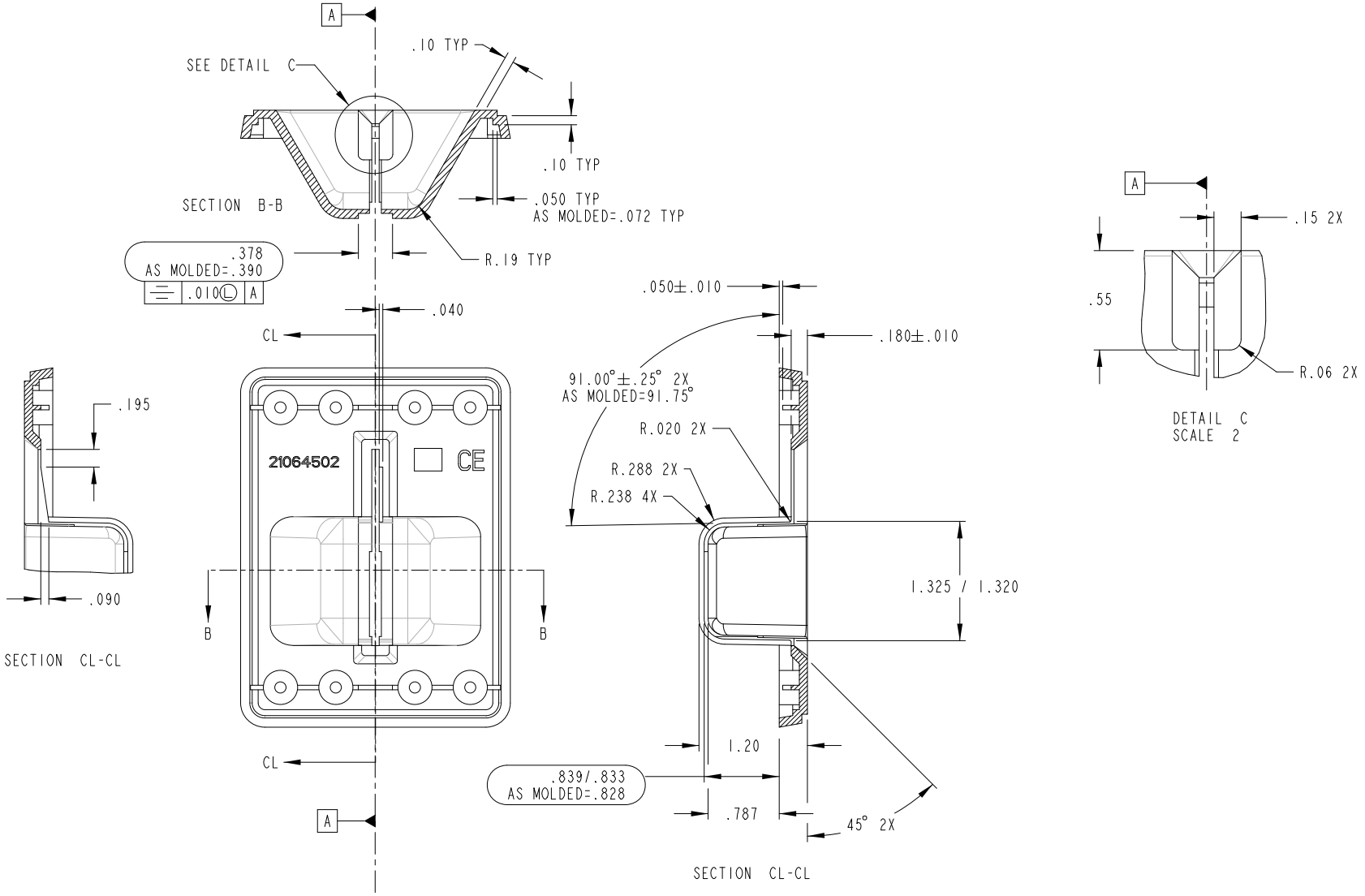


Figure A-2. Dimensions for Bezel Design Sheet 2