
MagScan

User's Manual

from United Barcode Industries

MAGSCAN

User's Manual

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This User's Guide explains in detail how to set up and operate the MagScan. It will help you:

- Install the MagScan on your system.
- Connect a scanner to the MagScan.
- Configure the MagScan to your system and data communications requirement via bar code menus.
- Regulate the magnetic stripe and bar code formats to be activated.
- Make use of the MagScan's advanced features.

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Section 1

Introduction to the MagScan

1.1 Description of the MagScan

The MagScan is an on-line magnetic stripe and bar code reader designed for compactness and maximum flexibility.

It connects to the host system either as a wedge, between keyboard and screen; or it connects as a dual port RS-232 device between terminal and host. The MagScan can be converted by UBI's Customer Service department from the wedge configuration to the RS-232 configuration, and vice versa.

In addition to its built-in magnetic stripe reading capability, the MagScan has an additional port to connect a bar code reading wand, or any other bar code scanning device such as a CCD or laser diode scanner with a wand-compatible output.

The MagScan indicates a good read to the operator through an audible beep and a visual signal from its bi-color light emitting diode (LED) which turns from red to green, upon each good read of either a magnetic stripe or a bar code.

1.2 MagScan Versions

The MagScan is available in three versions, depending on the output. Versions 1 and 2 have decoded outputs and are connected directly to the host system while Version 3 is used by O.E.M.'s. Since the characteristics of a MagScan Version 3 depend on the reader to which it is connected, this manual can be used only with Versions 1 and 2.

Versions 1 and 2 are designated by -1 or -2, respectively after the part number (e.g. 155000 or 1556000).

Version 1 - Wedge output (P/N 155000). Reads track 1, track 2, or tracks 1 and 2.

Version 2 - RS-232 output (P/N 155600). Reads track 1, track 2, or tracks 1 and 2.

Version 3 - (For O.E.M. applications including connection to UBI's MiniBar readers. Outputs undecoded magnetic stripe data from track 1, track 2, or tracks 1 and 2.

1.3

Using the MagScan with a Magnetically Encoded Transaction Card

Reading a magnetic card with the MagScan requires virtually no training apart from instructing the user in the proper orientation of the credit card in the MagScan's reading slot.

To read the card, the user must position it so that the magnetic stripe faces down and toward the front of the reader.

Scanning is bidirectional and can be accomplished at a wide range of scanning speeds.

1.4 Using a Bar Code Wand Connected to the MagScan

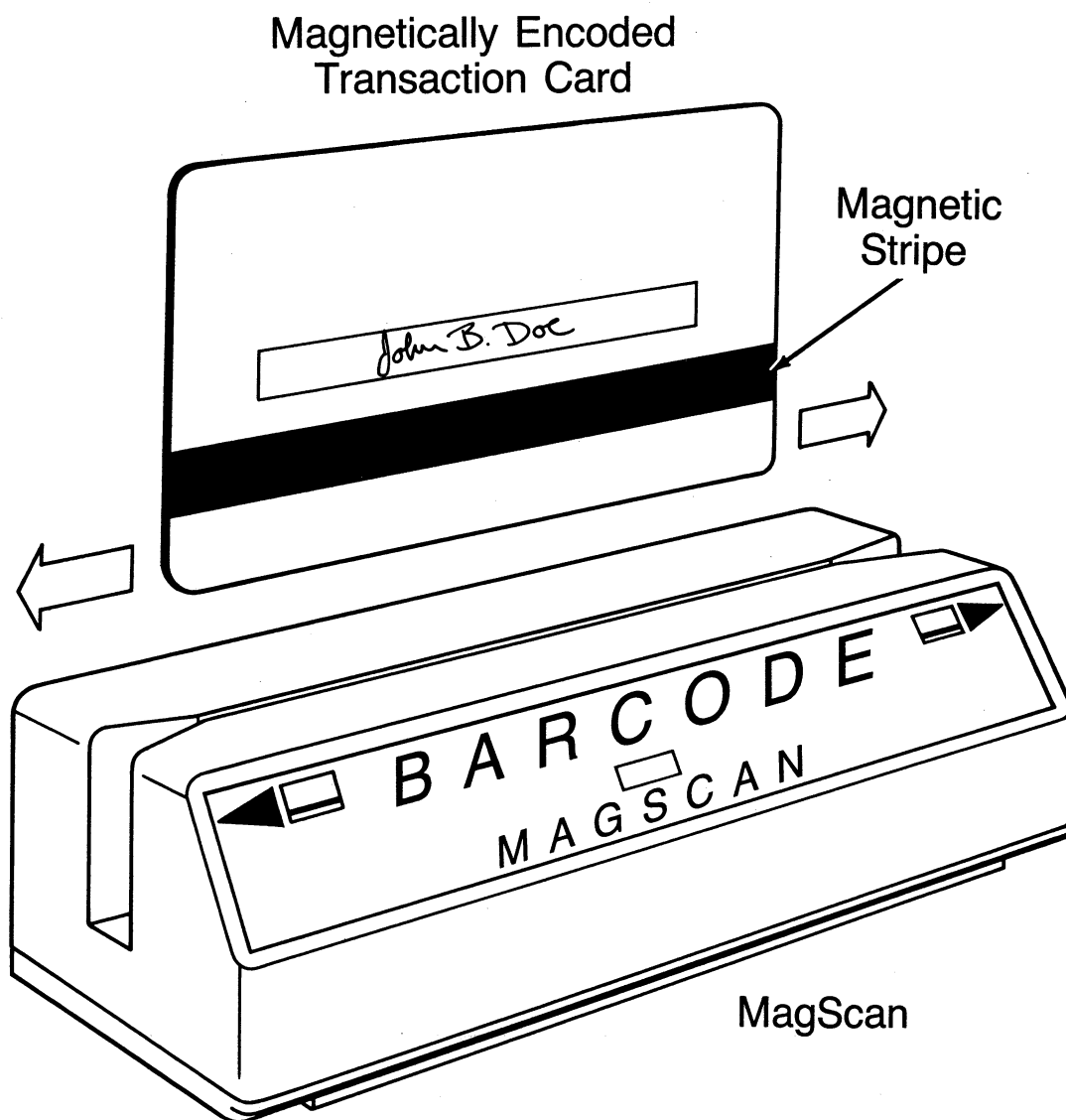
A wand can be connected to the modular port on the MagScan found on the rear of the unit next to the main cable. To scan, hold the wand comfortably as if it were a pen. The wand will scan at any angle from 0 to 30 degrees from vertical.

To read a bar code, start with the tip of the wand lightly touching the surface on which the bar code is printed. Draw the wand across the code with a uniform "swipe". A wide range of speed is accepted by the reader, and you will learn the most comfortable one with practice.

Remember that the wand must stay within the code while scanning, and must pass over every bar and space starting on either side of the bar code, and finishing on the other side. Experienced users move their entire forearm while scanning, to ensure that the wand will move at a constant and quick speed.

FIGURE 1-1

ORIENTING THE MAGNETIC CARD IN THE MAGSCAN



Position card with magnetic stripe
down and facing front of MagScan

Slide card through slot in either direction

Section 2

Installing the MagScan

2.1 Installing the MagScan as a Wedge

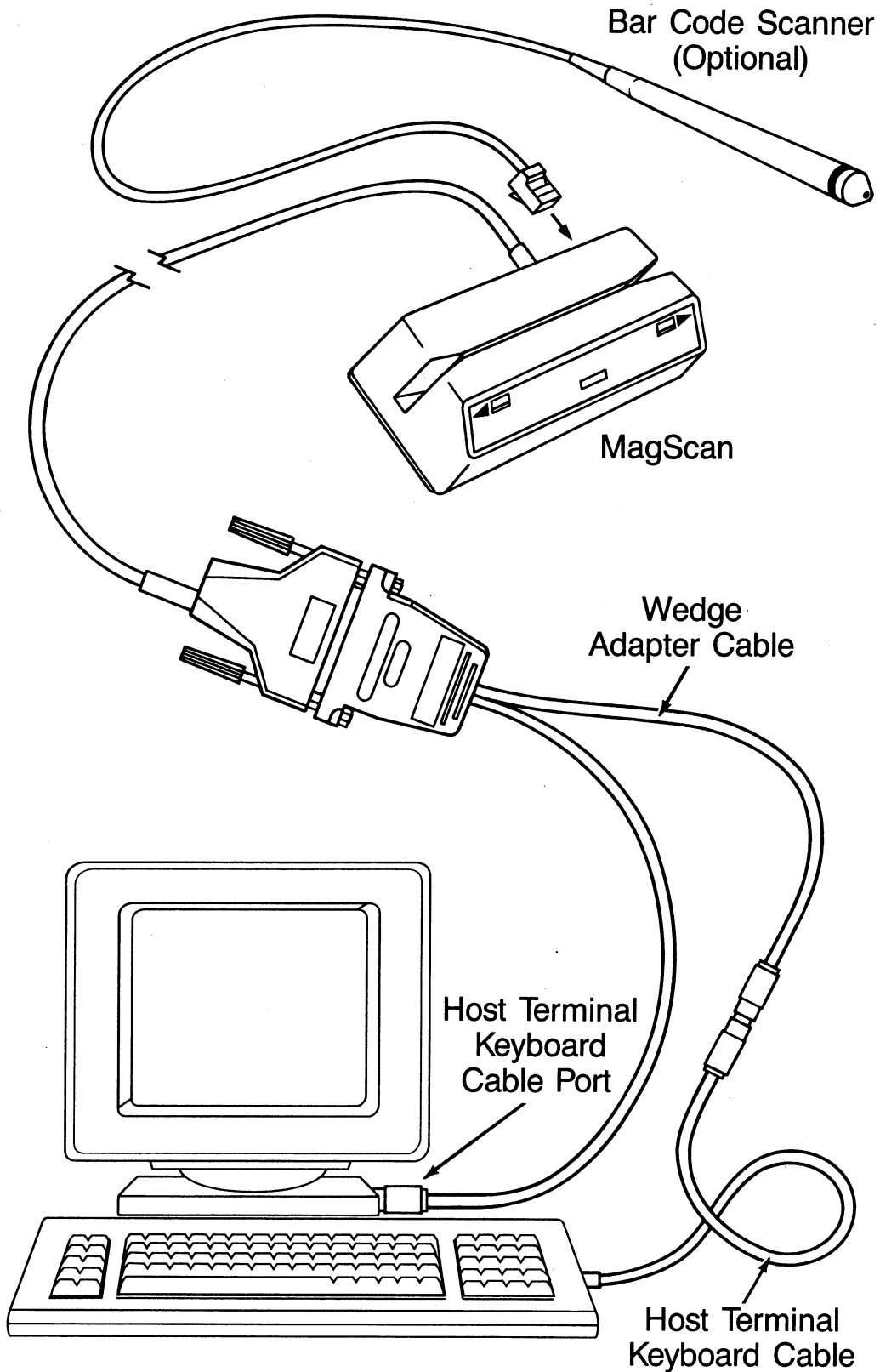
Installing the MagScan as a wedge requires specifying the correct part number (P/N 155000), selecting the proper Cable Management Module (CMM), (P/N 3250XX), and the proper Wedge Cable (P/N 601XXX). The Wedge Cable and CMM required are shown in Appendix A of this manual or in UBI's Commercial Price List. The Wedge Cables are designated as 601XXX where XXX is an identification number for a cable type compatible with one or more terminals or PC's.

The MagScan cable terminates in an 8 pin connector and is plugged into the port labeled "Reader" on the CMM. The 601XXX cables are also connected to the CMM. To install the 601XXX cables, the modular 6 pin side labeled "J2 to Keyboard" is plugged into the CMM port labeled "To Keyboard". The keyboard cable of the terminal is disconnected and plugged into the mating 601XXX connector labeled "J2 to Keyboard". The other 601XXX cable 6 pin modular side labeled "J1 to Display" is plugged into the CMM port labeled "To Display". The other side of the 601XXX cable labeled "J1 to Display" is plugged into the terminal's keyboard port to which its keyboard cable was previously connected.

The proper connection of the MagScan is shown in Figure 2-1, on page 2-2.

FIGURE 2-1

MAGSCAN CONNECTED AS A WEDGE



2.2 Installing the MagScan as Single RS-232 Device

Installing the MagScan as a single RS-232 device requires specifying the correct part number (P/N 155000), plus the proper CMM, (P/N 704300, 704310, 704320, 704330, 704340, 7043XX, depending on the pin assignments of the connector). Please see figure 2-3 for pin assignments.

In most RS-232 applications it is necessary to connect a power supply (P/N 700901) to the jack incorporated on the CMM. To install the MagScan RS-232, the power supply is plugged into the CMM port labeled "Power Supply", the 8 pin connector from the MagScan is plugged into the CMM port labeled "Reader" and the RS-232 DB connector is plugged into the serial port on the PC terminal.

In O.E.M. applications, use of a power supply may be avoided if +5 VDC at minimum 115 mA is supplied on power pin of the CMM.

FIGURE 2-2

MAGSCAN CONNECTED AS A SINGLE RS-232 DEVICE

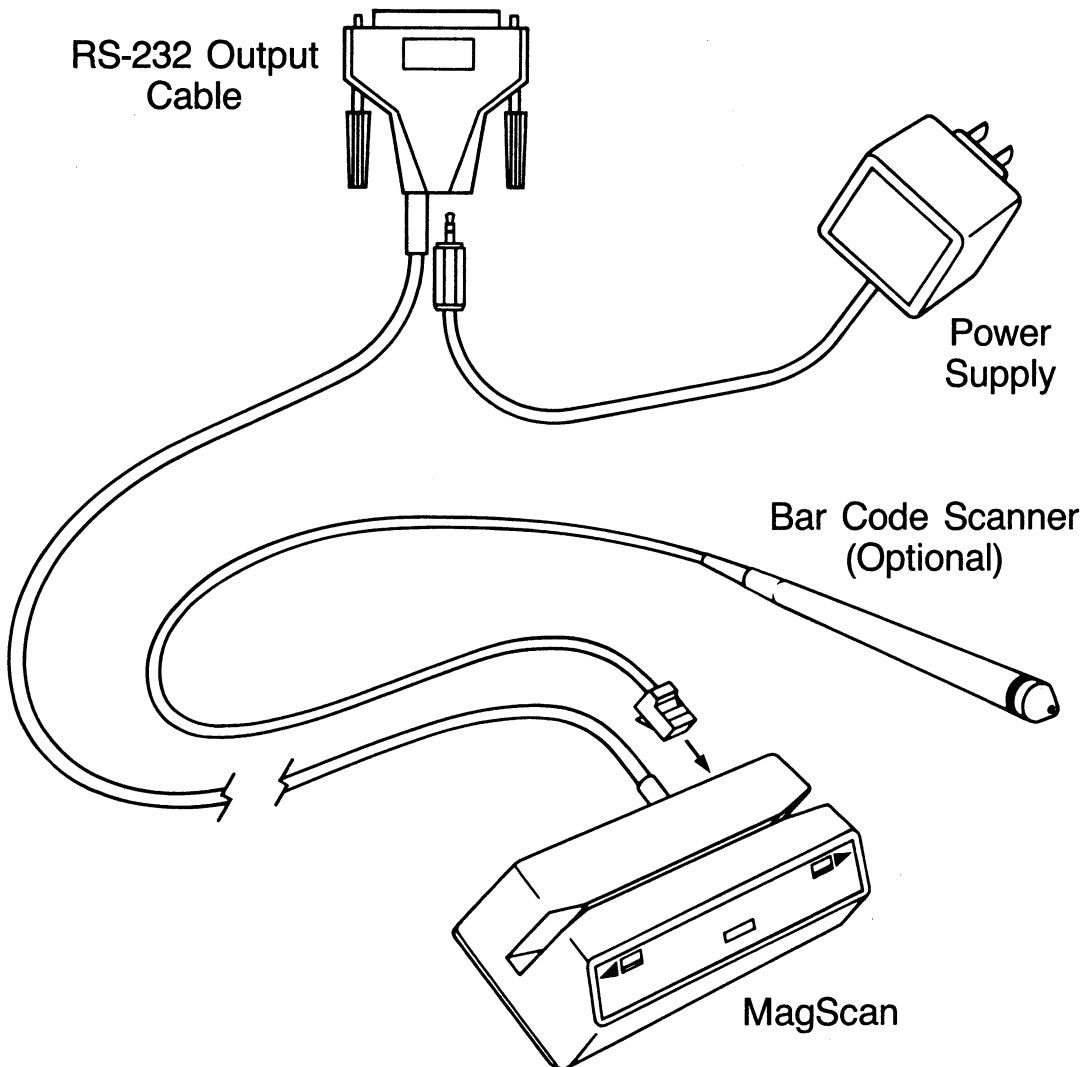


FIGURE 2-3

SINGLE RS-232 PIN ASSIGNMENTS Single Output Cable Management Module (CMM)

	PIN	ASSIGNMENT
	Standard DB-25S (Female) "DTE"	Standard DB-25S (Male) "DTE"
	<u>(P/N 7043-1)</u>	<u>(P/N 7043-2)</u>
1	Frame Ground	Frame Ground
2	Transmit Data	Transmit Data
3	Receive Data	Receive Data
4	Request To Send	Request to Send
5	Clear to Send	Clear to Send
6	NC	NC
7	Signal Ground	Signal Ground
8	NC	NC
12	+5V	+5V
20	NC	NC
	PIN	ASSIGNMENT
	Standard 25 Pin PC Serial (Female) "DCE"	Standard 9 Pin AT Serial (Male) "DCE"
	<u>(P/N 7043-3)</u>	<u>(P/N 7043-4)</u>
1	Frame Ground	NC
2	Receive Data	Transmit Data
3	Transmit Data	Receive Data
4	Clear to Send	NC
5	Request to Send	Signal Ground
6	NC	NC
7	Signal Ground	Clear to Send
8	NC	NC
12	+5V	NA
20	NC	NA

Note: Pins 6,8 and 20 are shorted

2.3 Installing the MagScan as a Dual Output RS-232 Device

Installing the MagScan as a dual output RS-232 device requires the addition of one of UBI's Dual Output options and a power supply (P/N 700901). The standard CMM (P/N 704300) is mated with either the Standard Dual Output Option (P/N 700302) or the Reverse Gender Dual Output Option (P/N 701302).

The Dual RS-232 option can be set via the placement of jumpers on its circuit board, to transmit data in full duplex to either host only or terminal only, or in half duplex to both host and terminal simultaneously. Pin assignments and diagrams for dual RS-232 are provided in figure 2-4, 2-5 and 2-6.

The Dual RS-232 options are designed to conform to standard hardware connections between the data communications line and the terminal, so as not to require any modification to the adapter or additional cables.

Once the adapter is in place, it will not affect communications between the display terminal and the host.

FIGURE 2-4

MAGSCAN CONNECTED AS A DUAL RS-232 DEVICE

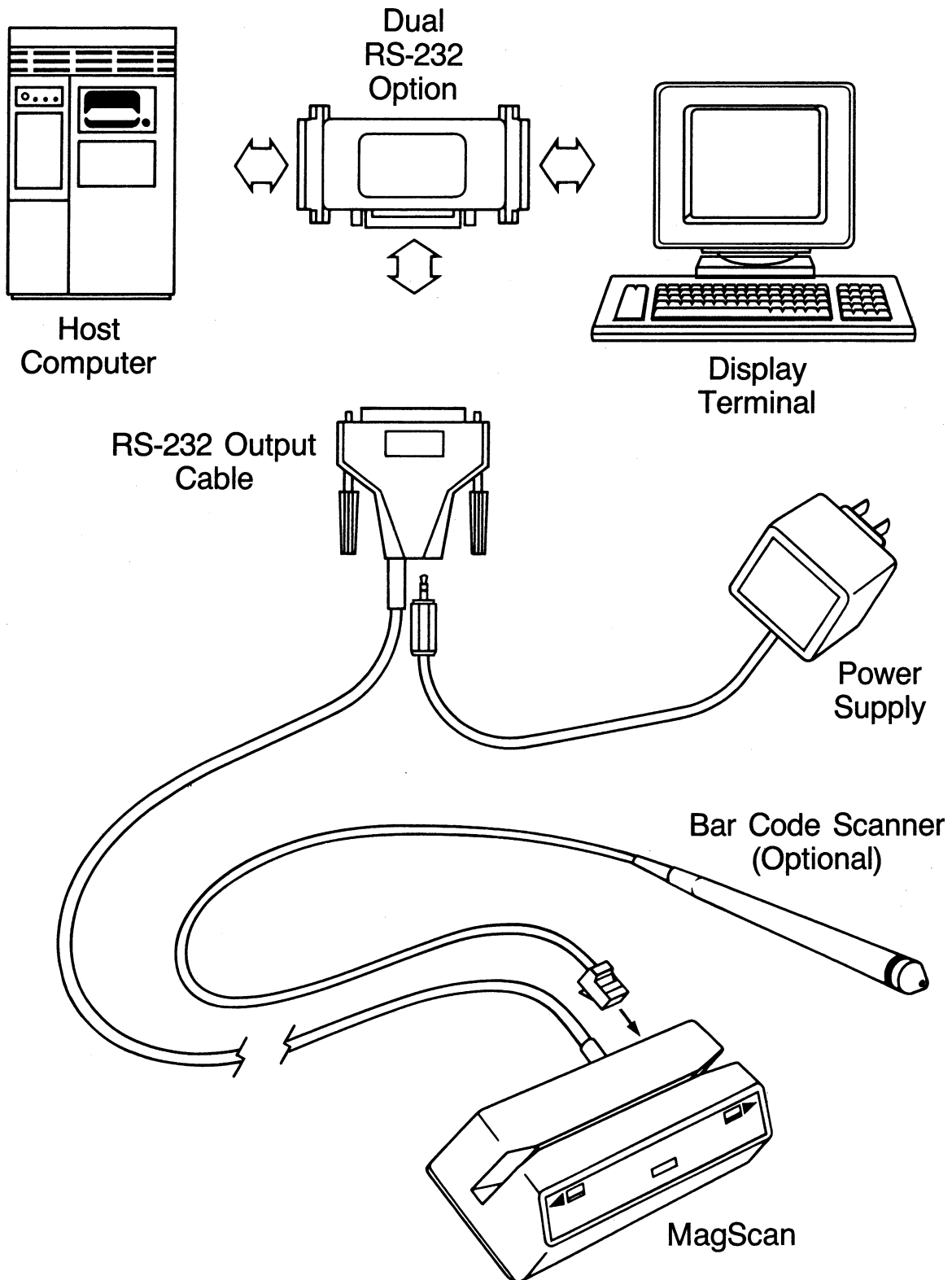
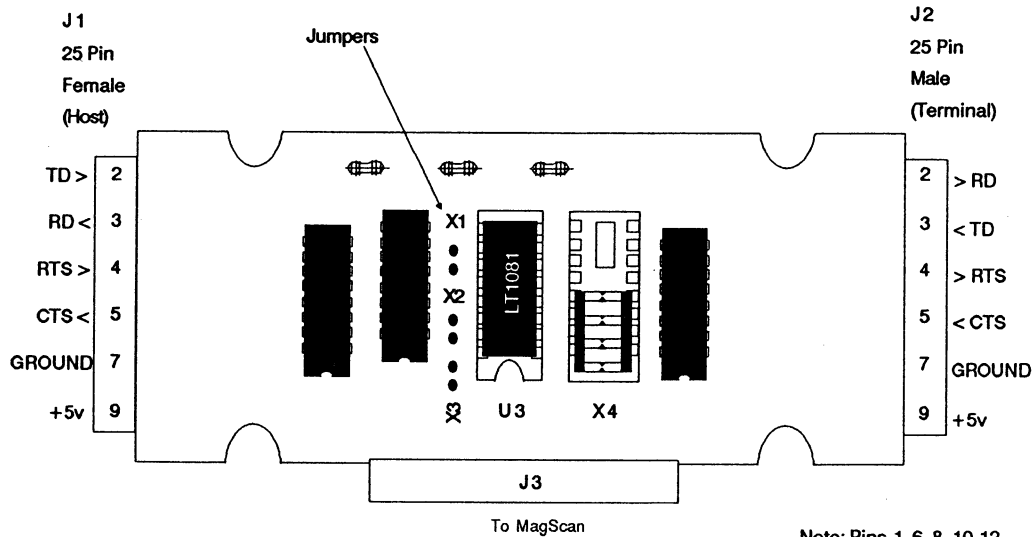


FIGURE 2-5

STANDARD DUAL RS-232 OPTION

(P/N 700302)



Note: Pins 1, 6, 8, 10-12, 14-16, 18, 20, and 25 are connected straight through.

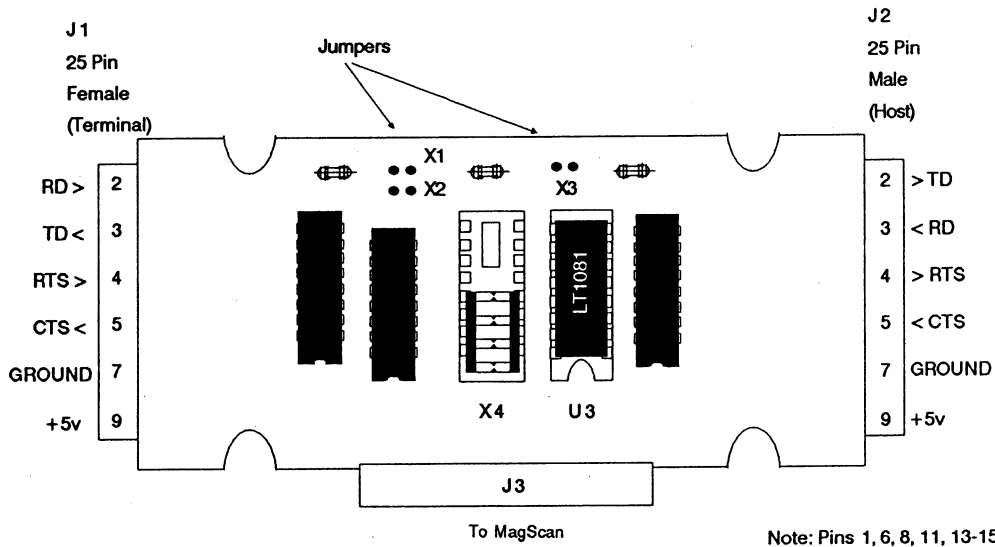
Jumper Settings

Full duplex to host (J1) only (default setting)	Full duplex to terminal (J2) only	Half duplex to both host (J1) and terminal (J2)
X1	X1	X1
X2	X2	X2
X3	X3	X3

FIGURE 2-6










REVERSE GENDER DUAL RS-232 OPTION

(P/N 701302)



Note: Pins 1, 6, 8, 11, 13-15, 17, 20, 22 and 24 are connected straight through.

Jumper Settings

Full duplex to host (J1) only (default setting)	Full duplex to terminal (J2) only	Half duplex to both host (J1) and terminal (J2)
 X1	 X1	 X1
 X2	 X2	 X2
 X3	 X3	 X3

Section 3

Configuring the MagScan

3.1 Introduction

To configure the MagScan using the bar code menus in this manual, a wand must be connected to the bar code input port.

The MagScan must be powered on to perform the configuration. This is accomplished when it is connected to the host terminal as a wedge, and the host is powered on, or when a power supply is attached in the RS-232 configuration.

All key parameters of the MagScan are programmed via bar code menus organized into families. The user must configure the MagScan for the terminal or system to which it is to be attached (unless the MagScan is configured as a wedge and the host terminal is an AT compatible -- the default setting), but need only enter other families in which the default values are to be modified.

3.2 List of Parameters

Following the configuration menu, the bar code menus are organized into the following families of parameters:

Family

- A Wedge Interface - Terminal Type Section**
- B RS-232 Interface - Data Communications Parameters**
- C Audio Management, and Data Transmission
- D Bar Code Formats
- E Code 39 Parameters
- F Interleaved 2 of 5 Parameters
- G 2 of 5 Standard Parameters
- H Codabar Parameters
- I UPC/EAN Parameters
- J Parameters for Code 128, MSI, Plessey, Code 11, Code 93, and Code 49
- K Magnetic Stripe Parameters**

The Families printed in **bold** are those which it will most often be necessary to modify.

Parameter sections which are not self-explanatory are described in notes following the menu for each family.

3.3 Preparing the MagScan for Configuration

To configure the MagScan follow these steps; additional notes on the configuration sections are provided following the configuration menu.

- a) From the configuration chart on page 3-6, read the command "Configuration"
- b) Select one of the families of parameters by turning to the appropriate section of the manual and reading the Enter Family bar code of the family you wish to change. In most cases it will be necessary to enter and make changes in Family A or B, and K, at a minimum.
- c) Within the family, read the bar code of the parameter to be changed, then the option to be selected. Repeat this step for other parameters within the same family.
- d) When all the parameters within a family which you wish to change are modified as described, read the "End Section" label, at the top right hand corner of each setup menu.
- e) Repeat steps b, c, and d for each family in which you wish to change one or more parameters.
- f) When you have finished changing all families of parameters as desired, read the "End Configuration".

3.4 Default Values

The MagScan is shipped with all parameters set to their default values, which are marked with asterisks(*) in the bar code setup menus in this guide. On request the MagScan can be shipped in a custom configuration.

3.5 End Section

End Section bar code labels appear at the top of each bar code menu. They are read to perform either of the following two types of operations.

1. When the configuration within a Family of parameters is complete, scanning End Section enables the user to enter another Family or to return to the menu of Configuration Commands.
2. To perform certain operations (e.g. establishment of the number of permitted characters in interleaved 2 of 5, or definition of preamble/postamble) the user is asked to scan one or more bar codes from the full ASCII and Command menus in Appendixes B-1 and C-1. When the desired character(s) is (are) entered, the user scans End Section to indicate that the definition is complete. In this case, scanning End Section does not result in exiting the Family, and another parameter in the same Family can be accessed without re-scanning the Select Family bar code. To exit the family immediately after composing a character string from the full ASCII menu, it is necessary to read the End Section bar code a second time.

Note that it is not necessary to scan End Selection following the entry of user defined characters for commands where only one length is permitted. For example all configuration numbers in Family A consist of three digits, and the MagScan accepts the configuration number selection following the entry of the third digit.

3.6 Operator Indicators

Invalid configuration commands are signaled by two beeps in a low pitch. These result from reading a configuration bar code out of its proper sequence. An example would be if a Select Family bar code is read before and End Selection bar code is read to exit the previously used family.

I. Configuration Commands

Step One

Enter Configuration



Step Two

Modify parameters as required using the menus organized into Families in this manual.

Step Three

End Configuration



II. Returning to Default Parameters

Return to Default Parameters



Section 4

Families of Parameters

FAMILY A

WEDGE INTERFACE SELECTION OF TERMINAL TYPE

Select Family A



End Selection



Compose Terminal Identification Number



1



2



3



4



5



6



7



8



9











0

Compose the identification number of the terminal to which the MagScan is to be attached, as defined in Appendix A.

Default: 163 -- IBM AT and compatibles.



End of Message Control Code



-  None
-  *Enter
-  Return
-  Down Arrow
-  Field Advance
-  Field Exit
-  Tab
-  User Defined --
Scan control code
from Appendix C-1

Upper/Lower Case



-  *Lower Case
-  Upper Case
(host terminal
keyboard has caps
lock activated)

End Selection



Notes to Family A

Compose Terminal Type

The MagScan can be set to emulate a large number of terminals, as listed in Appendix A. To configure the MagScan for a specific terminal, the terminal identification number must be composed for Family A, and the appropriate set of cables must be installed, as described in Section 2.

End of Message Control Code

The MagScan is connected as a wedge, it can send after each message a control code which emulates a command key on the keyboard thereby allowing automatic entry of data.

Upper/Lower Case

In order to transmit alphabetical characters in the correct case, the MagScan must be set for the shift position of the keyboard of the terminal to which it is interfaced. When the keyboard is in the normal, unshifted position, lower case is used. When the caps lock is activated on the terminal's keyboard, upper case should be selected.

FAMILY B

RS-232 INTERFACE -- DEFINITION AND PARAMETERS

Select Family B



End Selection

Interface Definition



RS-232 as single
or dual output

RS-232 as input

Applicable to all Interface Definitions:

Baud Rate



300



600



*1200

(continued on next page)

 2400

 4800

 9600

 19200

 38400

Data Bits



 *Seven

 Eight

Stop Bits



 *One

 Two

Parity



 *Even

 Odd

 Mark

 Space

Applicable to RS-232 as Single or Dual Output:

End of Message Control Code



None



*CR (Hex 0D)



LF (Hex 0A)



CR, LF (Hex 0D,10)



Tab (Hex 09)



ETX (Hex 03)



EOT (Hex 04)



User defined --
Scan single character
from full ASCII menu in
Appendix B-1

Applicable to RS-232 as Input Only:

End of Message Character



*Carriage Return (CR)



Carriage Return, Line Feed (CR/LF)



User defined -- scan single character from full ASCII menu in Appendix B-1

End of Message Translation



*Same "End of Message" control code sent by MagScan after each read



CR,LF (If RS-232 output only)



Tab



User defined -- scan a single control code from Command menu in Appendix C-1 if wedge or full ASCII menu in Appendix B-1 if RS-232 output



None

Post-Block Delay



Active -- Scan a Post-Block delay in following section



*Not Active

Post-Block Delay Duration



20 ms



*50 ms



100 ms



500 ms



1 sec



2 sec



5 sec



10 sec

Control Code Retransmission



Transmit all



*Transmit none

Acknowledge



ACK (HEX 06)



Other character -- Scan character from full ASCII menu in Appendix B-1



*Not Used

Negative Acknowledge



NAK (HEX 15)



Other character -- Scan character from full ASCII menu in Appendix B-1



*Not Used

XON/XOFF



Active



*Not Active

CTS/RTS



Active



*Not Active

NOTES TO FAMILY B

Interface Definition

The MagScan can make use of its RS-232 interface in either of two modes.

RS-232 as Single or Dual Output

The MagScan can be interfaced as a single or dual port RS-232 output device, as described in Section 2.

RS-232 as Input

The MagScan can accept RS-232 input from portable terminals, scales, or other devices and retransmit it via either the wedge or dual RS-232 interface. Use of RS-232 as an input requires the optional part 700501 or 700601 attached to port J3.

Applicable to RS-232 as Input Only

End of Message Character

Data from the RS-232 port is received on a message-by-message basis. Data composing each message is buffered until an end of message character (customarily a CR-Hex OD) is received. When it is received the MagScan beeps and sends the record to the host system followed by a control code.

The control code sent by the MagScan to the host after each message from the RS-232 port may be the same as the control code that is transmitted after each message from the bar code scanner as defined in Family A and B bar code menus, as the "End of Message Character."

In some applications, however, it may be desirable to differentiate the control code between each message from the RS-232 port from that sent at the end of each bar code scanned. By activating this feature, the MagScan can, for example, transmit a Tab after each record from the RS-232 port and an Enter after each bar code message.

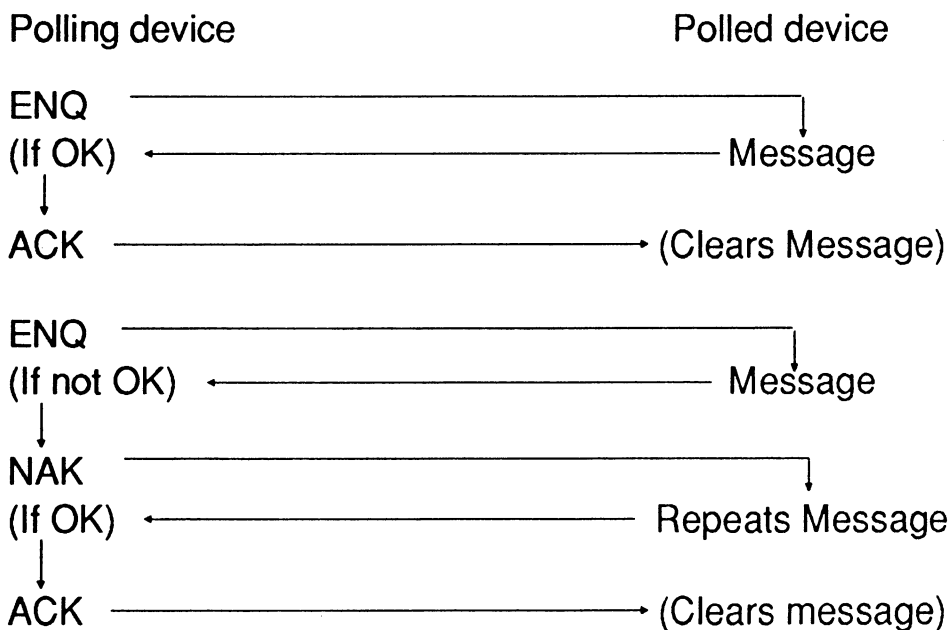
Control Code Retransmission

This option allows control characters (Hex 00-20) sent by the RS-232 device to be removed from retransmission by the MagScan to the host. This does not affect the treatment of End of Message or End of Block characters, but allows such characters as STX, NUL, ETX, etc. to be removed.

Request for Data Character/Acknowledge/Negative Acknowledge

This protocol allows the host to poll a MagScan configured in the "RS-232 as Output" mode or a MagScan configured in the "RS-232 as Input" mode to poll a device connected to the RS-232 port.

The protocol is as follows:



Note that ENQ/ACK/NAK can be replaced by user defined characters.

XON/XOFF Protocol

This protocol allows the host to control the flow of data from a MagScan configured in the RS-232 as Output mode or a MagScan configured in the RS-232 as Input mode to control the flow of data for an RS-232 device.

To interrupt reception of data the host or the MagScan transmits the XOFF character (ASCII DC3); to restart the flow, it sends the XON character (ASCII DC1).

The XOFF character is only sent after reception of a complete message. A connected device operating in this mode should wait at least 50 ms between records to verify reception of the XOFF character before starting to send another record.

CTS/RTS

The reader acts as a standard terminal, and manages the RTS/CTS levels when configured to do so in Family B. RTS is brought high before data is transmitted and dropped when transmission of a message is completed. CTS is tested before transmission of each character. Data is only transmitted when CTS is high. If CTS is not used by the host system, the reader maintains the level high. DTR is connected only on the modem port (toward the host system) and is maintained high.

Family C

AUDIO MANAGEMENT AND DATA TRANSMISSION

Select Family C



End Selection



Audio Management

Speaker Volume



Louder



Softer

A total of 7 different levels are available; the default level is 4. By scanning "louder" or "softer" successively, the volume is raised or lowered in increments of one level until the maximum or minimum level is reached. Two low beeps indicate that the minimum or maximum level has been attained.

Preamble



*Both ports



J2 Wand input



J3 magnetic input

Postamble



*Both ports



J2 wand input



J3 magnetic input

After scanning each port selection for the preamble or postamble, scan one or more characters from the full ASCII chart in Appendix A-1, then scan End Selection.

End Selection






Note: To leave Family C after entering a preamble or postamble, it is necessary to scan the End Selection label a second time.

Intercharacter Delay

		*No delay
		5 ms
		10 ms
		15 ms
		20 ms
		30 ms
		50 ms

Rolling buffer

		Active
		*Not Active

(If Rolling Buffer Active)

Intermessage Delay

		No delay
		*100 ms
		500 ms
		1 sec
		2 sec
		5 sec

Notes to Family C

Preamble and Postamble

Character strings can be transmitted by the MagScan before each message as a preamble, or after each message as a postamble. Preambles and postambles can be assigned to individual ports; and control codes can be used. For example, messages from the magnetic stripe reader could be preceded by an M and followed by a tab, while messages from the bar code scanner could be preceded by a B and followed by an enter. A total of 33 characters may be entered among all active preambles and/or postambles.

Intercharacter Delay

In some terminals or RS-232 systems, the maximum rate at which data can be transmitted by the MagScan is affected by the response of the system. By the insertion of an intercharacter delay, the MagScan can avoid dropping characters, if it is transmitting decoded data too rapidly.

Rolling Buffer

When codes are scanned faster than the host system can accept data, messages can be spooled in the MagScan's "rolling buffer" on a first in first out basis.

The rolling buffer may be deactivated if the operator is required to verify the transmission of each record to the host before the next record is scanned.

Intermessage Delay

The intermessage delay is used to slow the rate at which successive records are transmitted to the host.

Family D

BAR CODE FORMATS

Select Family D



End Selection



Read the bar code(s) corresponding to the code formats to be activated. Only those codes or groups of codes required should be activated.

*Scan End Selection
when all desired code
formats are specified.*



Code 39



Interleaved 2 of 5



Standard 2 of 5



Codabar/Ames



UPC/EAN



Code 128



MSI / Plessey



Code 11 / Code 93



*Code 39 + Codabar
+ UPC/EAN
+ Interleaved 2 of 5

Family E

CODE 39 PARAMETERS

Select Family E




End Selection



Character Set



 *Full ASCII

 Standard 43 Characters

Start/Stop



 Transmitted

 *Not Transmitted

\$\$ Start/Stop



 Active - \$\$ only

 Active - \$\$ + */*

 *Not Active

Check Digit



Mod 43 calculated
and transmitted



Mod 43 calculated
but not transmitted



CIP transmitted



CIP not transmitted



Italian transmitted



Italian not transmitted



*Not used

HIBC Format



Active



*Not active

Multiread



Activated by
leading space



Activated by user
selected character--
scan a character
from the full ASCII
test chart in
Appendix B-1



*Not Active

Full ASCII Control Codes



Active in separate label of two characters, and embedded in a code



*Active in separate label, and embedded in a code if preceded by a hyphen (-)



Active in separate label of two characters only



Not active

Notes to Family E

Modulo 43 Check Digit

The modulo 43 check digit is a character added to the end of the Code 39 bar code label which allows an extra validation of the data.

It is calculated as follows:

1. Replace each of the characters by the corresponding value in the table below, noting that the start and stop are not used in calculating the check digit.
2. Sum all the values.
3. Divide this sum by 43 and note the remainder.
4. The check digit is the character in the Standard ASCII table of 43 characters corresponding to the remainder in step 3.

Take as an example the following label

* 5 6 7 8 9 A D F \$ cd *

The values to be summed are:

$$S = 5 + 6 + 7 + 8 + 9 + 10 + 13 + 15 + 39 = 112$$

$$R = 112/43 = 2 \text{ with a remainder of } 26$$

26 corresponds to Q

cd = "Q"

Therefore the label with the check digit is

* 5 6 7 8 9 A D F \$ Q *

The reader can be set to transmit or not transmit the Mod 43 check digit.

Figure 4.1

Code 39 Character Values for Calculating Modulo 43 Check Digit

<u>Character</u>	<u>Value</u>
0 - 9	0 - 9
A - Z	10 - 35
--	36
.	37
space	38
\$	39
/	40
+	41
%	42

Multiread

The multiread function allows Code 39 labels beginning with a predetermined character to be put into the MagScan's memory. One or more of these labels is retained in memory until a controllable is read, which may be a transmit label (**), or until a label not beginning with the multiread character is read.

This function allows a message to be composed "off-line" from the terminal or host, by reading a series of multiread labels.

The multiread character can be either a space, which is widely used, or any other Code 39 character defined by the user.

HIBC Format

The Health Industry Bar code Council format is used by the American pharmaceutical industry and many hospitals and blood banks. It makes use of the modulo 43 check digit.

Full ASCII Control Codes

Activates or deactivates the bar code control functions from the command menus in Appendix B-1 and C-1. This allows the emulation of control keys such as special function keys, tab or back space, by reading bar code labels consisting of specially defined dual character combinations. For example the characters .B can represent an Enter. The translations for the control codes in Appendix B-1 and C-1 are provided in Appendices B-2 and C-2 respectively.

These control codes can be activated either when in a separate label or when embedded in a label, usually as the last two characters.

Family F

INTERLEAVED 2 OF 5 PARAMETERS

Select Family F



End Selection



Number of Characters



*Even Number



Odd Number -- select
suppressed character,
below

Odd Number
Suppressed Character



First character
suppressed



*Last character
suppressed

Code Length



*Fixed for a single length; first read fixes length



Fixed for two lengths; first two different lengths read fix lengths



Fixed for 3 lengths; first three different lengths read fix lengths



Variable length



Fixed for 1 length, user fixes length



Fixed for 2 lengths, user fixes lengths



Fixed for 3 lengths, user fixes lengths

If you selected one of the last three choices for code length, you must enter the length by scanning digits using the bar codes in the full ASCII chart in Appendix B-1 or in the keypad printed in the Family A menu. *Scan End Selection after each length.*

Length 1



Compose the desired length

Length 2



Compose the desired length

Length 3



Compose the desired length

Check Digit



Calculated and transmitted



Calculated but not transmitted



*Not Calculated

End Selection



Notes to Family F

Number of Characters

Interleaved 2 of 5 must always encode an even number of characters. An odd length may be selected to allow an Interleaved 2 of 5 label to be scanned into an odd-numbered field. In this case, the MagScan does not transmit either the first or last encoded digit. When the last digit is suppressed, the MagScan will accept a code in which the last character is invalid, e.g. composed of 5 narrow spaces.

Code Length Selection

In order to minimize the chance of misreads, Interleaved 2 of 5 codes are often restricted to one or a few fixed lengths. The valid length(s) are selected either by the first read of one or more lengths. In which case the reader will lock onto the first read(s) of different length labels. For example, if the user authorizes two lengths, the first two labels read of different lengths will establish the two permitted lengths.

Alternatively, the valid length(s) can be selected by bar code menu, in which case the user can specify one, two, or three lengths, to be accepted by the MagScan.

Check Digit

The Interleaved 2 of 5 check digit can be used as the last encoded character of a label; it is especially recommended when using variable length Interleaved 2 of 5 if the multiple read validation feature discussed above is not activated.

Follow these steps:

1. Add all numbers in the odd place values.
2. Multiply the sum by 3.
3. Add to that product all the numbers in the even place values.
4. The check digit is the complement to this number required to bring the sum to the higher multiple of 10.

For example, determine the check digit:

2 1 3 4 6 1 8 cd

$$(2 + 3 + 6 + 8) \times 3 = 57$$

$$57 + 1 + 4 + 1 = 63$$

$$70 - 63 = 7 \text{ therefore } cd = 7$$

The label should be 2 1 3 4 6 1 8 7

Family G

2 OF 5 STANDARD PARAMETERS

Select Family G



End Selection



Start/Stop




 6 bars


 *4 bars


 6 or 4 bars

Code Length







 *Fixed for a single length; first read fixes length

 Fixed for two lengths; first two different lengths read fix lengths

 Fixed for 3 lengths; first three different lengths read fix lengths

(continued on next page)

-  Variable length
-  Fixed for 1 length,
user fixes length
-  Fixed for 2 lengths,
user fixes lengths
-  Fixed for 3 lengths,
user fixes lengths

If you selected one of the last three choices, you must enter the length by scanning digits using the bar codes in the full ASCII menu Appendix B-1 or in the keypad printed in the Family A menu.

Length 1



Compose the desired length

Length 2



Compose the desired length

Length 3



Compose the desired length

Check Digit (variable length)



Calculated and
transmitted



Calculated but
not transmitted



*Not Calculated

End Selection



Family H

CODABAR PARAMETERS

Select Family H



End Selection



Start/Stop



*Not transmitted



a, b, c, d



A, B, C, D



a,b,c,d/t,n,*,e



DC1, DC2, DC3, DC4

CLSI Library System



Active



*Not active

Concatenation



All adjacent codes



All adjacent codes
with same stop of
first and start of
second



A B C



*Not Active

(If active)

Coexistence of Concatenated and Single Labels



*Both single
(unconcatenated)
and concatenated
labels read and
transmitted



Only concatenated
labels read

Notes to Family H

CLSI Library System

Libraries in the CLSI system used in the United States, require insertions of spaces within the 14 character label.

For example, the label : 399900019214

is transmitted : 3 999 0001 9214

The start/stop code can be transmitted or not transmitted according to menu selection.

Concatenation

When two or more Codabar labels are placed side by side, and scanned in a single sweep, the reader can transmit the data as a single message. If the reader is programmed to transmit the start/stop characters, it will transmit the first start and last stop characters, and suppress intermediate start and stop characters.

Whether or not two adjacent codes scanned in a single sweep are concatenated can depend on whether the MagScan is programmed to accept certain defined intermediate start/stop combinations.

Concatenation may either be required or may coexist with unconcatenated labels.

ABC

ABC is a form of concatenation used by members of the American Blood Commission. It functions as described in the previous note with the following restrictions on the start/stop characters:

First (leftmost label) Start = A, B, C, or D
 Stop = D

Second (rightmost label) Start = D
 Stop = A, B, C, or D

Family I

UPC/EAN PARAMETERS

Select Family I



End Selection



Select Formats



*Scan the bar code(s)
corresponding to each
format to be activated.
Scan End Selection
when all desired
formats are specified.*



UPC A



UPC E



EAN 8



EAN 13



*All Formats

Add-on Digits



*Not required, but
transmitted if present



Required and transmitted



Not required and not
transmitted

Leading Digit UPC A



*Transmitted



Not transmitted

Check Digit UPC A



*Transmitted



Not transmitted

Leading Digit UPC E



*Transmitted



Not transmitted

Check Digit UPC E



Transmitted




*Not transmitted

UPC E = UPC A



 Active

 *Not active

UPC A = EAN 13




 Active

 *Not active

Bookland EAN



 Active - Bookland Only

 Active - Bookland Plus
Other Formats

 *Not Active

End Selection



Notes to Family I

UPC E = UPC A

This option allows a 6 digit UPC E code to be expanded to 10 digit UPC A (plus the leading 0 and/or check digit if called for in your setup).

The expansion follows these rules:

Step 1. Substitute alpha characters for the 6 numeric characters in the zero suppressed code, i.e., ABCDEF

Step 2. Examine numeric value in a position "F".

Step 3. Use these rules to reconstruct the 10 digit UPC:

- a. If "F" is 0, 1 or 2, the UPC is: ABF0000CDE
- b. If "F" is 3, the UPC is: ABC00000DE
- c. If "F" is 4, the UPC is: ABCD00000E
- d. If "F" is 5, 6, 7, 8 or 9, the UPC is: ABCDE0000F

Note that in rules 3-b and 3-c "F" is a "signal" digit and does not appear in the expanded 10 digit UPC.

Example #1. Take the zero suppressed number 123456

1 2 3 4 5 6
A B C D E F

The number fits rule 3-d. The 10 digit UPC is:

0 - 1 2 3 4 5 - 0 0 0 0 6

Example #2. Take the zero suppressed number 654321

6 5 4 3 2 1
A B C D E F

The number fits rule 3-a. The 10 digit UPC is:

0 - 6 5 1 0 0 - 0 0 4 3 2

UPC A = EAN 13

An extra leading 0 is added to the beginning of each UPC-A label so that UPC A codes can be transmitted in 13 digit fields which accommodate EAN 13 codes.

Family J

PARAMETERS FOR CODE 128, MSI, PLESSEY, CODE 11, AND CODE 93

Select Family J



End Selection



Code 128:

Append Function (FNC 2)



Active



*Not active

MSI

Check Digit



*Modulo 10



Double Modulo 10



Modulo 11



Not calculated

Transmission of Check Digit



*Transmitted



Not transmitted

Plessey

Check Digit



*Transmitted



Not transmitted

Code 11

Number of Check Digits



*One



Two

Transmission of Check Digit



*Transmitted



Not transmitted

Code 93

Multiread



Activated by leading
space



Activated by user
selected character--
scan a character
from a full ASCII
test chart presented
in Appendix B-1



*Not active

Notes to Family J

Code 128 - Append Function

This function allows labels with the special FNC2 character encoded in any position to be buffered in the MagScan's memory rather than immediately transmitted. Labels containing the FNC2 character are buffered on a first in, first out basis and are transmitted preceding the first read of a standard, non-buffered label, that does not contain the FNC2 character.

Code 93 - Multiread Function

The Multiread function operates in the same manner as the Code 39 Multiread function as described in Family E.

Family K

MAGNETIC STRIPE PARAMETERS

Select Family K



End Selection



Magnetic Track



Track 1 or 3



Track 2



*Tracks 1 and 2



Tracks 2 and 3

If Two Tracks Are Selected



*Will read either or both tracks



Requires both tracks

Transmission Of Data From Two Tracks



*Track 1 then Track 2
Or
Track 3 then Track 2



Track 2 then Track 1
Or
Track 2 then Track 2

Separation Character



Read bar code from
Appendix B-1
(# is default)

LRC Check Digit



*Not transmitted



Transmitted

Start/End Sentinels



*Not transmitted



Transmitted

Reserved 1



*Not Active



Active

Reserved 2



*Not Active



Active

Reserved 3



*Not Active



Active

Family L

ADVANCED FEATURES

Select Advanced Features



Character Masking and Reordering

Port Selection (Must be scanned)



*Both Ports



Wand Input



Magnetic Input

Code Limitation



*Any code format



Single specified code format--scan one bar code corresponding to code format desired, in Family D.

Note: Bar codes not meeting limitations of port or code, as defined above, will be transmitted normally, without masking or reordering.

Select Number of Characters in Original Label



Using the numeric part of the full ASCII bar code chart in Appendix B-1, compose the number of characters in the original bar code label to be scanned, then scan End Selection.

Note: Bar codes with lengths different from that scanned in this selection, will be transmitted normally, without masking or reordering.

End Selection



Begin Masking/Reordering



Using the Full ASCII bar code chart in Appendix B-1, scan the upper case letters corresponding to the alphabetical order in which you wish to transmit the characters in the code. The first character decoded = A, the second = B, etc. up to a maximum of 22 characters. Character W is a delay character of user-defined duration. Characters XYZ are user defined characters, and may be any full ASCII or command characters supported by the terminal to which the MaxiBar is connected. For example, if the original label is 123456, and is masked/reordered by FEABC, the label will be transmitted 65123, with the 4 suppressed. If W is defined as a 250 ms delay, X as an Enter, and Y as an A, and the original label is masked/reordered by scanning YFEXWABC, then it will be transmitted A65 Enter (250 ms delay) 123.

When the reordering/masking is complete, Scan End Selection.

Delay Character (W)



Using the keypad in Family A or the Full ASCII chart in the full ASCII menu in Appendix B-1, compose the number of 20 msec increments of delay from 1 to 256 (composing 50 designates a delay of 1 sec). When the delay is composed, Scan End Selection.

End Selection



User Defined Characters Activated



X



Y



Z

For each selection scan any character supported by the terminal to which the MagScan is connected from Appendix B-1 or C-1. If the MagScan is connected as a single or dual RS-232 output device, any character from Appendix B-1 may be used.

Note: It is not necessary to scan End Selection after defining the X, Y, and/or Z characters. To exit Advanced Features after defining characters, scan End Selection once.

Code Type Identifier



Active -- Follow
procedure below



*Not Active

Scan a code format in Family D, page 6-24, then scan a single character from the full ASCII chart in Appendix B-1. Repeat this sequence for each code to be assigned an identifier. Scan End Selection after entering all desired code type identifiers.

Scan End Selection a second time to exit Family 7.

Character Substitution/Deletion



First character



Second character

For each selection, scan a character from the full ASCII chart in Appendix B-1, then scan the character to be systematically transmitted in its place. To delete the character whenever it appears, scan DEL (Hex 7F) in the Full ASCII chart.

Control Code Suppression Character



Active -- Scan any character from the full ASCII chart in Appendix B-1.



*Not Active

Transmission of Control Code Suppression Character (If preceding selection active)



Transmitted



*Not transmitted

Delay Character



Active -- Scan any character from the full ASCII chart in Appendix B-1.



*Not Active

Delay Duration



 20 ms

 *50 ms

 100 ms

 500 ms

 1 sec


 2 sec

 5 sec

 10 sec

Configuration Password



 Active -- Scan any three Code 39 numerals, upper case letters, or \$, /, +, % from the full ASCII chart in Appendix B-1.

 *Not Active

Notes to Family L

Character Masking and Reordering

This facility allows the user to reformat data scanned by the MagScan before it is transmitted to the host. It can be used to delete characters in certain positions in the label, add user defined characters, and to reorder the data. By use of control codes as user-defined characters, with the delay feature, a single code can be split into two fields, for example item number and quantity. Where necessary, more complex programming can be performed by Barcode Industries.

Code Type Identifier

The code type identifier is a single character transmitted as a preamble before all messages of a given code type. The code type identifier will *precede* any other user-defined preamble.

Character Substitution/Deletion

This feature allows one or two defined characters in any bar code or message from a supported RS-232 device to be systematically re-transmitted as another character or characters. By scanning DEL as the substituted character, the defined one or two characters is deleted. In this mode, the feature is useful for eliminating spaces, hyphens, and other character separators. For example, if - is replaced with DEL, the label 123-45 will be transmitted 12345.

Control Code Suppressing Character

Use of a Control Code Suppression Character allows codes preceded by a defined character to be transmitted without the end of message control code, such as an enter, defined in Family A.

This feature is useful when a keypad is used to compose a message character-by-character, or when certain codes are scanned into fields which do not require transmission of the standard end of message control code.

Delay Character

The MagScan can recognize a selected full ASCII character, appearing in a bar code or in the data stream from an RS-232 device connected to port J3, as requiring the insertion of a delay in the transmission of a control code to the host, requiring a response from the system before transmission of the next character.

Configuration Password

The configuration password allows the user to create a new code for the Configuration label, which replaces the code of the Configuration command on page 3-7. Once implemented, the reader can only be caused to enter the configuration mode by scanning a label with the user defined password encoded in Code 39.

Implementation of a configuration password ensures that unauthorized persons cannot change the configuration stored in the MagScan's permanent memory. Any user with a manual can make modifications by scanning Modify Parameters in the Configuration menu, the Store in Memory selection is disabled when a configuration password is implemented, so that any modification will be lost when the reader is powered down. The unauthorized user will not be able to erase the configuration stored in the reader's permanent memory, since the default command is accessible only once the reader is in the configuration mode.

The format of the label in Code 39 must be

*

char 1	char 2	char 3	\$
--------	--------	--------	----

 *






where * is the Code 39 start and stop character, char 1, char 2, and char 3 are user defined, and the \$ is an obligatory character, which must be printed as the last four characters in the Configuration password.

Section 5

Appendices

Appendix A
























Full ASCII Bar Code Chart (HEX 00 - 31)

NUL 	LF 	DC4 	RS 	(
SOH 	VT 	NAK 	US ) 
STX 	FF 	SYN 	SP 	* 
ETX 	CR 	ETB 	! 	+ 
EOT 	SO 	CAN 	" 	, 
ENQ 	SI 	EM 	# 	- 
ACK 	DLE 	SUB 	\$ 	. 
BEL 	DC1 	ESC 	% 	/ 
BS 	DC2 	FS 	& 	0 
HT 	DC3 	GS 	' 	1 

Full ASCII Chart (HEX 32 - 6A)

2	=	H	S	^
3	>	I	T	~
4	?	J	U	
5	@	K	V	a
6	A	L	W	b
7	B	M	X	c
8	C	N	Y	d
9	D	O	Z	e
:	E	P	[	f
;	F	Q	\	g
<	G	R	]	h

Full ASCII Chart (HEX 6B - 7F)

i	n	s	x	}
				
j	o	t	y	~
				
k	p	u	z	del
				
l	q	v	{	
				
m	r	w	|	
				

Full ASCII Code 39

ASCII	Hex	Code 39	ASCII	Hex	Code 39
NUL	00	%U	SP	20	
	Space				
SOH	01	\$A	!	21	/A
STX	02	\$B	"	22	/B
ETX	03	\$C	#	23	/C
EOT	04	\$D	\$	24	/D
ENQ	05	\$E	%	25	/E
ACK	06	\$F	&	26	/F
BEL	07	\$G	'	27	/G
BS	08	\$H	(	28	/H
HT	09	\$I	)	29	/I
LF	0A	\$J	*	2A	/J
VT	0B	\$K	+	2B	/K
FF	0C	\$L	,	2C	/L
CR	0D	\$M	-	2D	/M
SO	0E	\$N	.	2E	/N
SI	0F	\$O	/	2F	/O
DLE	10	\$P	0	30	/P
DC1	11	\$Q	1	31	/Q
DC2	12	\$R	2	32	/R
DC3	13	\$S	3	33	/S
DC4	14	\$T	4	34	/T
NAK	15	\$U	5	35	/U
SYN	16	\$V	6	36	/V
ETB	17	\$W	7	37	/W
CAN	18	\$X	8	38	/X
EM	19	\$Y	9	39	/Y
SUB	1A	\$Z	:	3A	/Z
ESC	1B	%A	;	3B	%F
FS	1C	%B	<	3C	%G
GS	1D	%C	=	3D	%H
RS	1E	%D	>	3E	%I
US	1F	%E	?	3F	%J


Full ASCII Code 39 (continued)

ASCII	Hex	Code 39	ASCII	Hex	Code 39
@	40	%V	'	60	%W
A	47	A	a	61	+A
B	42	B	b	62	+B
C	43	C	c	63	+C
D	44	D	d	64	+D
E	45	E	e	65	+E
F	46	F	f	66	+F
G	47	G	g	67	+G
H	48	H	h	68	+H
I	49	I	i	69	+I
J	4A	J	j	6A	+J
K	4B	K	k	6B	+K
L	4C	L	l	6C	+L
M	4D	M	m	6D	+M
N	4E	N	n	6E	+N
O	4F	O	o	6F	+O
P	50	P	p	70	+P
Q	51	Q	q	71	+Q
R	52	R	r	72	+R
S	53	S	s	73	+S
T	54	T	t	74	+T
U	55	U	u	75	+U
V	56	V	v	76	+V
W	57	W	w	77	+W
X	58	X	x	78	+X
Y	59	Y	y	79	+Y
Z	5A	Z	z	7A	+Z
[	5B	%K	{	7B	%P
\	5C	%L	|	7C	%Q
]	5D	%M	}	7D	%R
^	5E	%N	~	7E	%S
_	5F	%O	DEL	7F	%T

United Barcode Industries Command Menu

PF1


PF12


PF22


PF2


PF13


PF23


PF3


PF14


PF24


PF4


PF15


RETURN


PF5


PF16


ENTER


PF6


PF17


FIELD EXIT


PF7


PF18


FIELD +


PF8


PF19


FIELD -


PF9


PF20


LINE FEED


PF10


PF21


SEND


PF11


ESC


Appendix B-1

United Barcode Industries Command Menu

FIELD -



LINE FEED



SEND



ESC



CLEAR



RESET



BACK SPACE



DEL



TAB



BACK TAB



HOME



END



→



←



↑



↓



DUP



ALT



Appendix B-2

United Barcode Industries Command Translation

Legend	Code 39 Bar Code	Legend	Code 39 Bar Code
PF1	0A	RETURN	.C
PF2	0B	ENTER	.B
PF3	0C	FIELD EXIT	.F
PF4	0D	FIELD +	.E
PF5	0E	FIELD -	.R
PF6	0F	LINE FEED	.U
PF7	0G	SEND	.D
PF8	0H	ESC	.T
PF9	0I	CLEAR	.Q
PF10	0J	RESET	.V
PF11	0K	BACK SPACE	.L
PF12	0L	DEL	.A
PF13	0M	TAB	.I
PF14	0N	BACK TAB	.K
PF15	0O	HOME	.G
PF16	0P	END	.H
PF17	0Q	→	.M
PF18	0R	←	.N
PF19	0S	↑	.O
PF20	0T	↓	.P
PF21	0U	DUP	.S
PF22	0V	ALT	.J
PF23	0W		
PF24	0X		

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