



S C A N I M A G E

User's Manual Edition 3

from United Barcode Industries
February 1994

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Notice

Patent Information

Scanners discussed in this manual are covered by patents issued or pending in the U.S. and other countries.

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Notice

The ScanImage is certified to be a CDRH Class II laser (class 3A for 97x and 99x models) product with the United States Department of Health and Human Services Center for Devices and Radiological Health, and IEC Class II.

FCC Compliance Information

Warning: This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it 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 of FCC Rules, which are designed to provide reasonable protection against such interferences when operated in a commercial environment. Operation of the equipment in a residential area is likely to cause interferences in which case the user at his own expense will be required to take whatever measure may be required to correct the interference.

Using this manual

This User's Manual explains in detail how to set up and operate the ScanImage. Section 1 provides an overview of the ScanImage versions available. Section 2, 3 and 4 cover, respectively, programming for the following versions.

9X1 - Wand emulation

9X2 - RS-232 interface

9X7 - Wedge connection

This User's Manual will help you:

Install the ScanImage on your terminal.

Configure the ScanImage to your system and data communications requirements via bar code menus.

Select the bar code formats to be activated.

Configure the ScanImage to incorporate preambles and/or postambles.

Make use of ScanImage's advanced features such as, laser management, character masking, bar code verification, and bar code identifiers.

Table of contents

Noticei

Using this manualiii

Table of contentsiv

PART I - INSTALLATION

Section 1 - Description of the ScanImage and Special Features

ScanImage Versions..... 1-1

Preparing the ScanImage for configuration..... 1-2

Special Features..... 1-3

Section 2 - Installing the ScanImage as a Wand emulation

Wand emulation..... 2-1

- Wand emulation Enable 2-1
- Transmission 2-2
- Signal State 2-2
- Speed 2-2
- Delay..... 2-3

Table of contents

Section 3 - Installing the ScanImage as an RS-232 output device

Single RS-232 mode	3-1
-Single RS-232 Mode (P/N 9X2).....	3-1
-ScanImage 9X2 With Single RS-232 Output	3-2
-Pin Assignments for Single Output Cable Management Module.....	3-4
Dual RS-232 mode	3-5
-Dual RS-232 Mode.....	3-5
-ScanImage 9X2 With DUAL RS-232 Ouput Option	3-6
-Standard Dual RS-232 Option (P/N 901196 or 700352)	3-8
RS-232 interface parameters	3-9
-RS-232 Enable	3-9
-Baud Rate	3-10
-Data/Stop/Parity.....	3-11
-End of message Control Codes	3-12
-Protocols for Contolling Data Transmission	3-13

Section 4 - Installing the ScanImage as a Keyboard Wedge

Keyboard Wedge mode.....	4-1
-Keyboard Wedge Mode (P/N 9X7)	4-1
-ScanImage 9X7 Wedge Connection with Cable Management Module.....	4-2
-Compose Terminal Type.....	4-4
-End of message Control Codes	4-5
-Upper Lower Case Options	4-6
-Alt Mode	4-6

Table of contents

PART II - READING PARAMETERS

Family A - Audio and data management

Audio Management A-1

- Speaker Volume..... A-1
- Speaker Tones A-2

Data Management A-3

- Preambles and Postambles..... A-3
- Intercharacter Delay A-4
- Rolling Buffer A-5
- Intermessage Delay..... A-6

Family B - Activation/Deactivation of Bar Code Formats

Bar Code Formats B-1

Family C - Code 39 Parameters

Code 39 Parameters..... C-1

Family D - Interleaved 2 of 5 Parameters

Interleaved 2 of 5 Parameters D-1

Family E - 2 of 5 Standard Parameters

2 of 5 Standard Parameters..... E-1

Family F - Codabar Parameters

Codabar Parameters F-1

Table of contents

Family G - UPC/EAN Parameters

UPC/EAN Parameters G-1

Family H - Code 128, PLESSEY, MSI, Code 93, Code 11, TELEPEN, MATRIX 2/5, EAN 128 Parameters

Code 128, PLESSEY H-1

MSI, Code 93..... H-2

Code 11, TELEPEN, MATRIX 2/5 H-3

EAN 128..... H-4

Family I - Advanced features

Laser management I-1

Laser Time-out Variable..... I-2

Consecutive same read code validation I-3

No read message I-4

Character masking and reordering I-5

Single code type identifier I-9

Identification AIM I-11

Delay character..... I-12

Character substitution/deletion..... I-13

Configuration password..... I-13

Table of contents

Appendix - Full ASCII Bar Code Chart and Command Menu

Full ASCII Bar Code Chart X-1

Command Menu..... X-9

PART I

INSTALLATION

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S e c t i o n 1

Description of the ScanImage
and Special Features

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SECTION 1

ScanImage Versions

The ScanImage is available with six different optical configurations for the HP (High Performance), IP (Industrial Performance), and seven different interfaces. Each optical configuration is available with each interface. All part numbers start with the digit 9. The second digit indicates the optics; the third digit the interface. Listed below are the available Optics and Interfaces.

Optics Available

STD	Standard (91X)
VIN	Wind-shield (92X)
LR	Long Range (95X)
UHD	Ultra High Density (96X)
XLR	Extra Long Range (97X)
ULR	Ultra Long Range (99X)

Interfaces Available

(9X0) - *Undecoded* for connection to UBI's MaxiBar

(9X1) - *Wand Emulation* for connection to on-line Readers

(9X2) - *RS-232* for connection to a serial port, or as a dual port device for connection on the serial communications line between a terminal and host.

(9X3) - *IBM 4683* for connection to IBM 4683 and 4684 P.O.S. registers.

(9X5) - *OCIA* for connection to NCR, TEC and other P.O.S. registers.

(9X6) - *Fujitsu* for connection to Fujitsu and other registers with parallel interfaces.

(9X7) - *Wedge* for connection to terminals and PC's in keyboard emulation mode.

SECTION 1

Preparing the ScanImage for configuration

To prepare the ScanImage for configuration follow these steps:

1. Verify that the correct ScanImage cables and accessories, if any were ordered, have been received.
2. Turn off power to the terminal to which the ScanImage will be connected.
3. Install the ScanImage according to the instructions in the following sections. Chapter two describes installation of wand emulation mode, chapter three RS-232, and chapter four wedge installation.
4. Connect the power supply, if necessary. Power up the host according to the interface (except 9x1), the ScanImage will beep five or six times indicating that hookup has been completed.
5. Type on the keyboard to verify that the terminal is transparent to the system.
6. Test the ScanImage by scanning your bar code label(s). If further changes are required go to the appropriate family in Part II and make the additional changes.

SECTION 1

Special Features

Resetting the scanner to factory defaults

Return to Factory Defaults



Printed Label

Normal*



Normal or Inverted



Autostand Mode

Autostand Enabled



Autostand Disabled*



Marker Beam

Marker Beam Enabled



Marker Beam Disabled*



Master



Slave



Software Version



SECTION 1

Special Features

Return to Factory Defaults

At any time, the ScanImage can have its settings reset to factory defaults which are indicated by (*) asterisk throughout the manual. By scanning the **Return to Default Parameters bar code label**, the ScanImage will return back to the indicated default settings.

Autostand

The ScanImage may be configured for use with UBI's Autostand, which allows the scanner to work in a hands-free mode. The ScanImage will revert to its normal method of trigger activation when temporarily removed from the stand to read large or bulky items.

The autostand mode is a factory installed feature that is added to 91X UBI laser scanners. The user has the capability to enable the autostand mode by scanning the **Autostand Enable bar code**. The scanner will respond by emitting a continuous, low level, red beam of light. The autostand mode is deactivated by scanning **Autostand Disable bar code**.

Marker Beam

The Marker Beam is available on all scanimage and automatically selected in the long range 95X, Extra Long Range 97X and Ultra Long Range 99X ScanImage. The marker beam is a stationary spot that appears momentarily before the ScanImage begins scanning. It shows the operator exactly where the scanner is aimed for error-free scanning of hard-to-target symbols. The marker beam can be disabled or enabled at any time.

SECTION 1

Special Features

Software version

By scanning this label, the ScanImage will emit a sequence of beeps to let you hear the Prom version, and then will display this version and the date of the prom.

Example: sequence of beeps: 2.03

3 beeps, 1 silence, 1 beep, 1 silence, 4 beeps.

The digits are incremented by one due to the zero digit.

Master

This command designates the ScanImage as the master enabling it to "clone" its configuration to additional ScanImage.

Slave

This command designates an unconfigured ScanImage or an improperly configured ScanImage as a slave, and instructs it to "clone" to its own memory the configuration in the ScanImage master to which it is connected.

For further information on these two functions, contact UBI's technical service.

SECTION 1

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S e c t i o n 2

Installing the ScanImage as a Wand Emulation

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SECTION 2

Wand Emulation

Wand Emulation Mode (P/N 9X1)

The 9X1 scanner can be configured by the user to connect to the wand port of a portable fixed station terminal.

WAND EMULATION

Wand Emulation Enable



Scan ***Wand Emulation Enable*** when converting the ScanImage from a Keyboard Wedge to Wand Emulation.

SECTION 2

Wand Emulation

Transmission

Same code Wand Emulation



Code 39 Wand Emulation*



Signal State

Bar = 0



Bar = 1*



Idle = 0



Idle = 1*



Speed

70 Inches/Sec



50 Inches/Sec



30 Inches/Sec



20 Inches/Sec*



SECTION 2

Wand Emulation

Speed (continued)

15 Inches/Sec



10 Inches/Sec



5 Inches/Sec



The ScanImage emulates a pen reading at different speeds :

5 Inches/Sec -> Slow Read

70 Inches/Sec -> Fast Read

Delay

100 ms Delay*



50 ms Delay



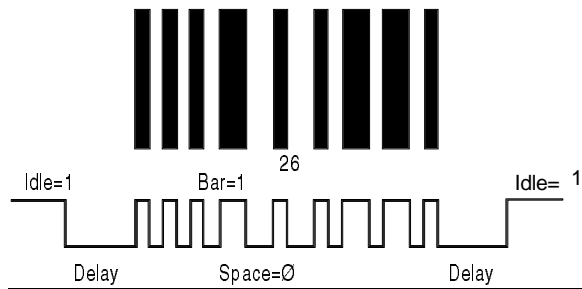
20 ms Delay



10 ms Delay



Example: INT 2 of 5



SECTION 2

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S e c t i o n 3

**Installing the ScanImage
as a RS-232 Output Device**

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SECTION 3

Single RS-232 Mode

RS-232 Single/Dual Mode (P/N 9X2)

The 9X2 scanner is RS-232 device that can be used in a single or dual RS-232 configuration. Installing the 9X2 as single RS-232 requires connecting the unit to the proper serial port on the host. By adding a Dual RS-232 option to the 9X2 transforms the 9X2 from single RS-232 device to dual RS-232 device by connecting the Dual RS-232 option between the host and terminal.

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.

Single RS-232 Mode (P/N 9X2)

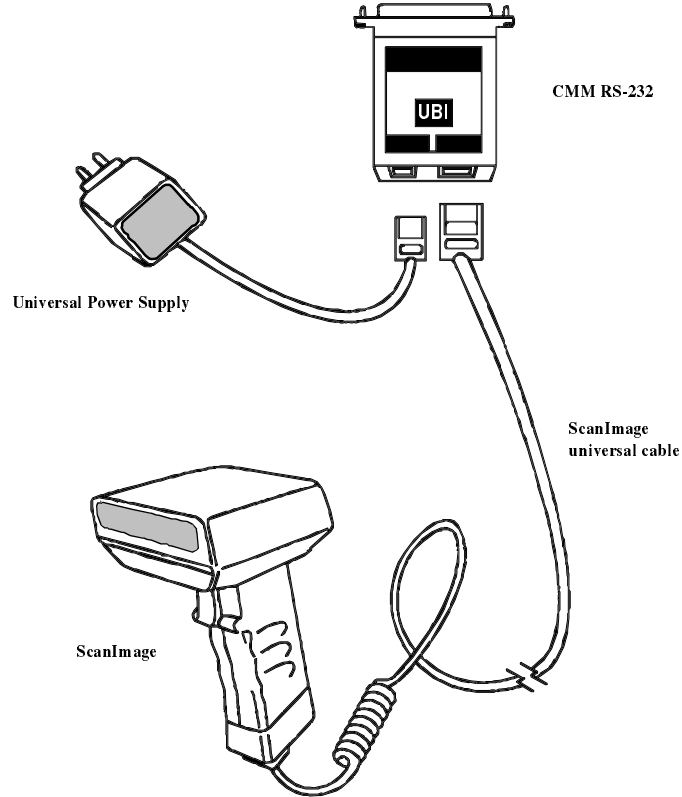
A. Cable Installation

1. Installing the ScanImage requires selecting the proper Cable Management Module (CMM P/N 704300, 704310, 704320, 704330 or 704340, depending on the pin assignments of the connector) and a power supply (P/N 701901).
See page 3-4 for pin assignments.
2. Turn off power to the terminal to which the ScanImage 9X2 scanner will be connected.
3. Plug the 8 pin connector from the ScanImage to the port labeled "Reader" on the CMM. Plug the power supply (P/N 701901) into the CMM port labeled "Power Supply" and plug the RS-232 DB connector into the serial port on the PC or terminal.
See the diagram on page 3-2.
4. Arrange the fully connected unit so that all cables run freely.

SECTION 3

Single RS-232 Mode

SCANIMAGE 9X2 WITH SINGLE RS-232 OUTPUT



SECTION 3

Single RS-232 Mode

B. Terminal Power Up Sequence

Turn on the power to the terminal to which the 9X2 scanner is connected. The ScanImage will issue a series of five beeps which are intentional and indicate that the terminal keyboard power-on reset routines have been completed.

IMPORTANT

If this is a first time installation, it is NECESSARY to program the 9X2 scanner for the RS-232 setups compatible with your terminal starting on page 3-9.

SECTION 3

Single RS-232 Mode

Pin Assignments for Single Output Cable Management Module

PIN ASSIGNMENTS (CMM)

Standard DB-25S (Female) "DTE" (P/N 704300)	Standard DB-25S (Male) "DTE" (P/N 704310)
---	---

1	Frame Ground
2	Transmit Data
3	Receive Data
4	Request to Send
5	Clear to Send
6	NC
7	Signal Ground
8	NC
12	+5Volts
20	NC

Standard DB-25S (Female) "DCE" (P/N 704320) (P/N 704340)	Standard DB-25S (Male) "DCE" (P/N 704330)
---	---

1	Frame Ground
2	Receive Data
3	Transmit Data
4	Clear to Send
5	Request to Send
6	NC
7	Signal Ground
8	NC
12	+5Volts
20	NC

Note: Pins 6, 8, and 20 are shorted

SECTION 3

Dual RS-232 Mode

Dual RS-232 Mode

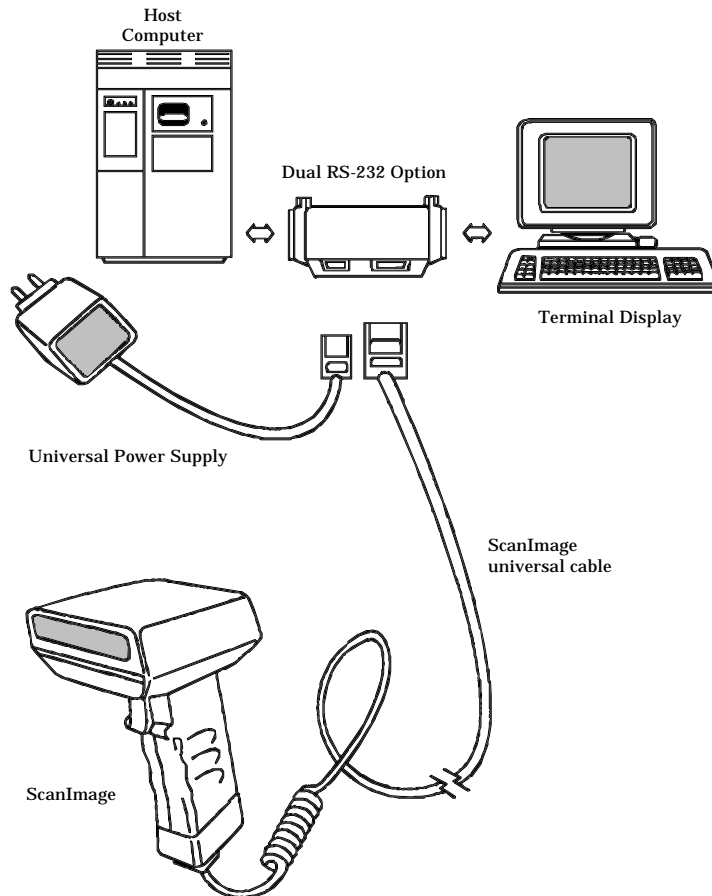
A. Cable Installation

1. Installing the ScanImage as dual RS-232 output requires the standard Dual Output Option (P/N 901196) and a power supply (P/N 701901).
2. 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. Jumpers settings are shown on page 3-8. To open the dual, remove the two screws from the case, and pull off the cover.
3. Plug the 8 pin connector from the ScanImage to the port labeled "Reader" on the Dual RS-232 Output Option. Plug the power supply (P/N 701901) to the port labeled "Power Supply" on the Dual Output Option. See the diagram on page 3-6.
4. Turn off power to the terminal to which the ScanImage 9X2 scanner will be connected and disconnect the host cable from the terminal. Plug the Dual Output option labeled "To Terminal" into the serial port on the terminal, and plug the "To Host" side of the Dual into the cable from the host computer.
5. Arrange the fully connected unit so that all cables run freely.

SECTION 3

Dual RS-232 Mode

SCANIMAGE 9X2 WITH DUAL RS-232 OUTPUT OPTION



SECTION 3

Dual RS-232 Mode

B. Terminal Power Up Sequence

Turn on the power to the terminal to which the 9X2 scanner is connected. The ScanImage will issue a series of five beeps which are intentional and indicate that the terminal keyboard power-on reset routines have been completed.

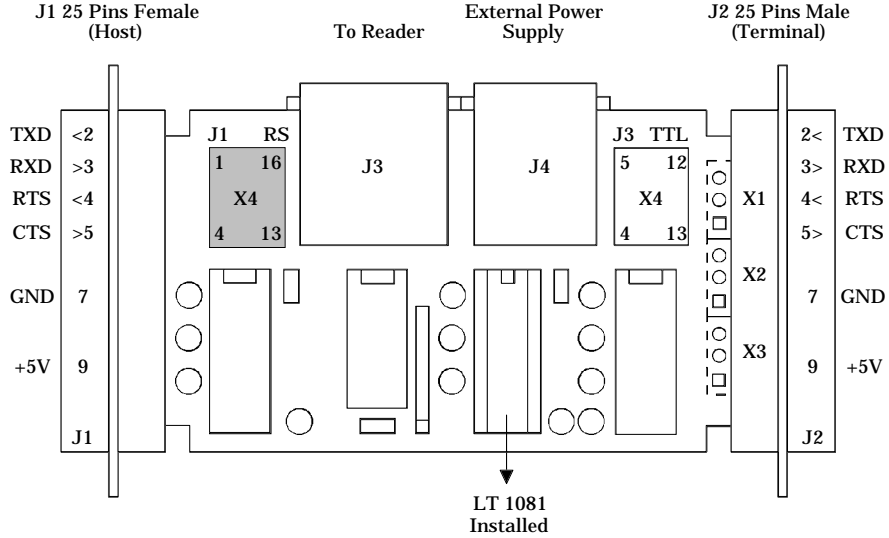
IMPORTANT

If this is a first-time installation, it is NECESSARY to program the 9X2 scanner for the RS-232 setups compatible with your host system starting on page 3-9.

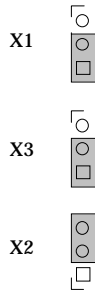
SECTION 3

Dual RS-232 Mode

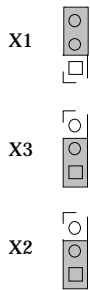
STANDARD DUAL RS-232 OPTION (P/N 901196 or 700352)



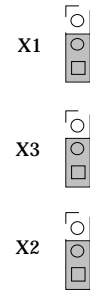
Full duplex to Host (J1) only default setting



Full duplex to Terminal (J2) only



Half duplex to Both Host (J1) and terminal (J2)



SECTION 3

RS-232 Interface Parameters

RS-232 Mode (P/N 9X2)

The 9X2 scanner can be configured by the user to connect to the proper serial port on the host.

RS-232 Enable



Scan **RS-232 Enable** when converting the ScanImage from a keyboard wedge to RS-232 mode.

SECTION 3

RS-232 Interface Parameters

Baud Rate

300



600



1200



2400



4800



9600*



19200



38400



SECTION 3

RS-232 Interface Parameters

Data Bits

Seven*



Eight



Stop Bits

One*



Two



Parity

Parity On*



Parity Off



Parity Setting

Even*



Odd



SECTION 3

RS-232 Interface Parameters

Parity Setting (continued)

Mark



Space



End of message Control Codes

None



CR (Hex 0D)



LF (Hex 0A)



CR, LF (Hex 0D, 0A)*



Tab (Hex 09)



ETX (Hex 03)



EOT (Hex 04)



User defined -
Scan Control code
from Appendix



SECTION 3

RS-232 Interface Parameters

Protocols for Controlling Data Transmission

Request For Data Character

ENQ (HEX 05)



Not used*



Other Character--Scan character
from Appendix.



Acknowledge

ACK (HEX 06)



Not Used*



Other Character--Scan character
from Appendix.



Negative Acknowledge

NAK (HEX 15)



Not Used*



Other Character--Scan character
from Appendix.



SECTION 3

RS-232 Interface Parameters

X/ON X/OFF

Active



Not Active*



CTS RTS

Active



Not Active*



Low RTS idle*



High RTS idle



LRC

Active



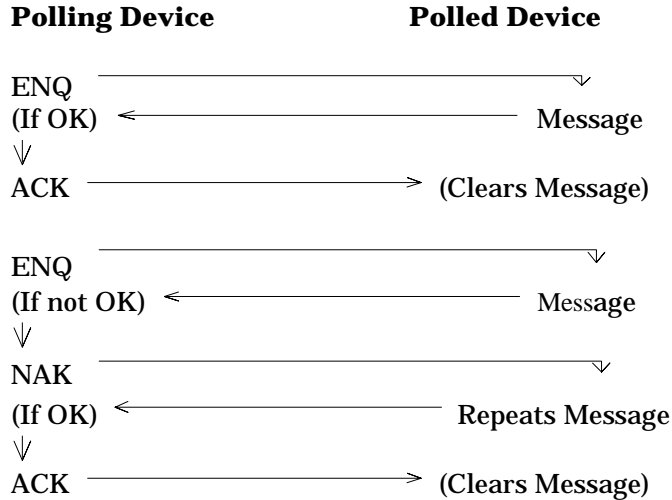
Not Active*



SECTION 3

RS-232 Interface Parameters

Request for Data Character/Acknowledge/Negative Acknowledge



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

X/ON X/OFF Protocol

This protocol allows the host to control the flow of data from the ScanImage to interrupt reception of data the host or the ScanImage transmits the X/OFF character (ASCII DC3); to restart the flow, it sends the X/ON character (ASCII DC1).

RTS, CTS

The ScanImage acts as a standard terminal, and manages the RTS/CTS levels when configured. 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 ScanImage maintains the level high.

SECTION 3

RS-232 Interface Parameters

RTS, CTS not active

Low RTS idle : The ScanImage maintains the low level on RTS pin.

High RTS idle : The ScanImage maintains the high level on RTS pin.

RTS, CTS active

Low RTS idle : The ScanImage works in normal RTS/CTS protocol.

High RTS idle : The ScanImage reverses signals in the RTS/CTS protocol.
(i.e : high becomes low and low becomes high).

LRC

This command allows the exclusive OR of each character in the data, the result is converted into two bytes which then can be transmitted after the data.

Example: LRC = 4Ah -> LRC1 = 34h, LRC2 = 41h.

S e c t i o n 4

**Installing the ScanImage
as a Keyboard Wedge Device**

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SECTION 4

Keyboard Wedge Mode

Keyboard Wedge Mode (P/N 9X7)

In its keyboard wedge configuration, the ScanImage is connected between the host terminal's keyboard and display. Data from the ScanImage is transmitted in a "keyboard emulation" mode providing instant compatibility with the user's hardware and software.

The 9X7 can be used with terminals provided by most of the major terminal manufacturers. A list of the terminals supported and the required cables can be found in Configuration List.

Keyboard Wedge Mode

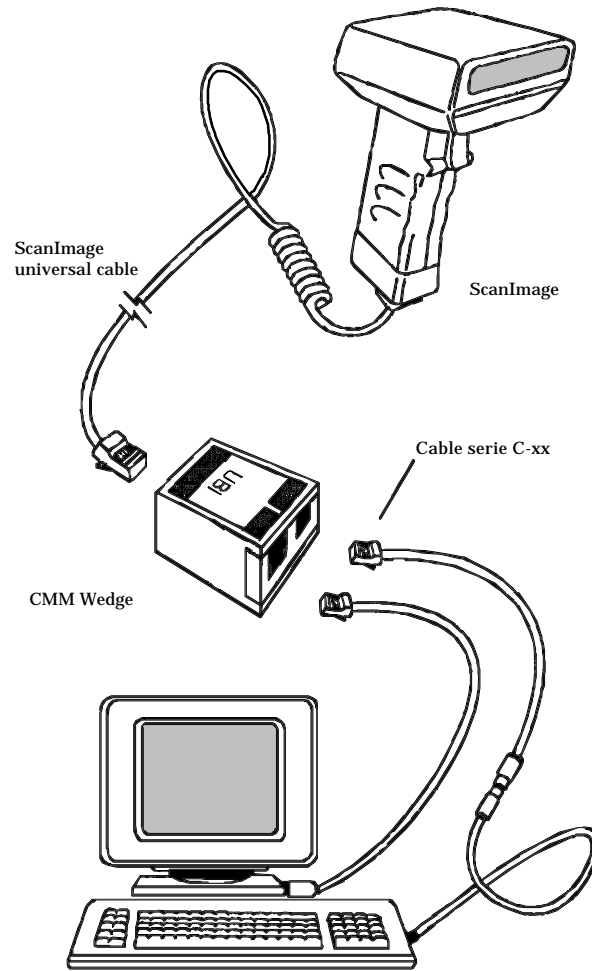
A. Cable Installation

1. Installing the ScanImage requires selecting the proper Cable Management Module (CMM), (P/N 3250-XX), and the proper Wedge Cable C-XXX (P/N 601XXX). The Wedge Cables and CMM required are shown in Configuration List.
2. Turn off power to the terminal to which the ScanImage 9X7 scanner will be connected.
3. To install the wedge cables, disconnect the keyboard from the terminal. Plug the keyboard cable into the wedge cable labeled "J2 to Keyboard". Plug the 6 pin modular side of the wedge cable labeled "J2 to Keyboard" into the CMM port labeled "To Keyboard". Plug the other wedge cable 6 position modular connector labeled "J1 to Display" into the CMM port labeled "To Display". Plug mating wedge cable labeled "J1 to Display" into the terminal's keyboard port to which its keyboard was previously connected.
4. The ScanImage cable terminates in a 8 pin connector. Plug the ScanImage's 8 pin connector into the port labeled "Reader" on the CMM. See the diagram on page 4-2.

SECTION 4

Keyboard Wedge Mode

SCANIMAGE 9X7 Wedge Connection with Cable Management Module.



SECTION 4

Keyboard Wedge Mode

B. Terminal Power Up Sequence

Turn on the power to the terminal, the ScanImage will issue a series of six beeps which are intentional and indicate that the terminal keyboard power-on reset routines have been completed.

Important

If this is a first-time installation, it is NECESSARY to enable the 9X7 scanner as a wedge device on page 4-4 and program the unit for the correct terminal type. See Configuration List for the correct terminal type.

***Note:** It may be necessary to add a power supply to the CMM for certain terminal interfaces. Please refer to Configuration List for those terminals that require the addition of a power supply.*

SECTION 4

Keyboard Wedge Mode

Compose Terminal Type



To program a terminal type, scan Compose Terminal Type, then scan the three digit terminal type from Configuration List that corresponds to your terminal or PC.



SECTION 4

Keyboard Wedge Mode

End of message Control Codes

None



Enter*



Return



Down Arrow



Field Advance



Field Exit



Tab



User defined - Scan Control Code from the ASCII chart in Appendix.



SECTION 4

Keyboard Wedge Mode

Upper Lower Case Options

Lower Case*



Upper Case



Alt Mode

Alt Mode Active



Alt Mode Not Active*



Compose Terminal Type

The ScanImage can be set to emulate a large number of terminals, as listed in Configuration List. To configure the ScanImage for a specific terminal, the terminal identification number must be composed in page 4-4.

End of Message Control Codes

The ScanImage can send a control code after each message, which emulates a command key on the keyboard, allowing automatic entry of data.

Upper/Lower case

In order to transmit alphabetical characters in the correct case, the ScanImage 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.

SECTION 4

Keyboard Wedge Mode

Alt Mode

On some microcomputers working under MSDOS operating system, all the Full ASCII character set and many graphic characters can be generated depressing the "ALT" key, and keying a numeric from 0 to 255.

The ScanImage can also work in this mode allowing the user not to pay attention to the keyboard type (French, Us, German, etc...) on which the ScanImage is connected, neither to the upper/lower case position.

SECTION 4

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PART II

READING PARAMETERS

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Family A

Audio and Data Management

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FAMILY A

Audio Management

Speaker Volume

A total of 4 different levels are available; the default level is 3. By scanning one of the 4 levels the volume will be increased or decreased. By scanning "No Beep" the beeper will be turned off.

Level 4 - Loudest



Level 3*



Level 2



Level 1 - Softest



No Beep



FAMILY A

Audio Management

Speaker Tones

To assign a beeper tone to the reader, scan the bar code label corresponding to the desired beeping tone that you want the scanner to emit when reading a bar code label.

1 Beep - High*



1 Beep - Low



2 Beeps - High-Low



2 Beeps - Low-High



FAMILY A

Data Management

Preamble and Postambles

Character strings can be transmitted by the reader before each message as a preamble, or after each message as a postamble. Preambles and Postambles can be used as control codes. A total of 10 characters may be entered for each preambles and/or postambles.

Preambles



Postambles



After scanning Preamble/Postambles, scan one or more characters from the full ASCII chart in Appendix. Scan End Selection to finish composing your Preambles or Postambles.

End Selection



FAMILY A

Data Management

Intercharacter Delay

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

No delay*



5 ms



10 ms



15 ms



20 ms



30 ms



50 ms



FAMILY A

Data Management

Rolling Buffer and Intermessage Delay

When codes are scanned faster than the host system can accept data, messages are spooled in the reader's "Rolling Buffer" on a first in first out basis.

The intermessage delay is used to slow the rate at which successive records are transmitted to the host. This feature is especially usefull when a control code, such as an enter, is sent after each record, which requires a response from the host.

Rolling Buffer

Active



Not Active*



FAMILY A

Data Management

(If Rolling Buffer Active) Intermessage Delay

No delay



100 ms



500 ms*



1 sec



2 sec



5 sec



Family B

Activation/Deactivation of Bar Code Formats

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FAMILY B

Bar Code Formats

Deactivate all bar code formats



Read the bar code(s) corresponding to the code formats to be activated.

Code 39

Active*



Not Active



Interleaved 2 of 5

Active



Not Active*



Standard 2 of 5

Active



Not Active*



FAMILY B

Bar Code Formats

Codabar

Active*



Not Active



Ames

Active



Not Active*



UPC/EAN

Active*



Not Active



MSI

Active



Not Active*



FAMILY B

Bar Code Formats

Code 128

Active*



Not Active



Code 49

Active



Not Active*



Plessey

Active



Not Active*



Code 93

Active



Not Active*



FAMILY B

Bar Code Formats

Matrix 2 of 5

Active



Not Active*



Telepen

Active



Not Active*



Code 16K

Active



Not Active*



Code 11

Active



Not Active*



FAMILY B

Bar Code Formats

Code EAN128

Active



Not Active*



FAMILY B

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Family C

Code 39 Parameters

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FAMILY C

Code 39 Parameters

Code 39

Standard 43 Characters



Full ASCII*



Start/Stop

Transmit



Not Transmit*



Start/Stop Character

Active */* only*



Active S/S + */* only



Active S/S only



FAMILY C

Code 39 Parameters

Check Digit

Not Used*



Mod 43 Transmitted



Mod 43 Not Transmitted



CIP Transmitted



CIP Not Transmitted



Italian Transmitted



Italian Not Transmitted



if Check Digit Italian, auto-discrimination mode

Active



Not Active*



FAMILY C

Code 39 Parameters

Multi Read

Not Active*



Activated by leading space



Activated by user selected character -
Scan a character from the full ASCII chart
located in Appendix.



Full ASCII Control Codes

Not Active*



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.



FAMILY C

Code 39 Parameters

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 *56789ADF\$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

56789ADF\$Q

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

FAMILY C

Code 39 Parameters

Code 39 Character values for calculating Modulo 43 Check Digit

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

CIP Check Digit

The CIP check digit is utilized in the French pharmaceutical industry. It is only used for codes with seven characters.

Italian Check Digit

The Italian check digit is used in the Italian pharmaceutical industry.

Auto-discrimination mode if Italian Check Digit

When the data bar code is different of six characters, or equal to six characters but false Italian Check Digit, the reader sends the data in Code 39.

Multiread

The multiread function allows Code 39 labels beginning with a predetermined character to be put into the reader's memory. One or more of these labels is retained in memory until a control label is read, which may be a label not beginning with the Multiread character or until the memory reaches 255 characters. 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.

FAMILY C

Code 39 Parameters

Full ASCII Control Codes

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.

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 D

Interleaved 2 of 5 Parameters

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FAMILY D

Interleaved 2 of 5 Parameters

I 2 of 5 Number of Characters

Even Number*



Odd Number



Odd Number Suppressed

First character



Last character*



Check Digit

Calculated and Transmitted



Calculated but not transmitted



Not Calculated*



FAMILY D

Interleaved 2 of 5 Parameters

Code Lengths

Variable length



Fixed for 1 length, first read fixes length.*



Fixed for 2 lengths, first 2 different lengths read fixes lengths.



Fixed for 3 lengths, first 3 different lengths read fixes lengths.



By setting one of the last three choices for code length, you can compose the bar code length. Scan Length 1, 2 or 3, use the numeric bar codes located in the full ASCII chart to compose the length, and finally scan End Selection.

length 1



length 2



length 3



End Selection



FAMILY D

Interleaved 2 of 5 Parameters

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 reader does not transmit either the first or last encoded digit. When the last digit is suppressed, the reader will accept a code 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 by the bar code menu, in which case the user can specify one, two or three lengths, to be accepted by the reader.

The reader can, if desired, be configured to read and transmit all lengths of Interleaved 2 of 5. In this case, it is recommended that a check digit or the Consecutive Same Read Code Validation features in Family I be activated if a laser or CCD scanner is used. By activating Consecutive Same Read Code Validation, the reader is forced to obtain the same read result on 2 or more successive scans in order to validate the read.

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 Consecutive Same Read Code Validation feature discussed above is not activated.

It is calculated as follows:

1. Add all numbers in the odd place values.

FAMILY D

Interleaved 2 of 5 Parameters

Check Digit (Continued)

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 21346187

Family E

2 of 5 Standard Parameters

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FAMILY E

2 of 5 Standard Parameters

Start/Stop Bars

4 Bars*



6 Bars



Check Digit

Calculated and transmitted



Calculated but not transmitted



Not Calculated*



FAMILY E

2 of 5 Standard Parameters

Code Lengths

Variable length



Fixed for 1 length, first read fixes length.*



Fixed for 2 lengths, first 2 different lengths read fixes lengths.



Fixed for 3 lengths, first 3 different lengths read fixes lengths.



By selecting one of the last three choices for code length, you can compose the bar code length. Scan Length 1, 2 or 3, use the numeric bar codes located in the full ASCII chart to compose the length, and finally scan End Selection.

length 1



length 2



length 3



End Selection



Family F

Codabar Parameters

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FAMILY F

Codabar Parameters

Start/Stop Bars

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*



FAMILY F

Codabar Parameters

Concatenation

All adjacent codes*



All adjacent codes with same stop of first & start of second.



A B C



Not Active



(If active)

Coexistence of Concatenated and Single Labels :

Both Single (unconcatenated) and concatenated labels read are transmitted.*



Only concatenated labels read are transmitted.



FAMILY F

Codabar Parameters

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 the 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 reader 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 F

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Family G

UPC/EAN Parameters

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FAMILY G

UPC/EAN Parameters

Format Selection

All Formats*



Scan All Formats, then scan the bar code(s) corresponding to each format to be deactivated. If changes are needed, all formats must be scanned again and the appropriate bar code(s) deactivated.

Deactivation of Bar Code Fomats

UPC A



UPC E



EAN 8



EAN 13



Add-On Digits

Not Required, but transmitted
if present



Required and transmitted



Not Required and not transmitted*



FAMILY G

UPC/EAN Parameters

Leading Digit UPCA

Transmitted*



Not Transmitted



Check Digit UPC A

Transmitted*



Not Transmitted



Leading Digit UPC E

Transmitted*



Not Transmitted



Check Digit UPC E

Transmitted



Not Transmitted*



FAMILY G

UPC/EAN Parameters

Transmission of UPC/EAN bar code format

UPC E = UPC A



UPC E = UPC E*



UPC A = EAN 13*



UPC A = UPC A



FAMILY G

UPC/EAN Parameters

UPC E = UPC A

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

The expansion follows these rules:

- Step1** : Substitute alpha characters for the 6 numeric characters in the zero suppressed code i.e., ABCDEF.
- Step2** : Examine numeric value in a position "F".
- Step3** : Use these rules to reconstruct the 10 digit UPC:
- If "F" is 0, 1 or 2, the UPC is : ABF 0000 CDE
 - If "F" is 3, the UPC is : ABC 00000 DE
 - If "F" is 4, the UPC is : ABCD 00000 E
 - If "F" is 5, 6, 7, 8 or 9 , the UPC is : ABCDE 0000 F.

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
123456
ABCDEF
The number fits rule 3-d.
The 10 digit UPC is : 0-12345-0006.

Example 2: Take the zero suppressed number 654321
654321
ABCDEF
The number fits rule 3-a.
The 10 digit UPC is : 0-65100-00432.

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 with accommodate EAN 13 codes.

Family H

**Code 128, PLESSEY, MSI, Code 93,
Code 11, TELEPEN, MATRIX 2/5,
EAN 128 Parameters**

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FAMILY H

Code 128, PLESSEY

Code 128

Append Function (FNC2)

Active



Not Active*



Full ASCII Control Codes

Active in Separate Label of
2 Characters Only



Not Active*



Plessey

Transmission of Check Digit

Active



Not Active*



FAMILY H

MSI, Code 93

MSI

Check Digit

Active Modulo 10*



Active Double Modulo 10



Check Digit

Transmitted*



Not Transmitted



CODE 93

Multi Read

Not Active*



Leading Space



Activated by user selected character:
Scan this bar code and then scan
a character from the full ASCII
chart located in the Appendix.



FAMILY H

Code 11, TELEPEN, MATRIX 2/5

CODE 11

Number of Check Digits

One*



Two



Transmission of Check Digit

Transmitted*



Not Transmitted



TELEPEN

Numeric



ASCII*



MATRIX 2/5

Check Digit

Calculated*



Not Calculated



FAMILY H

EAN 128

EAN 128

Start Character FNC1

No Traduction*



Traduction



Scan this bar code and then scan a character from the full ASCII chart in appendix.

Code 128 - Append Function

This function allows labels with the special FNC2 character encoded in any position to be buffered in the reader'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 - Multi Read Function

Multi Read function operates in the same manner as the Code 39 Multi Read function as described in Family C.

Family I

Advanced Features

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FAMILY I

Advanced Features

Laser Management

RS-232 Trigger

Not Active*



Active



Scan any single character from the ASCII Chart, this will become the trigger.

CTS Trigger

Not Active*



Low Level Active



High Level Active



FAMILY I

Advanced Features

Laser Time-out Variable : Scan Time-out Level 1 - 7

1



2*



3



4



5



6



7



FAMILY I

Advanced Features

Consecutive Same Read Code Validation

The feature optimizes data security for codes read by the laser . It requires that a code be scanned and decoded identically in succession based on number of consecutive reads selected below. This feature significantly enhances the reliability of transmitted data when a code is printed poorly, or is used when a code is printed without a check digit, especially when exceptional data reliability is required. Use of this function is recommended when Interleaved 2 of 5 code is used with variable lengths, and without a check digit.

1*



2



4



6



8



FAMILY I

Advanced Features

No Read Message

Not Active*



Active



Scan any character from the ASCII Chart located in the Appendix.

Repetitions



Scan a single digit from the the full ASCII chart in Appendix to repeat No Read Message.

FAMILY I

Advanced Features

Character Masking and Reordering

Any Code Format

Active*



Code Limitation

Scan a single specified code format below. Bar Codes not meeting the limitation of the code, as defined, will be transmitted normally, without masking and reordering.

Code 39



Interleaved 2 of 5



UPC/EAN



Code 128



Codabar



Standard 2 of 5



Code 93



Code 49



FAMILY I

Advanced Features

Code Limitation (Continued)

Code MSI



Code Plessey



Code 11



Code 16K



Code Ames



Code Matrix 2 of 5



Code Telepen



Code EAN 128



FAMILY I

Advanced Features

Select Number of Characters in Original Label



Using the numeric part of the full ASCII bar code chart located in the Appendix, compose the number of characters in the original label to be scanned, scan End Selection, then scan Begin Masking and Reordering.

Begin Masking and Reordering



Using the Full ASCII bar code chart located in the Appendix, scan the upper case letters corresponding to the alphabetical order in which you wish to transmit the character 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 reader 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.

End Selection



FAMILY I

Advanced Features

Delay Character (W)



Using the numeric part of the full ASCII bar code chart located in the Appendix, compose the number of 50 msec increments of delay from 1 to 79 (composing 20 designates a delay of 1 sec).

User Defined Characters Activated

X



Y



Z



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

FAMILY I

Advanced Features

Single Code Type Identifier

Not Active*



Active



Code Limitation

Scan one of the bar code formats below to which you want to attach a single specified code identifier. Scan a single character from the full ASCII chart in Appendix. Repeat this sequence for each code to be assigned an identifier.

Code 39



Interleaved 2 of 5



UPC/EAN



Code 128



Codabar



Standard 2 of 5



FAMILY I

Advanced Features

Single Code Type Identifier (continued)

Code 93



Code 49



Code MSI



Code Plessey



Code 11



Code 16K



Code Ames



Code Matrix 2 of 5



FAMILY I

Advanced Features

Single Code Type Identifier (continued)

Code Telepen



Code EAN 128



For **UPC/EAN:**

Selection of @ -> EAN8 = FF
EAN13 = F
UPC A = A
UPC E = E

For **EAN 128:**

Selection of @ ->]C1

For **Interleaved 2 of 5:**

Selection of @ -> I + Number of characters (ex: 10 char ->
31h,30h)

Identification AIM

Not Active*



Active



FAMILY I

Advanced Features

Delay Character

The reader can recognize a selected full ASCII character, appearing in a bar code or in the data stream from an RS-232 device as requiring the insertion of a delay in the transmission of data to the host system. This may be useful following transmission of a control code to the host, requiring a response from the host before transmission of the next character.

No Delay*



Active Delay



Scan any character from the ASCII Chart, this will become the delay character.

50 ms Duration*



100 ms Duration



500 ms Duration



1 Sec Duration



2 Sec Duration



5 Sec Duration



FAMILY I

Advanced Features

Delay Character (continued)

10 Sec Duration



Character Substitution/Deletion

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

First Character to Delete and Replace



Second Character to Delete and Replace



Configuration Password

Not Active*



Active



If active is selected, scan any three numbers, upper case letters, or \$, /, +, % from the full ASCII chart located in the Appendix.

FAMILY I

Advanced Features

RS-232 Trigger

The reader can be triggered when it receives a designated RS-232 character from the host. By scanning an ASCII character you define the reader as a RS-232 trigger, when the character is received from the host the reader will turn on.

CTS Trigger

By scanning Low Level Active or High Level Active, you define the CTS trigger. According to the level of CTS, when the CTS signal is received, the reader will turn on.

Laser Timeout

In normal operation, when a laser is triggered, it will remain on until the trigger is released or its timeout period is attained, at which point it turns off. By scanning Laser Timeout Variable 1 to 8, the user can establish the timeout.

Consecutive Same Read Code Validation.

The feature optimizes data security for codes read by the laser. It requires that a code has to be scanned and decoded identically in succession based on number of consecutive reads selected below. This feature significantly enhances the reliability of transmitted data when a code is printed poorly, or is used when a code is printed without a check digit, especially when exceptional data reliability is required. Use of this function is recommended when Interleaved 2 of 5 code is used with variable length and without a check digit.

No Read Message.

This function is used when a message needs to be sent to the system when the trigger is released or the timeout period is reached, without resulting in a valid decode. This is particularly useful when scanners are used in an unattended mode to signal when an item bearing a code passes a scanning point without being read.

FAMILY I

Advanced Features

Character Masking and Reordering

This facility allows the user to reformat data scanned by the reader 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. Where necessary, more complex programming can be performed by UBI.

Code Type Identifier

The code type identifier is just one character in length and is 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 up to two user defined characters in any bar code message to be systematically re-transmitted as another character or characters. By scanning DEL as the substituted character, the defined one or two characters are 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 as 12345.

Configuration Password

The implementation of the configuration password ensures that unauthorized persons cannot change the configuration stored in the ScanImage's permanent memory. 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. The (*) is the Code 39 start and stop character, chart 1, chart 2 and chart 3 are user defined. The (\$) is an obligatory character, which must be printed as the last of four characters in the Configuration Password.

*

Char 1	Char 2	Char 3	\$
--------	--------	--------	----

 *

FAMILY I

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Appendix

Full ASCII Bar Code Chart and Command Menu

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Appendix

Full ASCII Bar Code Chart

NULL		STX	
		SOH	
ETX		ENQ	
		EOT	
ACK		BS	
		BEL	
HT		VT	
		LF	
FF		SO	
		CR	
SI		DC1	
		DLE	

Appendix

Full ASCII Bar Code Chart

DC2



DC4



DC3



NAK



ETB



SYN



CAN



SUB



EM



ESC



GS



FS



RS



SP



US



!



#







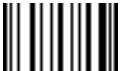


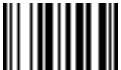


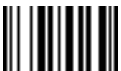







"














Appendix

Full ASCII Bar Code Chart

\$		%		&	
,		()	
*		+		,	
-		.		/	
0		1		2	
3		4		5	



















Appendix

Full ASCII Bar Code Chart

6		7		8	
9		:		;	
<		=		>	
?		@		A	
B		C		D	
E		F		G	



















Appendix

Full ASCII Bar Code Chart

H		J
		
	I	
		
K		M
		
	L	
		
N		P
		
	O	
		
Q		S
		
	R	
		
T		V
		
	U	
		
W		Y
		
	X	
		



















Appendix

Full ASCII Bar Code Chart

Z		[	\	
]		^		_	
`		a		b	
c		d		e	
f		g		h	
i		j		k	

Appendix

Full ASCII Bar Code Chart

l		m		n	
o		p		q	
r		s		t	
u		v		w	
x		y		z	
{				}	

Appendix

Full ASCII Bar Code Chart



DEL



End Selection



Appendix

Command Menu

PF1



PF3



PF2



PF4



PF6



PF5



PF7



PF9



PF8



PF10



PF12



PF11



PF13



PF15



PF14



PF16



PF18



PF17



Appendix

Command Menu

PF19



PF21



PF20



PF22



PF24



PF23



DEL



RETURN



ENTER



SEND



FIELD EXIT



FIELD +



HOME



TAB



END



ALT



BACK SPACE



BACK TAB



Appendix

Command Menu

→ 		↑ 
	← 	
↓ 		FIELD - 
DUP 	CLEAR 	LINE FEED 
RESET 	ESC 	SPECIAL 
	CTRL 	

Appendix

Command Menu

Command Translation

<u>Legend</u>	<u>Barcode Code 128</u>	<u>Legend</u>	<u>Barcode Code 128</u>
PF1	0A	DEL	.A
PF2	0B	ENTER	.B
PF3	0C	RETURN	.C
PF4	0D	SEND	.D
PF5	0E	FIELD +	.E
PF6	0F	FIELD EXIT	.F
PF7	0G	HOME	.G
PF8	0H	END	.H
PF9	0I	TAB	.I
PF10	0J	ALT	.J
PF11	0K	BACK TAB	.K
PF12	0L	BACK SPACE	.L
PF13	0M		.M
PF14	0N		.N
PF15	0O		.O
PF16	0P		.P
PF17	0Q	CLEAR	.Q
PF18	0R	FIELD -	.R
PF19	0S	DUP	.S
PF20	0T	ESC	.T
PF21	0U	LINE FEED	.U
PF22	0V	RESET	.V
PF23	0W	CTRL	.W
PF24	0X	SPECIAL	.X

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