

Mag Stripe Reader

Models 100/102

User's Manual



2190 Regal Parkway, Euless, TX 76040
(817)571-9015 • (800)648-4452 • FAX(817)685-6232

FCC NOTICE

WARNING: This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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INTRODUCTION

The Model 100/102 is an easy to use system that accepts a mag stripe reader as the input device. The decoder installs quickly between the keyboard and the personal computer. Mag stripe data is sent to the computer as if it was typed from the keyboard. No hardware or software changes are necessary.

FEATURES

Supports Single Track (1,2,3) or Dual Track (1&2 or 2&3) Readers

No Software Changes Needed - Data Appears as Though it were Typed from the Keyboard.

Dip Switch Programmable Output for ABA/ANSI/ISO Formats and Others

Allows Bi-directional Swiping of the Magnetic Stripe Cards

Power/Ready Light Indicating Scanner Status

Low Power CMOS Design

Keyboard Wedge Interface for IBM PC/XT/AT, PS/2, and Compatibles

Installs Between the Keyboard and the Personal Computer (Cable Included)

Works with NOVELL Networks and Non-Dedicated File Servers

Automatically Ensures that Data is Transmitted in the Correct Upper/Lower Case.

Audible "BEEP" Indicates Successful Scan.

No External Power Supplies (Decoder Receives its Power From the PC just like the Keyboard).

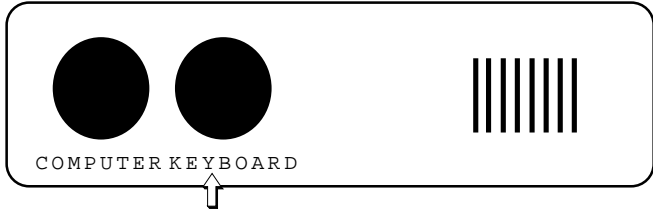
INSTALLATION INSTRUCTIONS

OVERVIEW

Installation requires connecting cables between the decoder and your computer.

Step 1: Turn OFF the power to the computer.

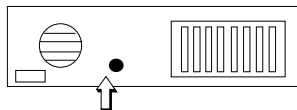
Step 2: Unplug the KEYBOARD cable from the back of the computer and plug it into the connector labeled "KEYBOARD" on the rear panel of the decoder.



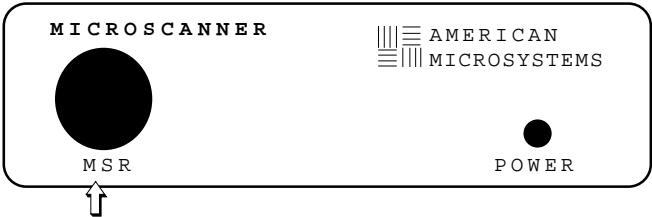
Step 3: Plug one end of the cable (supplied with the decoder) into the connector labeled "COMPUTER" on the rear panel of the decoder.



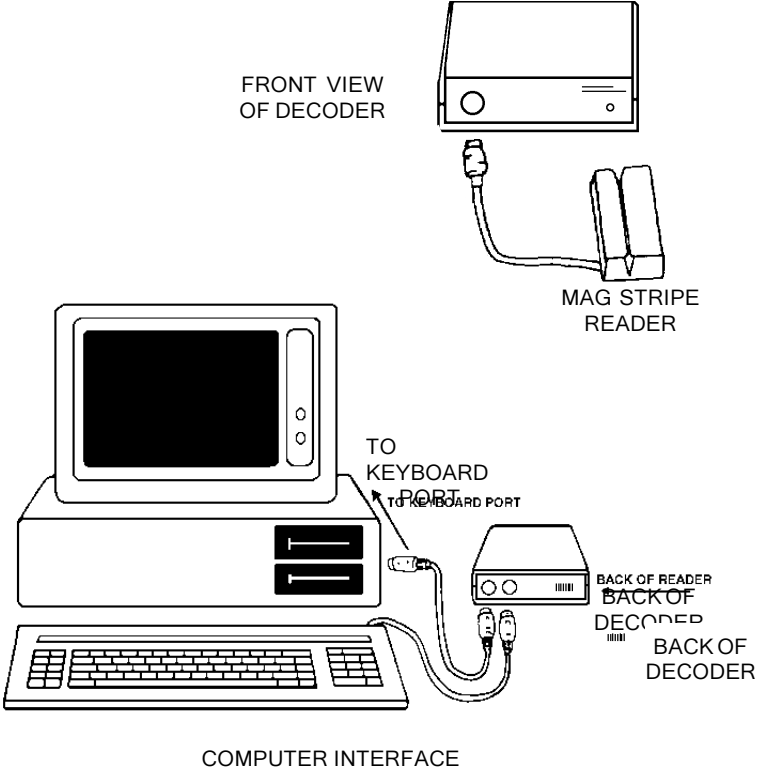
Step 4: Plug the other end of the cable (supplied with the decoder) into the KEYBOARD connector located at the back of your computer.



Step 5: Plug the end of the Mag Stripe cable into the circular connector labeled "MSR" on the front panel of the decoder.



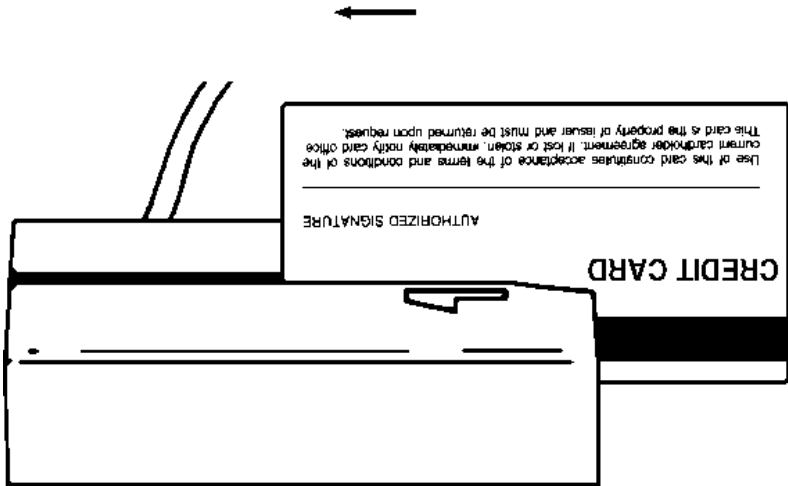
Step 6: Verify that the cables are connected as shown below:



- Step 7: Turn ON the power to the computer. (The decoder receives its power from the computer just like the keyboard.)
- Step 8: The "POWER" display light on the front panel of the decoder will display RED and the decoder will BEEP twice. A p p r o x i m a t e l y 1/2 second later the display will change to GREEN.
- Step 9: The GREEN color indicates the decoder is ready to use. The keyboard remains fully functional and you may enter data as before.

SCANNING MAGNETIC STRIPES/CARDS

- Step 1: Hold the CARD so that the magnetic stripe is on the bottom and faces you.



p. 5

- Step 2: Insert the CARD into the enlarged opening.
- Step 3: Holding the CARD flat against the bottom of the reader, SLIDE the card in the direction of the arrows. The CARD must maintain contact with the base of the reader while scanning. The front panel "POWER" light on the decoder will change to RED while the card is pulled through the reader.
- Step 4: After a successful read the following will occur:
- The decoder will BEEP.
 - The magnetic stripe data is transmitted to the computer.
- Step 5: When the front panel "POWER" light changes to GREEN, the decoder is ready to scan another card.

DEFAULT SETTINGS

The Model 100/102 is shipped from the factory with the following default settings:

SWITCH BLOCK 1 (SW1)

COMPUTER TYPE	IBM AT
AUTO CAPS LOCK	ON
DATA TRANSMISSION SPEED	FAST
AUDIO BEEP	ON
TRACK OUTPUT SELECTION	BOTH
SEND ALL TRACK DATA	ON

SWITCH BLOCK 2 (SW2)

WHEN SEND ALL DATA = ON

TRACK 1 FIELD SEPARATOR CHARACTER	" ^ "
TRACKS 2 & 3 FIELD SEPARATOR CHAR.	" = "
SEND START/END SENTINELS	ON
REQUIRE TWO TRACKS	OFF
SEND CARRIAGE RTRN. BETWEEN TRKS	OFF
SEND ENDING CARRIAGE RETURN	ON

SWITCH BLOCK 2 (SW2)

WHEN SEND ALL DATA = OFF

SEND ACCOUNT NUMBER FIELD	ON
SEND NAME FIELD	ON
SEND EXPIRATION DATE FIELD	ON
FORMAT EXPIRATION DATE FIELD	MMYY
STRIP SPACES	ON
REQUIRE TWO TRACKS	OFF
SEND CRRGE. RTRN. BETWEEN FIELDS	OFF
SEND ENDING CARRIAGE RETURN	ON

If you need to change the default settings, follow the instructions below:

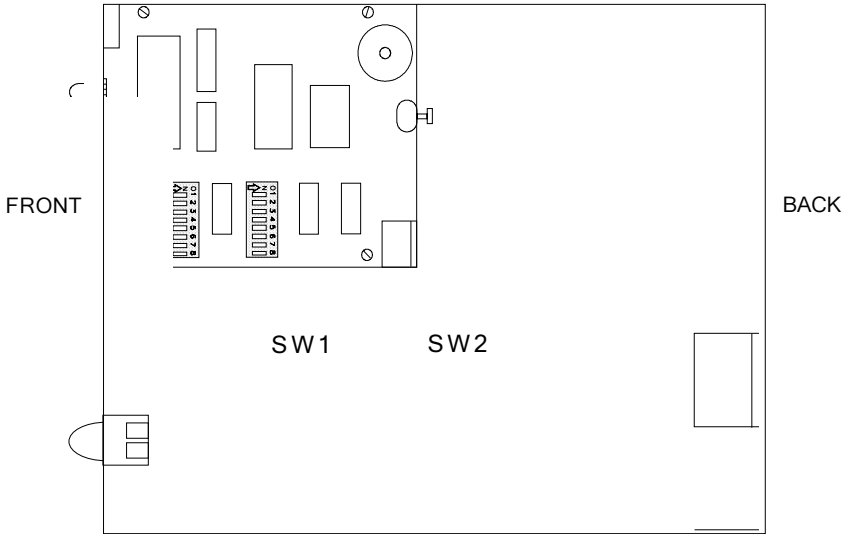
INSTRUCTIONS FOR CHANGING DEFAULT SETTINGS

OVERVIEW

Changing the default settings requires opening the M100/102 case and changing the dip switches located on the printed circuit board. A phillips screwdriver is required.

- Step 1: Remove the two phillips screws from the bottom of the case.
- Step 2: Hold the bottom half of the case in one hand. With the other hand grasp the sides of the upper half of the case.

- Step 3: Lift straight up and remove the upper half of the case. (The front and back panels will stay attached to the bottom half of the case.)
- Step 4: You now have access to the dip switches. There are two switch blocks located on the printed circuit board. Switch Block #1 is labeled "SW1" and is located closest to the front of the decoder. Switch Block #2 is labeled "SW2" and is located closest to the back of the decoder. See the following pages for dip switch definitions.

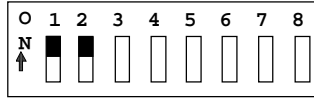


Model 100/102 Printed Circuit Board

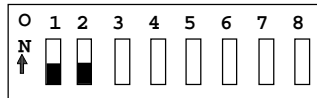
- Step 5: Confirm your new dip switch settings by scanning a mag stripe card.
- Step 6: Replace the upper half of the case and tighten the two screws.
- Step 7: The decoder is now operational and ready to use.

SWITCH BLOCK 1 (SW1)

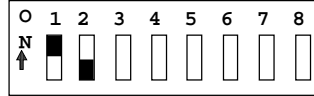
COMPUTER
TYPE



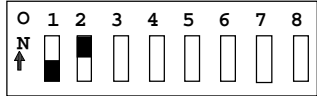
IBM AT, PS/2 MODELS 30-286,
50, 55, 60, 65, 70, 80
(US KEYBOARDS)



IBM AT, PS/2 MODELS 30-286,
50, 55, 60, 65, 70, 80
(INTERNAT'L KEYBOARDS)



IBM PS/2 (25, 30, 57, SOME
70'S)

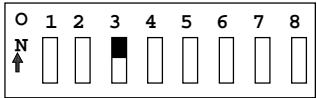


IBM PC / XT

AUTO
CAPS LOCK



DISABLED (OFF)

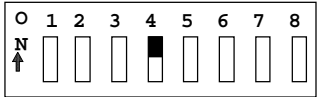


ENABLED (ON)

DATA
TRANSMISSION
SPEED

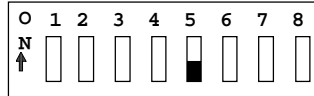


SLOW

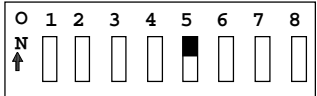


FAST

AUDIO
BEEP

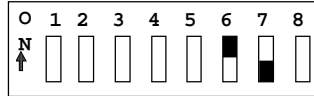


DISABLED (OFF)

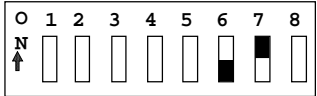


ENABLED (ON)

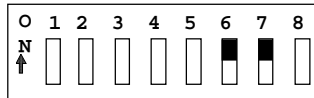
TRACK
OUTPUT
SELECTION



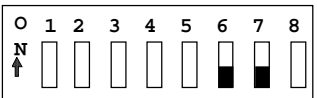
FIRST TRACK ONLY



SECOND TRACK ONLY

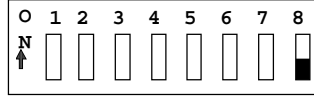


BOTH TRACKS

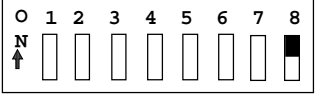


BOTH TRACKS
(REVERSE ORDER OUTPUT)

SEND ALL
TRACK DATA



DISABLED (OFF)



ENABLED (ON)

SWITCH BLOCK 1 - DESCRIPTIONS

COMPUTER TYPE These two switches define the type of computer that will be used. This option must be set properly for the mag stripe data to transmit correctly. Select one of the following:

- 1) IBM AT, or PS/2 MODELS 30-286, 50, 55, 60, 65, 70, 80 (for US KEYBOARDS)
- 2) IBM AT, or PS/2 MODELS 30-286, 50, 55, 60, 65, 70, 80 (for INTERNAT'L. KEYBOARDS)
- 3) IBM PS/2 MODELS 25, 30, 57, and SOME 70'S
- 4) IBM PC/XT

NOTE: For IBM PC/XT INTERNATIONAL KEYBOARDS, the AUTO CAPS LOCK option must be set ON.

AUTO CAPS LOCK With this option set ON, data is automatically transmitted in the correct upper/lower case. When OFF, the computer keyboard's Caps Lock must be set ON for proper case.

DATA TRANSMISSION SPEED There are two speeds: SLOW and FAST. The speed determines how fast data will be output to the computer. If your computer is not able to receive data at the FAST speed, i.e., if there is any loss of data, you may need to set the speed to SLOW.

AUDIO BEEP When this switch is ON, the decoder will beep after every successful read. When this switch is OFF, the beep is disabled.

TRACK OUTPUT SELECTION These two switches designate which track(s) will be output, and in what order. (To use a Dual Track reader with a Single Track application, select FIRST TRACK ONLY or SECOND TRACK ONLY.)

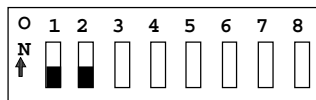
NOTE: If the REQUIRE TWO TRACKS option on Switch Block 2 (SW2) is set ON, then BOTH TRACKS will always be transmitted.

SEND ALL TRACK DATA With this switch ON, all data for each enabled track will be transmitted. (See the Switch Block 2 settings for SEND ALL DATA = ON)

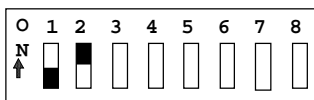
With this switch OFF, only the designated fields for each enabled track will be transmitted. (See the Switch Block 2 settings for SEND ALL DATA = OFF)

SWITCH BLOCK 2 (SW2) / SEND ALL DATA = ON

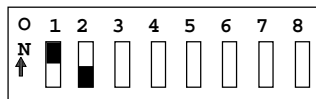
TRACK 1
FIELD
SEPARATOR
CHARACTER



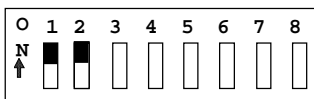
FS (ASCII 28)



" ;" (ASCII 124)

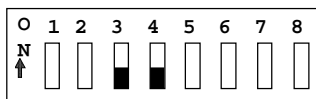


" =" (ASCII 61)



" ^" (ASCII 94)

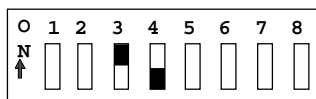
TRACKS 2 & 3
FIELD
SEPARATOR
CHARACTER



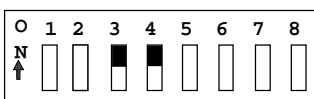
FS (ASCII 28)



"/" (ASCII 47)

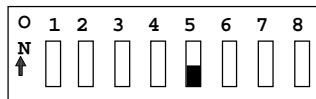


" =" (ASCII 61)



" ^" (ASCII 94)

SEND
START/END
SENTINELS

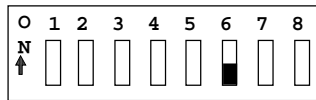


DISABLED (OFF)

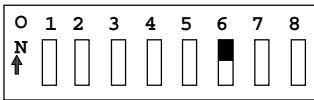


ENABLED (ON)

REQUIRE
TWO
TRACKS

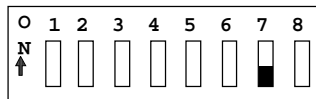


DISABLED (OFF)

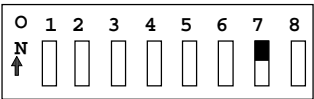


ENABLED (ON)

SEND
CARRIAGE
RETURN
BETWEEN
TRACKS

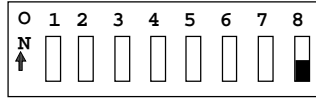


DISABLED (OFF)

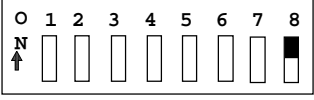


ENABLED (ON)

SEND
ENDING
CARRIAGE
RETURN



DISABLED (OFF)



ENABLED (ON)

SWITCH BLOCK 2 / SEND ALL DATA = ON DESCRIPTIONS

If the SEND ALL TRACK DATA setting from SWITCH BLOCK 1 is set ON, then the following options apply:

TRACK 1 FIELD SEPARATOR CHARACTER These two switches select the FIELD SEPARATOR CHARACTER to be transmitted between fields for Track 1 data. The choices are FS (ASCII 28), "!" (ASCII 124), "=" (ASCII 61), or "^" (ASCII 94).

TRACKS 2 & 3 FIELD SEPARATOR CHARACTER These two switches select the FIELD SEPARATOR CHARACTER to be transmitted between fields for Tracks 2 & 3 data. The choices are FS (ASCII 28), "/" (ASCII 47), "=" (ASCII 61), or "^" (ASCII 94).

SEND START/END SENTINELS When this switch is ON, the START/END SENTINEL characters for each track will be transmitted. The characters used for each type of sentinel are listed below:

- 1) Track 1 START SENTINEL = " % "
- 2) Tracks 2 & 3 START SENTINEL = " ; "
- 3) Tracks 1, 2 & 3 END SENTINEL = " ? "

When this switch is OFF, no START/END SENTINELS will be transmitted.

REQUIRE TWO TRACKS When this switch is ON, two tracks of mag stripe data must be read for a "good read" to occur. When this switch is OFF, the decoder will accept one or more valid tracks as a good read. This option must not be enabled when using single track readers.

SEND CARRIAGE RETURN BETWEEN TRACKS When this switch is ON, a CARRIAGE RETURN will be output after the first track of data has been transmitted. When this switch is OFF, no CARRIAGE RETURN is transmitted.

SEND ENDING CARRIAGE RETURN When this switch is ON, a CARRIAGE RETURN will be output after all data has been transmitted. When this switch is OFF, no CARRIAGE RETURN will be transmitted.

SWITCH BLOCK 2 (SW2) / SEND ALL DATA = OFF

<p>SEND ACCOUNT NUMBER FIELD</p>	<p>DISABLED (OFF)</p>	<p>ENABLED (ON)</p>
<p>SEND NAME FIELD</p>	<p>DISABLED (OFF)</p>	<p>ENABLED (ON)</p>
<p>SEND EXPIRATION DATE FIELD</p>	<p>DISABLED (OFF)</p>	<p>ENABLED (ON)</p>
<p>FORMAT EXPIRATION DATE FIELD</p>	<p>FORMAT AS "YMMM"</p>	<p>FORMAT AS "MMYY"</p>
<p>STRIP SPACES</p>	<p>DISABLED (OFF)</p>	<p>ENABLED (ON) (FORMATS ACCT# & NAME)</p>
<p>REQUIRE TWO TRACKS</p>	<p>DISABLED (OFF)</p>	<p>ENABLED (ON)</p>
<p>SEND CARRIAGE RETURN BETWEEN FIELDS</p>	<p>DISABLED (OFF)</p>	<p>ENABLED (ON)</p>
<p>SEND ENDING CARRIAGE RETURN</p>	<p>DISABLED (OFF)</p>	<p>ENABLED (ON)</p>

SWITCH BLOCK 2 / SEND ALL DATA = OFF DESCRIPTIONS

If the SEND ALL TRACK DATA setting from SWITCH BLOCK 1 is set OFF, then the following options apply:

SEND ACCOUNT NUMBER FIELD When this switch is ON, the ACCOUNT NUMBER FIELD will be transmitted. When this switch is OFF, the ACCOUNT NUMBER FIELD will not be transmitted.

SEND NAME FIELD When this switch is ON, the NAME FIELD will be transmitted. When this switch is OFF, the NAME FIELD will not be transmitted. (Note that the Name Field is found only on Track 1.)

SEND EXPIRATION DATE FIELD When this switch is ON, the EXPIRATION DATE FIELD will be transmitted. When this switch is OFF, the EXPIRATION DATE FIELD will not be transmitted.

FORMAT EXPIRATION DATE FIELD When ON the EXPIRATION DATE is formatted "MMYY". When OFF the EXPIRATION DATE is formatted "YYMM".

STRIP SPACES When this option is ON, all spaces will be stripped from the ACCOUNT NUMBER FIELD, and any leading or trailing spaces will be stripped from the NAME FIELD. When this option is OFF, no spaces will be stripped.

REQUIRE TWO TRACKS When this switch is ON, two tracks of mag stripe data must be read for a good read to occur. When this switch is OFF, the decoder will accept one or more valid tracks as a good read. This option must not be enabled when using single track readers.

SEND CARRIAGE RETURN BETWEEN FIELDS When this switch is ON, a CARRIAGE RETURN will be output between data fields. When this switch is OFF, no CARRIAGE RETURN is transmitted.

SEND ENDING CARRIAGE RETURN When this switch is ON, a CARRIAGE RETURN will be output after all data has been transmitted. When this switch is OFF, no CARRIAGE RETURN will be transmitted.

SELF TEST DIAGNOSTICS

SELF TEST is an option which can be set ON to send configuration data to the computer screen. The service department may request you to run this test to diagnose a problem.

To run the SELF TEST, take the following steps:

- 1) Set the Dip Switches according to the following settings:

SWITCH BLOCK 1 (SW1):

SWITCH 8 = OFF

SWITCH BLOCK 2 (SW2):

SWITCH 1 = OFF

SWITCH 2 = OFF

SWITCH 3 = OFF

(Any other combination of these switches will output mag stripe data and will not perform any diagnostics.)

- 2) To run a single cycle of the SELF TEST, simply swipe a valid mag stripe card. The diagnostics will be output to the computer screen.
- 3) To run the SELF TEST continuously, take the following steps:
 - 1) Disconnect the decoder from the computer.
 - 2) Reconnect the decoder and the computer.
(The SELF TEST will start. Diagnostics will be output to the computer screen as each cycle of the test runs.)
 - 3) To disable the SELF TEST, change any of the above dip switches back to the ON position. The SELF TEST will stop after the current cycle is complete.

SPECIFICATIONS

INPUT DEVICE SUPPORTED

- Single Track (1,2,3) or Dual Track (1&2 or 2&3) Mag Stripe Readers

SWITCH SELECTABLE OPTIONS

- Select "COMPUTER TYPE" (AT, XT, or PS/2 Models; US or International Keyboards)
- Enable/disable "AUTO CAPS LOCK"
- Select "DATA TRANSMISSION SPEED"
- Enable/disable "AUDIO BEEP"
- Select "TRACK OUTPUT"
- Enable/disable "SEND ALL TRACK DATA"
- Select "TRACK 1 FIELD SEPARATORS"
- Select "TRACKS 2 & 3 FIELD SEPARATORS"
- Enable/disable "SEND START/END SENTINELS"
- Enable/disable "REQUIRE TWO TRACKS"
- Enable/disable "SEND CARRIAGE RETURN BETWEEN TRACKS"
- Enable/disable "SEND ENDING CARRIAGE RETURN"
- Enable/disable "SEND ACCOUNT NUMBER"
- Enable/disable "SEND NAME FIELD"
- Enable/disable "SEND EXPIRATION DATE FIELD"
- Enable/disable "FORMAT EXPIRATION DATE FIELD"
- Enable/disable "STRIP SPACES"
- Enable/disable "SEND CARRIAGE RETURN BETWEEN FIELDS"
- Enable/disable internal "SELF-TEST/DIAGNOSTIC" routine

INDICATORS

- Audio "BEEP" Indicates Successful Read
- A Red/Green LED Indicates Status of decoder

POWER REQUIREMENTS

- Decoder Receives its Power from the Personal Computer Keyboard Interface.
- Power Consumption = 0.5 watts

CONNECTORS

- Mag Stripe Reader Input: 8 Pin DIN Style
- Keyboard InterfaceM100: 5 Pin DIN Style
- M102: 6 Pin MINI-DIN Style

PHYSICAL SPECIFICATIONS

- Weight: 14 Ounces Width: 5 1/8 Inches
- Depth: 5 1/4 Inches Height: 1 1/2 Inches

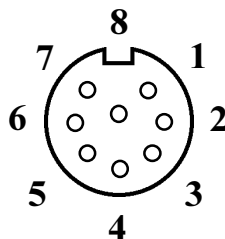
ENVIRONMENTAL

- Operating Temperature 0°C to +50°C
- Storage Temperature 30°C to +70°C
- Relative Humidity 5% to 95%
(Non-Condensing)

SIGNAL DEFINITIONS

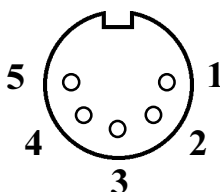
DUAL MAG STRIPE INTERFACE

<u>PIN</u>	<u>SIGNAL</u>
1	+5V
2	DATA, TRACK 2
3	CLOCK, TRACK 2
4	GROUND
5	DATA, TRACK 1
6	CLOCK, TRACK 1
7	CARD PRESENT
8	GROUND



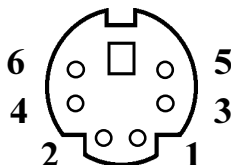
M100/102 KEYBOARD/COMPUTER INTERFACE

<u>PIN</u>	<u>SIGNAL</u>
1	KEYBOARD CLOCK
2	GROUND
3	KEYBOARD DATA
4	+5V
5	SPARE



M102 KEYBOARD/COMPUTER INTERFACE

<u>PIN</u>	<u>SIGNAL</u>
1	KEYBOARD DATA
2	RESERVED
3	GROUND
4	+5V
5	KEYBOARD CLOCK
6	RESERVED



APPENDIX A - TROUBLE SHOOTING

Some problems, along with possible causes and solutions, are listed below:

PROBLEM 1

The M100/102 transmits incorrect data characters or no data characters at all.

Cause 1: The COMPUTER TYPE selection is set for the wrong type of computer.

Solution: Set the COMPUTER TYPE selection for your computer.

Cause 2: The AUTO CAPS LOCK does not work properly on your type of computer.

Solution: Set the AUTO CAPS LOCK option to OFF.

Cause 3: The M100/102 is transmitting data too fast for the computer.

Solution: Set the TRANSMIT SPEED option to SLOW.

NOTE: It may be necessary to reboot your computer and disconnect/reconnect the M100/102 after changing any of these settings.

PROBLEM 2

The ACCOUNT NUMBER FIELD is transmitted with spaces in it.

Cause 1: Some credit cards have spaces embedded in the ACCOUNT NUMBER FIELD.

Solution: Set the STRIP SPACES option to ON.

PROBLEM 3

The M100/102 will read neither single track cards, nor some dual track cards.

Cause 1: The REQUIRE TWO TRACKS option is set to ON, and the card that is being scanned has only one track of data encoded, or one of the tracks has invalid or damaged data.

Solution: Set the REQUIRE TWO TRACKS option to OFF.

PROBLEM 4

The M100/102 does not always read the two tracks of data that are required by the computer's program.

Cause 1: The REQUIRE TWO TRACKS option is set to OFF, and the card that is being scanned is being swiped too quickly through the reader, or one of the tracks has invalid or damaged data.

Solution: Set the REQUIRE TWO TRACKS option to ON.

APPENDIX B - TRACK 1 CHARACTER SET

Six Bit Character Set Plus Odd Parity

TRACK 1 CHARACTER SET (Cont.)

Six Bit Character Set Plus Odd Parity

APPENDIX C - TRACKS 2 & 3 CHARACTER SET

Four Bit Character Set Plus Odd Parity

Note 1: Available for hardware control purposes;
not to be used for data content.

Note 2: To be defined in the future.

APPENDIX D

CARD DATA FORMAT FOR TRANSACTION CARDS

	Recording Density (bits per inch)	Character Configuration (includes Parity)	Information Content (Max characters)
TRACK 1	210 bpi	7 bits per char.	79 alpha-numeric
TRACK 2	75 bpi	5 bits per char.	40 numeric
TRACK 3	210 bpi	5 bits per char.	107 numeric

TRACK	COMMON FIELD ENCODING							
1	Start Sentinel	Account Number	Field Separator	Name	Field Separator	Exp Date & Addit'l Data	End Sentinel	LRC Char.
2	Start Sentinel	Account Number	Field Separator	Exp Date & Addit'l Data	End Sentinel	LRC Char.		
3	Start Sentinel	Account Number	Field Separator	Use & Security*	Addit'l Data*	End Sentinel	LRC Char.	

* NOTES: Track 3 Use & Security Data includes the following:

Country Code (opt)	3 or FS
Currency Code	3
Currency Exponent	1
Amt Authorized Per Cycle	4
Amt. Remaining This Cycle	4
Cycle Begin (Validity Date)	4
Cycle Length	2
Reentry Count	1
*Pin Control Param. (opt.)	6 or FS
Interchange Control	1
Acct. No. Service Restriction	2
SAN-1 Service Restriction	2
SAN-2 Service Restriction	2
Expiration Date (opt.)	4 or FS
Card Sequence Number	1
Card Security No. (opt)	9 or FS

Track 3 Additional Data includes the following:

First Subsidiary Acct. No. (opt.)	
Second Subsidiary Acct No. (opt.)	
Relay Marker	1
Cryptographic Chk Digits (opt.)	6 or FS
Discretionary Data	

NON-STANDARD USE OF THE THREE TRACKS

Many applications exist for non-standard use of the magnetic stripe card, such as access control, inventory, data entry, insurance information, medical, etc.... In those applications the data content, code, format and even densities can be changed to fit the application.

APPENDIX E

SOURCES OF MAGNETIC STRIPE STANDARDS

ANSI (American National Standards Institute)
1430 Broadway
New York, NY 10018
(212) 354-3300

- ⑩ ANSI X4.16-1983 Specifications for Magnetic Stripe Encoding (Financial Transaction Cards)
- ⑩ ANSI X4.13-1983 Specifications for Financial Services - Financial Transaction Cards
- ⑩ ANSI X9.1-1984 Specifications for Track 3 Magnetic Stripe Data Content

