

MT-215 TTL HALF CARD INSERTION READER TECHNICAL REFERENCE MANUAL

Manual Part Number 99875009 Rev 10

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MAGTEK[®]

REGISTERED TO ISO 9001:2000

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REVISIONS

Rev Number	Date	Notes
1	Jun 92	Initial Release
2	22 May 98	Complete Revision. Added Section 1, Features and Specifications. Added Section 2, Installation. Added Section 3, Operation. Added Section 4, Engineering Drawings.
3	7 Oct 98	Removed obsolete part numbers and tracks used from Section 1: Track 2 @ 128, Track 3 @210; 21066003, 21066004, and 21066005; Changed specs accordingly.
4	01 Jan 01	Front Matter: Changed copyright date. Changed Warranty from 90 days to one year. Added more agencies to Agency Statement.
5	01 Aug 01	Front Matter, Agency Page: Editorial changes to UL/CUL.
6	09 Jul 02	Sec 1: Added Related Documents section; changed specs to single track unit; changed power requirements. Sec 2: Changed pins on J1 from 10 to 8. Sec 3: Added figure for timing for back sensor and card present; corrected timing for data and strobe. Sec 4: Deleted.
7	10 Apr 03	Front Matter: Added ISO logo, added help line number.
8	9 May 03	Sec 1: Configuration, changed part numbers to 21066014 and 21066015.
9	7 May 04	Sec 3: Fig 3-2, Changed term SW2 to Back Sensor.
10	14 Jul 05	Sec 1, Table 1-1, Output Signal Levels: Added driver description (using 74HCT367) for output signal levels.

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FCC WARNING STATEMENT

This equipment has been tested and found to comply with the limits for a Class A 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 commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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 A 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 la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

CE STANDARDS

Testing for compliance to CE requirements was performed by an independent laboratory. The unit under test was found compliant to Class A.

UL/CSA

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

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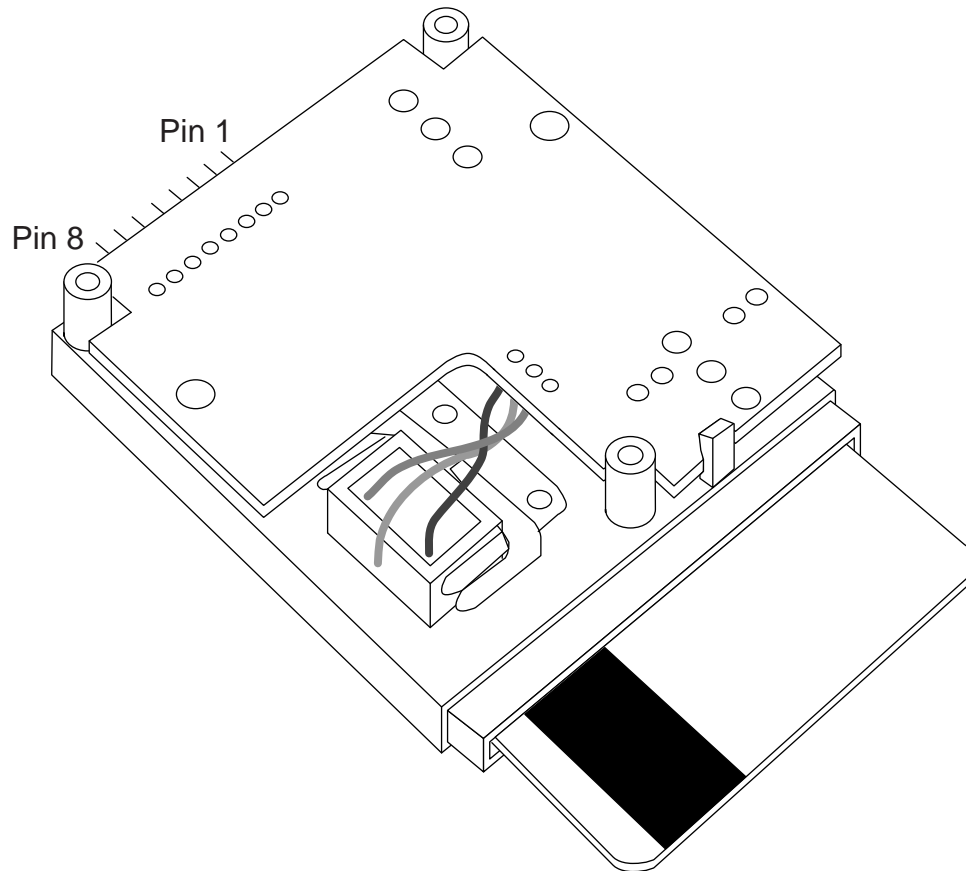


Figure 1-1. MT-215 TTL Half Card Insertion Reader

SECTION 1. FEATURES AND SPECIFICATIONS

The MT-215 TTL Half Card Insertion Reader reads the magnetic stripes on cards that have only a part of the stripe encoded. The Reader conforms to industry specifications including ANSI/ISO Standards 7810, 7811, 7812, and 7813.

The Half Card Reader is used primarily for access control but may also be used in security systems, ID card checking terminals, car parking systems, gaming, and hotel management systems.

Design simplification provides easy and reliable handling by minimizing the number of components. The wide card and speed range provides high accuracy readings to every user at speeds of 3 to 50 inches per second.

Reading capacities for tracks are as follows:

Track	Bits Per Inch	Number of Characters
1	210	34 alphanumeric
2	75	16 numeric
2	128	27 numeric

CONFIGURATIONS

The Reader is available in the following configurations:

Part Number	Track
21066014	2
21066015	1

RELATED DOCUMENTS

The Half Card Reader will read cards that meet the standards defined by ISO (International Standards Organization) except for the number of characters:

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*.

SPECIFICATIONS

The specifications are as follows:

Table 1-1. Specifications

Recording Method	Two-frequency coherent phase (F2F)
Card Speed Through Unit	3 to 50 inches per second
Reading Capacity*	Track 1, 210 BPI, 34 characters alphanumeric Track 2: 75 BPI, 16 characters numeric Track 2: 128 BPI, 27 characters numeric
Power Requirements	+5VDC \pm 5% at 13mA (typical)
Output Signal Levels using 74HCT367	V _{ol} =0.4V at 2mA V _{oh} =V _{cc} -0.5 V at 2mA
Operating Temperature	32°F (0°C) to 140°F (60°C)
Operating Humidity	10% to 90% noncondensing
Life	300,000 passes (150,000 insert cycles)
Physical Dimensions	Height: 0.89 inch (22.6mm) Length: 2.66 inches (67.6mm) Width: 2.36 inches (60.0mm)

* The Half Card Reader can read half of a fully encoded card, however, the likelihood of errors going undetected increases dramatically when the LRC is not read. When using LRC, the odds of an error going undetected are about 1 in 10,000 reads compared to about 1 in 7 reads when no LRC is present. For this reason, MagTek does not recommend reading cards that exceed the Half Card Reader's maximum number of characters.

SECTION 2. INSTALLATION

The installation consists of mounting and connecting the Reader.

MOUNTING

The Reader has three mounting holes with inserts for 3.0mm diameter, a thread pitch of 0.5mm, and a depth of 6.0mm. The mounting holes and dimensions are shown in Figure 1-2.

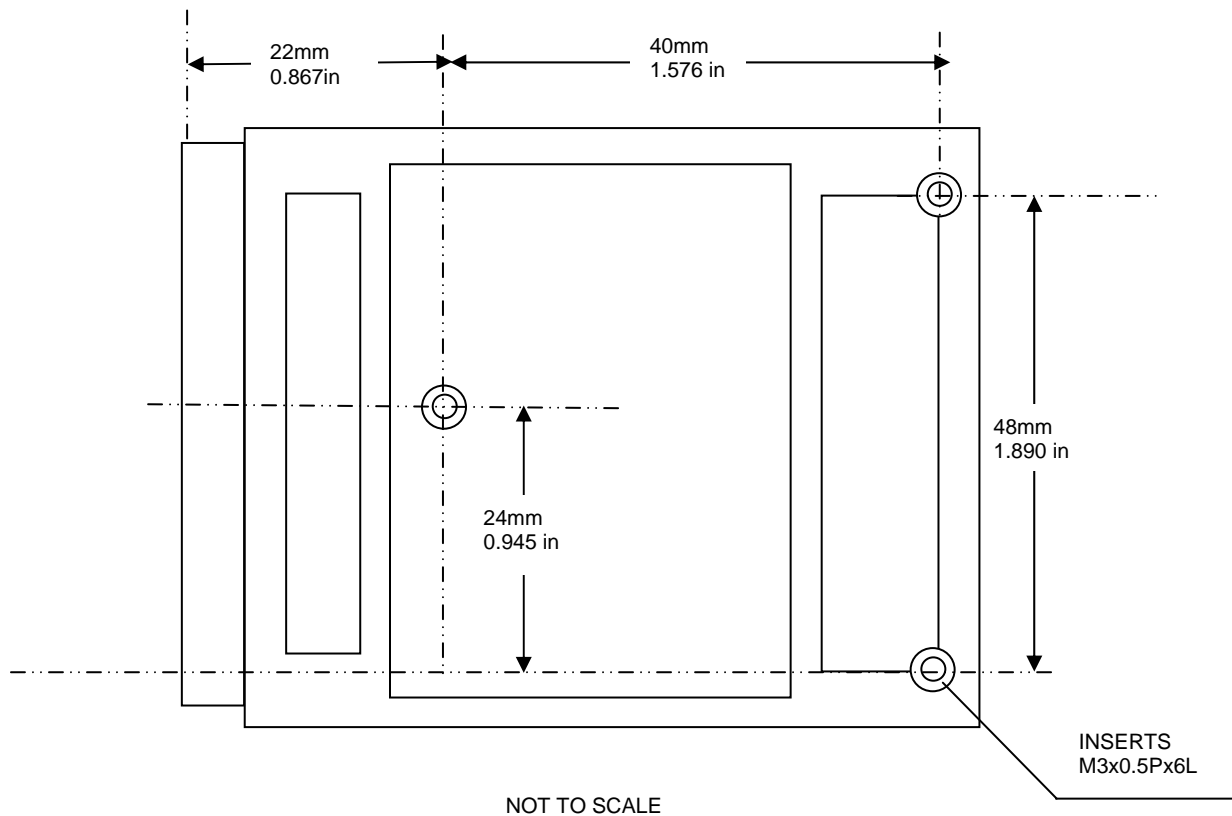


Figure 2-1. Mounting Dimensions

Mount the reader by attaching three screws through a surface and into the three mounting inserts shown in Figure 2-1. Connect cable connector to J1. Figure 2-2 shows orientation of the pins and the orientation for inserting the card. Pin 1 is closest to the center of the PCB, and Pin 8 is closest to the edge of the PCB.

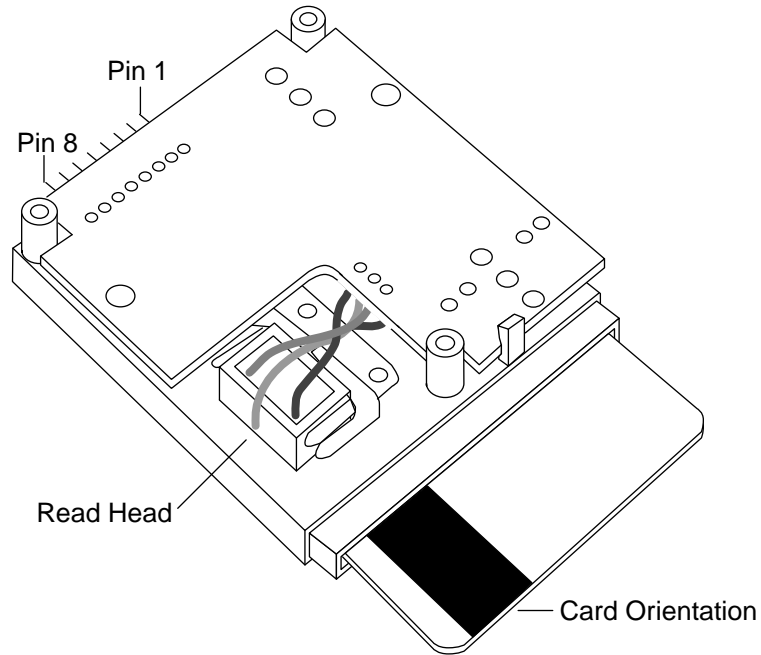


Figure 2-2. Connector, and Card Orientation

MOLEX MATING CONNECTOR

The Molex mating connector has 0.100" spacing for 0.025" square pins. Part numbers are as follows:

Molex Part Number	Description
22-01-2081	Connector Body
08-50-0114	Crimp Terminals

PIN LIST

The pin list for J1 is shown below.

Table 2-1. J1 Pin List – Molex Header 22-12-2081

PIN	SIGNAL	DESCRIPTION
1	SW1	BATTERY SAVER
2	SW1	BATTERY SAVER
3	<u>BACK SENSOR</u>	ACTIVE LOW
4	<u>DATA</u>	ACTIVE LOW
5	<u>CARD PRESENT</u>	ACTIVE LOW
6	STROBE	VALID DATA WITH FALLING EDGE
7	Vcc	+5 VDC
8	GND	GROUND

SECTION 3. OPERATION

The orientation of card insertion is shown in Figure 2-2. The timing for Back Sensor and Card Present is shown in Figure 3-1.

TIMING FOR BACK SENSOR AND CARD PRESENT

Figure 3-1 shows the timing for the Back Sensor and the Card Present signals.

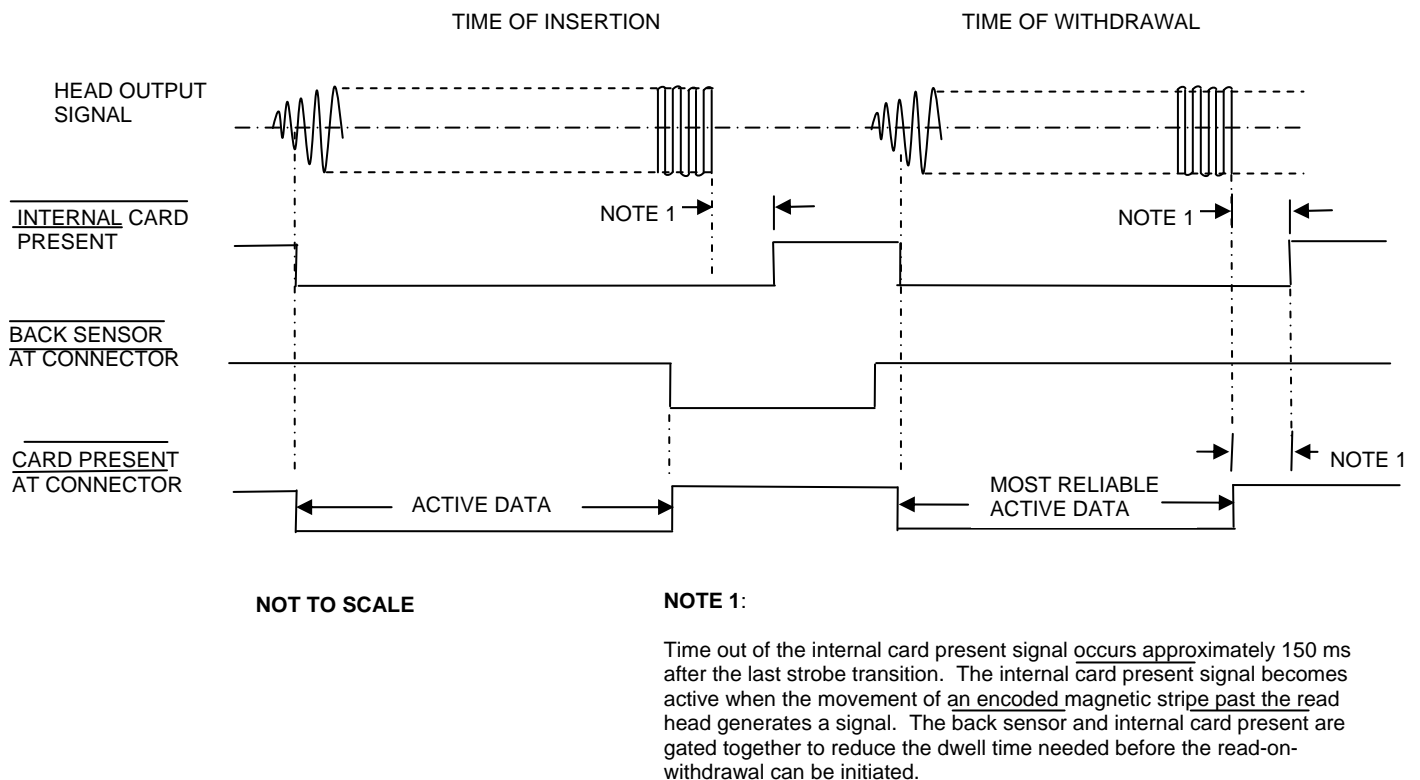


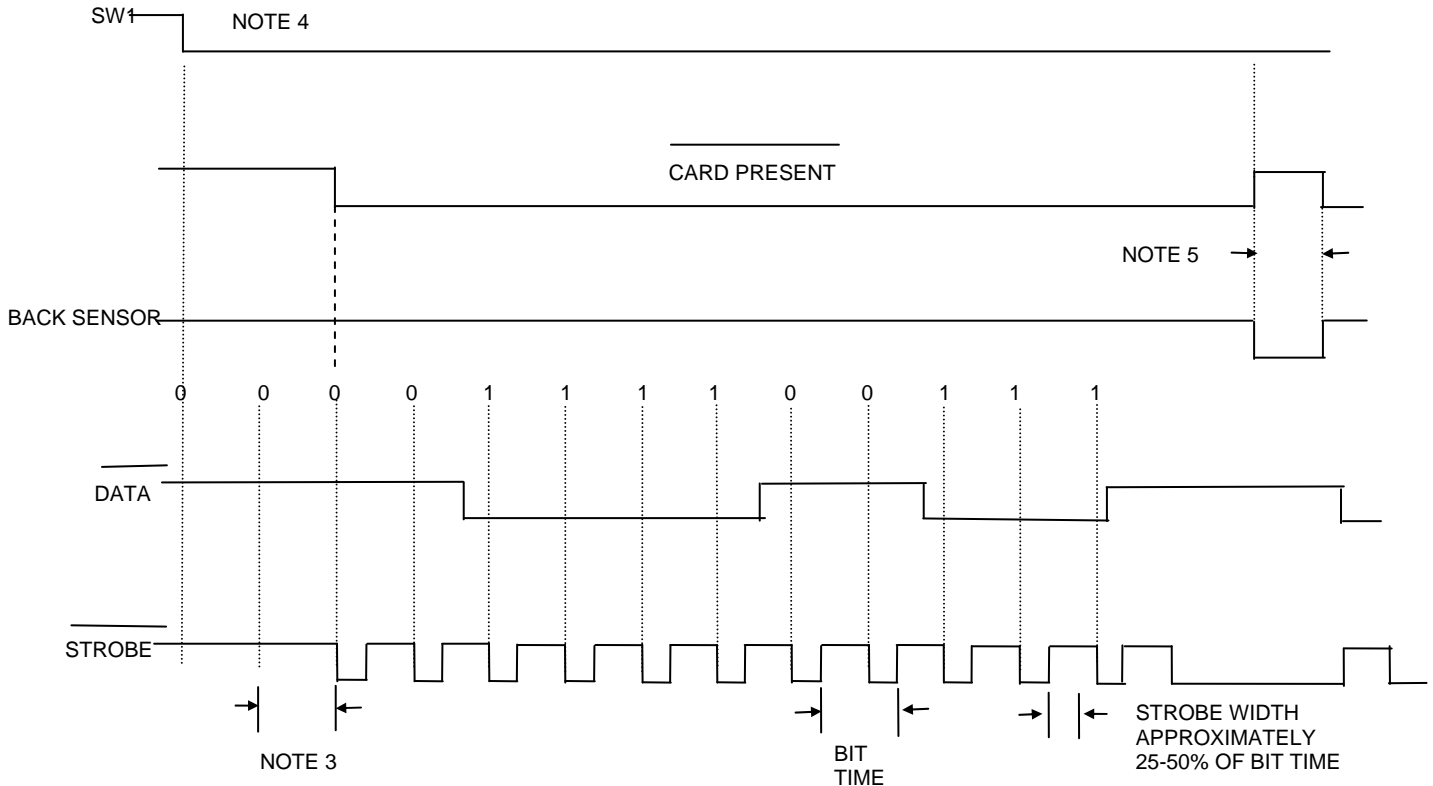
Figure 3-1. Timing for Back Sensor and Card Present Signals

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.

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

TIMING FOR DATA AND STROBE

The timing for Data and Strobe is shown in Figure 3-2.



Notes

1. The $\overline{\text{CARD PRESENT}}$ signal is low when a recorded card is being moved across the read head. The rear sensor switch is connected with $\overline{\text{CARD PRESENT}}$ to insure that $\overline{\text{CARD PRESENT}}$ will go high when the card is fully inserted. Time-out of the $\overline{\text{CARD PRESENT}}$ signal occurs approximately 150ms after the last strobe transition, after card removal.

The output of the rear sensor is quiescently high. It goes low when the card is completely inserted and remains that way as long as the card is completely inserted (Pin 3 on the single track, and Pin 5 on the dual track).

2. $\overline{\text{DATA}}$ is valid 1.0 μs (minimum) before the negative edge of $\overline{\text{STROBE}}$.
3. There are 8 or 9 head flux reversals for this configuration. These will be delayed (not output) before enabling the Bit Recovery system.
4. Switch 1 (SW1) is normally open. It closes after the first 0.85 inch of card is inserted and before the card reaches the head gap. It will remain closed until all but 0.85 inch of the card has been removed. This switch may be used for power saving for battery operation.
5. This is the time the card is against the back sensor.
6. See MagTek P/N 99875148 for interfacing information.

Figure 3-2. Timing for Data and Strobe