



METROLOGIC INSTRUMENTS, INC.

MS9535 Voyager^{BT}[™]

Wireless Hand-Held Laser Scanner

Installation and User's Guide



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INTRODUCTION

MS9535 VoyagerBT™ laser bar code scanner is a new member of Metrologic's Voyager series. While featuring the patented technologies of automatic trigger and CodeGate button, the VoyagerBT has incorporated the latest Bluetooth™ wireless technology. With this technology, it allows the scanner freedom of mobility, up to 10 meters from the cradle.

VoyagerBT works hand in hand with its cradle. Before normal scanning, the scanner must establish communications with the cradle by scanning a Bluetooth address bar code. After communications have been established between the scanner and cradle, futures bar code scans will be transmitted from the scanner to the cradle and from the cradle to the host.

The cradle of the VoyagerBT also works as a battery charger for the scanner. When resting in the cradle, the scanner can reach a fully charged state in 2.5 hours. When fully charged, the scanner can provide up to 12,000 scans. For power saving, the scanner can be put into a full sleep mode by depressing the CodeGate button for 5 seconds after the laser has shut down. In this mode, the scanner can remain powered for up to 35 hours before the batteries require recharging. To wake-up the scanner, simply depress the CodeGate button, and the scanner will resume normal operation, after an automatic reset.

VoyagerBT includes ability to decode Reduced Space Symbology (RSS) bar codes. VoyagerBT offers checkout personnel the ability to scan bulky items without the need for unnecessary heavy lifting by customers or checkout personnel, making for added convenience. It can be used in applications including supermarkets, hypermarkets, shopping clubs, retailers, light warehouse and manufacturing.

SCANNER AND ACCESSORIES

BASIC KIT	
Part #	Description
MS9535-5	VoyagerBT Scanner
70-79004	MS9535 VoyagerBT Wireless Hand Held Laser Scanner Installation and User's Guide*
00-02544B	MetroSelect Single-Line Programming Guide*
00-02024A	Bluetooth Programming Addendum

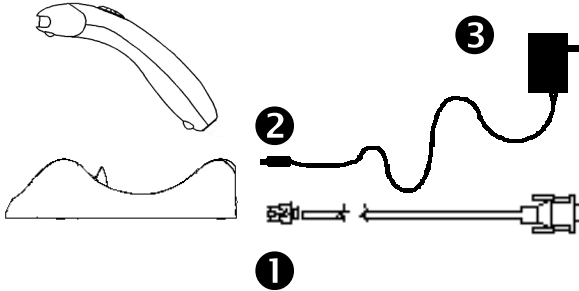
* Available on the Metrologic website - www.metrologic.com

OPTIONAL ACCESSORIES	
Part #	Description
Receiver / Charger Cradle	
MI9535-514	Receiver / Charger Cradle, Full RS232
MI9535-541	Receiver / Charger Cradle, RS232/Light Pen
MI9535-547	Receiver / Charger Cradle, Keyboard Wedge
MI9535-537	Receiver / Charger Cradle, USB
AC to DC Power Transformer- Regulated 5VDC @ 2A Output	
46-46911	Power Supply, China
46-46912	Power Supply, United Kingdom
46-46913	Power Supply, Continental Europe
46-46914	Power Supply, Australia
46-46915	Power Supply, United States
Communication Cable	
54-54000B-N	RS232 / Light Pen Cable, short strain relief
57-57002A	Keyboard Wedge Cable, short strain relief
52-52828A	USB Cable, short strain relief

Other items may be ordered for the specific protocol being used. To order additional items, contact the dealer, distributor or call Metrologic's Customer Service Department at 1-800-ID-METRO or 1-800-436-3876.

QUICK START

1. Connect the 10-pin RJ45 male connector into the 10-pin modular jack on the bottom of the cradle. You will hear a 'click' when the connection is made.
2. Connect the plug of the power supply into the power jack on the bottom of the cradle.
3. Connect the power supply into an AC outlet. The blue LED on the rear of the cradle will stay on.



4. Pick up the scanner and scan the Bluetooth address code on the cradle, you will hear 3 continuous beeps. After 4 seconds, both the blue LEDs of the charger cradle and the scanner flashes, followed by 3 combination beeps. This means the communication between the cradle and the scanner has been established successfully.



**This is a configuration bar code attached on the cradle. Before the normal scanning, you must establish a communication between the scanner and the receiver. Please go to Page 8 for more details.*



Caution:

To maintain compliance with applicable standards, all circuits connected to the scanner must meet the requirements for SELV (Safety Extra Low Voltage) according to EN 60950.

To maintain compliance with standard CSA C22.2 No. 950/UL 1950 and norm EN 60950, the power source should meet applicable performance requirements for a limited power source.

QUICK START (CONTINUED)

5. Scan a bar code anywhere within 10 meters from the cradle. The scanner will beep once and flash the white LED. The blue LED of the cradle will also flash once, indicating that the bar code has been successfully read and transmitted.



MS9535 VoyagerBT also provides two modes of operation:

1. Auto-trigger mode

When the scanner is at rest in the cradle, it is in auto-trigger mode. While in this mode, present a bar code in the scanning field and the data is automatically decoded and transmitted.

2. CodeGate mode

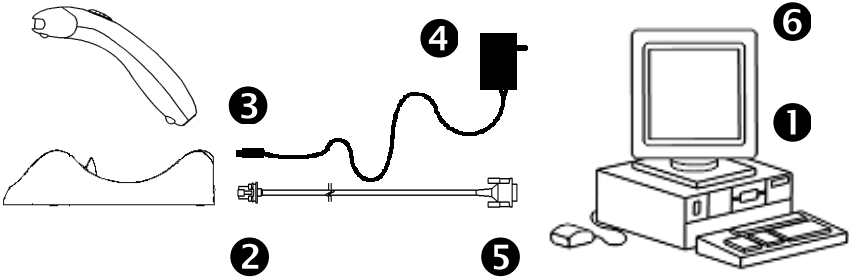
When the scanner is removed from the cradle, it is in CodeGate mode. While in this mode, scanned bar code data is only decoded and transmitted when the CodeGate button is pressed.



MS9535 is shipped from the factory programmed with default settings. Refer to the MetroSelect® Single-Line Programming Guide (MLPN 00-02544B) or MetroSet® 2's help files for instructions on how to configure the scanner.

RS232 AND LIGHT PEN SCANNER INSTALLATION

1. Turn off the host system.
2. Connect the 10-pin RJ45 male connector into the 10-pin modular jack on the bottom of the cradle. You will hear a 'click' when the connection is made.
3. Connect the plug of the power supply into the power jack on the bottom of the cradle.
4. Connect the power supply into an AC outlet. The blue LED on the rear of the cradle will stay on.
5. Connect the 9-pin D-type connector of the RS232 cable to the proper COM port of the host system.
6. Turn on the host system.



Right installation does not guarantee that the scanned information will be communicated properly to the host system. The scanner is shipped from the factory programmed with default settings. Please refer to the MetroSelect Programming Guide (MLPN 00-02544B) or MetroSet2's help files for instructions on changing the scanner's configuration. In addition, please check that the cradle and host system are using the same communication protocol.



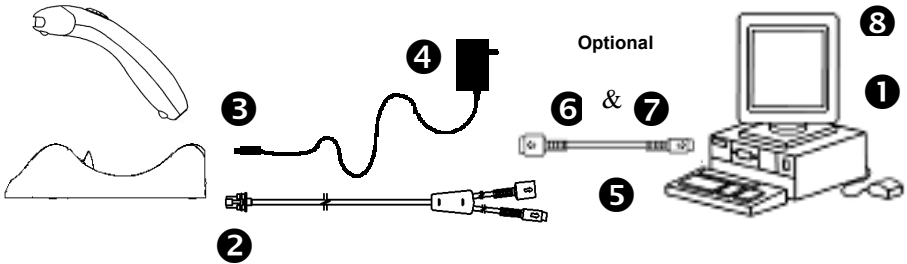
Caution:

To maintain compliance with applicable standards, all circuits connected to the scanner must meet the requirements for SELV (Safety Extra Low Voltage) according to EN 60950.

To maintain compliance with standard CSA C22.2 No. 950/UL 1950 and norm EN 60950, the power source should meet applicable performance requirements for a limited power source.

KEYBOARD WEDGE SCANNER INSTALLATION

1. Turn off the host system.
2. Connect the 10-pin RJ45 male connector into the 10-pin modular jack on the bottom of the cradle. You will hear a 'click' when the connection is made.
3. Connect the plug of the power supply into the power jack on the bottom of the cradle.
4. Connect the power supply into an AC outlet. The blue LED on the rear of the cradle will stay on.
5. Disconnect the keyboard from the PC.
6. The keyboard wedge cable is terminated with a 5-pin DIN female connector on one end, and a 6-pin mini DIN male on the other. Metrologic will supply an adapter cable with a 5-pin DIN male connector on one end and a 6-pin mini DIN female connector on the other. According to the termination required, connect the appropriate end of the adapter cable to the main cable, leaving the necessary termination exposed for connecting to the keyboard and the keyboard port on the PC.
7. Connect to the main cable to the keyboard and the keyboard port on the host system.
8. Power up the host system.



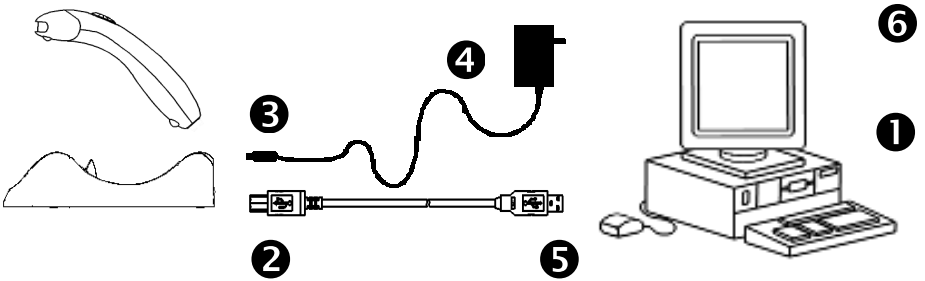
Caution:

To maintain compliance with applicable standards, all circuits connected to the scanner must meet the requirements for SELV (Safety Extra Low Voltage) according to EN 60950.

To maintain compliance with standard CSA C22.2 No. 950/UL 1950 and norm EN 60950, the power source should meet applicable performance requirements for a limited power source.

USB SCANNER INSTALLATION

1. Turn off the host system.
2. Connect the USB B type connector into the center jack on the bottom of the charger cradle.
3. Connect the plug of the power supply into the power jack on the bottom of the charger cradle.
4. Connect the power supply into an AC outlet.
5. Connect the USB cable to the USB port on the host system.
6. Turn on the host system.



Caution:

To maintain compliance with applicable standards, all circuits connected to the scanner must meet the requirements for SELV (Safety Extra Low Voltage) according to EN 60950.

To maintain compliance with standard CSA C22.2 No. 950/UL 1950 and norm EN 60950, the power source should meet applicable performance requirements for a limited power source.

ESTABLISH COMMUNICATION BETWEEN SCANNER AND CRADLE

Before the normal scanning starts, Bluetooth communication between the scanner and cradle must be established.

The communication between the scanner and cradle can be established by scanning the Bluetooth address code located on the cradle. The pairing process takes a few seconds and can be confirmed by a solid blue LED on the cradle and a solid blue LED on the scanner, when the laser is activated.

Dynamic Pair Function

The scanner can “connect” to any cradle by scanning the Bluetooth address code attached to that cradle. This is referred as “Dynamic Pair Function”.

Each scanner will only communicate with the last cradle address scanned. Once a cradle is paired with a scanner, another scanner can not be paired with that cradle until the connection is broken. The connection can be easily broken by placing the unit into sleep mode by holding down the CodeGate button for three (3) seconds.

For example:

Scanner #1 has established communication with Cradle #1. If you make it scan the Bluetooth address code on Cradle #2, its connection with Cradle #1 will break and switch to Cradle #2. At this time, if Scanner #2 scans the Bluetooth address code on Cradle #2 again, it will razz, indicating that the communication cannot be established since Cradle #2 already connects to Scanner #1.

RangeGate

The operation range of the Bluetooth communication is 10 meters between the scanner and cradle. If scans are made out of this range, the communication will break and the blue LED will flash. At this time, RangeGate becomes active, and the bar codes scanned during this communication loss will be stored in the SRAM of the scanner instead of being lost. Once communication is re-established, the stored data will be transferred to the host and normal scanning will resume.

CHARGING THE SCANNER

Prior to performing any operation with the scanner, make sure it has been charged.

The following explains how to determine if the scanner needs recharging:

1. During operation, the scanner gives two beeps after a successful scan. This indicates the scanner has low power.
2. When a bar code is presented to the scanner and a scan line is not activated, or the CodeGate button is pressed and the laser comes on for brief moment. This indicates the scanner has automatically switched to normal sleep mode due to low power.
3. When the CodeGate button is pressed and a scan line is not present. This indicates the scanner has no power.

Before charging the scanner, it is suggested that the communication between the scanner and the cradle be established first.

To charge the scanner, place the unit into the cradle. The amber LED on the scanner begins to flash indicating the charging process has begun.

A complete charging process takes about 2.5 hours. The amber LED of the scanner will turn steady when charging is complete. If charging the scanner for the first time, it is suggested to keep the scanner on cradle for another 30 minutes after the amber LED turns steady.

Manufacturer's Suggestion:

If the scanner is not be used for a long period of time, it is suggested that the unit be placed into normal or full sleep mode to save power. For normal sleep mode, scan the configuration bar codes in the Bluetooth Programming Addendum (00-02024A). For full sleep mode, after the laser shuts off, depress the CodeGate button and hold for 3 seconds, the scanner will give a long beep and switch into full sleep mode. To wake-up the scanner from either mode, depress the CodeGate button. After an automatic reset, the scanner is ready for normal operation.

CHARGING THE SCANNER (CONTINUED)

Safety Precautions for Lithium Batteries:

- Do not place batteries in fire or heat the batteries
- Do not store batteries near fire or other high temperature locations
- Do not store or carry batteries together with metal objects
- Do not expose batteries to water or allow the batteries to get wet
- Do not connect (short) the positive and negative terminals, of the batteries, to each other with any metal object.
- Do not pierce, strike or step on batteries or subject batteries to strong impacts or shocks
- Do not disassemble or modify batteries



Caution:

Danger of explosion if batteries are incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacture. Dispose of used batteries according to the recycle program for batteries as directed by the governing agency for the country where the batteries are to be discarded.

RECEIVER / CHARGER CRADLE

The cradle of MS9535 works both as a receiver and a charger.

As a receiver, after establishing Bluetooth communication with the scanner, the cradle receives data being scanned by the scanner and transmits it to the host. To communicate with different host interfaces, the cradle is offered in various configurations.

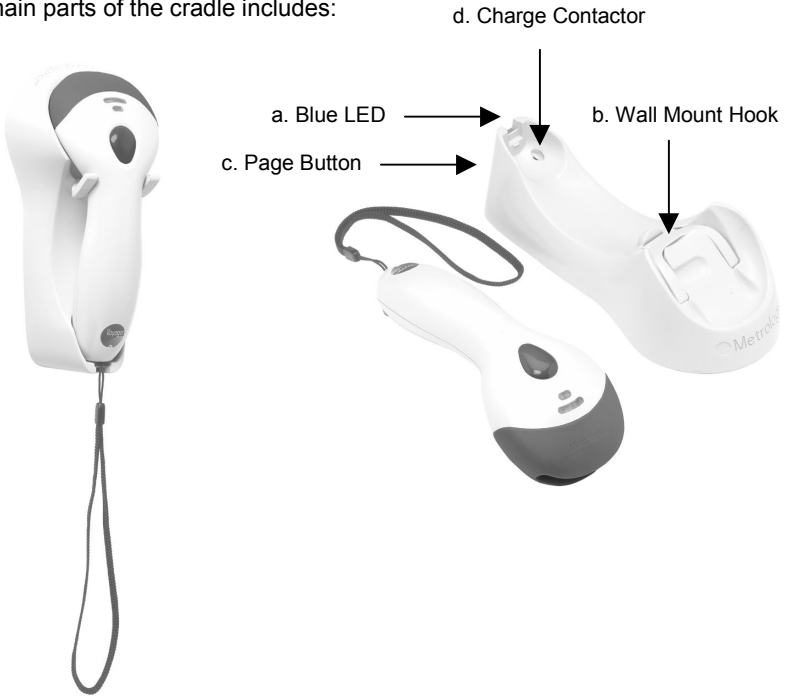
Cradle	Version Identifier	Communication Protocol(s)
MI9535-5xx	14	Full RS-232
MI9535-5xx	41	RS-232 / Light Pen Emulation
MI9535-5xx	47	Keyboard Wedge, Stand-Alone Keyboard Wedge and RS-232 Transmit / Receive
MI9535-5xx	37	USB and RS-232 Transmit / Receive
MI9535-5xx	11	IBM and RS-232 Transmit / Receive

As a charger, the cradle recharges the scanner whenever it is set into place. Even if the scanner's battery is full, the cradle will continue to supply power to the scanner.

A charger only cradle is also available with MLPN #46-46772.

CRADLE PARTS

The main parts of the cradle includes:



a) Blue LED

The blue LED indicates the “connecting” status of the cradle with the scanner. When the Bluetooth connection breaks, the blue LED will flash. A single flash of the blue LED indicates data has been received from the scanner.

b) Wall Mount Hook

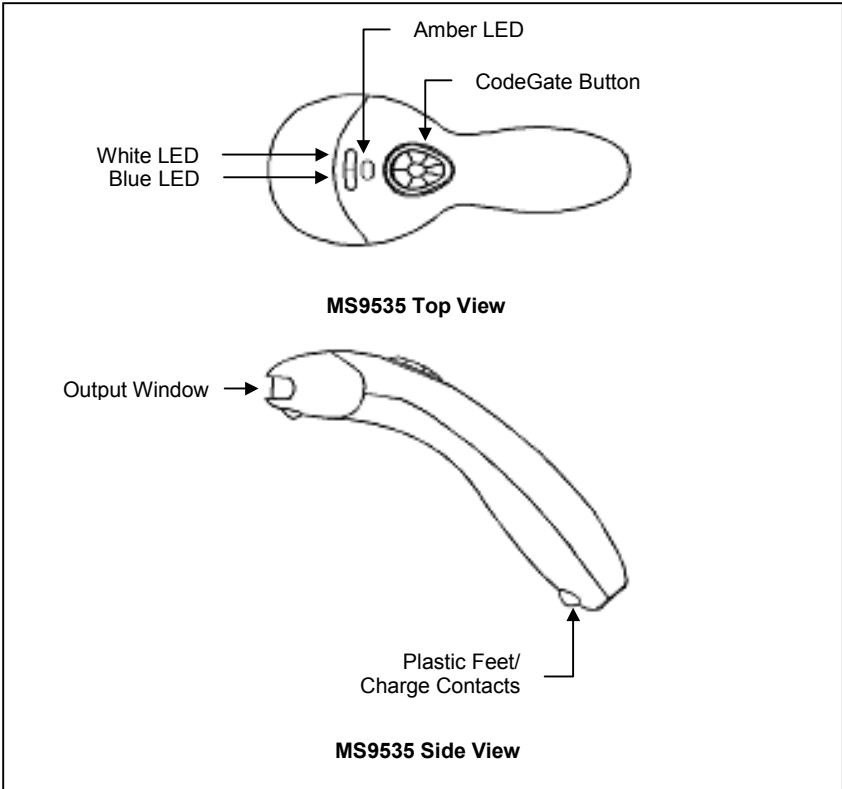
In applications where wall mount becomes necessary for the cradle, the hook will secure the scanner into place.

c) Page Button

The page button is located at the rear of the cradle. When the scanner associated with the cradle can not be found, press the page button; the scanner will begin beeping and the blue and amber LEDs will flash alternatively. To discontinue paging the scanner, press the page button again.

d) Charge Contactor

The cradle supplies power to the scanner through the charge contactors. When the cradle is powered up, do NOT short the two charge contactors with metal objects. This will result in damaging the cradle.



AUDIBLE INDICATORS

When the scanner is in operation, it provides audible feedback. These sounds indicate the status of the scanner. Eight settings are available for the tone of the beeper (normal, 6 alternate tones and no tone). To change the tones, refer to the MetroSelect Single-Line Programming Guide (MLPN 00-02544B) or MetroSet2's help files.



One Beep

After establishing communication, when the scanner is put into cradle correctly, the scanner will beep once.

When the scanner successfully reads a bar code, the white LED will flash and the scanner beeps once.

When the scanner is set into full sleep mode by pressing the CodeGate button for 3 seconds, the scanner will give a longer beep.

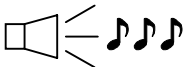


Two Beeps

When the scanner has a low battery voltage, it will give two beeps after a successful scan and flash the amber LED every 5 seconds.

When there is a Flash ROM upgrade needed, the scanner will beep twice followed by alternating flashing of the blue and white LEDs.

If the scanner gives out two combined high and low tones and flashes blue LED, this indicates the communication between scanner and cradle is broken.

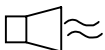


Three Beeps

When entering configuration mode, the white LED will flash while the scanner simultaneously beeps three times. Upon exiting configuration mode, the scanner will beep three times again, then the white LED will stop flashing.

When scanning a Bluetooth Address bar code, the scanner will beep three times. A few seconds later, the scanner's blue LED flashes, and sounds a 3-combination tone. This indicates communication between the scanner and the cradle has been successfully established.

When using single-code-programming, the scanner will sound a 3-combination tone (a short pause followed by a high tone and a low tone). This indicates a single configuration bar code has successfully configured the scanner.



Razzberry Tones

This tone indicates a type of failure. Refer to "Failure Modes" on page 16.

VISUAL INDICATORS

The MS9535 has three LED indicators (blue, white and amber) located on the head of the scanner. When the scanner is in operation, the flashing or stationary activity of the LEDs indicates the status of the current scan and the scanner.



Blue, White & Amber LEDs are off

The scanner receives is not receiving power from the cradle or the inside battery.

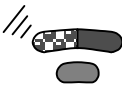
The scanner is in full sleep mode. Pressing the CodeGate button will wake-up the scanner, and the blue LED will flash.



Steady Amber

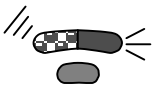
After establishing communication, when the scanner is put into the cradle and the battery has been fully charged, the amber LED will remain steady.

If the communication is not established, when the scanner is put into the cradle, the amber LED will stay on after a short delay.



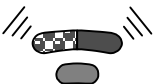
Steady Blue

When the laser is active, the blue LED is illuminated. The blue LED will remain illuminated until the laser is deactivated.



Steady Blue and Single White Flash

When the scanner successfully reads a bar code, the white LED will flash, the blue LED remains steady and the scanner will beep once. If the scanner reads the bar code successfully at a relatively long distance but still within the 10-meter operation range, the white LED may flash after a short delay.



Steady Blue and Steady White

After a successful scan, the scanner transmits the data to the cradle. If the cradle is not ready to accept the information, the scanner's white LED will remain on until the data can be transmitted or until a communication time-out occurs.

VISUAL INDICATORS (CONTINUED)

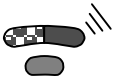


Alternating Flashing of Blue and White

This indicates the scanner is in program mode. Two razzberry tones indicate that an invalid bar code has been scanned while in this mode.

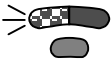
If the scanner is in RangeGate active mode, this indicates the SRAM of the scanner becomes full.

If the scanner needs to have a Flash ROM upgrade, the alternating flashing of the blue and white LEDs will occur during startup and is accompanied by three beeps.



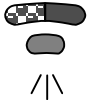
Steady White, Blue off

This indicates the laser is off and the scanner is still waiting for communication from the cradle.



Flashing Blue

This indicates the scanner is trying to establish communication with the cradle.

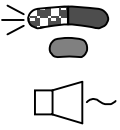


Flashing Amber

If the scanner is in cradle, this indicates the scanner is being charged.

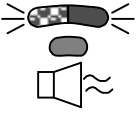
If the scanner is out of cradle, this indicates the scanner has low battery power and needs recharging.

FAILURE MODES



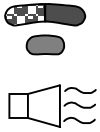
Flashing Blue and one Razzberry Tone

This indicates the scanner has experienced a laser sub-system failure. Return the unit for repair to an authorized service center.



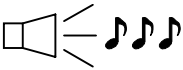
Flashing Blue and White with Two Razzberry Tones

This indicates the scanner has experienced a scanning mechanism failure. Return the unit for repair to an authorized service center.



Continuous Razzberry Tone with all LEDs off

If upon power, the scanner emits a continuous razzberry tone, the scanner has experienced an electronic failure. Return the unit for repair to an authorized service center.



Three Beeps – on power up

If the scanner beeps 3 times on power up then the non-volatile memory (NovRAM) that holds the scanner configuration has failed. If the scanner does not respond after reprogramming, return the scanner for repair to an authorized service center.



Two Razzberry Tones with Steady White

The scanner scans a bar code without establishing communication first.

The scanner reads a bar code but the cradle fails to transmit the data.

PROGRAMMING MODES

The MS9535 Voyager*BT* has 2 modes of programming.

➤ **Bar Codes**

Voyager*BT* can be configured by scanning the bar codes in the MetroSelect Single-Line Programming Guide (MLPN 00-02544B) and Bluetooth Programming Addendum (00-02024A). Please refer to these guides for instructions. The MetroSelect Single-Line Programming Guide can be downloaded for FREE from Metrologic's website (www.metrologic.com).

➤ **MetroSet2**

This user-friendly Windows-based configuration program allows you to simply 'point-and-click' at the desired scanner options. This program can be downloaded for FREE from Metrologic's website (www.metrologic.com), or set-up disks can be ordered by calling 1-800-ID-METRO.

UPGRADING THE FLASH ROM FIRMWARE

The **Meteor** program is a functional component of Metrologic's new line of Flash-based scanners. This program allows the user of a Metrologic scanner to quickly upgrade to a new or custom version of software. It requires the use of a personal computer running under Windows 95 or greater and the use of a communication port. The user merely connects the scanner to a communications port of the PC, launches the **Meteor** program, and blasts off to new software upgrades.

Each MS9535 and its cradle, regardless of the version number or communication protocol, can be upgraded. In other words, all RS232/Light Pen (-41), keyboard wedge (-47), USB (-07) and IBM 468X/469X (-11) units can be upgraded. To upgrade *all* units, an RS-232 cable (MLPN 54-54000B-N) is required. Before upgrading the flash ROM within the scanner, communication between the scanner and the cradle must be first established.

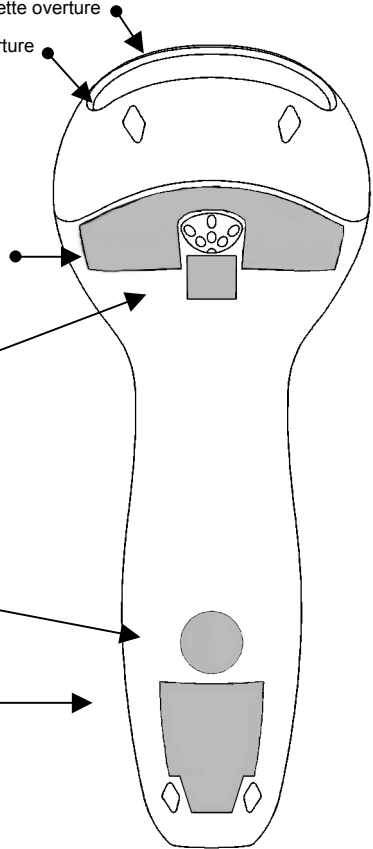
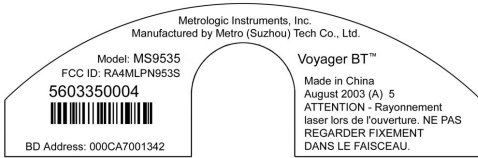
The upgrades and custom software versions will be supplied by Metrologic in files called Motorola S-record files. These files contain all the information needed to upgrade the scanner. Simply add this file to the working directory or retrieve from its current location.

The program guides the user with its simplistic one click approach. The user must first select the file. Once selected and verified, the file is ready to be used in the upgrade. Press the button to start the upgrading. (Contact Metrologic for additional details).

LABELS

Each scanner has a label on the back of the unit. This label has the model number, date of manufacture, serial number, CE and caution information. The following is an example of this label:

EVITER TOUTE EXPOSITION-Lumiere laser emis par cette ouverture
AVOID EXPOSURE -Laser light is emitted from this aperture



1.0 MILLIWATT (PEAK)
VISIBLE LASER DIODE
CLASS 1 LASER PRODUCT
IEC 60825-1:1993+A1:
1997+A2:2001



Patent Information-See Manual
FCC and ICES-003 Information-See Manual
Warranty VOID if case opened.
Contains no user serviceable components.
Complies with 21CFR 1040.10 & 1040.11
NACH EN60825-1:1994/A11:1996
5V

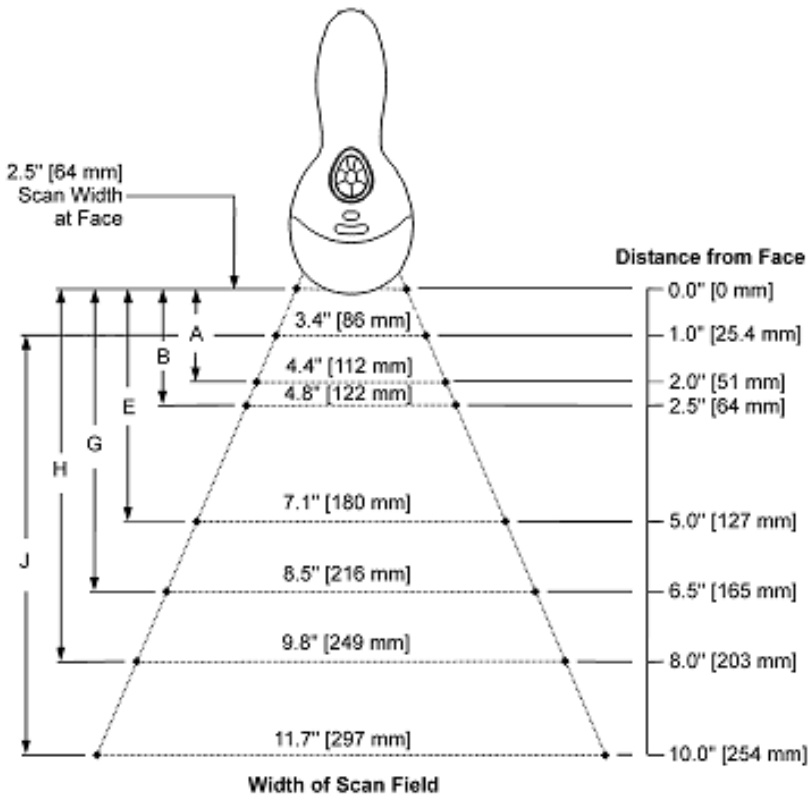


MAINTENANCE

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 scanner window.

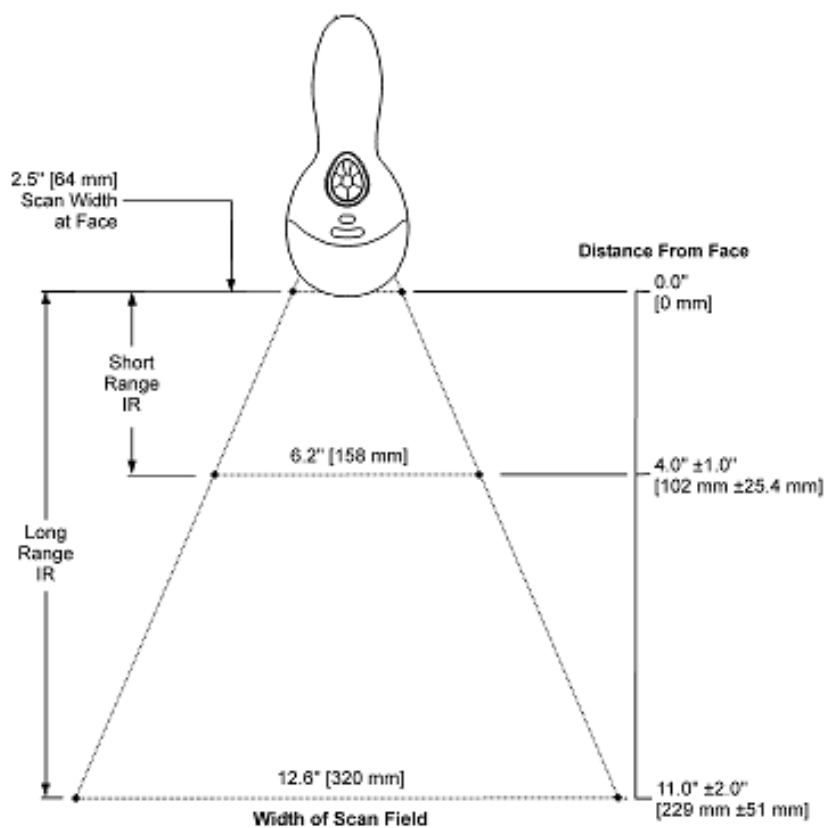
DEPTH OF FIELD



Minimum Bar Code Element Width

	A	B	C	D	E	F	G	H	J	K
mm	.13	.15	-	-	.19	-	.25	.33	.53	-
mils	5.2	5.7	-	-	7.5	-	10	13	21	-

IR ACTIVATION



CONNECTING TO OTHER BLUETOOTH DEVICES

Other than the cradle, the MS9535 VoyagerBT scanner can also link to other Bluetooth compatible devices, such as a computer, printer or laptop.

A Bluetooth communication between the scanner and the other device must be established before the system works.

➤ **When MS9535 acts as Client:**

The MS9535 is defaulted to act as client when connected to other Bluetooth devices. Communication is established by scanning the Bluetooth address code of the other device.

- a) If the Bluetooth address is headed with FNC3 and consists of a 12-digit hex value (e.g. ³000CA7FFFF99), scan the address bar code to establish the communication.



Example Bluetooth Address
With FNC3

- b) If the Bluetooth address is NOT headed with FNC3 but is just a common 12-digit hex value (e.g. 000CA7000118), scan the *Get Bluetooth Address* code first, and then scan the address bar code.



Get Bluetooth Address



Example Bluetooth Address
Without FNC3

CONNECTING WITH OTHER BLUETOOTH DEVICE (CONTINUED)

➤ **When MS9535 acts as Server:**

To enable the MS9535 to act as a server and to be discovered by another Bluetooth device, scan the below *Provide Service* code. This will allow other Bluetooth devices to send inquiries to the scanner and attempt communication. Use this bar code to establish communication directly with a Bluetooth enabled device, bypassing the cradle.



Provide service to other
Bluetooth devices

TROUBLESHOOTING GUIDE

The following guide is for reference purposes only. Contact a Metrologic representative at 1-800-ID-Metro or 1-800-436-3876 to preserve the limited warranty terms.

Symptoms	Possible Causes	Solution
No LEDs, beep or laser - Scanner in Cradle	No power is being supplied from cradle to scanner	Check transformer, outlet and power strip. Make sure the cable is plugged into the cradle properly.
No LEDs, beep, or laser - Scanner out of Cradle	Internal battery not supplying power to scanner	Place the scanner into cradle to recharge the battery.
Scanner's white LED locks up after first scan, and razz twice	Communication is not established between scanner and cradle	Establish communication between scanner and cradle before scanning a normal bar code
Scanner scans, but white LED locks up at one scan and razz twice	The distance between scanner and cradle is beyond the 10-meter operation range	Bring the scanner back into the 10-meter communication range from the cradle.
2 Beeps with alternately flashing LEDs on Power up	Possible ROM failure	Flash ROM Upgrade Required
3 Beeps on power up	Non-volatile RAM failure	Contact a Metrologic Representative, if the unit will not hold the programmed configuration.
Continuous razz tone on power up	RAM or ROM failure	Contact a Metrologic Representative, if the unit will not function.
Razz tone and blue LED flash at power up	VLD failure	Contact a Metrologic Representative
Razz tone, blue and white LEDs flash at power up	Scanning mechanism failure	Contact a Metrologic Representative

TROUBLESHOOTING GUIDE (CONTINUED)

Symptoms	Possible Causes	Solution
Unit scans, Communicates and beeps twice	Same symbol timeout set too short	Adjust same symbol timeout for a longer time.
The unit powers up, but does not scan/or beep	Beeper disabled. No tone selected	Enable beeper. Select tone.
The unit powers up, but does not scan and/or beep	Scanning a particular symbology that is not enabled	UPC/EAN, Code 39, interleaved 2 of 5, Code 93, Code 128 and Codabar are enabled by default. Verify that the type of bar code being read has been selected.
The unit powers up, but does not scan and/or beep	The scanner has been programmed for a character length lock, or a minimum length and bar code being scanned does not satisfy the programmed criteria	Verify that the bar code that is being scanned falls into the criteria (Typical of Non-UPC/EAN codes) <i>The scanner defaults to a minimum of 3-character bar code.</i>
The unit scans a bar code, but locks up after the first scan white LED stays on	The scanner is configured to support some form of host handshaking but is not receiving the signal	If the scanner is setup to support ACK/NAK, RTS/CTS, XON/XOFF or D/E, verify that the host cable and host are supporting the handshaking properly.
The unit scans, but the data transmitted to the host is incorrect	The scanner's data format does not match the host system requirements	Verify that the scanner's data format matches that required by the host. Most sure that the scanner is connected to the proper host port.
Scanner beeps at some bar codes and NOT for others of the same bar code symbology	The print quality of the bar code is suspect	Check print mode. The type of printer could be the problem. Change print settings. i.e. change to econo mode or high speed.

TROUBLESHOOTING GUIDE (CONTINUED)

Symptoms	Possible Causes	Solution
Scanner beeps at some bar codes and NOT for others of the same bar code symbology	The aspect ratio of the bar code is out of tolerance	Check print mode. The type of printer could be the problem. Change print settings. i.e. change to econo mode or high speed.
Scanner beeps at some bar codes and NOT for others of the same bar code symbology	The bar code may have been printed incorrectly	Check if it is a check digit/character/or border problem.
Scanner beeps at some bar codes and NOT for others of the same bar code symbology	The scanner is not configured correctly for this type of bar code	Check if check digits are set properly.
Scanner beeps at some bar codes and NOT for others of the same bar code symbology	The minimum symbol length setting does not work with the bar code	Check if the correct minimum symbol length is set.
The unit scans the bar code but there is no data	Configuration is not correct	Make sure the scanner is configured for the appropriate mode.
The unit scans but the data is not correct	Configuration is correct	Make sure that the proper PC type AT, PS2 or XT is selected. Verify correct country code and data formatting are selected. Adjust inter-character delay symptom.
Alpha characters show as lower case	Computer is in Caps Lock mode	Enable Caps Lock detect setting of the scanner to detect whether the PC is operating in Caps Lock.

TROUBLESHOOTING GUIDE (CONTINUED)

Symptoms	Possible Causes	Solution
The unit is transmitting each character twice	Configuration is not correct	Increase interscan code delay setting. Adjust whether the F0 break is transmitted. It may be necessary to try this in both settings.
Everything works except for a couple of characters	These characters may not be supported by that country's key look up table	Try operating the scanner in Alt mode.
Power-up OK and scans OK but does not communicate properly to the host	Com port at the host is not working or configured properly	Check to make sure that the baud rate and parity of the scanner and the communication port match and the program is looking for "RS-232" data.
Power-up OK and scans OK but does not communicate properly to the host	Cable not connected to the proper com port	Check to make sure that the baud rate and parity of the scanner and the communication port match and the program is looking for "RS-232" data.
Power-up OK and scans OK but does not communicate properly to the host	Cable not connected to the proper com port	Check to make sure that the baud rate and parity of the scanner and the communication port match and the program is looking for "RS-232" data.
The host is receiving data but the data does not look correct	The cradle and host may not be configured for the same interface parameters	Check that the cradle and the host are configured for the same interface parameters
Characters are being dropped	Inter-character delay needs to be added to the transmitted output	Add some inter-character delay to the transmitted output

DESIGN SPECIFICATIONS

OPERATIONAL	
Light Source:	Visible Laser Diode 650 nm ± 10 nm
Laser Power:	0.96 mW (peak)
Depth of Scan Field:	0 mm – 203 mm (0" – 8") for 0.330 mm (13 mil) bar code at default setting
Scan Speed:	72 ± 2 scan lines per second
Scan Pattern:	Single scan line
Minimum Bar Width:	0.127 mm (5.0 mil)
Decode Capability:	Autodiscriminates all standard bar codes (For others call a Metrologic service representative)
System Interfaces:	RS232/Light Pen, PC Keyboard Wedge, Stand-Alone Keyboard, USB (low speed and full speed), IBM
Print Contrast:	35% minimum reflectance difference
Number of Characters Read:	Up to 80 data characters (Maximum number will vary based on symbology & density)
Roll, Pitch, Yaw:	42°, 68°, 52°
Beeper Operation:	7 tones or no beep
Indicators (LED) <i>Default Settings:</i>	Blue = laser on, ready to scan; White = good read; Amber = battery full
MECHANICAL	
Length:	198 mm (7.8")
Width:	Handle - 45 mm (1.8"), Head - 78 mm (3.1")
Depth:	40 mm (1.6")
Weight:	Scanner: 199 g (7.02 oz) Cradle: 225g (7.94 oz)
ELECTRICAL	
Input Voltage:	Scanner: 5.2VDC ± 0.25V Cradle: 5.2VDC ± 0.25V
Power:	Scanner: Operating = 1.15 W, Sleep = 150 mW Cradle: 0.6 W
Current:	Scanner: Operating=230 mA@5VDC, Sleep=30mA@ 5VDC Cradle: 120 mA @ 5VDC
DC Transformers:	Class II; 5.2V @ 2A
Laser Class 1:	IEC 60825-1:1993+A1:1997+A2:2001 EN 60825-1:1994+A11:1996+A2:2001
EMC:	FCC, ICES-003 & EN55022 Class B
Battery Capacity /Recharge Time:	12000 scans per charge / recharge time = 2.5 hours
Radio Range:	10 m (33 ft)
ENVIRONMENTAL	
Temperature:	Operating = 0°C to 40° (32° to 104°F) Storage = -20°C to 50°C (-4°F to 122°F)
Humidity:	5% to 95% relative humidity, non-condensing
Light Levels:	Up to 4842 Lux (450 footcandles)
Shock:	Designed to withstand 1.5 m (5') drops
Contaminants:	Sealed to resist airborne particulate contaminants
Ventilation:	None required

DEFAULT SETTINGS

Many functions of the scanner and cradle can be “programmed” – that is, enabled or disabled. The scanner and cradle are shipped from the factory programmed to a set of default conditions. The default parameter 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 communication does not support every parameter. If the communication supports a parameter listed in the charts on the following pages, a check mark will appear.

PARAMETER	DEFAULT	RS-232	LIGHT PEN	IBM 46XX	KBW	USB
Normal Scan Mode	*	✓	✓	✓	✓	✓
Continuous Scan Mode		✓	✓	✓	✓	✓
Blinky Scan		✓	✓	✓	✓	✓
Continuous Blinky Scan		✓	✓	✓	✓	✓
Custom (one shot) Scan		✓	✓	✓	✓	✓
Long-Range In-Stand	*	✓	✓	✓	✓	✓
Short-Range In-Stand		✓	✓	✓	✓	✓
Long-Range Out-of-Stand	*	✓	✓	✓	✓	✓
Short-Range Out-of-Stand		✓	✓	✓	✓	✓
CodeGate Active In-Stand		✓	✓	✓	✓	✓
CodeGate Inactive In-Stand	*	✓	✓	✓	✓	✓
CodeGate Active Out-of Stand	*	✓	✓	✓	✓	✓
CodeGate Inactive Out-of Stand		✓	✓	✓	✓	✓
UPC/EAN	*	✓	✓	✓	✓	✓
Code 128	*	✓	✓	✓	✓	✓
Code 93	*	✓	✓	✓	✓	✓
Codabar	*	✓	✓	✓	✓	✓
Interleaved 2 of 5 (ITF)	*	✓	✓	✓	✓	✓
MOD 10 check on ITF		✓	✓	✓	✓	✓
Code 11		✓	✓	✓	✓	✓
Code 39	*	✓	✓	✓	✓	✓
Full ASCII Code 39		✓	✓	✓	✓	✓

DEFAULT SETTINGS (CONTINUED)

PARAMETER	DEFAULT	RS-232	LIGHT PEN	IBM 46XX	KBW	USB
Mod 43 Check on Code 39		✓	✓	✓	✓	✓
MSI-Plessey 10/10 Check Digit		✓	✓	✓	✓	✓
MSI-Plessey Mod 10 Check Digit	*	✓	✓	✓	✓	✓
Paraf Support ITF		✓	✓	✓	✓	✓
ITF Symbol Lengths	Variable	✓	✓	✓	✓	✓
Minimum Symbol Length	3	✓	✓	✓	✓	✓
Symbol Length Lock	None	✓	✓	✓	✓	✓
Bars High as Code 39	*		✓			✓
Spaces High as Code 39			✓			✓
Bars High as Scanned			✓			✓
Spaces High as Scanned			✓			✓
DTS/SIEMENS						
DTS/NIXDORF	*					
NCR F						
NCR S						
Poll light pen source			✓			
Beeper tone	Normal	✓	✓	✓	✓	✓
Beep/transmit sequence	Before transmit	✓	✓	✓	✓	✓
Communication timeout	None	✓	✓	✓	✓	✓
Razzberry tone on timeout		✓	✓	✓	✓	✓
Three beeps on timeout		✓	✓	✓	✓	✓
Same symbol rescan timeout 250 msec		✓	✓	✓	✓	✓
Same symbol rescan timeout 375 msec		✓	✓	✓	✓	✓
Same symbol rescan timeout: 500 msec)		✓	✓	✓	✓	✓
Same symbol rescan timeout 625 msec		✓	✓	✓	✓	✓

DEFAULT SETTINGS (CONTINUED)

PARAMETER	DEFAULT	RS-232	LIGHT PEN	IBM 46XX	KBW	USB
Same symbol rescan timeout 750 msec		✓	✓	✓	✓	✓
Same symbol rescan timeout 875 msec	*	✓	✓	✓	✓	✓
Same symbol rescan timeout: 1000 msec		✓	✓	✓	✓	✓
No Same symbol timeout		✓	✓	✓	✓	✓
Infinite Same symbol timeout		✓	✓	✓	✓	✓
Inter-character delay Program able in 1 msec steps (max 255 msec)	1 msec 10 msec in KBW	✓	✓	✓	✓	✓
Number of scan buffers (maximum)	4	✓	✓	✓	✓	✓
Transmit UPC-A check digit	*	✓	✓	✓	✓	✓
Transmit UPC-E check digit		✓	✓	✓	✓	✓
Expand UPC-E		✓	✓	✓	✓	✓
Convert UPC-A to EAN-13		✓	✓	✓	✓	✓
Transmit lead zero on UPC-E		✓	✓	✓	✓	✓
Transmit UPC-A number system	*	✓	✓	✓	✓	✓
Transmit UPC-A Manufacturer ID#	*	✓	✓	✓	✓	✓
Transmit UPC -A Item ID#	*	✓	✓	✓	✓	✓
Transmit Codabar Start/Stop Characters		✓		✓	✓	✓
CLSI Editing (Enable)		✓		✓	✓	✓
Transmit Mod 43 Check digit on Code 39		✓		✓	✓	✓
Transit Mod 10/ITF		✓		✓	✓	✓
Transmit MSI-Plessey		✓		✓	✓	✓
Parity	Scanner: Space Cradle: None	✓		✓		
Baud Rate	9600	✓				
8 Data Bits	Scanner: *	✓				
7 Data Bits	Cradle: *	✓				
Stop Bits	2	✓				

DEFAULT SETTINGS (CONTINUED)

PARAMETER	DEFAULT	RS-232	LIGHT PEN	IBM 46XX	KBW	USB
Transmit Sanyo ID Characters		✓			✓	✓
Nixdorf ID		✓			✓	✓
LRC Enabled		✓			✓	✓
UPC Prefix		✓			✓	✓
UPC Suffix		✓			✓	✓
Carriage Return	*	✓			✓	✓
Line Feed-Disabled by default in KBW	*	✓			✓	✓
Tab Prefix		✓			✓	✓
Tab Suffix		✓			✓	✓
"DE" Disable Command		✓				
"FL" Laser		✓				
Enable Command		✓				
DTR Handshaking support		✓				
RTS/CTS Handshaking		✓				
Character	*	✓				
Message RTS/CTS		✓				
XON/XOFF Handshaking		✓				
ACK/NAK		✓				
Two Digit Supplements		✓	as code 39	✓	✓	as code 39
Five Digit Supplements		✓	as code 39	✓	✓	as code 39
Bookland		✓	as code 39	✓	✓	as code 39
977 (2 digit) Supplemental Requirement		✓	✓	✓	✓	✓
Supplements are not Required	*	✓	✓	✓	✓	✓
Two Digit Redundancy	*	✓	✓	✓	✓	✓
Five digit Redundancy		✓	✓	✓	✓	✓

DEFAULT SETTINGS (CONTINUED)

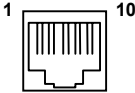
PARAMETER	DEFAULT	RS-232	LIGHT PEN	IBM 46XX	KBW	USB
100 msec to Find Supplement Programmable in 100 msec steps (max 800 msec)	*	✓	✓	✓	✓	✓
Coupon Code 128		✓	as code 39	✓	✓	as code 39
† Programmable Code Lengths	7 avail	✓	✓	✓	✓	✓
† Code Selects with programmable Code Length Locks	3 avail	✓	✓	✓	✓	✓
Programmable Prefix characters	10 avail	✓			✓	✓
Suffix characters	10 avail	✓			✓	✓
Prefixes for Individual Code types		✓			✓	✓
Editing		✓	✓	✓	✓	✓
Inter Scan-Code delay programmable (100 µsec steps)	800 µsec				✓	
Function/control Key Support						
Minimum Element width Programmable in 5.6 µsec steps	1 msec		✓			✓
RangeGate Enabled		✓	✓	✓	✓	✓
Authentication		✓	✓	✓	✓	✓
MTLG Challenge		✓	✓	✓	✓	✓
Charging enabled	*	✓	✓	✓	✓	✓

† These options are mutually exclusive. One can not be used in conjunction with the other.

CRADLE AND CABLE TERMINATIONS

Cradle Pinout Connections

The MS9535 cradle has 3 ports on the bottom. One is for power, and the other two are for interfaces connection. The 10-pin RJ45 modular jack has different configurations for different interfaces.



10-Pin RJ45

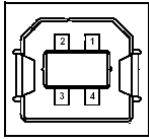
MI9535-541 RS232 / Light Pen Emulation	
Pin	Function
1	Ground
2	RS-232 Transmit Output
3	RS-232 Receive Input
4	RTS Output
5	CTS Input
6	DTR Input/LTPN Source
7	Reserved
8	LTPN Data
9	Reserved
10	Shield Ground

MI9535-547 Keyboard Wedge	
Pin	Function
1	Ground
2	RS-232 Transmit Output
3	RS-232 Receive Input
4	PC Data
5	PC Clock
6	KB Clock
7	PC +5V
8	KB Data
9	+5VDC
10	Shield Ground

MI9535-537 USB	
Pin	Function
1	Ground
2	RS-232 Transmit Output
3	RS-232 Receive Input
4	RTS Output
5	CTS Input
6	Reserved
7	Reserved
8	Reserved
9	Reserved
10	Shield Ground

CRADLE AND CABLE TERMINATIONS (CONTINUED)

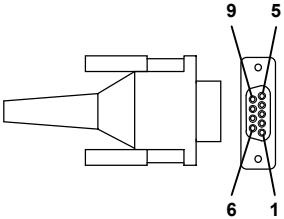
USB Port	
Pin	Function
1	VCC
2	D-
3	D+
4	Ground



USB B Type Port

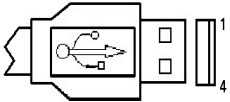
Cable Connector Configurations (Host End)

RS232/Light Pen Cable [MLPN 54-54000B-N]	
9-pin D-type female connector to the PC	
Pin	Function
1	Shield Ground
2	RS-232 Transmit Output
3	RS-232 Receive Input
4	DTR Input/Light Pen Source
5	Power/Signal Ground
6	Light Pen Data
7	CTS Input
8	RTS Output
9	+5VDC



9-Pin D-Type Connector

Pin	Function
1	VCC
2	D-
3	D+
4	Ground

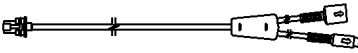


USB A Type Connector

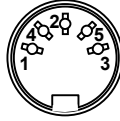
CRADLE AND CABLE TERMINATIONS (CONTINUED)

Cable Connector Configuration

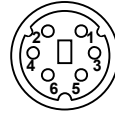
The Keyboard Wedge cable [MLPN 57-57002A] is terminated with a 5-pin DIN female connector on one end, and a 6-pin mini DIN male on the other.



Keyboard Wedge Cable

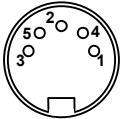


5-Pin DIN, Female



6-Pin DIN, Male

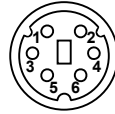
Metrologic will supply an adapter cable with a 5-pin DIN male connector on one end and a 6-pin mini DIN female connector on the other.



5-Pin DIN, Male



Adapter Cable



6-pin Mini DIN, Female

According to the termination required, connect the appropriate end of the adapter cable to the main cable, leaving the necessary termination exposed for connecting to the keyboard and the keyboard port on the PC. The pin assignments are as follows:

Main Cable

5-pin Female DIN	
Pin	Function
1	Keyboard Clock
2	Keyboard Data
3	No Connect
4	Power Ground
5	+5 Volts DC
6-pin Male Mini-DIN	
Pin	Function
1	PC Data
2	No Connect
3	Power Ground
4	+5 Volts DC
5	PC Clock
6	No Connect

Adapter Cable

5-pin Male DIN	
Pin	Function
1	PC Clock
2	PC Data
3	No Connect
4	Power Ground
5	+5 Volts DC
6-pin Female Mini-DIN	
Pin	Function
1	Keyboard Data
2	No Connect
3	Power Ground
4	+5 Volts DC
5	Keyboard Clock
6	No Connect

LIMITED WARRANTY

The MS9535 scanners are manufactured by Metrologic at its Suzhou, China facility. The MS9535 scanners have a two (2) year limited warranty from the date of manufacture. Metrologic warrants and represents that all MS9535 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 the Metrologic facility in Blackwood, New Jersey, USA or Puchheim, Germany. To do this, contact Metrologic's 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 judgement 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.

THIS LIMITED WARRANTY, EXCEPT AS TO TITLE, IS IN LIEU OF ALL OTHER WARRANTIES OR GUARANTEES, EITHER EXPRESS OR IMPLIED, AND SPECIFICALLY EXCLUDES, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE UNDER THE UNIFORM COMMERCIAL CODE, OR ARISING OUT OF CUSTOM OR CONDUCT. THE RIGHTS AND REMEDIES PROVIDED HEREIN ARE EXCLUSIVE AND IN LIEU OF ANY OTHER RIGHTS OR REMEDIES. IN NO EVENT SHALL METROLOGIC BE LIABLE FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES, INCIDENTAL DAMAGE, DAMAGES TO PERSON OR PROPERTY, OR EFFECT ON BUSINESS OR PROPERTY, OR OTHER DAMAGES OR EXPENSES DUE DIRECTLY OR INDIRECTLY TO THE PRODUCT, EXCEPT AS STATED IN THIS WARRANTY. IN NO EVENT SHALL ANY LIABILITY OF METROLOGIC EXCEED THE ACTUAL AMOUNT PAID TO METROLOGIC FOR THE PRODUCT. METROLOGIC RESERVES THE RIGHT TO MAKE ANY CHANGES TO THE PRODUCT DESCRIBED HEREIN.

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NOTICES

Notice

The FCC requires that you be advised of certain requirements involving the use of this device. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device uses and generates radio frequency energy. If not installed and used in accordance with the instruction, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio TV technician for help

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Privacy of communications may not be ensured when using this equipment.

The radiated output power of this intentional wireless radio is far below the FCC radio frequency exposure limits. The internal wireless radio operates within guidelines found in radio frequency safety standards and recommendations, which reflect the consensus of the scientific community. The level of energy omitted is far less than the electromagnetic energy emitted by wireless devices such as mobile phones. However, the use of wireless radios may be restricted in some situations or environments, such as aboard airplanes. If you are unsure of restrictions, you are encouraged to ask for authorization before turning on the wireless radio.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice

This Class B digital apparatus complies with Canadian ICES-003.

Remarque

Cet appareil numérique de la class B est conforme à la norme NMB-003 du Canada.

Caution

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser light exposure. Under no circumstances should the customer attempt to service the laser scanner. Never attempt to look at the laser beam, even if the scanner appears to be nonfunctional. Never open the scanner in an attempt to look into the device. Doing so could result in hazardous laser light exposure. The use of optical instruments with the laser equipment will increase eye hazard.

Atención

La modificación de los procedimientos, o la utilización de controles o ajustes distintos de los especificados aquí, pueden provocar una luz de láser peligrosa. Bajo ninguna circunstancia el usuario deberá realizar el mantenimiento del láser del escáner. Ni intentar mirar al haz del láser incluso cuando este no esté operativo. Tampoco deberá abrir el escáner para examinar el aparato. El hacerlo puede conllevar una exposición peligrosa a la luz de láser. El uso de instrumentos ópticos con el equipo láser puede incrementar el riesgo para la vista.

Attention

L'emploi de commandes, réglages ou procédés autres que ceux décrits ici peut entraîner de graves irradiations. Le client ne doit en aucun cas essayer d'entretenir lui-même le scanner ou le laser. Ne regardez jamais directement le rayon laser, même si vous croyez que le scanner est inactif. N'ouvrez jamais le scanner pour regarder dans l'appareil. Ce faisant, vous vous exposez à une rayonnement laser qui est dangereux. L'emploi d'appareils optiques avec cet équipement laser augmente le risque d'endommagement de la vision.

NOTICES (CONTINUED)

Achtung

Die Verwendung anderer als der hier beschriebenen Steuerungen, Einstellungen oder Verfahren kann eine gefährliche Laserstrahlung hervorrufen. Der Kunde sollte unter keinen Umständen versuchen, den Laser-Scanner selbst zu warten. Sehen Sie niemals in den Laserstrahl, selbst wenn Sie glauben, daß der Scanner nicht aktiv ist. Öffnen Sie niemals den Scanner, um in das Gerät hineinzusehen. Wenn Sie dies tun, können Sie sich einer gefährlichen Laserstrahlung aussetzen. Der Einsatz optischer Geräte mit dieser Laserausrüstung erhöht das Risiko einer Sehschädigung.

Attenzione

L'utilizzo di sistemi di controllo, di regolazioni o di procedimenti diversi da quelli descritti nel presente Manuale può provocare delle esposizioni a raggi laser rischiose. Il cliente non deve assolutamente tentare di riparare egli stesso lo scanner laser. Non guardate mai il raggio laser, anche se credete che lo scanner non sia attivo. Non aprite mai lo scanner per guardare dentro l'apparecchio. Facendolo potete esporvi ad una esposizione laser rischiosa. L'uso di apparecchi ottici, equipaggiati con raggi laser, aumenta il rischio di danni alla vista.

PATENTS

Patent Coverage

The Voyager^{BT} METROLOGIC product may be covered by one or more of the following US Patents:

US Patent No. 4,958,984; 5,081,342; 5,260,553; 5,340,971; 5,340,973; 5,424,525; 5,468,951; 5,484,992; 5,525,789; 5,528,024; 5,591,953; 5,616,908; 5,627,359; 5,661,292; 5,777,315; 5,789,730; 5,789,731; 5,811,780; 5,825,012; 5,828,048; 5,883,375; 5,886,337; 5,895,907; 5,925,870; 5,925,871; 5,939,698; 6,029,894; D408,532;

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Other worldwide patents are currently pending.

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