



METROLOGIC INSTRUMENTS, INC.
IS4110 and IS4125
ScanQuest® Laser Scan Engine
Installation and User's Guide



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INTRODUCTION

Metrologic's ScanQuest® Engines are miniature laser bar code scanners designed to be used in OEM applications and decode equipped OEM devices. The ScanQuest series provides fast, accurate, reliable scanning in a compact, lightweight package.

Two engine models are available: the IS4125 and the IS4110. The IS4125 has built-in decoding for versatile OEM operations, while the IS4110 non-decode engine interfaces directly with decode-equipped OEM devices*. The IS4125 has flash upgradeable firmware.

* Note: The manufacturer of the end equipment must register with agencies such as the Food and Drug Administration (FDA). The specifications required for registration are not obtainable until the OEM manufacturer uses the ScanQuest Engine in its final configuration. Therefore, it becomes the responsibility of the manufacturer who incorporates the scan engine into their product to comply with all federal laser safety regulations. The manufacturer must submit a Laser Product Report for the FDA in the US or similar forms as required by other countries. Metrologic will assist its customers in complying with the necessary procedures.



Theory of Operation

An infrared (IR) device located behind the scanner window initiates the scanning process. The IR sensor is active as long as the unit is being powered. When the laser decodes a bar code, the scan engine transmits the data to the host system.

If the same bar code stays in the field after successfully scanning, the laser stays on for approximately 4 seconds and then turns off. This prevents unintentional reads of the same bar code. To read the same symbol more than once, remove the object from the scan field for approximately 1 second and then present the symbol again.

If the bar code and object is removed from the field during the scanning process, the laser turns off. In this stage, the scan engine's computer remains on "standby".

However, *if the object stays in the field*, the laser remains on for up to 2.5 seconds trying to detect the bar code. To reactivate the scanning sequence, remove the object.

INTRODUCTION

Accessories

The following are available:

IS4125 **Decoded** Scan Engine Part Numbers

Decode Demo Kit 45729 (Includes RS232 adapter cable – MCA951 to 9 PC port)		
MLPN*	DESCRIPTION	MANUFACTURE/PART NO.
6233	Red LED GI High Efficiency	HP HLMP-1300
811	Green LED GI High Efficiency	HP HLMP-1523
1170	Transducer	Star Micronics QMB-105
7102	Thru Hole 12 Pos ZIF Connector	Burndy FLWSLW125-1C7
7103	Flex Ribbon 12 Pos x 130mm	Burndy BFC12X30A4

IS4110 **Non-Decoded** Scan Engine Part Numbers

Non-Decode Demo Kit 45730 (Includes 9-pin squeeze connector to decode controllers)		
MLPN*	DESCRIPTION	MANUFACTURE/PART NO.
6233	Red LED GI High Efficiency	HP HLMP-1300
811	Green LED GI High Efficiency	HP HLMP-1523
1170	Transducer	Star Micronics QMB-105
7084	1mm 10 POS ZIF Connector	MOLEX 52030-1010
7104	Flex Ribbon 10 POS x 130mm	Burndy BFC10X130A4

* *Metrologic Part Number*

Components of the ScanQuest Scan Engine

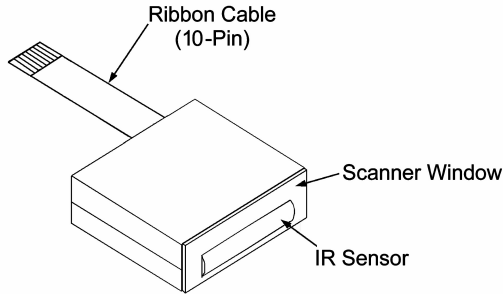


Figure 1: IS4110

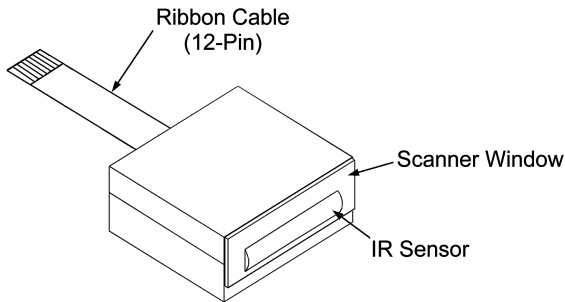


Figure 2: IS4125

Scanner window: This aperture emits laser light.

Infrared Object Sensor: When a specified time has elapsed without any scanning, the unit will enter a “standby” mode. To reactivate the unit, present an object in front of the IR (infrared) sensor.

Ribbon Cables: This IS4110 has a 10 position FFC/FPC cable and the IS4125 has a 12-position FFC/FPC cable. Refer to *Scanner Termination* starting on page 15.

INTRODUCTION

Label Locations

The serial number label is located on the bottom of the unit. On the top of the unit is the “avoid exposure” and model number label.

The following are examples of these labels:

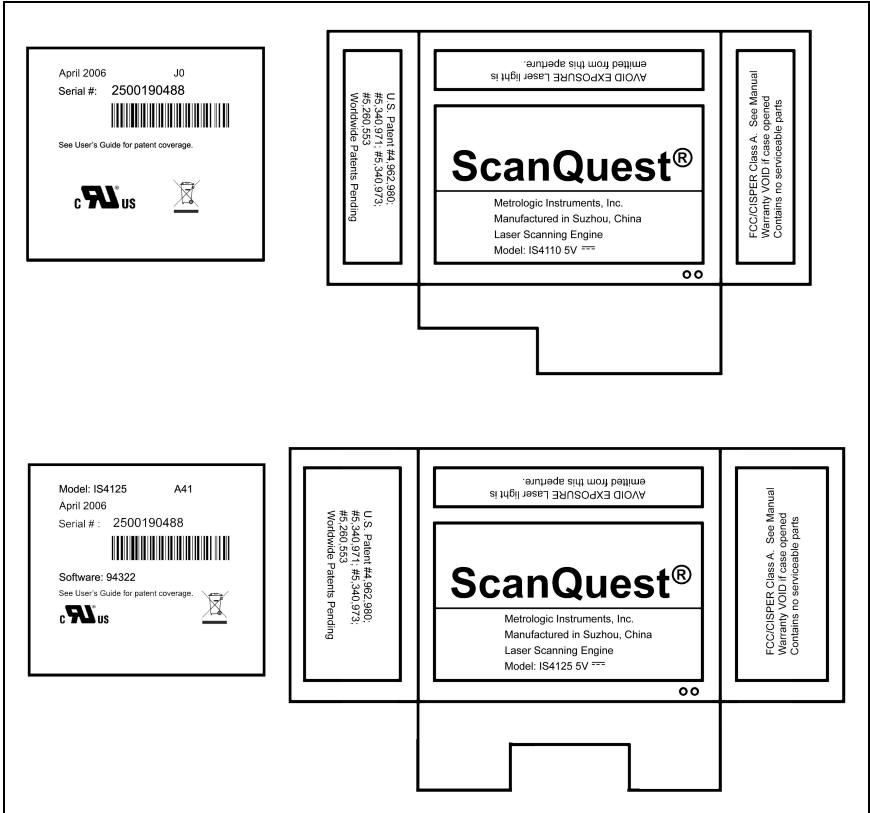


Figure 3: Labels

Maintenance

Smudges and dirt can interfere with the proper scanning of a bar code. Therefore, the output window will need occasional cleaning.

1. Spray glass cleaner onto lint free, non-abrasive cleaning cloth.
2. Gently wipe the scanning window.

IR SENSOR ACTIVATION

An infrared (IR) sensor located behind the scanner window initiates the scanning process. In short range mode the signal projects approximately 101.61 mm – 177.84 mm (4" – 7") beyond the output window. In long range mode the signal projects approximately 228.61 mm – 330.21 mm (9" – 13") beyond the output window. The IR sensor remains active as long as the unit is powered.

When the unit remains dormant for a time, the laser will turn off. In this stage, the scan engine's computer is on "standby". To reactivate the unit, present an object within the scan field.

APPLICATIONS AND PROTOCOLS

The model number on each scan engine includes the scan engine number and communications protocol.

Unit	Communication Protocol(s)	Type
IS4110	Laser Data	Non-decode
IS4125-41	RS232 and Light Pen Emulation (Flash Upgradeable Firmware)	Decode
IS4125-17	Keyboard Wedge, Stand Alone Keyboard (Flash Upgradeable Firmware)	
IS4125-38	Low Speed USB Keyboard Emulation or Serial Emulation Mode	
IS4125-103	TTL, RS232	

DESIGN SPECIFICATIONS

OPERATIONAL		
	Light Source:	VLD 650 ± 10 nm
	CDRH/IEC:	Designed to be used in CDRH Class II and IEC Class 2 laser products
	UL:	UL recognized component for Canada and US
	Depth of Field, UPC 100%:	12.7 mm to 203.2 mm (.5" to 8") for 0.33 mm (13 mil) bar codes
	Scan Speed:	52 scan lines per second minimum
	Scan Pattern:	Single scan line
	Beam Focus at 3" from Window:	.21 mm ± 10%
	Flipper Scan Angle:	± 15 degrees from 0 axis
	Scan Width:	At 152 mm (6") from Flipper (5" from Face) 114 mm ± 13 mm (4 ½" ± ½")
		At 25 mm (1") from Flipper (Face) 22 mm ± 13 mm (7/8" ± 1/8")
	Print Contrast:	35% minimum reflectance difference
IS4125	Decode Capability:	Autodiscriminates (menu select)
	System Interfaces:	RS232C, Light Pen Emulation, Keyboard Wedge, Low Speed USB, RS232 TTL
MAINTENANCE		
	Window:	Clean Periodically

Specifications are subject to change without notice.

DESIGN SPECIFICATIONS

MECHANICAL		
IS4125	Dimensions:	45.7 mm L x 40.6 mm W x 18.5 mm D (1.8" L x 1.6" W x .73" D)
	Weight:	55 g. (1.94 oz.)
	Termination:	Low profile ZIF 12-pin connector that accepts a 1 mm x 12 position FFC/FPC cable
IS4110	Dimensions:	45.7 mm L x 40.6 mm W x 14 mm D (1.8" L x 1.6" W x .55" D)
	Weight:	45 g. (1.774 oz.)
	Termination:	Low profile ZIF 10-pin connector that accepts a 1 mm x 12 position FFC/FPC cable
ELECTRICAL		
IS4125	Power:	.625 watts
	Input Voltage:	5VDC \pm 0.25V
	Operating Current:	125 mA typical @5VDC
	Standby Current:	9 mA typical @ 5VDC
IS4110	Power:	.375 watts (IS4110)
	Input Voltage:	5VDC \pm 0.25V
	Operating Current:	75 mA typical @ 5VDC (IS4110)
	Standby Current:	1.7 mA typical @ 5VDC (IS4110)

Specifications are subject to change without notice.

Specifications for the Supplemental Window

The IS4100 ScanQuest series was designed for integration into OEM equipment. The device is designed to function at its maximum performance capabilities as shipped. If the scanner is integrated into a system that requires a supplemental window in front of it, its performance will be altered to some degree.

To minimize the effect of adding a supplemental window in front of the scanner the following recommendations should be followed:

Material

- The window should have a transmission of 95% or greater at 675 nm.
- The window should be optically flat and clear, and free of scratches, pits, seeds etc.
- This material is available through Metrologic.

Mounting

The window should be placed at an angle of 10 degrees with respect to the plane of the scanner window (see figure 4 below).

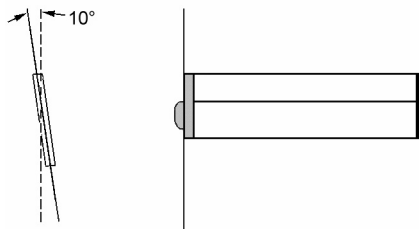


Figure 4: Supplemental Window Angle

DEFAULT SETTINGS

Many functions of the IS4125 decode scan engine can be configured or enabled/disabled. The decode engine is shipped from the factory configured to a set of default conditions. The default parameter of the decode scan engine has an asterisk (*) in the charts on the following pages. If an asterisk is not in the default column then the default setting is *OFF* or *disabled*. Every interface does not support every parameter. If the interface supports a parameter, a check mark (✓) will appear in interface column.

Parameter	Default	RS232 OR RS232 TTL	Light Pen	Keyboard Wedge	USB
Enter Configuration Mode, After Any Scan	*	✓	✓	✓	✓
Enter Configuration Mode, Only on First Scan		✓	✓	✓	✓
Short Range Activation		✓	✓	✓	✓
Long Range Activation	*	✓	✓	✓	✓
Normal Scan	*	✓	✓	✓	✓
Pulsing Scan		✓	✓	✓	✓
Custom Scan		✓	✓	✓	✓
DTR Activation		✓			
DC2 Activation		✓			
Address Based Activation		✓			
"NOREAD" message Transmission		✓			
Turn on Green LED during "NOREAD" Transmit	*	✓			
Short Same Symbol Re-scan		✓	✓	✓	✓
Long Same Symbol Re-scan	*	✓	✓	✓	✓
Green LED Identical Symbol Re-Scan Indicator		✓	✓	✓	✓
1 Vs 2 Scan Buffers	1	✓	✓	✓	✓
2X Redundancy (MECCA)		✓	✓	✓	✓
Double Border Requirement (Large Intercharacter Space Requirement)		✓	✓	✓	✓
Alternate Beeper Tone 1		✓	✓	✓	✓
Alternate Beeper Tone 2	*	✓	✓	✓	✓
Alternate Beeper Tone 3		✓	✓	✓	✓
No Beeper tone		✓	✓	✓	✓
Two Second Timeout		✓			

DEFAULT SETTINGS

Parameter	Default	RS232 OR RS232 TTL	Light Pen	Keyboard Wedge	USB
No Two Second Timeout	*	✓			
Razzberry Tone on Timeout		✓			
No Tone on Timeout	*	✓			
Three Beeps on Timeout		✓			
Beep Before Transmit	*	✓		✓	✓
Beep After Transmit		✓		✓	✓
Baud Rate	9600				
Parity	Space	✓			
8 Data Bits		✓			
7 Data Bits	*	✓			
RTS/CTS		✓			
Character RTS/CTS	*	✓			
Message RTS/CTS		✓			
ACK/NAK		✓			
XON/XOFF	*	✓			
No Intercharacter Delay		✓		✓	✓
1 Millisecond Intercharacter Delay		✓		✓	✓
5 Millisecond Intercharacter Delay		✓			
10 Millisecond Intercharacter Delay				✓	✓
25 Millisecond Intercharacter Delay		✓			
100 Millisecond Intercharacter Delay				✓	✓
DTR Input		✓			
DTR Scan Disable		✓			
"DE" Disable Command		✓			
LRC Calc+ Transmit RS232		✓			
Start LRC on first RS232 Byte		✓			
Start LRC on Second RS232 Byte	*	✓			
Carriage Return	*	✓		✓	✓
Line Feed	*	✓		✓	✓
STX Prefix		✓		✓	✓
ETX Suffix		✓		✓	✓
Tab Prefix		✓		✓	✓
Tab Suffix		✓		✓	✓

DEFAULT SETTINGS

Parameter	Default	RS232 OR RS232 TTL	Light Pen	Keyboard Wedge	USB
Prefix ID for UPC/EAN		✓		✓	✓
Suffix ID for UPC/EAN		✓		✓	✓
Bars High	*		✓		
Spaces High			✓		
Transmit as Scanned	*		✓		
Transmit as code 39			✓		
Poll Light Pen 5 volts			✓		
No Poll Light Pen	*		✓		
Reverse Polarity Idle for Light Pen			✓		
UPC	*	✓	✓	✓	✓
EAN	*	✓	✓	✓	✓
Full ASCII code 39		✓	✓	✓	✓
Code 39	*	✓	✓	✓	✓
Codabar		✓	✓	✓	✓
Code 128	*	✓	✓	✓	✓
Code 93	*	✓	✓	✓	✓
Code 11		✓	✓	✓	✓
RSS14 Enable		✓	✓	✓	✓
RSS14 ID "je0"	*	✓	✓	✓	✓
RSS14 App ID "01"	*	✓	✓	✓	✓
RSS14 Check Digit	*	✓	✓	✓	✓
RSS Expanded Enable		✓	✓	✓	✓
Expanded ID "je0"	*	✓	✓	✓	✓
RSS Limited Enable		✓	✓	✓	✓
RSS Limited ID "je0"	*	✓	✓	✓	✓
RSS Limited App ID "01"	*	✓	✓	✓	✓
RSS Limited Check Digit	*	✓	✓	✓	✓
Interleaved 2 of 5	*	✓	✓	✓	✓
Hong Kong Matrix 2 of 5		✓	✓	✓	✓
Airline 2 of 5		✓	✓	✓	✓
Minimum 1 Character Code Length		✓	✓	✓	✓
Minimum 3 Character Code Length	*	✓	✓	✓	✓
Minimum 6 character Code Length		✓	✓	✓	✓

DEFAULT SETTINGS

Parameter	Default	RS232 OR RS232 TTL	Light Pen	Keyboard Wedge	USB
Set Minimum Character Length		✓	✓	✓	✓
Set Character Lock Length		✓	✓	✓	✓
Transmit UPC-A Number Sys	*	✓	✓	✓	✓
UPC-A Check Digit Transmit	*	✓	✓	✓	✓
Convert UPC-A to EAN-13		✓		✓	✓
Expand UPC-E		✓		✓	✓
UPC-E Check Digit Transmit		✓		✓	✓
UPC-E Leading 0 Transmit		✓		✓	✓
EAN-8 Check Digit Transmit	*	✓	✓	✓	✓
EAN-13 Check Digit Transmit		✓	✓	✓	✓
Convert EAN-8 to EAN-13		✓	✓	✓	✓
“\$” Prefix ID for UPC/EAN		✓	✓		
2 Digit Supplements (Scan)		✓	✓	✓	✓
5 Digit Supplements (Scan)		✓	✓	✓	✓
Bookland (Scan)		✓	✓	✓	✓
Supplement Required		✓	✓	✓	✓
Bookland to ISBN		✓	✓	✓	✓
Transmit ISBN CD		✓	✓	✓	✓
Mod 43 Check digit-Code 39		✓	✓	✓	✓
Transmit Mod 43 Check Digit Code 39	*	✓	✓	✓	✓
Transmit Start/Stop-Code 39		✓	✓	✓	✓
CLSI Editing (Enable)		✓	✓	✓	✓
ITF Check Digit		✓	✓	✓	✓
Transmit Mod 10 ITF Check Digit		✓	✓	✓	✓
2 of 5 Symbol Lengths	Variable	✓	✓	✓	✓
ISBN Reformatting		✓			
Coupon Code 128		✓	✓	✓	✓
JC1 Transmit Coupon C128		✓	✓	✓	✓
Coupon 128 Group Separator		✓	✓	✓	✓
Italian Pharmaceutical		✓	✓	✓	✓
Codabar Start & Stop Class		✓	✓	✓	✓
ITF Minimum Symbol Length Test		✓	✓	✓	✓
Matrix 2 of 5		✓	✓	✓	✓

DEFAULT SETTINGS

Parameter	Default	RS232 OR RS232 TTL	Light Pen	Keyboard Wedge	USB
Matrix 2 of 5 Check Digit		✓	✓	✓	✓
Hong Kong Matrix 2 of 5		✓	✓	✓	✓
MSI-Plessey Test of Check Digit	*	✓	✓	✓	✓
Enable MSI-Plessey Mod 10 Check Digit		✓	✓	✓	✓
Enable MSI-Plessey Mod 10/10 Check Digit				✓	✓
Transmit MSI-Plessey Check Digit	*	✓	✓	✓	✓
UK Plessey		✓	✓	✓	✓
UK Plessey Check Digit		✓	✓	✓	✓
UK Plessey Special Format		✓	✓	✓	✓
A to X conversion (UK)		✓	✓	✓	✓
Scan Count Test Mode		✓		✓	✓
Scanability Test Mode		✓		✓	✓
Normal Scan/Operating Test Mode		✓		✓	✓
Default to ScanPal Communication parameters Code ID					
Code ID				✓	✓
Sanyo 635 ECR Protocol		✓			
Post Software ID characters		✓		✓	✓
"Newcode" Mode A		✓		✓	✓
"Newcode" Mode B		✓		✓	✓
SNI Beetle Mode		✓			
BIO DATA Mode		✓			
Golden Bountiful Formatting		✓			
Enable Sineko Mode		✓			
Enable Caps Lock Mode (for MI951 external wedge)		✓			
Enable French Wyse 120V PC Term		✓			
Intermec Polling Mode D (limited function)		✓			
Rochford Thompson Mode		✓		✓	✓
RTS Counter Toggle		✓			
Beep on BEL RS232		✓			

DEFAULT SETTINGS

Parameter	Default	RS232 OR RS232 TTL	Light Pen	Keyboard Wedge	USB
Bancomer Mode		✓			
FedEx parsing		✓			
Retransmit of Same Code		✓		✓	✓
1st Configurable Prefix ID		✓		✓	✓
2nd Configurable Prefix ID		✓		✓	✓
1st Configurable Suffix ID		✓		✓	✓
2nd Configurable Suffix ID		✓		✓	✓
Clear all Configurable Prefixes and Suffixes		✓		✓	✓
SNI Beetle Mode		✓		✓	✓
AT Keyboard	*			✓	
Type XT Keyboard				✓	
Type PS2 Keyboard				✓	
USA Keyboard	*			✓	
Belgium Keyboard				✓	
France Keyboard				✓	
Germany Keyboard				✓	
Spain Keyboard				✓	
Italy Keyboard				✓	
UK Keyboard				✓	
IBM KDB4700 Financial Keyboard				✓	
Alt Mode				✓	
Auto Detection or Caps Lock				✓	
User-Defined Caps Lock				✓	
F0H Break Code Transmission	*			✓	
800 Microsecond Delay-Enter Scan Code	*			✓	
15 Millisecond Delay-Enter Scan Code				✓	
7-5 Millisecond delay-Enter Scan Code				✓	

SCANNER TERMINATIONS

IS4125-17 Connector Pin Assignments

Metrologic provides a low profile ZIF 12-pin connector to connect to a 1 mm x 12 position FFC/FPC cable. The pin assignments are as follows:

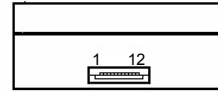


Figure 5

Pin	Signal Name	Function
1	VCC	<i>Input.</i> 5VDC ($\pm 0.25V$) This requires 25 mA in standby and 130 mA peak.
2	Ground	Signal and power ground.
3	Receive	<i>Input.</i> Keyboard Wedge receive data from host.
4*	PC Data	PCData
5*	PCClock	PCClock
6*	KB Clock	KB Clock
7	Transmit	<i>Output.</i> RS232 transmit data from the scan engine.
8*	KB Data	KB Data
9	Good Read Indicator	<i>Output.</i> 5V high with a 2 kHz pulse. This drain is the pin of a PFET type transistor that can source approximately 100 mA of current. This output is the connection for an LED or other indicator (<i>i.e.</i> beeper+). It is recommended that the indicator is terminated directly to ground.
10	Beeper -	<i>Input.</i> Collector of an NPN transistor that can sink approximately 100 mA of current. A current limiting pull-up resistor and Piezo type transducer (QMB- 111PXN or equivalent) is recommended.
11	Reserved Input	<i>Input.</i> Do not connect to this pin, Metrologic internal use only.
12	LED -	Negative connection for scan mode indicator. An external pull-up and LED are suggested. Maximum current is limited to 25 mA. This line is active low when the scanner is in the scanner mode (<i>i.e.</i> scan line is present).

* Pins 4, 5, 6 and 8 main function is to transmit scan codes between the Keyboard Wedge and PC.

SCANNER TERMINATIONS

IS4125-38 Connector Pin Assignments

Metrologic provides a low profile ZIF 12-pin connector to connect to a 1 mm x 12 position FFC/FPC cable. The pin assignments are as follows:

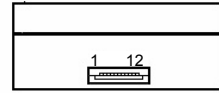


Figure 6

Pin	Signal Name	Function
1	VCC	<i>Input.</i> 5 VDC ($\pm 0.25V$) This requires 25 mA in standby and 130 mA peak.
2	Ground	Signal and power ground.
3	Receive	<i>Input.</i> RS232 receive data from host. Nominal $\pm 12V$ signals.
4	DTR	Data terminal ready signal from host. Nominal $\pm 12V$ signals.
5	D-	USB D- Data Line
6	D+	USB D+ Data Line
7	Transmit	<i>Output.</i> RS232 transmit data from the scan engine. Nominal $\pm 12V$ signals.
8	+USB_V	+USB power from terminal defined per USB specification
9*	Good Read Indicator	<i>Output.</i> 5V high with a 2 kHz pulse. This drain is the pin of a PFET type transistor that can source approximately 100 mA of current. This output is the connection for an LED or other indicator (<i>i.e.</i> beeper+). It is recommended that the indicator is terminated directly to ground.
10*	Beeper -	<i>Input.</i> Collector of an NPN transistor that can sink approximately 100 mA of current. A current limiting pull-up resistor and Piezo type transducer (QMB- 111PXN or equivalent) is recommended.
11	Reserved Input	<i>Input.</i> Do not connect to this pin, for Metrologic internal use only.
12	LED -	Negative connection for LED. An external pull-up and LED are suggested. Maximum current is limited to 25 mA. This line is active low when the laser diode is active.

* Pins 9 and 10 can be used together to form a push-pull type circuit. Pin 9 becomes the Beeper + and Good - Read source whereas Pin 10 supplies the pathway to ground.

SCANNER TERMINATIONS

IS4125-41 Connector Pin Assignments

Metrologic provides a low profile ZIF 12-pin connector to connect to a 1 mm x 12 position FFC/FPC cable. The pin assignments are as follows:

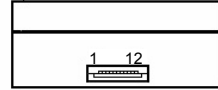


Figure 7

Pin	Signal Name	Function
1	VCC	<i>Input.</i> 5 VDC ($\pm 0.25V$) This requires 25 mA in standby and 130 mA peak.
2	Ground	Signal and power ground.
3	Receive	<i>Input.</i> RS232 receive data from host. Nominal $\pm 12V$ signals.
4	Light Pen Source/DTR IN	<i>Input.</i> Either light pen source voltage (typical:+5VDC) when configured for wand emulation or RS232 Data Terminal Ready signal from host. Nominal $\pm 12V$ signals.
5	RTS	<i>Output.</i> RS232 Ready to send signal from the scan engine.
6	Light Pen DATA	<i>Output.</i> Wand emulation data, open collector output from the scan engine.
7	Transmit	<i>Output.</i> RS232 transmit data from the scan engine. Nominal $\pm 12V$ signals.
8	CTS	<i>Input.</i> RS232 Clear to send signal from host. Nominal $\pm 12V$ signals.
9*	Good Read Indicator	<i>Output.</i> 5V high with a 2 kHz pulse. This drain is the pin of a PFET type transistor that can source approximately 100 mA of current. This output is the connection for an LED or other indicator (i.e. beeper+). It is recommended that the indicator is terminated directly to ground.
10*	Beeper -	<i>Input.</i> Collector of an NPN transistor that can sink approximately 100 mA of current. A current limiting pull-up resistor and Piezo type transducer (QMB- 111PXN or equivalent) is recommended.
11	Reserved Input	<i>Input.</i> Do not connect to this pin. This pin is for Metrologic internal use only.
12	LED -	Negative connection for LED. An external pull-up and LED is suggested. Maximum current is limited to 25 mA. This line is active low when the laser diode is active.

* Pins 9 and 10 can be used together to form a push-pull type circuit. Pin 9 becomes the Beeper + and Good - Read source whereas Pin 10 supplies the pathway to ground..

SCANNER TERMINATIONS

IS4125-103 Connector Pin Assignments

Metrologic provides a low profile ZIF 12-pin connector to connect to a 1 mm x 12 position FFC/FPC cable. The pin assignments are as follows:

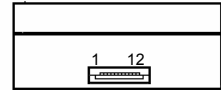


Figure 8

Pin	Signal Name	Function
1	VCC	<i>Input.</i> 5VDC ($\pm 0.25V$) This requires 25 mA in standby and 130 mA peak.
2	Ground	Signal and power ground.
3	Receive	<i>Input.</i> RS232 receive data from host. Nominal $\pm 12V$ signals.
4	TTL Receive	<i>Input.</i> +5/0V
5	RTS	<i>Output,</i> RS232 Ready to send signal from the scan engine. Nominal $\pm 12V$ signals.
6	TTL Transmit	<i>Output.</i> +5/0V
7	Transmit	<i>Output.</i> RS232 transmit data from the scan engine. Nominal $\pm 12V$ signals.
8	CTS	<i>Input.</i> RS232 clear to send signal from host. Nominal $\pm 12V$ signals.
9*	Good Read Indicator	<i>Output.</i> 5V high with a 2 kHz pulse. This drain is the pin of a PFET type transistor that can source approximately 100 mA of current. This output is the connection for an LED or other indicator (<i>i.e.</i> beeper+). It is recommended that the indicator is terminated directly to ground.
10*	Beeper -	<i>Input.</i> Collector of an NPN transistor that can sink approximately 100 mA of current. A current limiting pull-up resistor and Piezo type transducer (QMB- 111PXN or equivalent) is recommended.
11	Reserved Input	<i>Input.</i> Do not connect to this pin. This pin is for Metrologic internal use only.
12	LED -	Negative connection for LED. An external pull-up and LED are suggested. Maximum current is limited to 25 mA. This line is active low when the laser diode is active.

* Pins 9 and 10 can be used together to form a push-pull type circuit. Pin 9 becomes the Beeper + and Good - Read source whereas Pin 10 supplies the pathway to ground.

SCANNER TERMINATIONS

IS4110 Connector Pin Assignments

Metrologic provides a low profile ZIF 10-pin connector that accepts an FPC/FFC cable with a 1.0 mm Pitch and a 0.3 mm end thickness. This cable is available from Metrologic in various lengths.

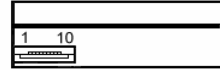


Figure 9

The pin assignments are as follows:

Pin	Signal Name	Function
1	VCC	+5V +/- .25V supplied from terminal (100 mA minimum supply)
2	Data Out	<i>Open collector output.</i> A black bar is indicated by a low signal. A 5K ohm pull-up resistor is recommended.
3	Range Select	<i>Open collector input.</i> A low on this line will put the scanner in long range (9" – 13") activation mode. This line may be left unterminated for short range (4" – 7") activation mode.
4	Scan Sense	<i>TTL output.</i> The signal pulses high once for each scan cycle (<i>i.e.</i> one scan in each direction). There are 35 scan pulses per second.
5	Scan Mode Indicator	<i>Open collector active low output.</i> This pin will go low whenever the scan mode is activated. It is capable of sinking 15 mA and can be used to activate an indicator light.
6	IR Enable	Do not connect to this pin.
7	Ground	Power ground
8	Object Detect	<i>TTL output.</i> A low signal indicates an object is within the scan field. The signal remains low until the object is removed.
9*	Scan Enable	<i>TTL low input.</i> A low signal applied to this pin will activate the scan mode. High or open deactivates the scan mode.*
10*	Scan Enable	<i>TTL high input.</i> A high signal applied to this pin will activate the scan mode. Low or open deactivates the scan mode.*

* Use either pin 9 or pin 10 to activate the scan engine.

IS4110 Timing Diagram

The SCAN SENSE pulse occurs once for each flip cycle. A flip cycle represents one scan in each direction (right to left then left to right from the scanner perspective). The HIGH to LOW transition of the SCAN SENSE signal initiates the start of the flip cycle.

The frequency of the SCAN SENSE pulses is dependent on the frequency of the internal flipper. This varies from unit to unit from 26 Hz to 30 Hz. Therefore, the period of the SCAN SENSE pulses will vary from 33 ms to 39 ms.

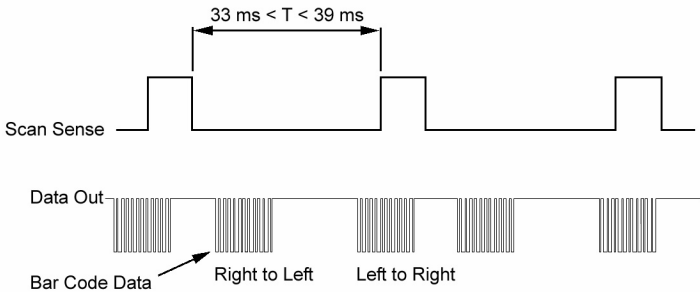


Figure 10: Timing Diagram

Regulatory Requirements

The IS4100 Series ScanQuest Laser Scan engines are designed to meet the requirements of CDRH Class II and IEC Class 2 laser products. CDRH Class II/IEC Class 2 are defined as follows:

Emission Duration: Greater than 0.25 seconds
Accessible Emission Limit: Less than 0.001 W (1.0 milliwatts) average radiant power

The IS4100 series ScanQuest laser scan engine is registered with the Center for Devices and Radiological Health as a laser "component". The addition of emission indicators, shut-down control, labeling and informational requirements are necessary to achieve compliance with the performance standard published in the Code of Federal Regulations (CFR), Title 21 Parts 1040.10 and 1040.11. Therefore, it is the responsibility of the manufacturer who incorporates the scan engine into their product to provide the additional performance, labeling and informational requirements necessary to comply with all federal laser safety regulations.

Federal law requires that all laser products introduced into commerce in the United States be registered with the CDRH, US Food and Drug Administration through submittal of a Laser Safety Report. The manufacturer of the end equipment must obtain approval and certification from agencies such as the FDA.

The specifications required for agency approval are not obtainable until the ScanQuest engine is used in its final configuration. Metrologic is unable to fulfill these requirements because the scan engine will operate differently depending upon where it is used as a component. The following information concerning the scan engine appears on the shipping label:

THIS DEVICE DOES NOT COMPLY WITH 21 CFR 1040.
USE ONLY AS A COMPONENT.

Manufacturers incorporating unmodified ScanQuest engines into their product may reference the following accession number on items in their Laser Product Report that request information concerning features inherent in the ScanQuest engine design.

Accession Number: 8820576-14, -19

If the product is to be used in another country, they must fulfill the requirements for that country. Refer to one of the following sections *Europe* on page 22, *United States* on page 23 or *Canada* on page 24 for further explanation.

Europe

The CE Mark is required on products with IS4110 and IS4125 Scan Engines if the products are to be imported into European Economic Area (EEA) countries. Use of the CE Mark requires compliance with Directives and standards dependent upon the type of product. Information may be found at "<http://europa.eu.int/comm/enterprise/newapproach/>".

Laser Safety

EN60825-1:1994+A1+A2 "Safety of Laser products".

Compliance with this standard is required for the product to bear the CE mark.

Note: Non EEA countries may impose additional testing/certification requirements.

EMC

Certain combinations of ScanQuest scan engines and associated electronics may require certification of compliance with the European EMC Directive. EMC compliance of finished products in Europe can be accomplished by the following method:

- The manufacturer may certify to the EC's Electromagnetic Compatibility Directive 89/336/EEC. Compliance is required for the product to bear the CE Mark.

Note: Non EEA countries may impose additional testing/certification requirements.

Electrical Safety

The scan engines are built to conform to the European Low Voltage Directive 73/23/EEC.

United States

Laser Safety

To assist with the FDA filing requirements (refer to *Regulatory Requirements* on page 21), Metrologic has registered the scan engine with the FDA as a component. Customers can contact CDRH at the following address:

Food and Drug Administration
Center for Devices and Radiological Health
Light Products Branch (HFX-312)
Office of Compliance
2098 Gaither Road
Rockville, MD 20850
Tel: 301-594-4654
www.fda.gov/cdrh

Requirements for laser products are described in CFR (Code of Federal Regulation) Title 21, part 1040.10 & 1040.11 from the Government Printing Office. Copies can be ordered by calling 202-512-1800, ordering on line from www.access.gpo.gov/su_docs or writing to:

Superintendent of Documents
PO Box 371954
Pittsburgh, PA 15250-7954

Note: State and local governments may regulate the use products containing lasers. The manufacturer should consult the applicable government regulations for more information.

EMC

Certain combinations of scan engines and associated electronics may require testing to insure compliance with the following Federal Communications Commission regulation: 47 CFR Part 15

Note: When using the scan engine with RF equipment, modems, etc. may require examination(s) to the standard(s) for the specific equipment combination. It is the manufacturers' responsibility to comply with the applicable federal regulation(s).

REGULATORY REQUIREMENTS AND WARNINGS

Canada

Laser Safety

The Radiation Protection Bureau currently accepts products meeting the FDA standards in Canada. For more information contact:

Radiation Protection Bureau
775 Brookfield Road
Ottawa, Ontario K1A 1C1

EMC

Products meeting FCC 47 CFR Part 15 will meet Industry Canada interference-causing equipment standard for digital apparatus. Additional testing is not required.

A written notice indicating compliance must accompany the apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus. The notice may be in the form of a statement included in the user's manual if, because of insufficient space or other restrictions, it is not feasible to affix a label to the apparatus.

Warnings

United States

WARNING:

IS4110 scan engines do not include control circuitry and therefore do not incorporate a laser beam timeout. This feature is necessary for compliance to CDRH Class II and /or IEC Class 2 unless laser product modifications that change the requirement are made.

German

WARNUNG:

Die Scanner IS4110 verfügen über keinen Steuerungsschaltkreis und daher auch nicht über einen Timeout des Laserstrahls. Diese Eigenschaft ist jedoch nötig zur Konformität mit den Normen CDRH Class II und/oder IEC Class 2, außer es werdenn Modifikationen des Laserprodukts vorgenommen, die zugleich die Anforderungen erfüllen.

French

AVERTISSEMENT:

Comme les scanner IS4110 ne sont pas équipés d'un circuit de commande, il n'y a pas de temps imparti pour le faisceau du laser. La conformité aux normes CDRH ClassII et/ou IEC Class 2 exige cependant cette propriété, sauf si les produits laser sont modifiés de façon à ce que ces exigences shangent aussi.

Italian

ATTENZIONE!

Gli scanner IS4110 non dispongono di un circuito di regolazione e quindi neanche di un timeout del raggio laser. Tuttavia questa caratteristica è necessaria ai fini della conformità con le norme CDRH Class II e/o IEC Class 2, a meno che non vengano effettuate modifiche del prodotto laser che mutino a loro volta I requisiti da soddisfare.

LIMITED WARRANTY

The IS4110 and the IS4125 ScanQuest scanners are manufactured by Metrologic at its Blackwood, New Jersey, USA facility. The ScanQuest scanners have a two (2) year limited warranty from the date of manufacture. Metrologic warrants and represents that all ScanQuest scanners are free of all defects in material, workmanship and design, and have been produced and labeled in compliance with all applicable US Federal, state and local laws, regulations and ordinances pertaining to their production and labeling.

This warranty is limited to repair, replacement of product or refund of product price at the sole discretion of Metrologic. Faulty equipment must be returned to one of the following Metrologic repair facilities: Blackwood, New Jersey, USA; Madrid, Spain; or Suzhou, China. To do this, contact the appropriate Metrologic Customer Service/Repair Department to obtain a Returned Material Authorization (RMA) number.

In the event that it is determined that the equipment failure is covered under the warranty, Metrologic shall, as its sole option, repair the Product or replace the Product with a functionally equivalent unit and return such repaired or replaced Product without charge for service or return freight, whether distributor, dealer/reseller, or retail consumer, or refund an amount equal to the original purchase price.

This limited warranty does not extend to any Product which, in the sole judgment of Metrologic, has been subjected to abuse, misuse, neglect improper installation, or accident, nor any damage due to use or misuse produced from integration of the Product into any mechanical, electrical or computer system. The warranty is void if the case of Product is opened by anyone other than Metrologic's repair department or authorized repair centers.

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PATENTS

This Metrologic product may be covered by, but is not limited to, one or more of the following US Patents:

U.S. Patent No.: 5,260,553; 5,340,971; 5,340,973; 5,424,525; 5,468,951;
5,484,992; 5,525,789; 5,528,024; 5,627,359; 5,661,292; 5,777,315; 5,789,730;
5,789,731; 5,811,780; 5,825,012; 5,886,337; 5,925,870; 5,925,871; 5,939,698;
6,029,894; 6,189,793; 6,209,789; 6,227,450; 6,874,689;

4,360,798; 4,369,361; 4,387,297; 4,460,120; 4,496,831; 4,593,186; 4,607,156;
4,673,805; 4,736,095; 4,758,717; 4,816,660; 4,845,350; 4,896,026; 4,923,281;
4,933,538; 4,992,717; 5,015,833; 5,017,765; 5,059,779; 5,117,098; 5,124,539;
5,130,520; 5,132,525; 5,140,144; 5,149,950; 5,180,904; 5,200,599; 5,229,591;
5,247,162; 5,250,790; 5,250,791; 5,250,792; 5,262,628; 5,280,162; 5,280,164;
5,304,788; 5,321,246; 5,324,924; 5,396,053; 5,396,055; 5,408,081; 5,410,139;
5,436,440; 5,449,891; 5,468,949; 5,479,000; 5,532,469; 5,545,889

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Other worldwide patents pending.

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November 2006 Version 01

Printed in USA



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