



METROLOGIC INSTRUMENTS, INC.
MS2020 Stratos® Series
Installation and User's Guide





LOCATIONS

CORPORATE HEADQUARTERS NORTH AMERICA

USA, NEW JERSEY

Metrologic Instruments, Inc.
Tel: 1-800-ID-METRO Fax: 856-228-6673
Email: info@metrologic.com

SOUTH AMERICA, BRAZIL SÃO PAULO

Metrologic do Brasil Ltda.
Tel: 55-11-5182-8226 Fax: 55-11-5182-8315
Email: info@br.metrologic.com

SOUTH AMERICA, OUTSIDE BRAZIL SÃO PAULO

Metrologic South America
Tel: 55-11-5182-7273 Fax: 55-11-5182-7198
Email: info@sa.metrologic.com

ASIA, SINGAPORE

Metrologic Asia (Pte) Ltd
Tel: 65-6842-7155 Fax: 65-6842-7166
Email: info@sg.metrologic.com

CHINA, SUZHOU

Metro Technologies Co., Ltd.
Tel: 86-512-62572511 Fax: 86-512-62571517
Email: info@cn.metrologic.com

Metro Sales Office

Tel: 86-512-67622550 Fax: 86-512-67622560
Email: info@cn.metrologic.com

JAPAN, TOKYO

Metrologic Japan Co., Ltd.
Tel: 81-03-3839-8511 Fax: 81-03-3839-8519
Email: info@jp.metrologic.com

EUROPEAN, MIDDLE EAST & AFRICAN HEADQUARTERS

GERMANY, MUNICH

Metrologic Instruments GmbH
Tel: 49-89-89019-0 Fax: 49-89-89019-200
Email: info@europe.metrologic.com

GERMANY, MUNICH

Metrologic Instruments GmbH
Tel: 49-89-89019-0 Fax: 49-89-89019-200
Email: info@de.metrologic.com

ITALY, BOLOGNA

Metrologic Instruments Italia srl
Tel: +39 0 51 6511978 Fax: +39 0 51 6521337
Email: info@it.metrologic.com

FRANCE, PARIS

Metrologic Eria France SA
Tel: +33 (0) 1 48.63.78.78
Fax: +33 (0) 1 48.63.24.94
Email: info@fr.metrologic.com

SPAIN, MADRID

Metrologic Eria Ibérica, SL
Tel: +34 913 272 400 Fax: +34 913 273 829
Email: info@es.metrologic.com

Metrologic Europe Repair Center (MERC)

Metrologic Eria Ibérica, SL
Tel: +34 913 751 249 Fax: +34 913 270 437

UNITED KINGDOM, BASINGSTOKE

Metrologic Instruments UK Limited
Tel: +44 (0) 1256 365900
Fax: +44 (0) 1256 365955
Email: info@uk.metrologic.com

RUSSIA, MOSCOW

Metrologic Russia
Tel: +7 095 730 7424 Fax: +7 095 730 7425
Email: info@ru.metrologic.com

Copyright

© 2004 by Metrologic Instruments, Inc. All rights reserved. No part of this work may be reproduced, transmitted, or stored in any form or by any means without prior written consent, except by reviewer, who may quote brief passages in a review, or provided for in the Copyright Act of 1976.

Products and brand names mentioned in this document are trademarks of their respective companies.

TABLE OF CONTENTS

INTRODUCTION

Manual Scope	1
Manual Symbol Key	1
Product Overview	2
Base Kit Components and Optional Accessories	4
Replacement Parts	6
General Precautions.....	7
MS2020 Series Design Specifications.....	8

BASE MODEL CHARACTERISTICS

MS2020 Scanner/Scale.....	10
Components	10
Dimensions.....	12
Connector Panel.....	12
Caution and Serial Number Labels.....	13
Optional Remote Scale Display.....	14
Dimensions.....	14
Control Panel.....	14
MS2021 Scanner.....	15
Components	15
Dimensions.....	17
Connector Panel.....	17
Caution and Serial Number Labels.....	18
MS2022 Scanner.....	19
Components	19
Dimensions.....	21
Connector Panel.....	21
Caution and Serial Number Labels.....	22

INSTALLATION

Quick Installation Outline.....	23
Site Requirements.....	23
Vertical Clearance	23
Ventilation and Spacing.....	23

TABLE OF CONTENTS

Service Access	24
Power Installation	24
Checkstand Layout Consideration.....	24
Unpacking the Unit	25
Installing the Unit in the Counter	26
Proper Lifting Technique	26
For the MS2020 and the MS2021 (Full Size Units)	27
For the MS2022 (Compact Size Unit).....	29
Interface	31
RS232	31
Full Speed USB	34
Low Speed USB (External with MX009).....	37
IBM 46xx	40
OCIA.....	43
Integrated Scale on Single Cable Scanner/Scale System.....	46
Secondary Scanner.....	49
EAS Deactivation	53
SCANNER OPERATION	
Scan Zone	54
IR Activation Area.....	56
Indicator Descriptions	57
Audible	57
Visual.....	58
Failure	60
Diagnostic Indicator Display	61
Power Save Modes	64
Beeper Options and Button Functions.....	66
The Multi-Function Button	67
Startup.....	68
Power-Up Test Mode.....	68
Programming Mode	68

TABLE OF CONTENTS

SCALE OPERATION

Scale Zeroing	69
Calibration	70
Tools Required	70
Scale Calibration Methods.....	70
Priming the Scale for Calibration (lbs. & kg)	71
Scale Calibration Procedure (lbs. & kg) with Remote Display	72
Bar Code Calibration Procedure without Remote Display	76
Calibration Verification.....	80
U.S. Pounds (lbs.)	80
Kilograms (kg)	82
Security Seal Installation	84
Pressure Sensitive Security Seal	84
Wire Security Seal (Conversion Kit 46-46890)	86

MAINTENANCE

Daily Maintenance.....	87
Horizontal Scan Window Replacement	87
Vertical Scan Window Replacement	88

TROUBLESHOOTING

RS232 Demonstration Program	93
-----------------------------------	----

DEFAULT SETTINGS

Communication Parameters	94
--------------------------------	----

SCANNER AND CABLE TERMINATIONS

Scanner Pinout Connections	103
Cable Connector Configurations	105

LASER AND PRODUCT SAFETY

Notices	106
Cautions	107

LIMITED WARRANTY

PATENTS.....

INDEX.....

INTRODUCTION

MANUAL SCOPE

This guide provides an overview of the scanner and scanner/scale operation with detailed information about setup and installation. Adobe® Acrobat® versions of the user's manuals are also available for download from the Metrologic website (www.metrologic.com).

MANUAL SYMBOL KEY

	Caution!
	Important Additional Information.
	Manufactures Note

INTRODUCTION

PRODUCT OVERVIEW

Metrologic's Stratos series is designed to meet the demanding needs of high volume supermarket and point-of-sale applications. With advanced features like 6-sided, 360° scanning, 6000 scans per second, a complex scan zone and advanced decoding software, this high performance series of in-counter scanner/scale products guarantees fast customer checkouts with minimal operator fatigue and stress. The MS2020 series is equipped with a multitude of standard features including:

- StratosSCAN™ - 6-sided, 360° scanning that minimizes product orientation
- StratosSPHERE™ - Decoding software that reads poor quality and damaged bar codes
- StratosSYNC™ - Horizontal and vertical scanning zones operate independently from one another
- RSS-14 Decoding – Decodes RSS-14, RSS Limited and RSS expanded emerging symbologies
- Flash ROM – Upgrade latest software enhancements on site.
- Powered Aux Port – Connect hand-held scanner for large or bulky items
- Integrated Scale – Factory integrated field upgradeable scale
- Loud Speaker – 3 volume/7 tone settings can be heard in all environments
- Easy Programming – Windows® based utility or simple bar code setup
- Fully Automatic – “No touch” infrared wake up from power save modes
- EAS Deactivation – Electronic Article Surveillance (EAS) included
- Field Replaceable Vertical Window – Quickly remove vertical window for cleaning or replacement
- StratosSCOPE™ - Visual diagnostic indicator for easy-to read feedback on scanner condition
- StratosSWAP™ - Modular optics engine technology – small, prealigned, field replaceable modules
- StratosSCHOOL™ - operator training software

INTRODUCTION

Metrologic's Stratos Series is available in three base models.

BASE MODEL NO.	DESCRIPTION
MS2020-xx	Scanner with integrated scale – full size
MS2021-xx	Scanner only – full size
MS2022-xx	Scanner only – compact size

-xx = Interface type see model number designation for options.

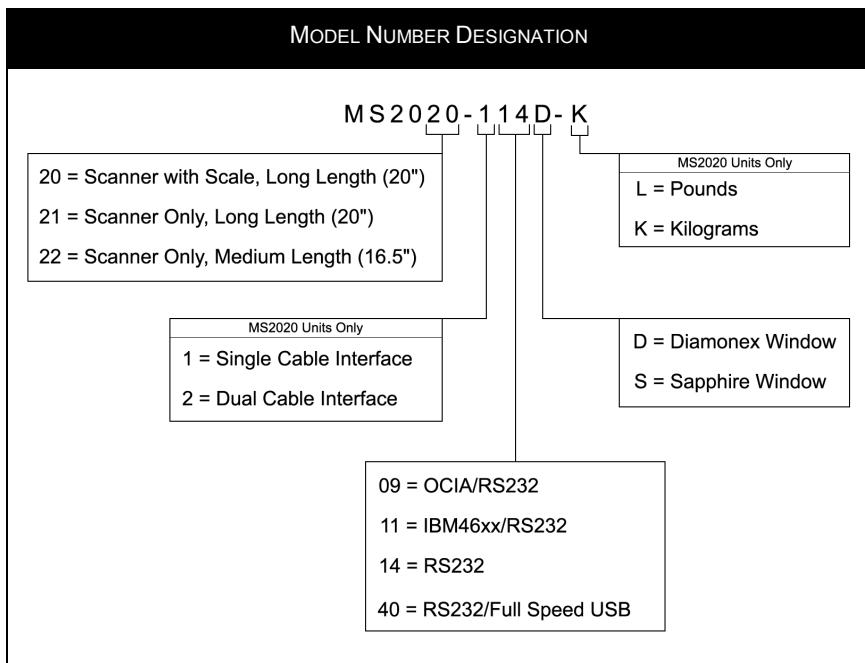


Figure 1. Model Number Designation

INTRODUCTION

BASE KIT COMPONENTS AND OPTIONAL ACCESSORIES

BASE KIT	
Part #	Description
MS202x-xxx	Stratos® Series Scanner
00-02407	MetroSelect® Configuration Guide
00-02983	MS2020 Stratos Series Installation and User's Guide

Guides also available for download at www.metrologic.com.

OPTIONAL ACCESSORIES	
Part #	Description
57-57xxx*	Interface Cable Straight, 3.7 m (12') cord with short strain relief
<i>xxx* specifies connection to the host. Contact a customer service representative for additional information.</i>	
MVC-**	Metrologic Voltage Converter Cable ($\pm 12\text{VDC}$ to $+5.2\text{VDC}$)
** Contact a Metrologic Customer Service representative for additional information on Metrologic's MVC cable series and the host connections available.	
57-57004C-N3	IBM 46xx Port 9 Cable, Straight 3.5 m (12') Cord
57-57200A-N-3	IBM USB Full Speed Cable, Straight 2.7 m (9') Cord
57-57000	Dual Cable Interface Straight, 3.7 m (12') cord with 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.

INTRODUCTION

BASE KIT COMPONENTS AND OPTIONAL ACCESSORIES

OPTIONAL ACCESSORIES	
Part #	Description
53-53004	RS232 Aux Cable, Coiled 2.7 m (9') cord
54-54004	RS232 Aux Cable, Straight 2.1 m (7') cord
54-54667	RS232 PowerLink AUX Cable with built in power jack Straight, 2.1 m (7') cord with long strain relief
52-52511	24" EAS cable
AC to DC Power Transformer - Regulated +5V @ 1.5A +12V @ 1.5A	
46-46812	120V United States and Canada
46-46813	220V – 240V Continental European
46-46814	220V – 240V United Kingdom
46-46817	220V – 240V China
46-46928	220V – 240V Australia
46-46816	Remote Scale Display for use with MS2020 lb. Scanner/Scales
46-46820	Remote Scale Display for use with MS2020 kg Scanner/Scales
46-46818	Mounting Adapter Plate

INTRODUCTION

REPLACEMENT PARTS

REPLACEMENT PARTS	
Part #	Description
 Caution	Window types (Diamonex and Sapphire) are <u>not</u> interchangeable due to laser safety and/or scanner performance differences. To change window type, the scanner must be returned to the manufacturer for reconfiguration.
46-46805	Vertical Window
46-46806	Diamonex Platter - Full Size
46-46807	Diamonex Platter - Compact Size
46-46808	Sapphire Platter - Full Size
46-46809	Sapphire Platter - Compact Size
The following replacement parts are available for purchase by a Metrologic authorized service representative only.	
46-46810	Vertical Optics Engine Module
46-46811	Horizontal Optics Engine Module
46-46815	MS2022 to MS2020 Scale Upgrade / Replacement Kit
46-46819	MS2021 to MS2020 Scale Upgrade / Replacement Kit
46-46890	Wire Seal Conversion Kit

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.

INTRODUCTION

GENERAL PRECAUTIONS

The following are some general precautions to remember when handling your MS2020 Series scanner.

Do Not Turn

the unit upside down with the platter in place.

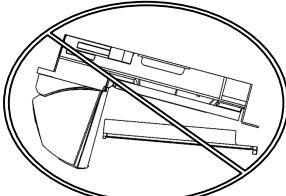


Figure 2.

Do Not Press

on the window in the replacement platter or the vertical window frame.

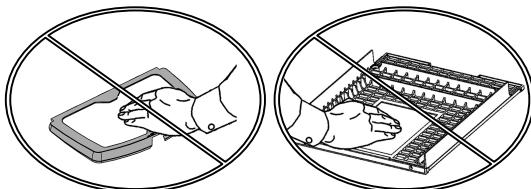


Figure 3.

PLATTER REMOVAL

No hardware or tools are required to remove the platter (see figure 4).

Refer to the Maintenance section of this manual for additional information on platter replacement.

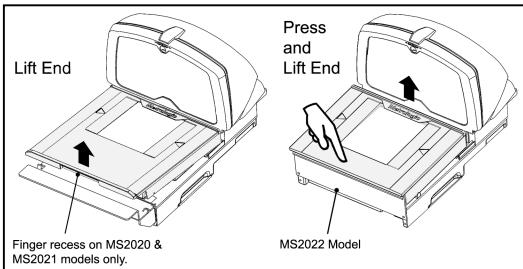


Figure 4.



See caution statement
on page 6.

FOR THE MS2020 ONLY

REST your thumbs against the vertical window frame when lifting the unit with the provided handles.

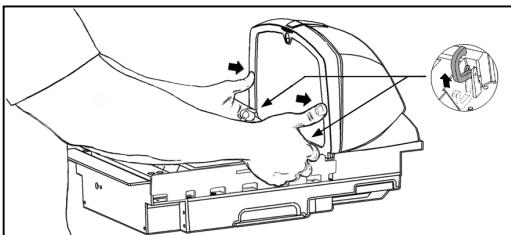


Figure 5.

INTRODUCTION

MS2020 SERIES DESIGN SPECIFICATIONS

Design Specifications	
Operational	
Light Source:	VLD 650 nm
Peak Laser Power:	<2.2 mW
Horizontal Depth of Field:	0 mm - 152 mm (0"- 6") for 0.33 mm (13 mil) bar code
Vertical Depth of Field:	0 mm - 216 mm (0"- 8.5") for 0.33 mm (13 mil) bar code
Scan Speed:	6000 scans lines per second
No. of Scan Lines:	68 (40 horizontal / 28 vertical)
Motor Speed:	4800 / 6000 RPM
Min Bar Width:	0.152 mm (6.0 mil)
Decode Capability:	All standard 1-D bar codes RSS-14, RSS-Expanded, and RSS-14 Limited
System Interfaces:	RS232, Aux RS232, IBM468x/469x, USB (low speed and full speed), OCIA
Print Contrast:	35% minimum reflectance difference
No. Characters Read:	up to 80 data characters (Maximum number will vary based on symbology and density)
Beeper Operation:	7 tones or no beep; 3 volume settings
Indicators (LED)	Blue = laser on, ready to scan; White = good read, decoding
Mechanical	
Length:	MS2020 (full size scanner/scale), 508 mm (20.0")
	MS2021 (full size scanner only), 508 mm (20.0")
	MS2022 (compact size scanner only), 420 mm (16.5")
Width (below counter):	MS2021/MS2020 - 290 mm (11.4")
	MS2022 - 292 mm (11.5")
Depth (below counter):	100 mm (3.9")
Height (above counter):	181 mm (7.1")
Weight (with platter):	MS2020 11.34 Kg (24.95 lbs.)
	MS2021 7.48 Kg (16.45 lbs.)
	MS2022 6.93 Kg (15.25 lbs.)

Specifications subject to change without notice.

INTRODUCTION

MS2020 SERIES DESIGN SPECIFICATIONS (CONTINUED)

		Design Specifications							
Scale Capacities									
Capacity:	kg unit	15 kg		lb. unit	30.0 lb.				
Minimum Increment:	kg unit	0.005 kg		lb. unit	0.01 lb.				
Maximum Static Weight:	kg unit	75 kg		lb. unit	150 lb.				
Adjustments required:	Calibration Only								
Electrical									
Voltage Supply:	1.5A @ +5V / 1.5A @ +12V								
Operating Power:	14.25 Watts								
Standby Power:	3.25 Watts								
Operating Current:	1 A @ 5V / .75A @ 12V								
Standby Current:	.44 A @ 5V / .08A @ 12V								
DC Transformers:	Class II; 5VDC @ 1.5A; 12VDC @ 1.5A								
Laser Class 1:	IEC 60825-1:1993+A1:1997+A2:2001 EN 60825-1:1994+A11:1996+A2:2001								
EMC:	FCC, ICES-003 & EN 55022 Class A								
Environmental									
Operating Temperature:	0°C to 40°C (32°F to 104°F)								
IP Rating:	IP 55								
Storage Temperature:	-40°C to 60°C (-40°F to 140°F)								
Humidity:	5% to 95% relative humidity, non-condensing								
Contaminants:	Sealed to resist airborne particulate contaminants								
Ventilation:	None required								

Specifications subject to change without notice.

BASE MODEL CHARACTERISTICS

MS2020 Scanner/Scale

Components

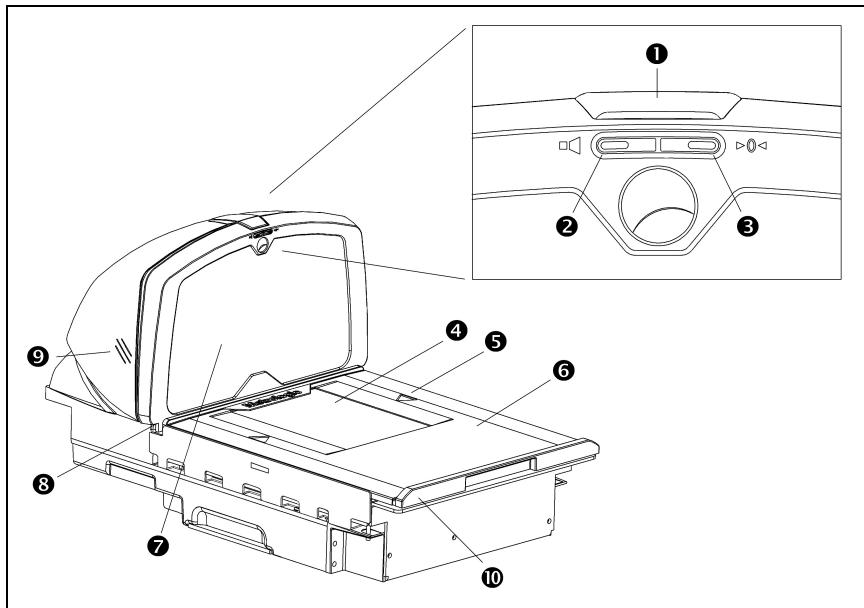


Figure 6. MS2020 Components

ITEM NO.	DESCRIPTION
1	Blue and White LEDs
2	Volume/Tone Button (Multi-Function)
3	Scale Zero Button
4	Diamonex or Sapphire Horizontal Window (Laser Aperture)
5	Flow Direction Indicator
6	Stainless Steel Platter (Replaceable)
7	Replaceable Vertical Window with High Impact Frame (Laser Aperture)
8	Debris Guard
9	Speaker
10	Product Weight/Roll Bar

BASE MODEL CHARACTERISTICS

MS2020 Scanner/Scale

Components

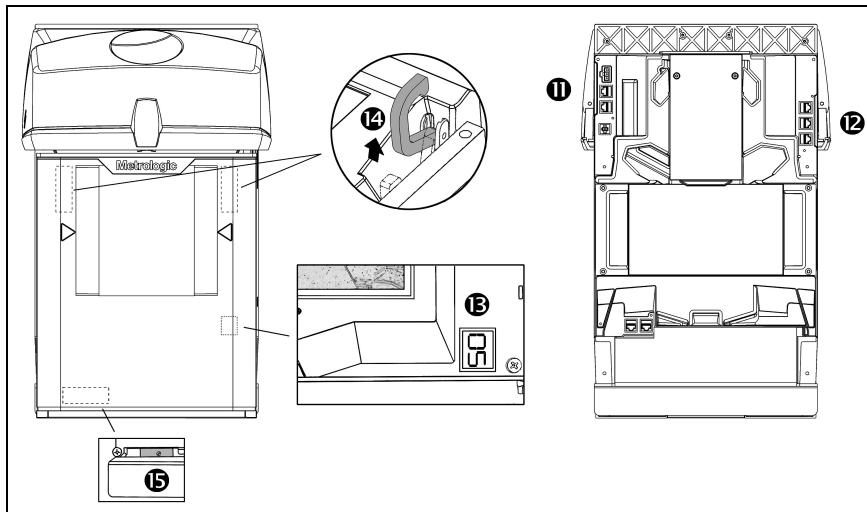


Figure 7. MS2020 Components

ITEM No.	DESCRIPTION
11	Power, Scale and EAS Connectors
12	Interface and Aux Scanner Connectors
13	Diagnostic Indicator Display (Located Under Platter)
14	Lift Handles (Located Under Platter)
15	Sealed Calibration Switch/Button Cover (Located Under Platter) On a fully installed unit the calibration switch cover should be sealed with a lead wire or paper seal. This seal indicates the appropriate Federal, State and Local Weights and Measures authorities have calibrated the scale. See the <i>Scale Operation: Calibration</i> section of this guide for further information.

BASE MODEL CHARACTERISTICS

MS2020 Scanner/Scale

Dimensions

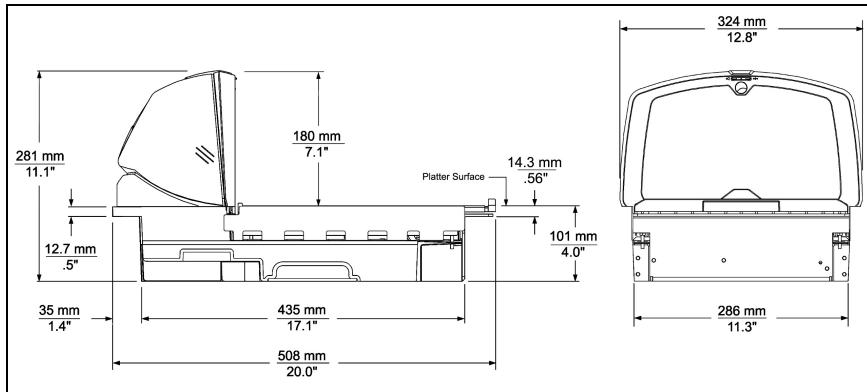


Figure 8. MS2020 Dimensions

Connector Panel

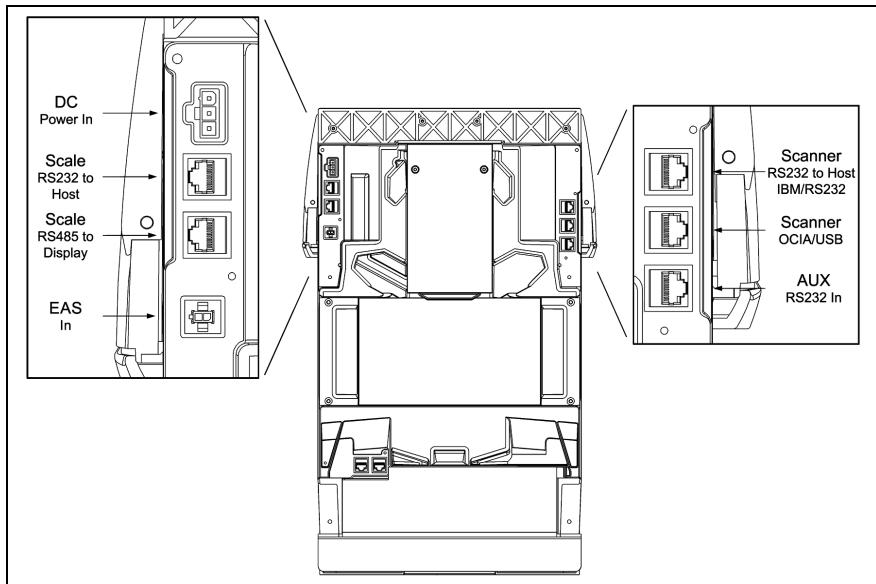


Figure 9. MS2020 Connectors

BASE MODEL CHARACTERISTICS

MS2020 Scanner/Scale

Caution and Serial Number Labels

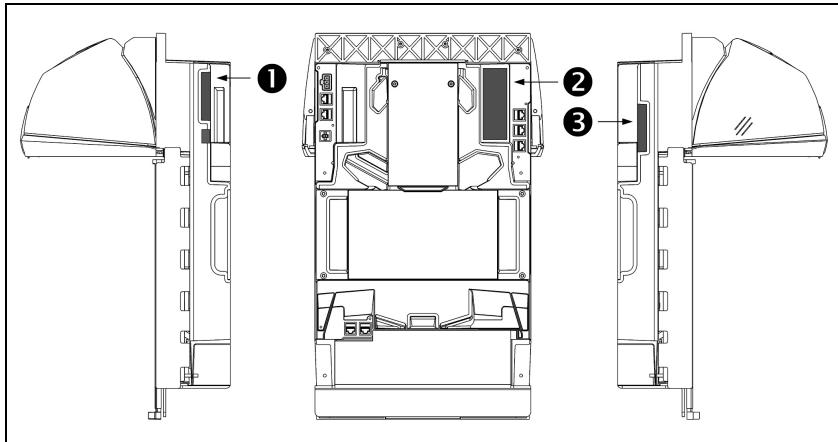


Figure 10. MS2020 Label Locations (Top) and Examples (Bottom)

①	EAS In	Scale RS485 to Display	Scale RS232 to Host	DC Power In
②	Metrologic Instruments Inc. Bridgewater, New Jersey, USA Contains no user serviceable components. Warranty void if case is opened. Complies with FCC and ICES-003 Class A. See manual. Manufactured Blackwood, NJ. October 2003 (A) Model: MS2020-14D 232 5V, 12V*** Stratos® Barcode Scanner 37 03 09 0011  See User's Guide for patent coverage.	This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50 dated July 26, 2001.		CAUTION: Laser light when opened. DO NOT STARE INTO BEAM.
③	Scanner RS232 to Host	N/C	Aux RS232 In	On MS2020-14 Model
	Scanner RS232 / IBM 46XX to Host	N/C	Aux RS232 In	On MS2020-11 Model
	Scanner RS232 to Host	Scanner USB to Host	Aux RS232 In	On MS2020-40 Model
	Scanner RS232 to Host	Scanner OCIA to Host	Aux RS232 In	On MS2020-09 Model

BASE MODEL CHARACTERISTICS

Optional Remote Scale Display

Dimensions

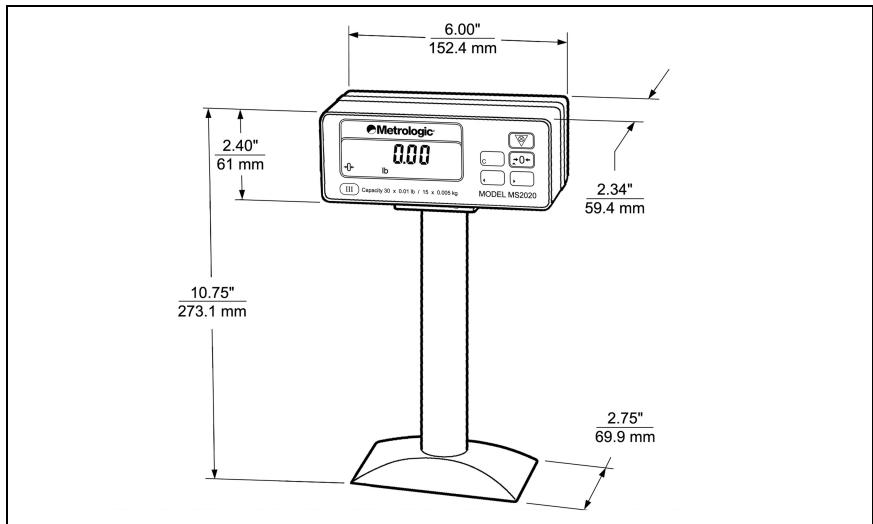


Figure 11. Optional Remote Scale Display Dimensions

Control Panel

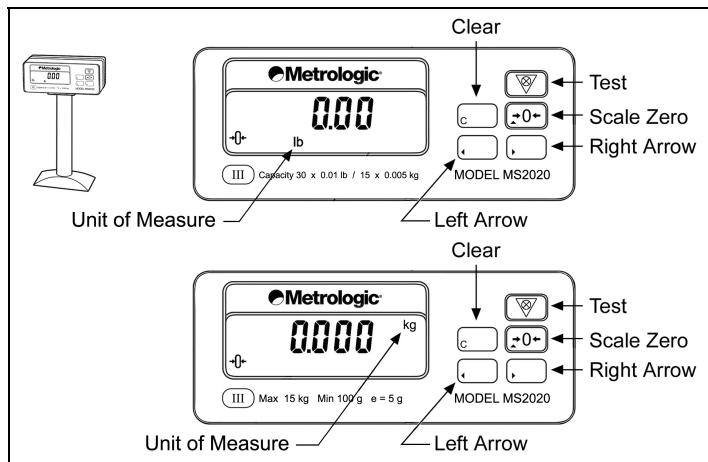


Figure 12. Optional Remote Scale Display Controls (46-46816 lb, 46-46820 kg)

BASE MODEL CHARACTERISTICS

MS2021 Scanner

Components

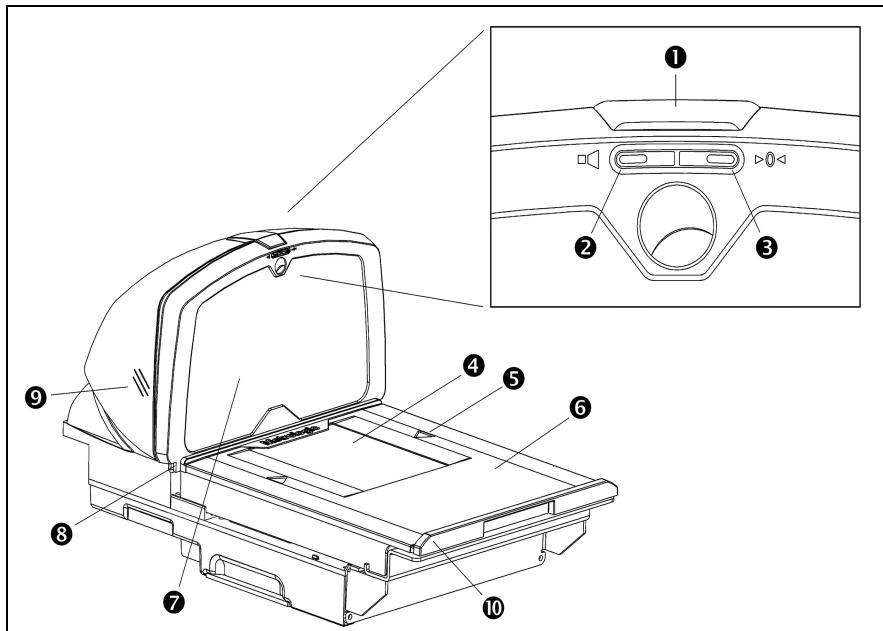


Figure 13. MS2021 Components

ITEM NO.	DESCRIPTION
1	Blue and White LEDs
2	Volume Button Volume/Tone Button (Multi-Function)
3	Applicable for MS2020 Scanner/Scale Models Only
4	Diamonex or Sapphire Horizontal Window (Laser Aperture)
5	Flow Direction Indicator
6	Stainless Steel Platter (Replaceable)
7	Replaceable Vertical Window with High Impact Frame (Laser Aperture)
8	Debris Guard
9	Speaker
10	Product Roll Bar/Debris Guard

BASE MODEL CHARACTERISTICS

MS2021 Scanner

Components

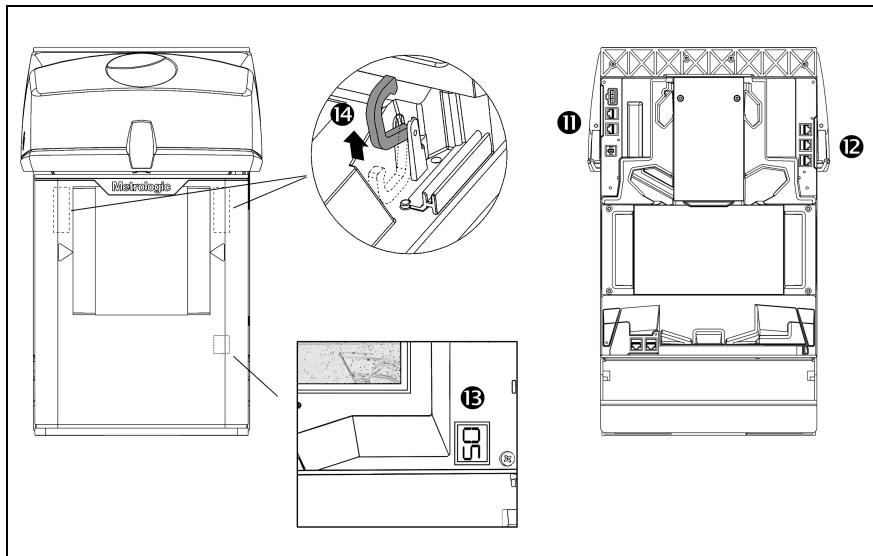


Figure 14. MS2021 Components

ITEM No.	DESCRIPTION
11	Power and EAS Connectors
12	Interface and Aux Scanner Connectors
13	Diagnostic Indicator Display (Located Under Platter)
14	Lift Handles (Located Under Platter)

BASE MODEL CHARACTERISTICS

MS2021 Scanner

Dimensions

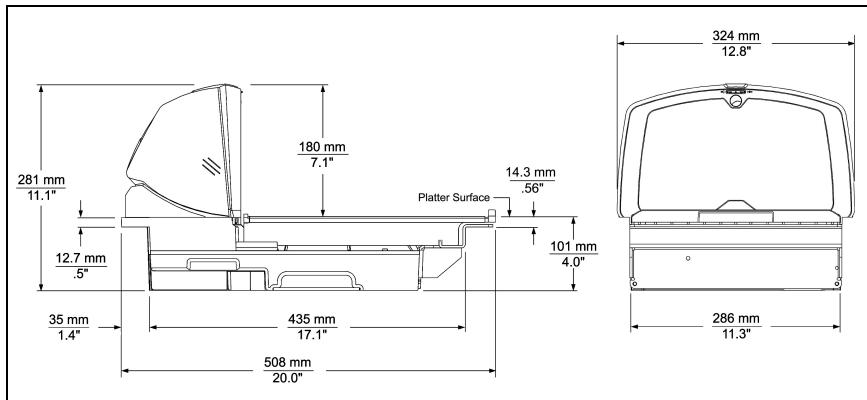


Figure 15. MS2021 Dimensions

Connector Panel

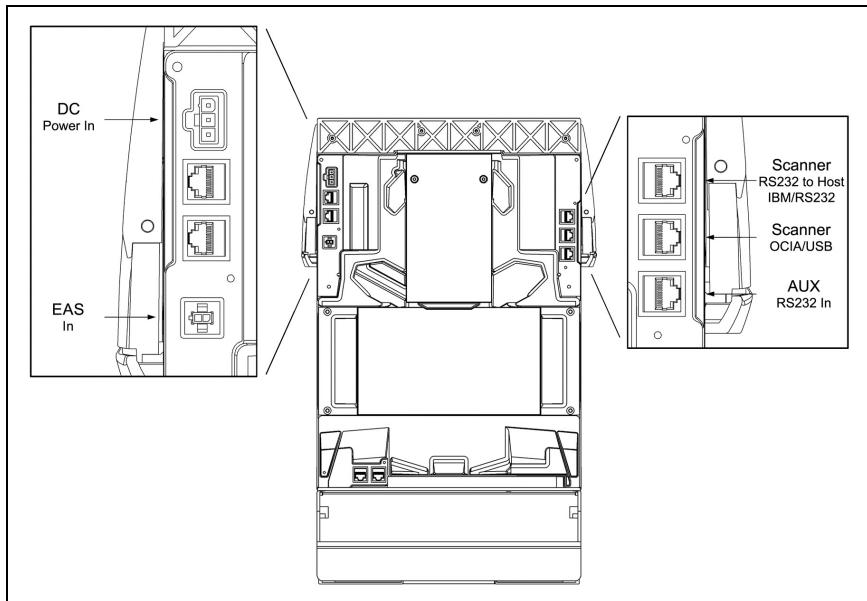


Figure 16. MS2021 Connectors

BASE MODEL CHARACTERISTICS

MS2021 Scanner

Caution and Serial Number Labels

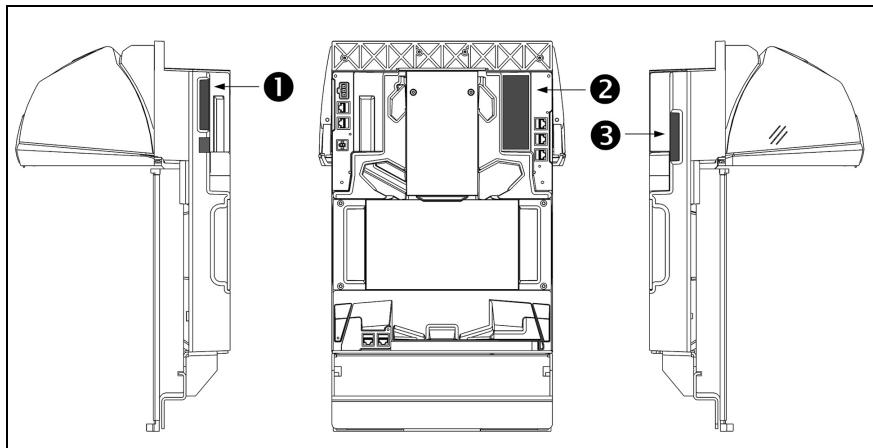


Figure 17. MS2021 Label Locations (Top) and Examples (Bottom)

①	EAS In	N/C	N/C	DC Power In
Metrologic Instruments Inc. Bridgewater, New Jersey, USA Contains no user serviceable components. Warranty void if case is opened. Complies with FCC and ICES-003 Class A. See manual. Manufactured Blackwood, N.J. October 2003 (A) Model: MS2021-14D 232 5V, 12V*** Stratos® Barcode Scanner 37 03 09 0011  See User's Guide for patent coverage.				
②	Scanner RS232 to Host	N/C	Aux RS232 In	This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50 dated July 26, 2001.  CAUTION: Laser light when opened. DO NOT STARE INTO BEAM.
On MS2021-14 Model				
③	Scanner RS232 / IBM 46XX to Host	N/C	Aux RS232 In	On MS2021-11 Model
On MS2021-40 Model				
④	Scanner RS232 to Host	Scanner USB to Host	Aux RS232 In	On MS2021-09 Model

BASE MODEL CHARACTERISTICS

MS2022 Scanner

Components

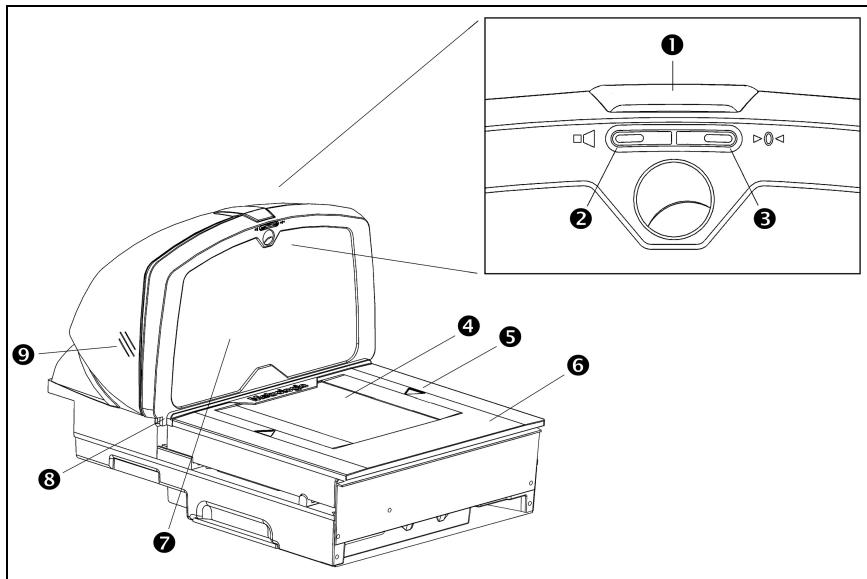


Figure 18. MS2022 Components

ITEM No.	DESCRIPTION
1	Blue and White LEDs
2	Volume/Tone Button (Multi-Function)
3	Applicable for MS2020 Scanner/Scale Models Only
4	Diamonex or Sapphire Horizontal Window (Laser Aperture)
5	Flow Direction Indicator
6	Stainless Steel Platter (Replaceable)
7	Replaceable Vertical Window with High Impact Frame (Laser Aperture)
8	Debris Guard
9	Speaker

BASE MODEL CHARACTERISTICS

MS2022 Scanner

Components

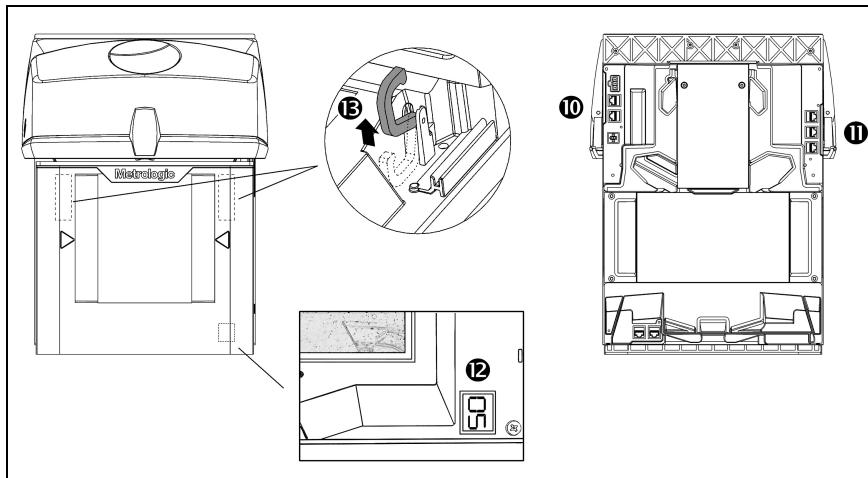


Figure 19. MS2022 Components

ITEM No.	DESCRIPTION
10	Power and EAS Connectors
11	Interface and Aux Scanner Connectors
12	Diagnostic Indicator Display (Located Under Platter)
13	Lift Handles (Located Under Platter)

BASE MODEL CHARACTERISTICS

MS2022 Scanner

Dimensions

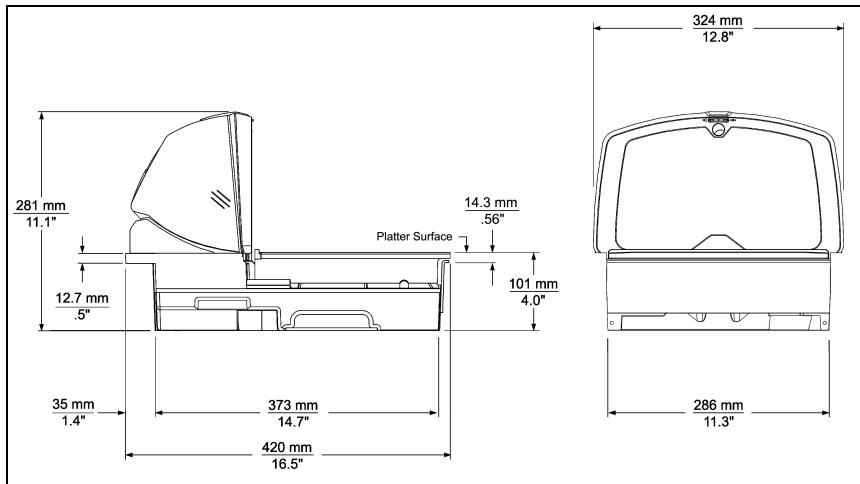


Figure 20. MS2022 Connectors

Connector Panel

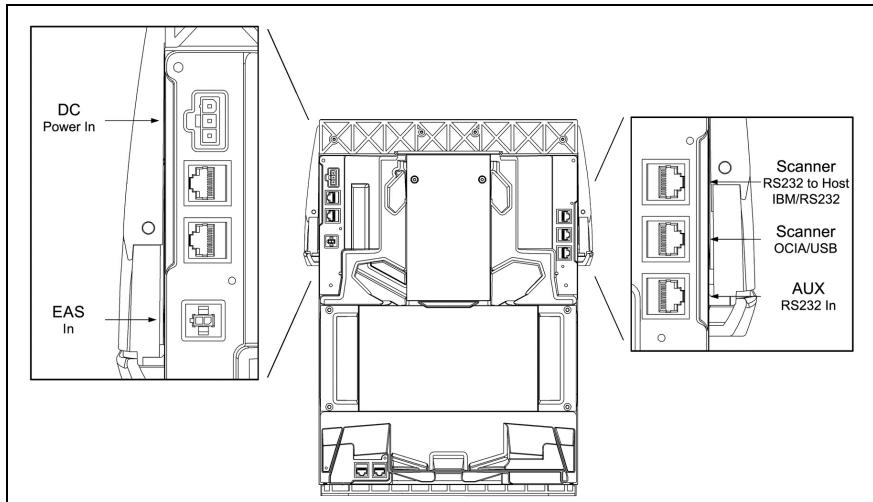


Figure 21. MS2022 Connectors

BASE MODEL CHARACTERISTICS

MS2022 Scanner

Caution and Serial Number Labels

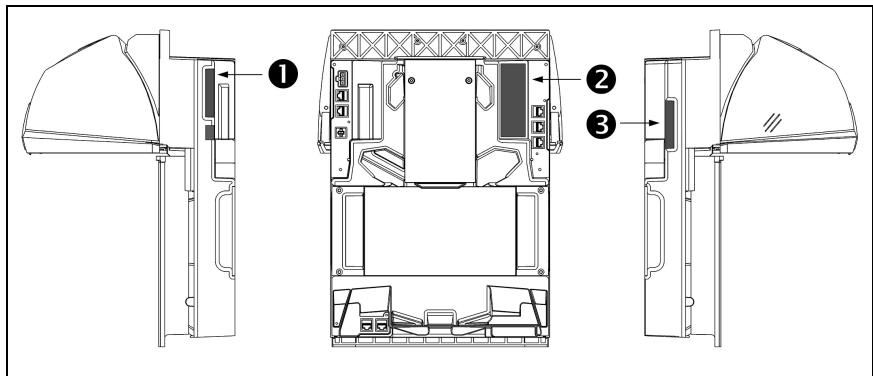


Figure 22. MS2022 Label Locations (Top) and Examples (Bottom)

1	EAS In	N/C	N/C	DC Power In
Metrologic Instruments Inc. Blackwood New Jersey, USA Contains no user serviceable components. Warranty void if case is opened. Complies with FCC and ICES-003 Class A. See User's Guide for patent coverage. Manufactured Blackwood, NJ. February 2003 (P) Model: MS2022-14D 232 5V, 12V== Stratos® Barcode Scanner 37 03 09 0011  See User's Guide for patent coverage.				
2				This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50 dated July 26, 2001.  CAUTION: Laser light when opened. DO NOT STARE INTO BEAM.
3	Scanner RS232 to Host	N/C	Aux RS232 In	On MS2022-14 Model
	Scanner RS232 / IBM 46XX to Host	N/C	Aux RS232 In	On MS2022-11 Model
	Scanner RS232 to Host	Scanner USB to Host	Aux RS232 In	On MS2022-40 Model
	Scanner RS232 to Host	Scanner OCIA to Host	Aux RS232 In	On MS2022-09 Model

INSTALLATION

QUICK INSTALLATION OUTLINE

The following is a quick preview of the steps required for 1st time installations. Each item is discussed in detail later in this section.

- Determine clearance, ventilation and service access requirements.
- Determine checkstand layout taking into account package flow, cable routing and power requirements.
- Choose the mounting option which provides the best cable/power access and unit stability.
- Unpack the unit.
- Make the appropriate countertop cutouts and install all support brackets.
- Place the unit in the counter.
- Install the platter.
- Follow the steps under the correct interface to connect the cables and power supply.
- Program the unit for the correct interface.
- Calibrate the scale (for the MS2020 model only).

SITE REQUIREMENTS

Before installing your Stratos scanner/scale, please consider the following items.

Vertical Clearance

A minimum clearance height of 7.50" from the checkstand surface is needed for the vertical 'hood' on all of the scanner models. Additional clearance is recommended for unobstructed LED viewing by the operator.

Ventilation and Spacing

All Stratos models have a die-cast housing to dissipate heat allowing the unit to operate without a ventilation fan. Metrologic recommends that the temperature surrounding the unit does not exceed 40°C (104°F). There should be adequate convection and minimal heat producing equipment in close proximity of the unit. A cooling fan with a filter is recommended if there will be a conveyor motor or other heat producing equipment close to the unit that will create a high temperature environment.

Adequate spacing between the unit and the checkstand opening is required for proper operation of the scale. When the scanner/scale model is mounted properly, the scale platter should be able to move up and down freely without hitting the edges of the checkstand cutout. Refer to *Installing the Unit in the Counter* for detailed cutout dimensions and mounting instructions.

INSTALLATION

SITE REQUIREMENTS

Service Access

When routing and installing the cable(s) and power supply, make sure you leave access that these components may be swapped easily without the need to remove the unit from the checkstand.

When changing the StratosSWAP optics engine modules, Metrologic recommends removing the unit completely from the checkstand.

When calibrating or zeroing the scale, do not remove the unit from the checkstand. Refer to the *Scale Operation Section* of this guide for detailed instructions on zeroing and calibration.

Power Installation

The Power Supply (AC/DC) should be connected to an AC Outlet that is free of electrical noise (clean). A qualified electrician can determine the amount of electrical noise on the AC line. See additional information on power installation and restrictions under the Installation: Interface section of this manual.

Checkstand Layout Considerations

When placing a scanner in a checkstand, the following factors should be considered.

- Items should flow at a distance to the operator that maximizes comfort. The operator should not need to stretch or strain to reach for and scan packages.
- The Stratos can scan a bar code on all 6 sides of a package. The packages should flow into the scan area that provides the maximum reading performance. No lifting or orientation of the items is necessary. A properly placed item diverter can maximize the flow of packages.
- In what direction are the packages flowing? Most checkstands are designed for left-handed takeaway. If the operator is facing the vertical window of the scanner, packages flow from the operator's right to left. The packages are in queue on the conveyor to the right and the bagging is to the left.

INSTALLATION

UNPACKING THE UNIT

1. Make sure the shipping box is top-side up before opening.
2. Remove the accessories box and check its content for the following items.
 - Remote Display (Optional), Qty. 1
 - Programming Guide, Qty. 1
 - Installation and User's Guide, Qty. 2
 - Power Supply, Qty. 1
 - Communication Cables, Qty. Application Dependent

3. Lift the scanner out of the shipping box by gripping the **bottom** of the unit on both sides.

Important! Do not lift the unit out of the box by gripping the sides of the platter.

4. Carefully remove the shipping foam around the unit.

Important! Do not turn the unit upside down or tilt the unit onto its side while removing the shipping foam. The platter is not attached to the unit and can fall off!

5. Lift the platter off the unit and store it in a safe location until the unit has been installed in the checkstand counter.

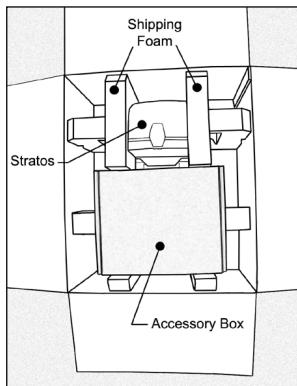


Figure 23.

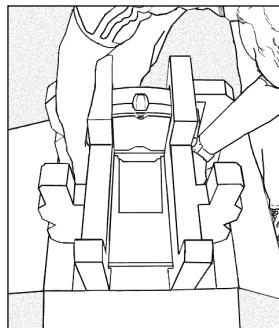


Figure 24.

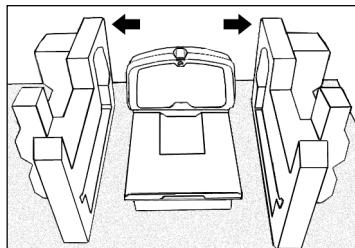


Figure 25.

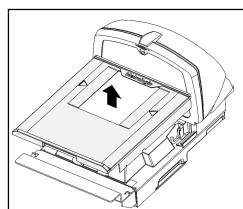


Figure 26.

INSTALLATION

INSTALLING THE UNIT IN THE COUNTER

Proper Lifting Technique

On every Stratos model there are two lifting handles located under the removable platter. These handles are provided to assist in installation when placing the unit in the checkstand cutout.

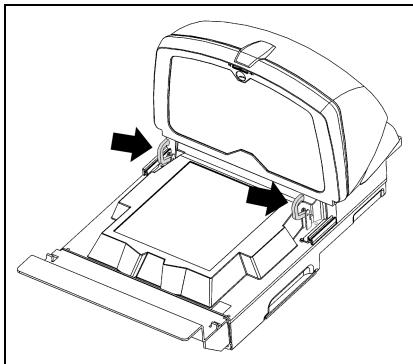


Figure 27. Lifting Handles
(MS2021 Shown)

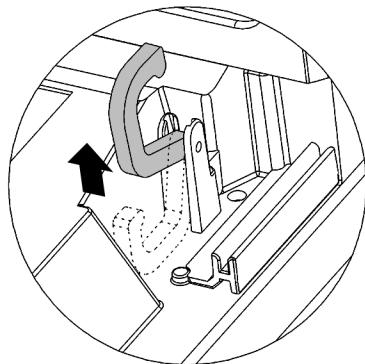


Figure 28. Rotate Handles Up
(MS2021 Shown)

For MS2020 Units Only

i When lifting the unit with these handles it is important to rest your thumbs against the front surface of the vertical window frame. If you do not do this the unit will tilt toward you when it is lifted. This makes installation difficult and increases the risk of dropping the scanner.

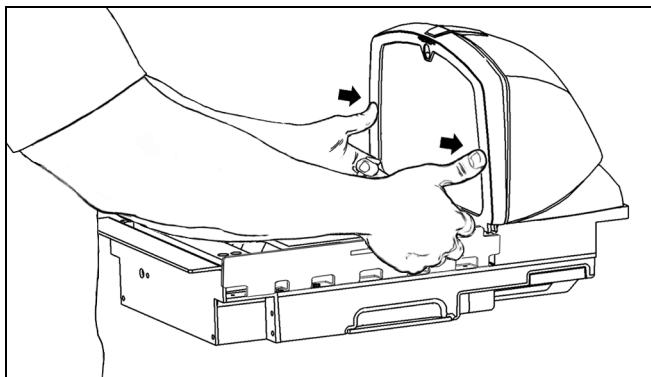


Figure 29. Rest Thumbs Against the Vertical Frame (MS2020 Shown)

INSTALLATION

INSTALLING THE UNIT IN THE COUNTER

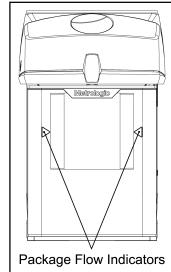
For the MS2020 and the MS2021 (Full Size Units)

There are two options for mounting your MS2020/MS2021 scanner. *Option A*, is a two-point mounting system that supports the unit at the front and back.

Option B, is a three-point mounting system that supports the unit at the back and on the sides.

Before starting to mount the MS2020/MS2021 determine:

- The scanner's orientation in reference to the operator and the direction of package flow.
- The mounting method that provides the most stability for the scanner.
- If any additional materials or tools are required for installation.



Option A: Two-point support.

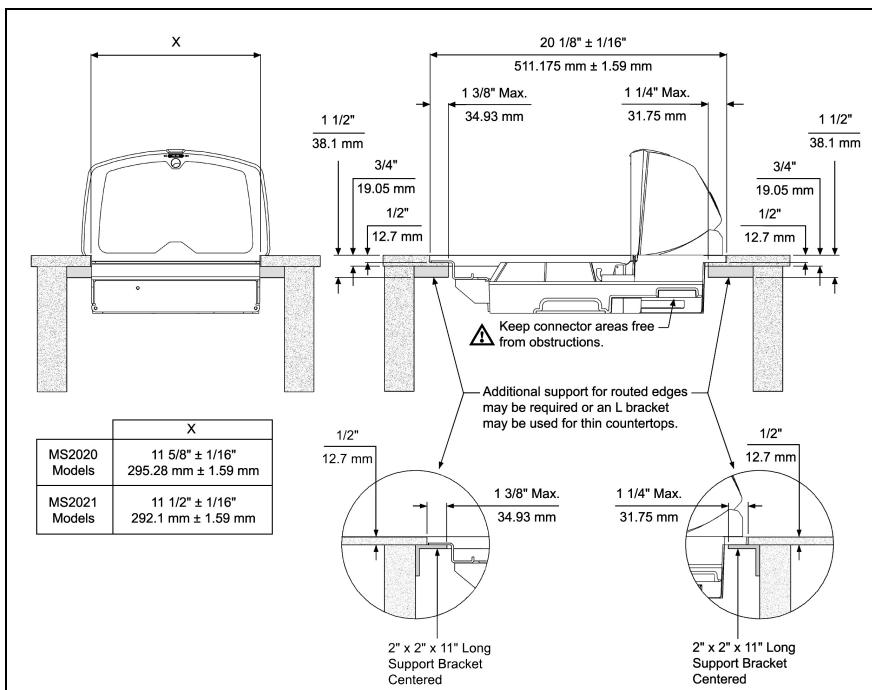


Figure 30. Option A, Two-Point Support

INSTALLATION

INSTALLING THE UNIT IN THE COUNTER

Option B: Three-point support.

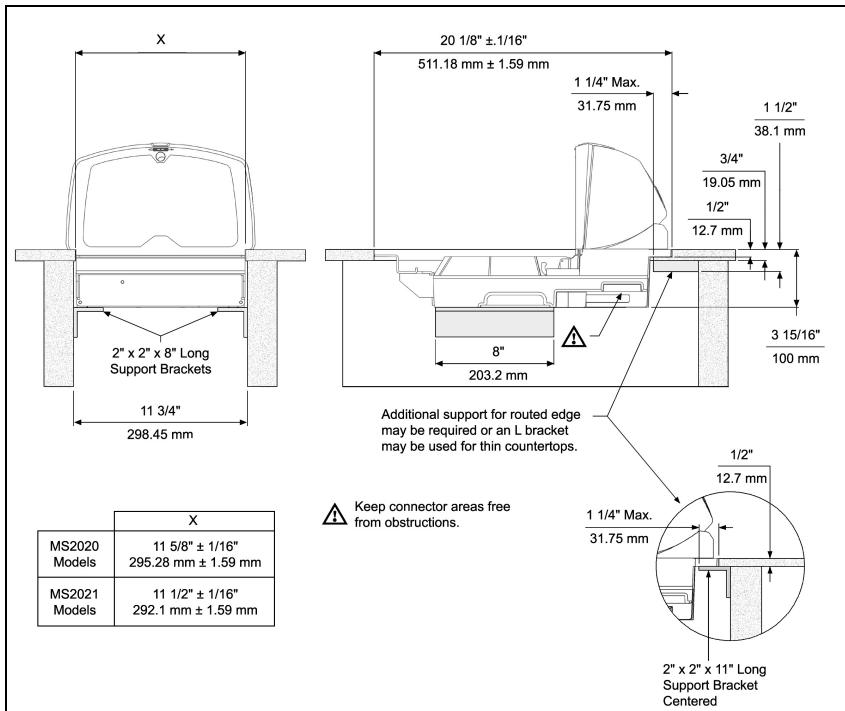


Figure 31. Option B, Three-Point Support

INSTALLATION

INSTALLING THE UNIT IN THE COUNTER

For the MS2022 (Compact Size Unit)

There are two options for mounting your MS2022 scanner. *Option A*, is a two-point mounting system that supports the unit at the front and back. *Option B*, is a three-point mounting system that supports the unit at the back and on the sides.

Before starting to mount the MS2022 determine:

- The scanner's orientation in reference to the operator and the direction of package flow.
- The mounting method that provides the most stability for the scanner.
- If any additional materials or tools are required for installation.



Option A: Two-point support.

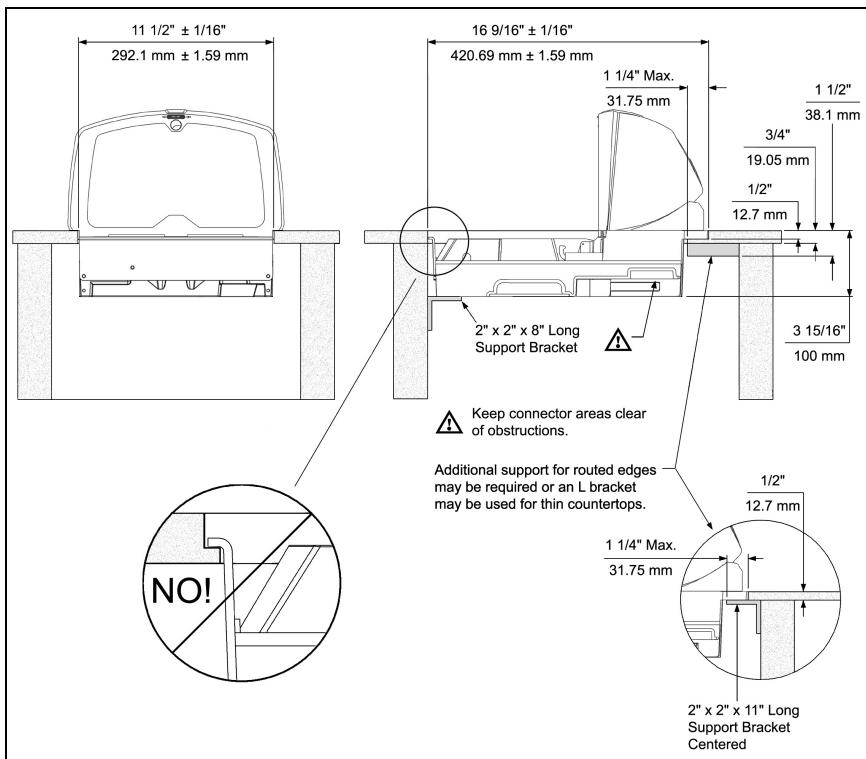


Figure 32. Option A, Two-Point Support

INSTALLATION

INSTALLING THE UNIT IN THE COUNTER

For the MS2022 (Compact Size Unit)

Option B: Three-point support.

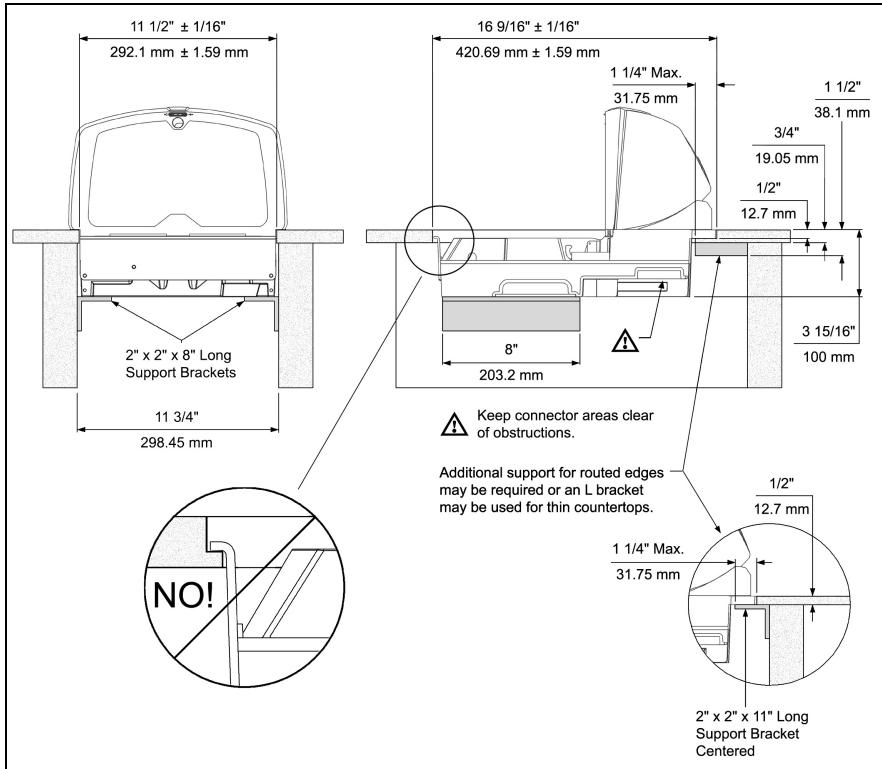


Figure 33. Option B, Three-Point Support

INSTALLATION

INTERFACE

RS232

1. Turn off the host system.
2. Connect the RS232 interface cable to the 1st 10-pin socket on the bottom of the scanner near the serial number label. Refer to figure 34 on page 33.
3. Connect the other end of the RS232 interface cable to the host device.



Before continuing, verify that the RS232 interface cable is connected to the appropriate interface jack on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner.

4. Steps 4 through 6 are for MS2020 scanner/scales using dual cable interfaces where the scale is connected to the host with a separate communication cable. If your Stratos model does not include a scale skip to step 7.

Connect the scale/host cable to the 1st 10-pin socket on the bottom of the scanner next to the 3-pin Molex plug. Refer to figure 34 on page 33.

5. Connect the other end of the scale/host cable to the host device.
6. Connect the *optional* remote display cable to the 2nd 10-pin socket on the bottom of the scanner near the 3-pin Molex plug.
7. Connect the external power supply to the 3-pin Molex plug on the bottom of the scanner farthest away from the serial number label.



Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.

8. Connect AC power to the transformer.

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/IEC 60950.



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

INSTALLATION

INTERFACE

RS232

9. Scan the recall defaults and enable RS232 bar codes to configure the MS202x for RS232.

Scan 1st



Scan 2nd



10. Turn on the host system.

INSTALLATION

INTERFACE

RS232

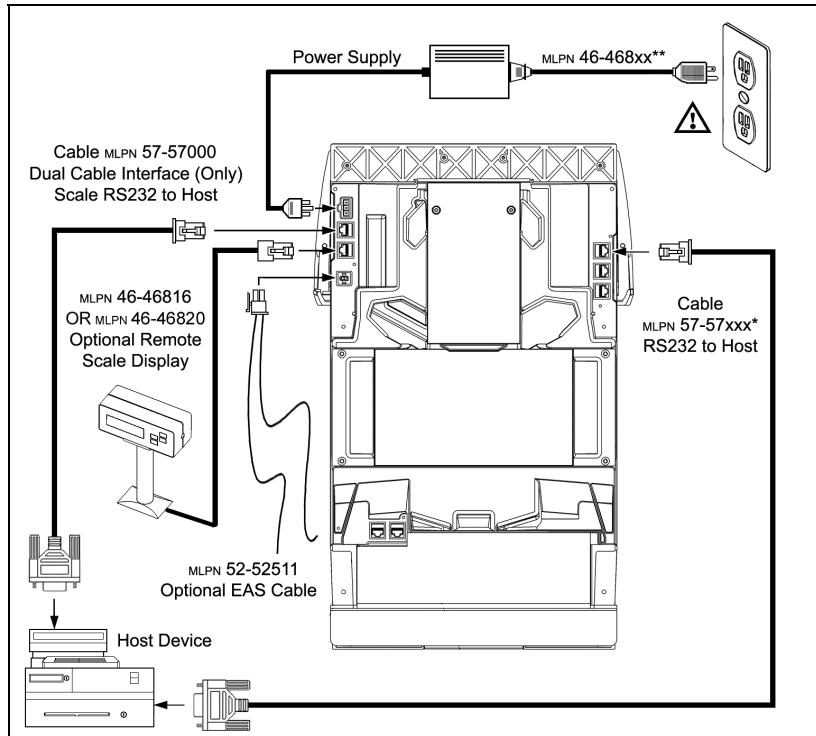


Figure 34. RS232 Interface Cable Installation Schematic

xxx* Specifies connection to the host. Contact a Metrologic representative for additional information.

xx** Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.

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/IEC 60950.



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

INSTALLATION

INTERFACE

FULL SPEED USB (INTEGRATED)

1. Turn off the host system.
2. Connect the USB interface cable to the 2nd 10-pin socket on the bottom of the scanner near the serial number label. Refer to figure 35 on page 36.
3. Connect the other end of the USB interface cable to the host.



Before continuing verify that the USB interface cable is connected to the appropriate socket on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner.



Manufacturers Note:

Plugging the scanner into the USB port of the PC does not guarantee that scanned information will appear at the PC. A software driver and correct configuration setting are also required for proper communication to occur.

4. Steps 4 through 6 are for MS2020 scanner/scales using dual cable interfaces where the scale is connected to the host with a separate communication cable. If your Stratos model does not include a scale skip to step 7.

Connect the scale/host cable to the 1st 10-pin socket on the bottom of the scanner next to the 3-pin Molex plug. Refer to figure 35 on page 36.

5. Connect the other end of the scale/host cable to the host device.
6. Connect the *optional* remote display cable to the 2nd 10-pin socket on the bottom of the scanner near the 3-pin Molex plug.
7. Connect the external power supply to the 3-pin Molex plug on the bottom of the scanner farthest away from the serial number label.



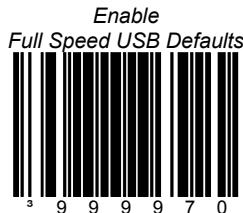
Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.

INSTALLATION

INTERFACE

FULL SPEED USB (INTEGRATED)

8. Connect AC power to the transformer.
9. Scan the *Enable Full Speed USB Defaults* bar code to configure the MS202x for USB communication.



10. 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/IEC 60950.



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

INSTALLATION

INTERFACE

FULL SPEED USB (INTEGRATED)

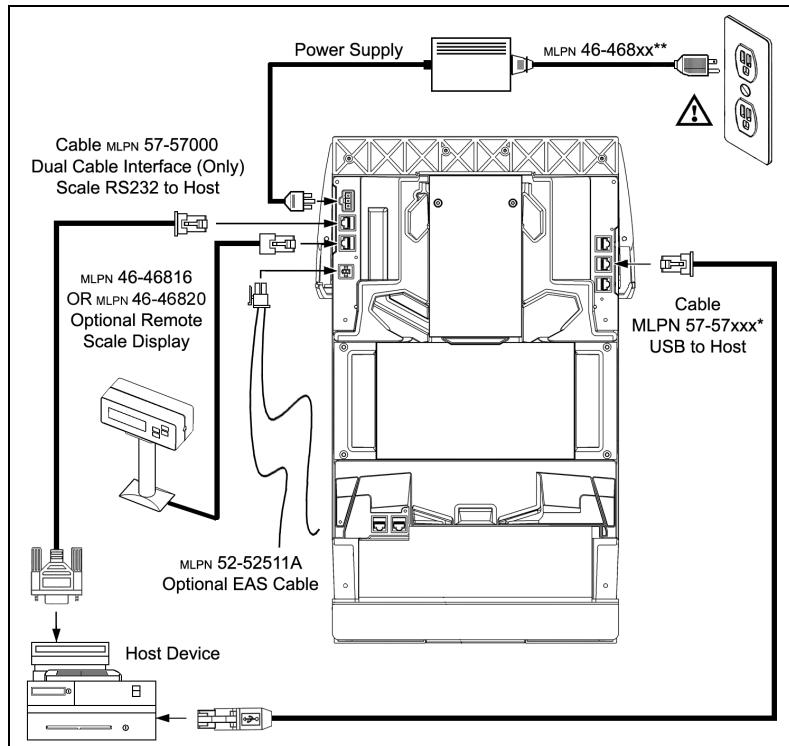


Figure 35. USB Cable Installation Schematic

xxx* Specifies connection to the host. Contact a Metrologic representative for additional information.

xx** Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.

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/IEC 60950.



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

INSTALLATION

INTERFACE

LOW SPEED USB (EXTERNAL WITH MX009)

1. Turn off the host system.
2. Connect the USB/MX009 interface cable to the 2nd 10-pin socket on the bottom of the scanner near the serial number label. Refer to figure 36 on page 39.
3. Connect the other end of the USB/MX009 interface cable to the host.



Before continuing verify that the USB interface cable is connected to the appropriate socket on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner.



Manufacturers Note:

Plugging the scanner into the USB port of the PC does not guarantee that scanned information will appear at the PC. A software driver and correct configuration setting are also required for proper communication to occur.

4. Steps 4 through 6 are for MS2020 scanner/scales using dual cable interfaces where the scale is connected to the host with a separate communication cable. If your Stratos model does not include a scale skip to step 7.

Connect the scale/host cable to the 1st 10-pin socket on the bottom of the scanner next to the 3-pin Molex plug. Refer to figure 36 on page 39.

5. Connect the other end of the scale/host cable to the host device.
6. Connect the *optional* remote display cable to the 2nd 10-pin socket on the bottom of the scanner near the 3-pin Molex plug.
7. Connect the external power supply to the 3-pin Molex plug on the bottom of the scanner farthest away from the serial number label.



Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.

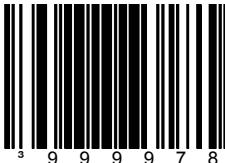
INSTALLATION

INTERFACE

LOW SPEED USB (EXTERNAL WITH MX009)

8. Connect AC power to the transformer.
9. Scan the *Enable USB Defaults* bar code to configure the MS202x for USB communication.

Enable USB Defaults



10. Scan the *Transmit to Converter* bar code to configure the MS202x for the MX009.

Transmit to Converter



11. 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/IEC 60950.



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

INSTALLATION

INTERFACE

LOW SPEED USB (EXTERNAL WITH MX009)

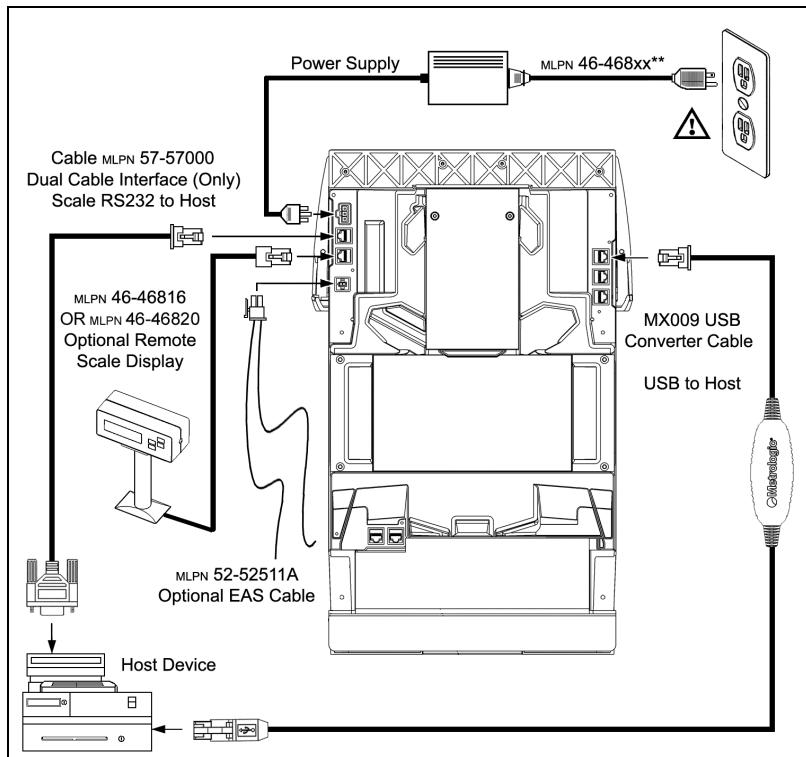


Figure 36. USB Cable Installation Schematic



xx** Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.

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/IEC 60950.



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

INSTALLATION

INTERFACE

IBM 46xx

1. Turn off the host system.
2. Connect the MVC cable to the 1st 10-pin socket on the bottom of the scanner near the serial number label. Refer to figure 37 on page 42.
3. Connect the other end of the IBM cable to the host.



Before continuing verify that the MVC cable is connected to the appropriate interface jack on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner.



Manufacturers Note:

Plugging the scanner into the serial port of the PC does not guarantee that scanned information will appear at the PC. A software driver and correct configuration settings are also required for proper communication to occur.

4. Steps 4 through 6 are for MS2020 scanner/scales using dual cable interfaces where the scale is connected to the host with a separate communication cable. If your Stratos model does not include a scale skip to step 7.

Connect the scale/host cable to the 1st 10-pin socket on the bottom of the scanner next to the 3-pin Molex plug. Refer to figure 37 on page 42.

5. Connect the other end of the scale/host cable to the host device.
6. Connect the *optional* remote display cable to the 2nd 10-pin socket on the bottom of the scanner near the 3-pin Molex plug.
7. Connect the external power supply to the 3-pin Molex plug on the bottom of the scanner farthest away from the serial number label.



Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.

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/IEC 60950.



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

INSTALLATION

INTERFACE

IBM 46xx

8. Turn on the host system.
9. Scan the *Load 46xx IBM Defaults* bar code to configure the MS2020 for IBM 46xx communication.



For additional communication options for IBM interfaces refer to the MetroSelect Configuration Guide (MLPN 00-02407).

INSTALLATION

INTERFACE

IBM 46xx

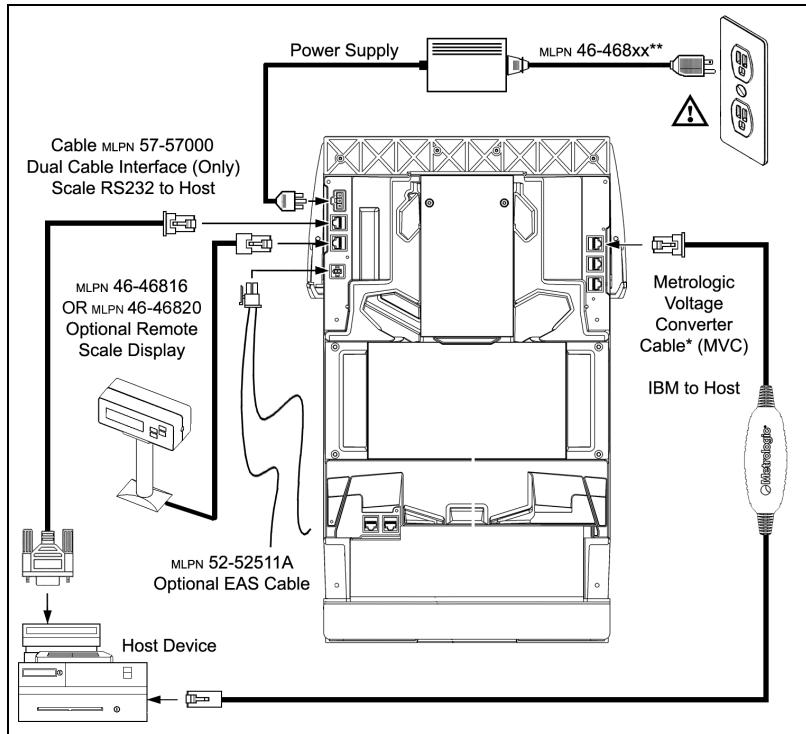


Figure 37. IBM Cable Installation Schematic

- * Host end connection is application dependent. Contact a Metrologic Customer Service representative for additional information on Metrologic's MVC Cable series and the host connections available.
- xx** Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.

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/IEC 60950.



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

INSTALLATION

INTERFACE

OCIA

1. Turn off the host system.
2. Connect the OCIA interface cable to the 2nd 10-pin socket on the bottom of the scanner near the serial number label. Refer to figure 38 on page 45.
3. Connect the other end of the OCIA Interface cable to the host.



Before continuing verify that the OCIA cable is connected to the appropriate interface jack on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner.



Manufacturers Note:

Plugging the scanner into the serial port of the PC does not guarantee that scanned information will appear at the PC. A software driver and correct configuration settings are also required for proper communication to occur.

4. Steps 4 through 6 are for MS2020 scanner/scales using dual cable interfaces where the scale is connected to the host with a separate communication cable. If your Stratos model does not include a scale skip to step 7.

Connect the scale/host cable to the 1st 10-pin socket on the bottom of the scanner next to the 3-pin Molex plug. Refer to figure 38 on page 45.

5. Connect the other end of the scale/host cable to the host device.
6. Connect the *optional* remote display cable to the 2nd 10-pin socket on the bottom of the scanner near the 3-pin Molex plug.
7. Connect the external power supply to the 3-pin Molex plug on the bottom of the scanner farthest away from the serial number label.



Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.

INSTALLATION

INTERFACE

OCIA

8. Turn on the host system.
9. Scan the *Load OCIA Defaults* bar code to configure the MS2020 for OCIA communication.



For additional communication options for OCIA interfaces refer to the MetroSelect Configuration Guide (MLPN 00-02407).

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/IEC 60950.



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

INSTALLATION

INTERFACE

OCIA

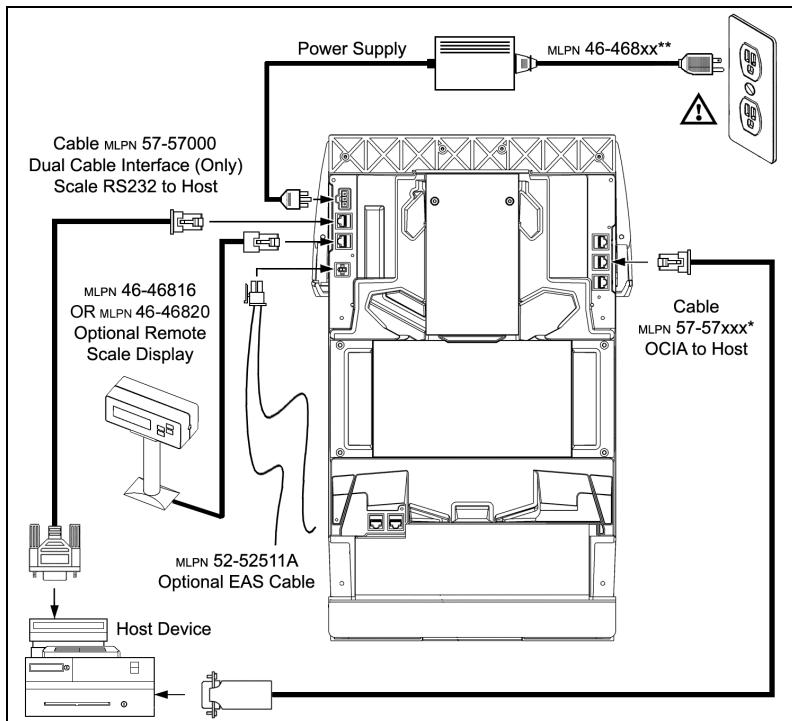


Figure 38. OCIA Cable Installation Schematic

 **xxx*** Specifies connection to the host. Contact a Metrologic representative for additional information.

 **xx**** Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.

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/IEC 60950.



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

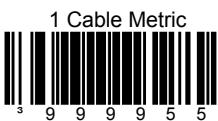
INSTALLATION

INTEGRATED SCALE ON SINGLE CABLE SCANNER/SCALE SYSTEM

The following bar codes configure the scanner to the desired interface and scale parameters. These single cable interfaces handle all status and commands over a single communication cable for both the scanner and scale. Each one will provide different protocols between the scanner and a host device.

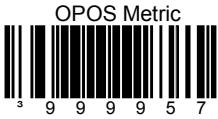
These bar codes are only used to configure the scanner. The scale is configured with a special download utility. It is pre-configured for use at the factory so the scale's parameters such as units of measure, remote display required, single or dual cable operation are all programmed at time of order. If desired to change the scale's configuration, please contact a Metrologic representative.

Scanner/Scale Single Cable RS232 Mode-English
Defaults. This interface uses the Scanner/Scale Single Cable Command set for scanners with scales. Scale parameters will default to display required, 4-digit weigh mode, English units (lbs.).



Scanner/Scale Single Cable RS232 Mode-Metric
Defaults. This interface uses the Scanner/Scale single Cable Command set for scanners with scales. Scale parameters will default to display required, 5-digit weigh mode, Metric units (kg.).

Scanner/Scale Single Cable RS232 OPOS Mode - English Defaults. This interface requires the Metrologic OPOS driver be installed on the host. The data transmissions then use special formatting to communicate. Scale parameters will default to display required, 5- digit weigh mode, English units (lbs.).



Scanner/Scale Single Cable RS232 OPOS Mode - Metric Defaults. This interface requires the Metrologic OPOS driver be installed on the host. The data transmissions then use special formatting to communicate. Scale parameters will default to display required, 5-digit weigh mode, Metric units (kg.).

INSTALLATION

INTEGRATED SCALE ON SINGLE CABLE SCANNER/SCALE SYSTEM

Scanner/Scale Single Cable IBM OEM Full Speed USB, English Defaults. This is full speed USB interface designed to communicate both scanner and scale information to a USB host. Scale parameters will default to display required, 4 digit weigh mode, English units (lbs.).



1 Cable USB - Metric



Scanner/Scale Single Cable IBM OEM Full Speed USB, Metric Defaults. This is a full speed USB interface designed to communicate both scanner and scale information to a USB host. Scale parameters will default to display required, 5-digit weigh mode, Metric units (kg.).

Scanner/Scale Single Cable IBM 46xx Emulation, English Defaults. This interface is IBM 46xx compatible. It defaults to Port 17 Table Top Scanner/ Scale but may be changed through MetroSet. Scale parameters will default of display required, 4-digit weigh mode, English units (lbs.).

1 Cable IBM - English



1 Cable IBM - Metric



Scanner/Scale Single Cable IBM 46xx Emulation, Metric Defaults. This interface is IBM 46xx compatible. It defaults to Port 17 Table Top Scanner/ Scale but may be caned through MetroSet. Scale parameters will default of display required, 5-digit weigh mode, Metric units (kg.).

INSTALLATION

INTEGRATED SCALE ON SINGLE CABLE SCANNER/SCALE SYSTEM

Changing Scale Defaults

The following bar codes change the defaults installed by the bar codes mentioned above.

When it is desired to give the English Mode weight in 5 digits, as in xx.yyy pounds, scan the “5-digit Weight” bar code AFTER any of the English scale defaults mentioned previously.



When it is desired to remove the scale's display form scanner memory because none is installed, use the “No Remote Display” bar code AFTER any of the main defaults mentioned previously.

When it is desired to use the previously mentioned protocols without the scale or the scale is in a Dual Cable environment, scan the “No Scale” barcode AFTER any of the main defaults mentioned previously. This is only needed if scanning one of the single cable protocols as no scale in the default condition otherwise.



Dual Cable Scanner/Scale Units

In a dual cable environment, the scanner and scale work independently. The scanner can be programmed to a stand-alone protocol by using one of the main single cable protocols mentioned previously and then remove the scale, or by use of the following bar code, which inherently does not include a scale.

Scanner Only Protocol RS232 Mode.
This interface uses the Scanner -Only Command set for scanners operating independently or without a scale installed.



INSTALLATION

SECONDARY SCANNER



Stratos' auxiliary port will support 5VDC devices with a 150mA maximum current. If the auxiliary device exceeds this specification an external power supply will be required to power the auxiliary device.

The following Metrologic scanners can receive power from Stratos: the MS9520, MS9540, and the MS5145.

1. Turn off the host system.
2. Connect the **round** end of the RS232 AUX cable to the RS232 socket of the **secondary** scanner (see *figure 39 on page 52*).
3. Connect the other end of the RS232 AUX cable to the **3rd** 10-pin socket on the bottom of the MS202x, near the serial number label.

Important: The MS2020 series' aux port requires the signals; transmit, receive, RTS & CTS from the secondary scanner.

4. **This step is required for secondary devices that require >5VDC and/or 150mA current to operate.** Skip to step 5 if the secondary device requires \leq 5VDC.

Plug the power supply into the secondary scanner's PowerLink cable (MLPN 54-54667).



Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.

5. Connect the MS2020/Host interface* cable to the appropriate jack on the bottom of the MS2020.
6. Connect the other end of the MS2020/Host interface cable to the host.



Before continuing verify that the interface* cable is connected to the appropriate jack on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner.



* The MS2020/host cable connection is interface dependent. Refer to the installation steps provided for the type of interface (RS232, IBM 46xx, etc.) required for your application.

INSTALLATION

SECONDARY SCANNER

Manufacturers Note:



Plugging the scanner into the serial port of the PC does not guarantee that scanned information will appear at the PC. A software driver and correct configuration settings are also required for proper communication to occur.

7. Steps 7 through 9 are for MS2020 scanner/scales using dual cable interfaces where the scale is connected to the host with a separate communication cable. If your Stratos model does not include a scale skip to step 10.

Connect the scale/host cable to the 1st 10-pin socket on the bottom of the scanner next to the 3-pin Molex plug. Refer to figure 39 on page 52.

8. Connect the other end of the scale/host cable to the host device.
9. Connect the *optional* remote display cable to the 2nd 10-pin socket on the bottom of the scanner near the 3-pin Molex plug.
10. Connect the external power supply to the 3-pin Molex plug on the bottom of the scanner farthest away from the serial number label.



Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.

11. Connect AC power to the Stratos transformer and the secondary scanner if applicable.

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/IEC 60950.



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

12. Configure the MS2020 for the appropriate interface configuration settings*.



* The MS2020/host cable connection is interface dependent. Refer to the installation steps provided for the type of interface (RS232, IBM 46xx, etc.) required for your application.

INSTALLATION

SECONDARY SCANNER

13. Scan the following bar code to configure the auxiliary port on the MS2020 to accept a Metrologic scanner as the secondary scanner.



The following bar codes **do not apply** when using an MS6720 as a secondary scanner. Contact a Metrologic representative for additional information on the MS6720. If the secondary scanner is not a Metrologic scanner refer to Section O of the MetroSelect Configuration Guide.

Enable Aux Port



3 4 3 7 3 3 0



The auxiliary input port's data format must match the main output format of the secondary scanner.

14. Scan the following bar codes, in order, to configure the secondary scanner to match the auxiliary port's data format.

1st

Enable AUX Output



3 1 2 4 8 1 7

2nd

Secondary Scanner
Data Format



3 4 3 7 5 3 0

3rd

Enable Comm Timeouts



3 1 1 8 4 1 2

4th (Optional)

Turn OFF Secondary
Scanner's Beeper



3 3 1 8 5 0 5

15. Turn on the host system.

INSTALLATION

SECONDARY SCANNER

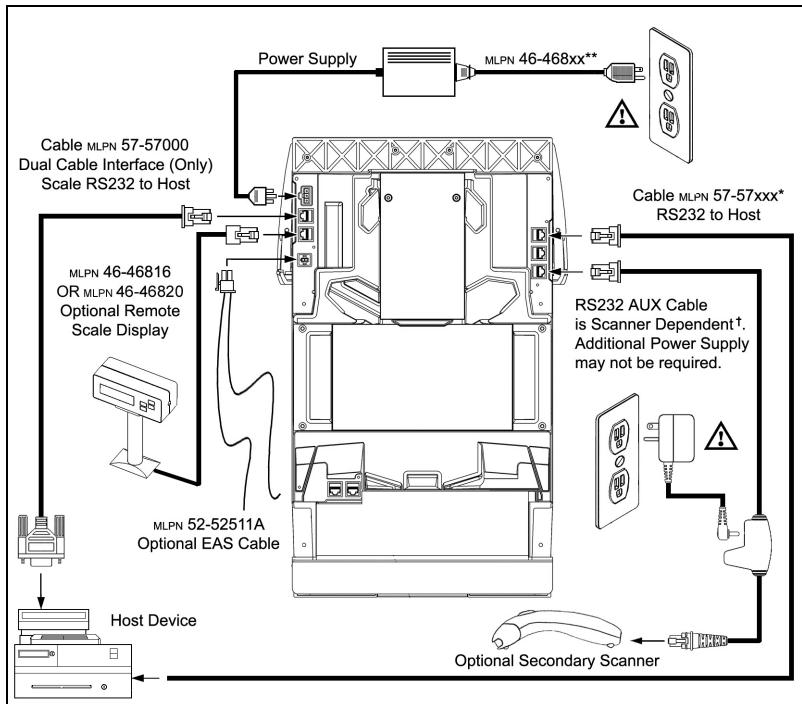


Figure 39. Secondary Scanner Cable Installation Schematic

xxx* Specifies connection to the host. Contact a Metrologic representative for additional information.



The MS202x/host cable connection is interface dependent. Refer the installation steps provided for the type of interface required for your application.

xx** Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.

† See Aux power notes on page 49.

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/IEC 60950.



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

INSTALLATION

EAS DEACTIVATION

SW1 and SW2 are the switch banks inside the CheckPoint Device that set the deactivation range. The following is a list of CheckPoint recommended switch bank settings.

Base Model	CheckPoint Recommended Switch Bank Settings
MS2020	SW1 & SW2 switches 1 and 6 set to ON
MS2021	SW1 & SW2 switches 1 and 6 set to ON
MS2022	SW1 & SW2 switches 1 and 6 set to ON

All models have a connector (*marked EAS In*) on the bottom of the scanner. Metrologic has available for purchase an EAS cable for connection between the scanner/scale and the Checkpoint Device (optional accessory, MLPN 52-52511A).

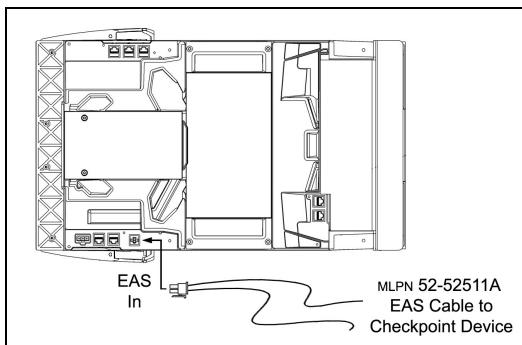
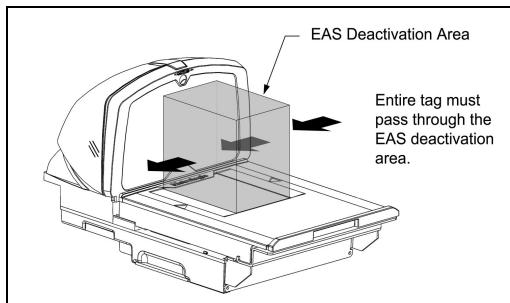


Figure 40. EAS Cable Connection (Bottom of Stratos)

The following figure shows the location of the EAS deactivation area for Stratos. It is important to pass the entire tag through this area to deactivate the security tag.



SCANNER OPERATION

SCAN ZONE

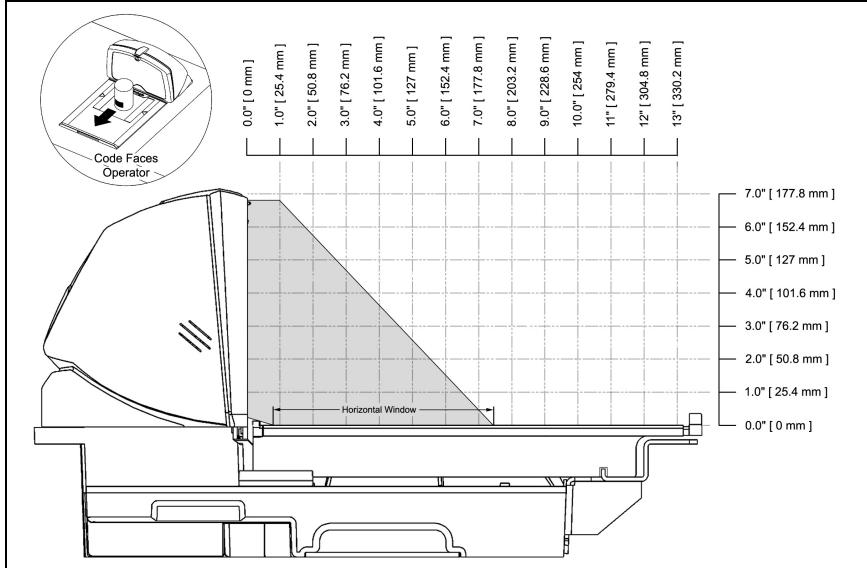


Figure 42. Checker-Side (13 mil)

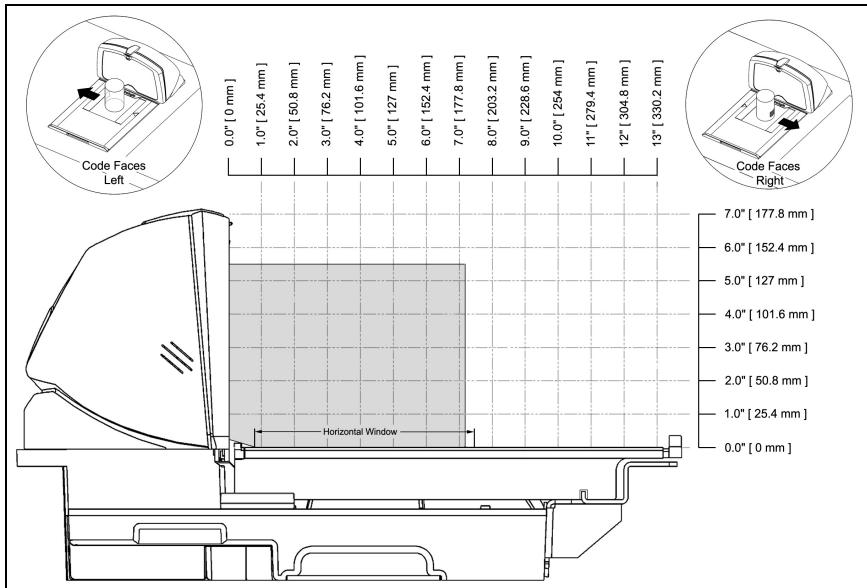


Figure 43. Horizontal Left/Right (13 mil)

SCANNER OPERATION

SCAN ZONE

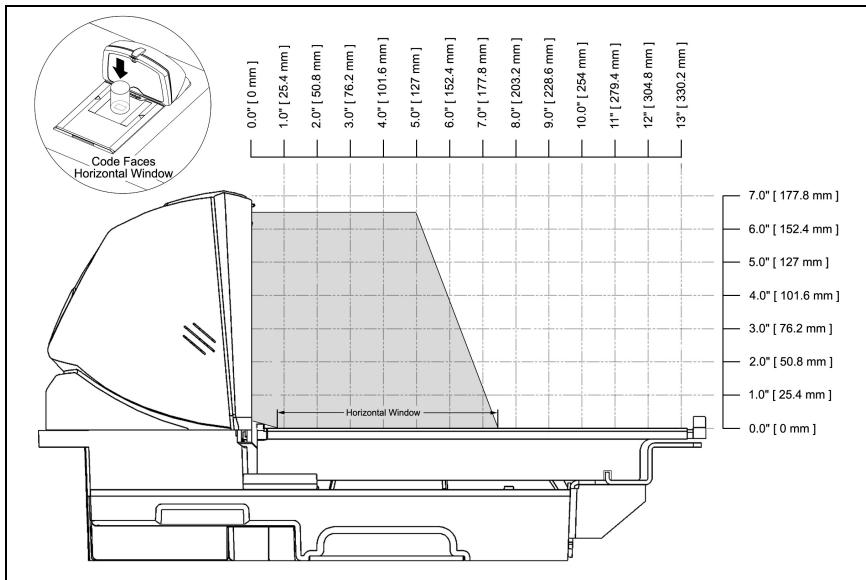


Figure 44. Horizontal Direct (13 mil)

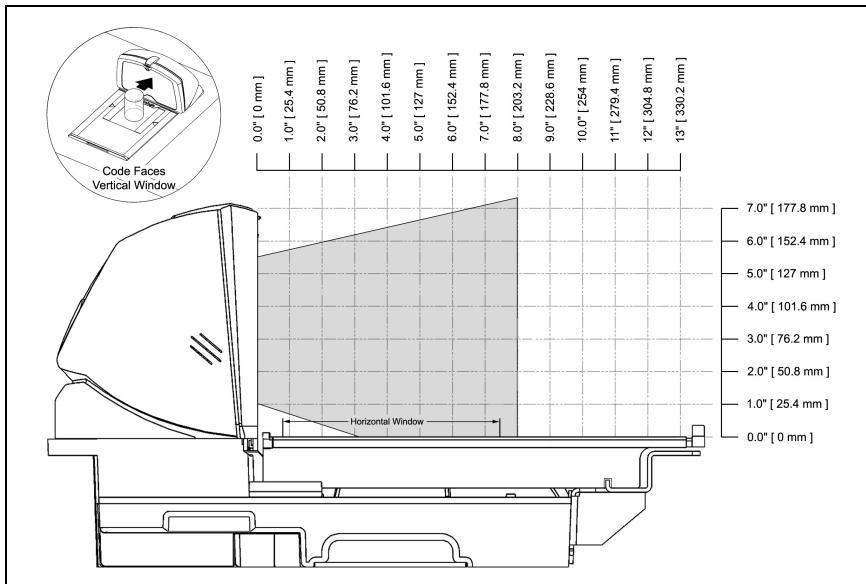


Figure 45. Vertical Direct (13 mil)

SCANNER OPERATION

SCAN ZONE

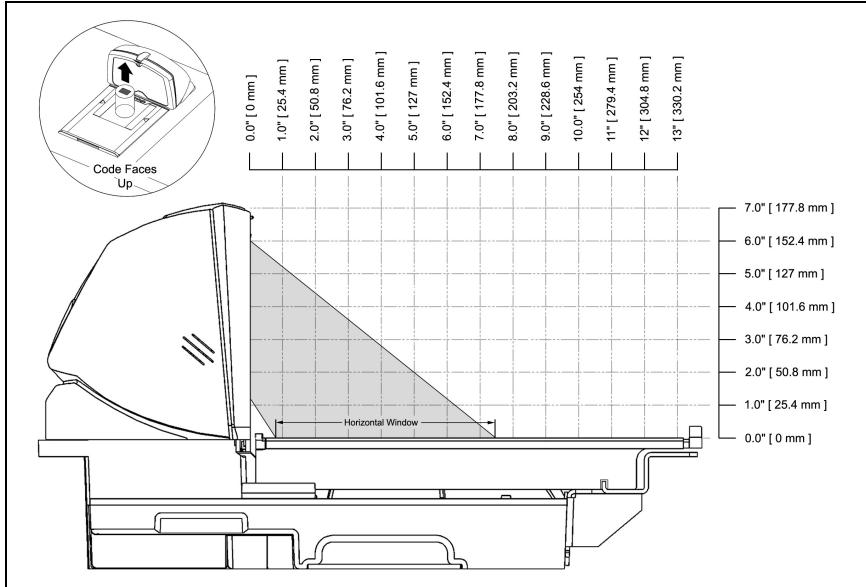


Figure 46. Top-Down (13 mil)

IR ACTIVATION AREA

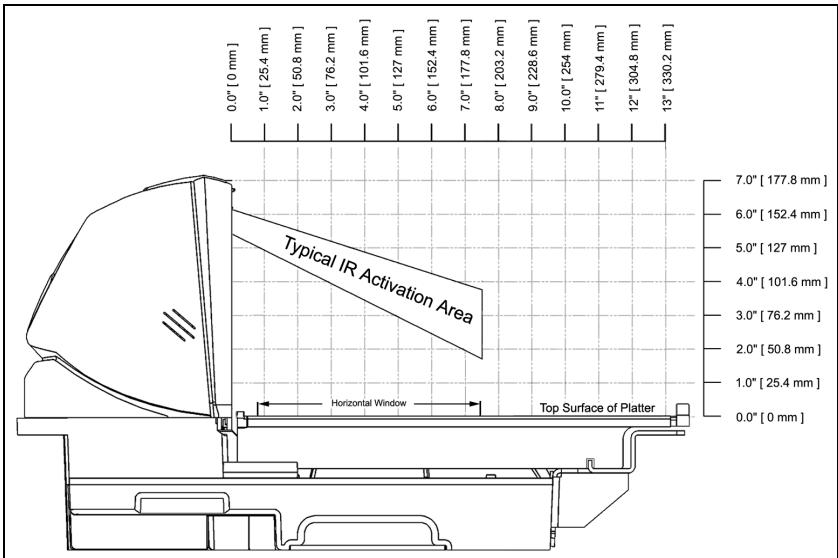


Figure 47. IR Activation Area Perpendicular to Package Flow

SCANNER OPERATION

INDICATOR DESCRIPTIONS

Audible

When the MS2020 is in operation, it can provide audible feedback. These sounds indicate the status of the scanner. Eight settings are available for the tone of the beep (normal, 6 alternate tones and no tone) plus three volume settings. To change the tone or volume, refer to the *Changing the Beeper Tone & Volume* section of this manual.

One Beep



When the scanner *first* receives power the white LED will flash, the blue LED will turn on and the scanner will beep once (*the white LED will remain on for the duration of the beep*). The scanner is now ready to scan.

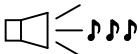
When the scanner *successfully* reads a bar code, the white LED will flash and the scanner beeps once (*if programmed to do so*). If the scanner does not beep once and the white light does not flash, then the bar code has *not* been successfully read.

Razzberry Tone



This is a failure indicator. Refer to failure modes on page 60.

Three Beeps - during operation

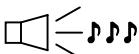


When placing the scanner in program mode, the white LED will flash while the scanner simultaneously beeps three times. The white and blue LEDs will continue to flash until the unit exits program mode. Upon exiting program mode, the scanner will beep three times and the white LED will stop flashing.

When configured, 3 beeps can also indicate a communications timeout during normal scanning mode.

When using one-code-programming, the scanner will beep three times (the current selected tone), followed by a short pause, a high tone and a low tone. This tells the user that the single configuration bar code has *successfully* configured the scanner.

Three Beeps - on power up



This is a failure indicator. Refer to failure modes on page 60.

SCANNER OPERATION

INDICATOR DESCRIPTIONS

Visual

There is an array of LEDs (white and/or blue) located on the top of the hood of the MS202x. When the scanner is on, the flashing or constant illumination of the LEDs indicates the status of the current scan and the scanner.

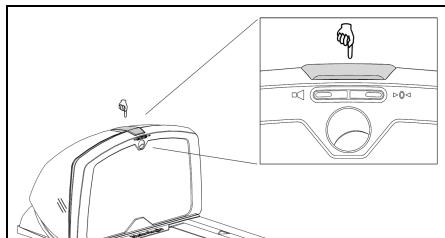


Figure 48. LEDs

No White or Blue LED

The LEDs will not be illuminated if the scanner is not receiving power from the host or transformer. They are also not illuminated when all lasers are turned off for any reason.

Steady Blue

When all lasers are active, the blue LED is illuminated. The blue LED will remain illuminated until all lasers are deactivated.

Steady Blue and Single White Flash

When the scanner successfully reads a bar code, the white LED will flash and the scanner will beep once. If the white LED does not flash or the scanner does not beep once, then the bar code has not been successfully read.

Steady White and Blue

After a successful scan, the scanner transmits the data to the host device. Some communication modes require that the host inform the scanner when data is ready to be received. If the host is not ready to accept the information, the scanner's white LED will remain on until the data can be transmitted.

SCANNER OPERATION

INDICATOR DESCRIPTIONS

Visual

Flashing Blue then Flashing White

This indicates the scanner is in program mode. A razzberry tone indicates that an invalid bar code has been scanned in this mode.

or

If the unit is in sleep mode, each LED will flash once every 15 seconds.

Steady White, Blue Off

This indicates the scanner may be waiting for communication from the host.

SCANNER OPERATION

INDICATOR DESCRIPTIONS

Failure Modes

Flashing Blue and One Razzberry Tone

This indicates that the scanner has experienced a laser subsystem failure. The scanner will try up to 3 times to correct the failure condition. If the laser subsystem continues to fail, that subsystem (horizontal or vertical) will be shut down and an error indication will be shown on the Diagnostic Indicator Display. This error stays on the display until corrected. If the remaining subsystem is still operational, scanning will continue using the operational components.

Flashing Blue and White and Two Razzberry Tones

This indicates that the scanner has experienced a motor subsystem failure. The scanner will try up to 3 times to correct the failure condition. If the motor subsystem continues to fail, that subsystem (horizontal or vertical) will be shut down and an error indication will be shown on the Diagnostic Indicator Display. This error stays on the display until corrected. If the remaining subsystem is still operational, scanning will continue using the still operational components.

Continuous Razzberry Tone with Both LEDs Off

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

Three Beeps - On Power Up

If the scanner beeps 3 times on power up then, the nonvolatile memory that holds the scanner configuration has failed. Return the unit for repair at an authorized service center.

SCANNER OPERATION

INDICATOR DESCRIPTIONS

Diagnostic Indicator Display

There is a two-digit error code display located under the platter near the bottom right corner of the output window. The following is a list of possible error codes and their meanings. Some errors will require immediate scanner maintenance.

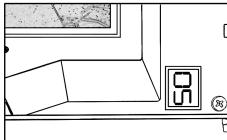


Figure 49. Error Code Display

Error Code	Description
01	Reserved
02	RAM ERROR – The scanner's Random Access Memory (RAM) is tested as faulty. Return the unit for repair at an authorized service center.
03	PROGRAM ERROR – The scanner's software program is failing. Return the unit for repair.
04	INTERFACE ERROR – After power up and any application exit (e.g. MetroSet, etc.), the scanner checks the interface hardware with that chosen in configuration. If they do not agree, an interface error exists. Correct this problem by getting the proper hardware interface OR programming Stratos configuration for the proper interface hardware attached.
05	CONFIGURATION ERROR – The non-volatile configuration memory did not agree with the data last saved. Default configuration data is then used and the scanner continues operating. This error is also accompanied by 3 beeps. This error will remain during operation as a reminder that this power cycle is scanning against a default-generated configuration.
06	COMMUNICATION ERROR - The RS232 data line is being held active. This causes the scanner to read a "break" signal constantly and continuous attempts are made to enter MetroSet configuration mode. A short on the RX Data line can cause this condition. It can also be the result of a laptop in power save mode. The scanner will abort attempts to enter configuration mode after a short timeout. The scanner can automatically recover from this condition once the short in the RX Data line is corrected.

SCANNER OPERATION

INDICATOR DESCRIPTIONS

Diagnostic Indicator Display

Error Code	Description
11	SWITCH ERROR – The switch used for volume selection or sleep mode is detected in error (always closed). The condition is self-correcting if possible. If the error persists, return the unit for repair at an authorized service center. The scanning operation can continue with this error active.
12	Reserved
13	SCALE ERROR – Single Cable Scanner/Scales Only. The scanner does not communicate with the scale. Make sure there is nothing plugged into the 'Scale RS232 to Host' port. If there is disconnect the cable, it may be causing the communication error. If there is still no communication between the scanner and scale return the unit to authorized service center for repair.
14	SCALE RETURN TO ZERO ERROR – The scale did not return to zero between scale weight requests if the zero checking function is enabled. The scale will need to be re-zeroed.
21	LASER #1 (vertical) ERROR – The laser in the vertical scanning subsystem denotes a failure. The scanner will try three times to correct the laser operation. If the laser error persists, the vertical scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. If the horizontal scanning subsystem is still healthy, it will remain active and scanning can CONTINUE using the remaining good subsystem! The unit, however, should be scheduled for repair at an authorized service center when convenient.
22	LASER #2 (right horizontal) ERROR – The right laser in the horizontal scanning subsystem denotes a failure. The scanner will try three times to correct the laser operation. If the laser error persists, and the left horizontal laser (#3) is also in error, the horizontal scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. If the left (Laser #3) horizontal scanning subsystem is still healthy, the horizontal scanning subsystem remains active and scanning can CONTINUE using the remaining good components! The unit, however, should be scheduled for repair at an authorized service center when convenient.

SCANNER OPERATION

INDICATOR DESCRIPTIONS

Diagnostic Indicator Display

Error Code	Description
23	LASER #3 (left horizontal) ERROR – The left laser in the horizontal scanning subsystem denotes a failure. The scanner will try three times to correct the laser operation. If the laser error persists, and the right horizontal laser (#2) is also in error, the horizontal scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. If the right (Laser #2) horizontal scanning subsystem is still healthy, the horizontal scanning subsystem remains active and scanning can CONTINUE using the remaining good components! The unit, however, should be scheduled for repair at an authorized service center when convenient.
31	MOTOR #1 (vertical) ERROR – The motor in the vertical scanning subsystem denotes a failure. The scanner will try three times to correct the motor operation. If the motor error persists, the vertical scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. If the horizontal scanning subsystem is still healthy, it will remain active and scanning can CONTINUE using the remaining good subsystem! The unit, however, should be scheduled for repair at an authorized service center when convenient.
32	MOTOR #2 (horizontal) ERROR – The motor in the horizontal scanning subsystem denotes a failure. The scanner will try three times to correct the motor operation. If the motor error persists, the horizontal scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. If the vertical scanning subsystem is still healthy, it will remain active and scanning can CONTINUE using the remaining good subsystem! The unit, however, should be scheduled for repair at an authorized service center when convenient.

SCANNER OPERATION

POWER SAVE MODES

The MS2020 has five programmable power save modes. Refer to the *MetroSelect Programming Guide* for additional information on Power Save Modes.

1. **Blink Power Save Mode:**

Blinks the laser OFF & ON after a programmed period of non-use.

When the scanner recognizes a bar code it will exit the Blink mode.

2. **Laser Off Power Save Mode:**

Turns the laser OFF after a programmed period of non-use. The motor continues to spin allowing for a faster “wake” up time.

Any movement detected by the IR will “wake” the scanner from the *Laser Off* power save mode (see figure 47 on page 56).

3. **Laser & Motor Off Power Save Mode:**

Turns the laser and motor OFF after a programmed period of non-use.

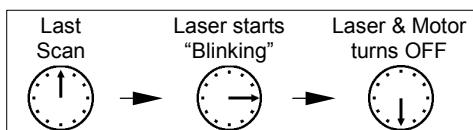
Any movement detected by the IR will “wake” the scanner from the power save mode (see figure 47 on page 56). This mode’s “wake” time is slightly longer due to the motor’s need to restart.

4. **Dual Action Power Save Mode #1:**

“Blinks” the laser OFF & ON after a programmed period of non-use turns the laser and motor OFF at thirty-minute intervals.

Example:

If the power save timeout is set to 15 minutes.



Any movement detected by the IR will “wake” the scanner from the power save mode (see figure 47 on page 56).

SCANNER OPERATION

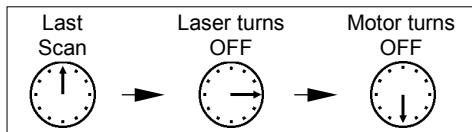
POWER SAVE MODES

5. Dual Action Power Save Mode #2 (Default):

Turns the laser OFF after a programmed period of non-use then turns the motor OFF after thirty-minute intervals.

Example:

If the power save timeout is set to 15 minutes.



Any movement detected by the IR will “wake” the scanner from the power save mode (see figure 47 on page 56).

SCANNER OPERATION

BEEPER OPTIONS AND BUTTON FUNCTIONS

Changing the Beeper Tone

Beeper tones may be programmed directly or incrementally using the following bar code. The new tone will be heard followed by a short pause. Two more new tones will be heard signifying the new setting has been stored in memory. The silent (no beep) tone is also selectable.

Next Beep Tone



Changing the Beeper Volume

Volume levels may be programmed directly or incrementally using the following bar code. The new volume will be heard followed by a short pause. Two more tones will be heard signifying the new setting has been saved in memory. The silent (no volume) tone is also selectable.

Next Volume



SCANNER OPERATION

BEEPER OPTIONS AND BUTTON FUNCTIONS

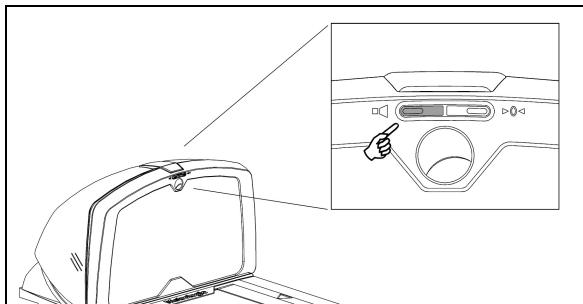


Figure 50. The Multi-Function Volume Button

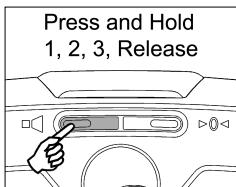


Figure 51. Changing the Beeper

Changing the Beeper Tone

A short (<3 second) depression and the beeper volume will change. The new volume will be heard. The silent (no beep) volume is also selectable.

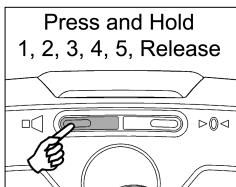


Figure 52. Laser & Motor Off Power Save

Placing the Unit in Laser & Motor Off Power Save Mode

Long (>3 seconds) depression
The *Laser & Motor Off Power Save Mode* is the only power save mode that can be activated with the multi-function button.

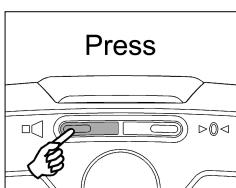


Figure 53. Normal Operation

Waking the Unit from All Power Save Modes

The next button depression will awaken the scanner for normal operation.

SCANNER OPERATION

STARTUP

When the scanner *first* receives power the white LED will flash, the blue LED will turn on and the scanner will beep once (*the white LED will remain on for the duration of the beep*). The scanner is now ready to scan.

POWER-UP TEST MODE

When a Stratos scanner is first powered up, it cycles through a number of self-tests before starting normal operation. If there are any initial failures during this sequence of tests the scanner will beep or razz to indicate the error and an error code will appear in the diagnostic indicator display.

The following are examples of the types of tests performed at power-up.

1. Memory tests
2. Hardware setup tests
3. Motor tests
4. Laser tests
5. Configuration tests
6. Interface tests
7. Scale tests (MS2020 Models Only)

These tests are also performed on a periodic basis with the operator alerted to any failures.

PROGRAMMING MODE

All MS2020 series scanners have been configured at the factory with a set of default communication protocols. Since many host systems have unique formats and protocol requirements, Metrologic provides a wide range of configurable features that may be selected with the use of the MetroSelect® Configuration Guide (MLPN 00-02407) or MetroSet.

For a complete list of the factory default settings, refer to the *Default Settings* section of this guide.

SCALE OPERATION

SCALE ZEROING

After the unit has been officially calibrated (see page 70) the scale can be re-zeroed by pressing the scale zeroing button on either the unit or on the remote display stand. Refer to the figures below for button locations.

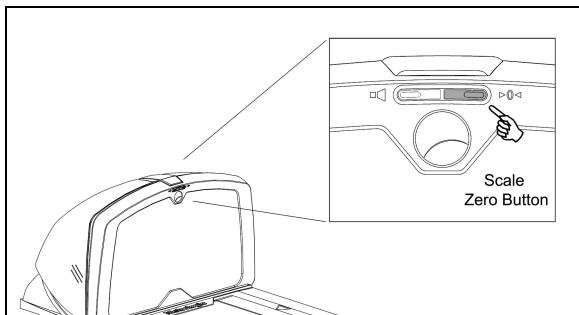


Figure 54. The scale zero button on scanner/scale.

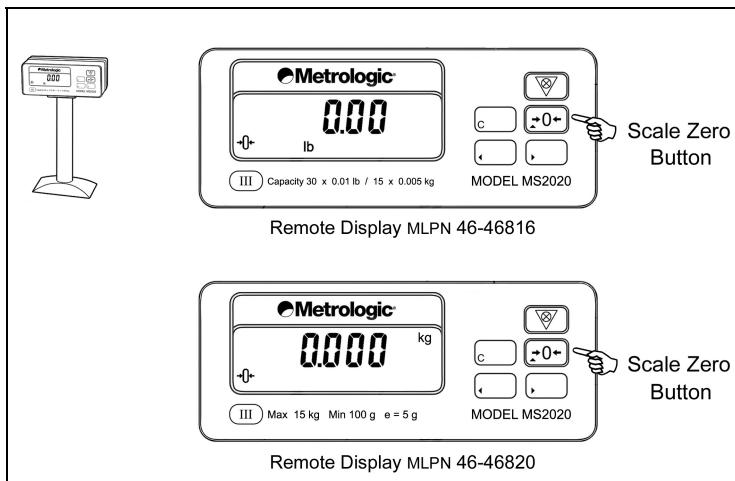


Figure 55. The scale zero button on the remote display.

SCALE OPERATION

CALIBRATION

The scanner/scale must be calibrated if:

- it is a first time installation
- the scale cannot be re-zeroed
- the calibration verification tests indicate errors
- there is a change in the units of measure
[i.e. from pounds (lbs.) to kilograms (kg)]
- if the scale load cell has been replaced
- the calibration seal is missing or torn



The certification of the weighing mechanism of the scale version of this scanner is subject to federal, state and local Weights and Measures statutes and regulations and can only be performed by authorized government agencies and/or their duly registered agents. Each time the scale or weighing mechanism is calibrated, it should be properly sealed with a paper seal or a wire seal prior to being placed into service in commerce.

It is the responsibility of the owner of the scale to confirm compliance with the relevant Weights and Measures statutes and regulations applicable in your area by checking with the appropriate government agency before placing a newly calibrated unit into service or removing any official seals.

Tools Required

- Field Standard 30.0 pound Weight Set **or** 15.0 kilogram Weight Set
- Wire or Paper Seal



Type of seal to be used will depend on the guidelines specified by the local Weights and Measures authorities.

- Phillips #1 Screw Driver

Scale Calibration Methods

- **Scale Calibration with Remote Display** uses the scale display to sequence through the calibration steps and store critical calibration points.
- **Bar Code Scale Calibration without Remote Display*** uses the scanner / scale *only* and assumes there is no remote scale display. A bar code is used to initiate the calibration sequence and the speaker volume switch is used to store critical range values.

* This calibration procedure will work with the remote display connected to the Stratos but no data will appear on the remote display.

SCALE OPERATION

CALIBRATION

Priming the Scale for Calibration (lbs. or kg)

Prime the scale before either method of calibration is started.



Calibrating the scanner/scale must be done **after** the unit has been installed in the checkstand countertop.



It is important to use the correct certified (lb. or kg.) field weight set when calibrating the scale.

1. Check the platter to ensure that nothing is interfering with its freedom to move. This includes cleaning out the debris channel if the scanner/scale has been previously used.
2. Apply power to the scanner/scale.
3. Once the unit is powered up wait 5 minutes before proceeding.
4. Place the 30.0 lb. weight **or** the 15 kg weight on the center of the scale. Allow the weight to settle.
5. Remove the weight.
6. Repeat three times to prime the scale before calibration.

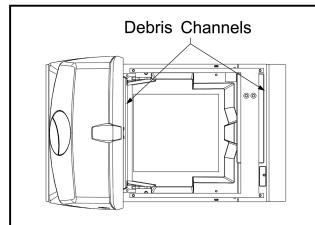


Figure 56. Debris Channels

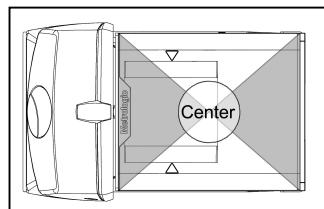


Figure 57. Scale Center

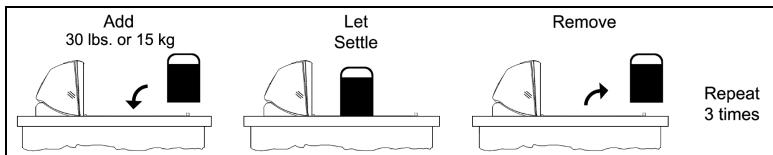


Figure 58. Priming the Scale for Calibration

SCALE OPERATION

CALIBRATION

Scale Calibration Procedure (lbs. or kg) with Remote Display

1. Temporarily Remove the platter and place it in a safe location.



It is the responsibility of the owner of the scale to confirm compliance with the relevant Weights and Measures statutes and regulations applicable in your area by checking with the appropriate government agency before placing a newly calibrated unit into service or removing any official seals.

2. If this is a currently installed scanner/scale in need of calibration, cut and remove the calibration switch cover seal. If this is a new installation, cut and remove the factory-applied adhesive seal.



Follow all Electro-Static Discharge (ESD) procedures when exposing internal scanner/scale components.

3. Remove the M3 screw securing the calibration switch/button cover. Place the cover and screw in a safe location. Verify that the scale calibration switch is in the Run position.

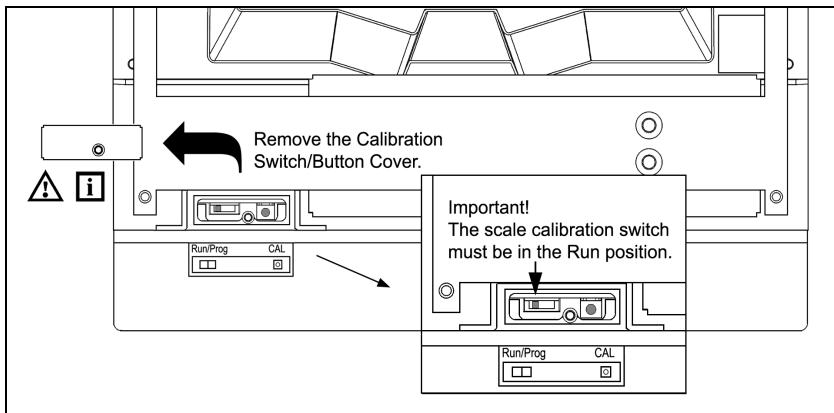


Figure 59. Calibration Switch/Button Cover Removal

SCALE OPERATION

CALIBRATION

Scale Calibration Procedure (lbs. or kg) with Remote Display

4. **Enter full service access mode.** Power down the unit if necessary. Press and hold down the Calibration push button then power up the scanner/scale. Release the Calibration push button.

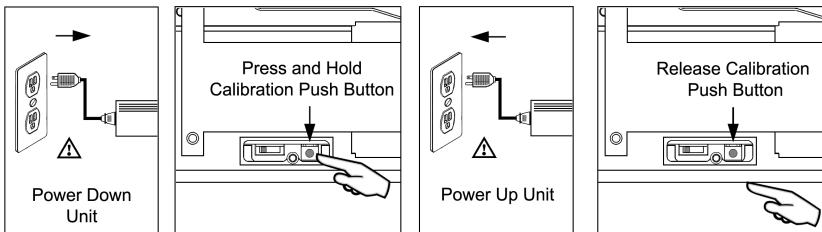


Figure 60. Entering Full Service Access Mode

5. **Enter calibration mode.** The remote display will flash all of the characters available (see illustration below). Press the right arrow button twice (►)(►) while the display flashes all characters. The remote display should read CAL 1.

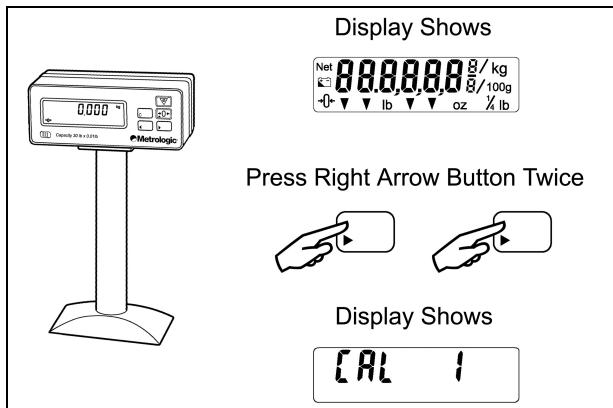


Figure 61. Entering Full Service Access Mode

6. Reinstall the platter onto the scanner/scale. Check the platter to ensure that it is seated properly and nothing is interfering with its freedom to move.

SCALE OPERATION

CALIBRATION

Scale Calibration Procedure (lbs. or kg) with Remote Display

7. Make sure there is no load on the scale platter.
8. **Calibrate a zero load.** Press the right arrow (►) button once when the remote display reads CAL 1 and there is **no** load on the scale platter.

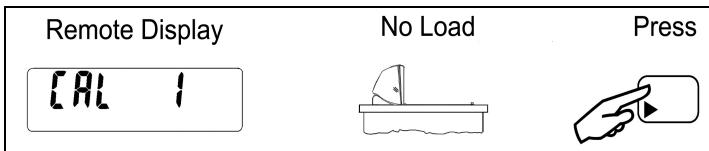


Figure 62.

9. Place a half load (15.00 lbs. or 7.500 kg) on the center of the scale platter then press the right arrow (►) button.

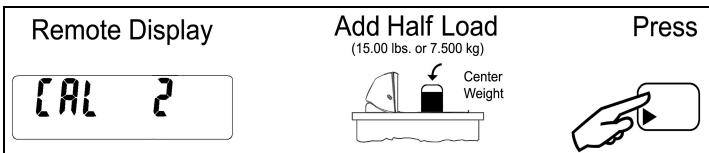


Figure 63.

10. Add an additional half load (15.00 lbs. or 7.500 kg) to the existing half to simulate a full load, center entire load then press the right arrow (►) button.

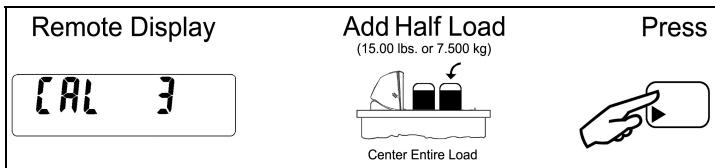


Figure 64.

11. Remove half of the load (15.00 lbs. or 7.500 kg), center the remaining load then press the right arrow (►) button.

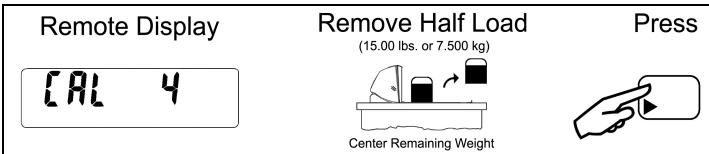


Figure 65.

SCALE OPERATION

CALIBRATION

Scale Calibration Procedure (lbs. or kg) with Remote Display

12. Remove the remaining half load from the scale then press clear (C). The message *done* will flash briefly on the display.

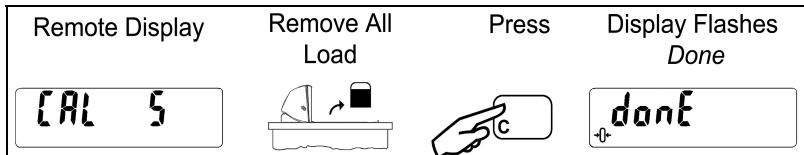


Figure 66.

13. **Exit calibration mode.** Press and hold the test button for at least 3 seconds then release. With no load on the scale the display should read 0.00 lb. or 0.000 kg.

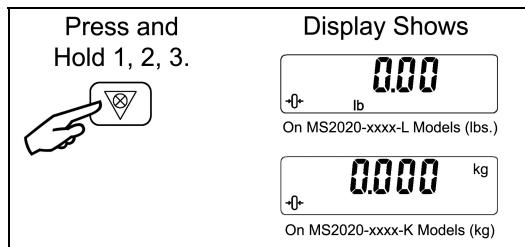


Figure 67.

14. The unit's calibration must now be verified as required by state and/or local Weights and Measures regulations (starting on page 80).

Need to Start Over?

If for any reason you need exit the calibration mode or restart the process press the test button then the clear button.

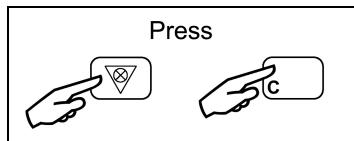


Figure 68.

SCALE OPERATION

CALIBRATION

Bar Code Calibration Procedure without Remote Display

The following calibration procedure can be used when the remote scale display is not present. This procedure requires that the scanner/scale have a software serial number of 15001, or greater. The beeper volume switch is used to advance to the next stage of calibration and the LED display notifies the operator which 'calibration stage' (1 through 5) is active.

1. Temporarily remove the platter and place it in a safe location.



It is the responsibility of the owner of the scale to confirm compliance with the relevant Weights and Measures statutes and regulations applicable in your area by checking with the appropriate government agency before placing a newly calibrated unit into service or removing any official seals.

2. If this is a currently installed scanner/scale in need of calibration, cut and remove the calibration switch cover seal. If this is a new installation, cut and remove the factory-applied adhesive seal.



Follow all Electro-Static Discharge (ESD) procedures when exposing internal scanner/scale components.

3. Remove the M3 screw securing the calibration switch/button cover. Place the cover and screw in a safe location.

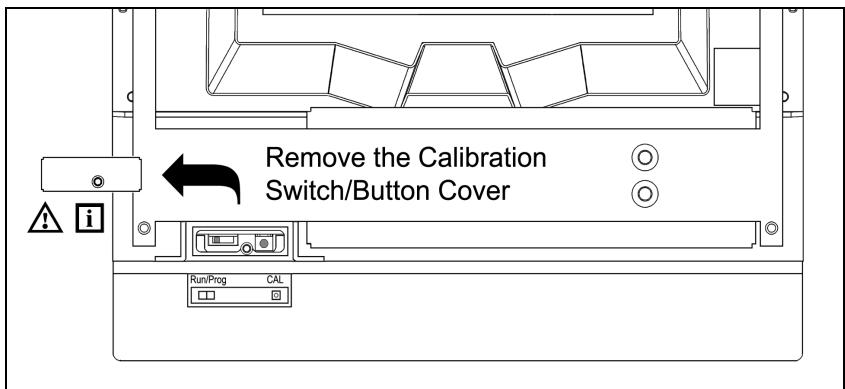


Figure 69. Calibration Switch Plate Cover Removal

SCALE OPERATION

CALIBRATION

Bar Code Calibration Procedure without Remote Display

4. **Enter the scale program mode.** Power down the unit and slide the scale program switch to the program position. *If the system is a dual cable system, disconnect the host to scale RS232 cable from the unit.*

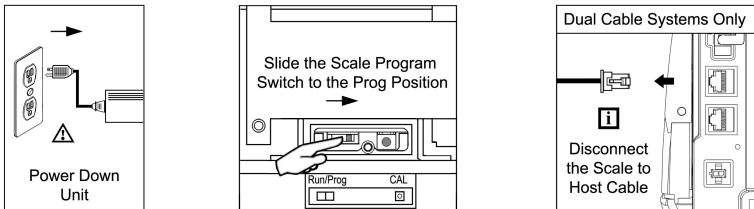


Figure 70. Entering the Scale Program Mode

5. **Reinstall the platter and power up the unit.**

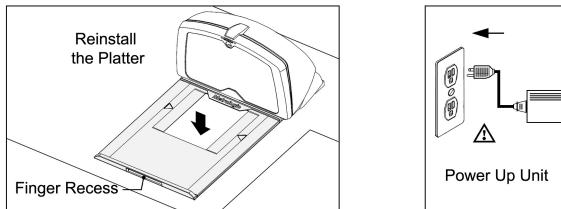


Figure 71. Platter Installation and Power Up

6. **Enter bar code calibration mode.** Use the vertical window to scan the following bar code. The scanner will beep once as it enters the bar code calibration mode and the calibration utility will start.

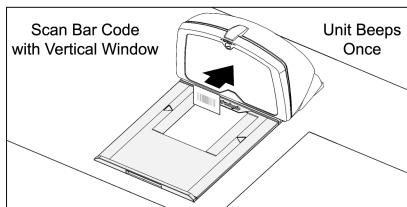
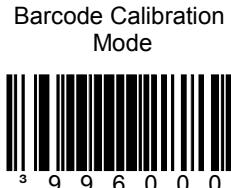


Figure 72. Entering Bar Code Calibration Mode



If a razz tone is heard an error has occurred. Refer to Diagnostic Indicator Display: Error Codes in the Stratos installation and user's guide for additional information (00-02983).

SCALE OPERATION

CALIBRATION

Bar Code Calibration Procedure without Remote Display

7. Make sure there is **no load** on the scale platter. The white LEDs will be used to indicate the current step in the calibration process.
8. **Calibrate a zero load.** The white LEDs will blink once periodically. Wait 8 to 10 seconds for scale stability then press the beeper volume switch one time. The beeper will beep 1 time indicating that the Cal 1 value has been stored.

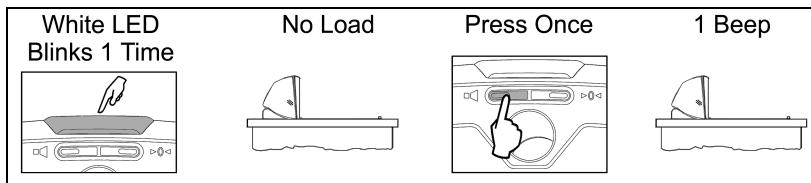


Figure 73.

9. Place a half load on the center of the scale platter. The white LEDs will blink twice periodically. Wait for scale stability, and then press the beeper volume switch once. The beeper will beep 2 times indicating that the Cal 2 value has been stored.

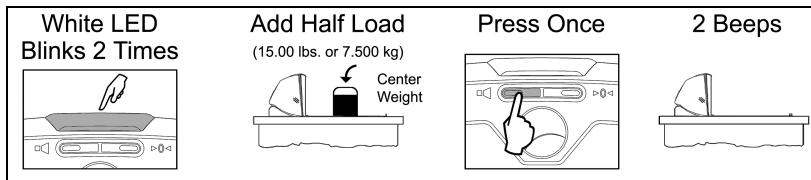


Figure 74.

10. Add an additional half load to the existing half to simulate a full load (center the entire load). The white LEDs will blink three times periodically. Wait for scale stability, and then press the beeper volume switch once. The beeper will beep 3 times indicating that the Cal 3 value has been stored.

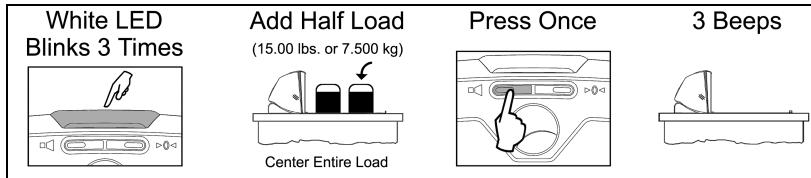


Figure 75.

SCALE OPERATION

CALIBRATION

Bar Code Calibration Procedure without Remote Display

11. Remove half of the load and center the remaining load. The white LEDs will blink four times periodically. Wait for scale stability, and then press the beeper volume switch once. The beeper will beep 4 times indicating that the Cal 4 value has been stored.

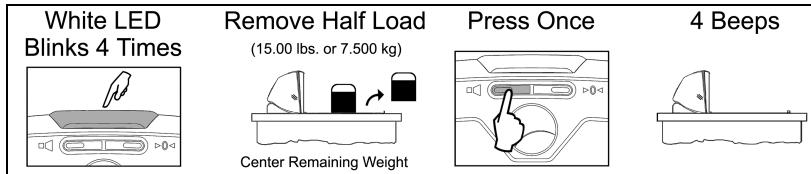


Figure 76.

12. Remove the remaining half load from the scale. The white LEDs will blink five times periodically. Wait for scale stability, and then press the beeper volume switch once. The beeper will beep 5 times indicating that the Cal 5 value has been stored.

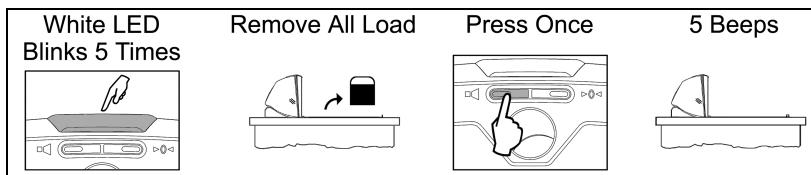


Figure 77.

13. Calibration is now complete. The scanner will automatically restart, and beep one time, in 5 seconds.
14. In order to use the scale in the normal operating mode, the unit must be powered down and the scale program switch returned to the run position.

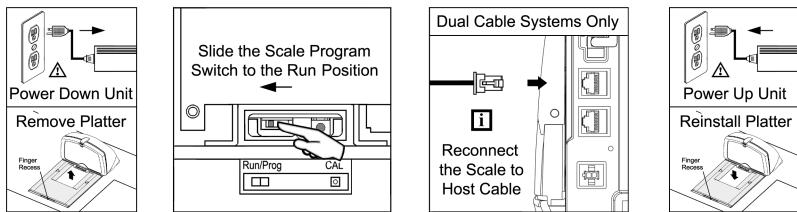


Figure 78.

15. The unit's calibration must now be verified as required by state and/or local Weights and Measures regulations (starting on page 80).

SCALE OPERATION

CALIBRATION VERIFICATION

U.S. Pounds

The following tests verify if the scale's Calibration is accurate. For Kilograms see instructions starting on page 82.



The following tests are based on a 2-digit accuracy setting for pounds.

- Increasing Load Test
- Shift Test
- Decreasing Load Test
- Return to Zero Test

Increasing Load Test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.00 lbs.
2. Place a 5.00 lb. weight on the center of the scale platter and verify the display reads 5.00 lbs.
3. Place an additional 5.00 lb. weight on the center of the scale platter and verify the remote display reads between 9.99 and 10.01 lbs.
4. Place an additional 10.00 lb. weight on the center of the scale platter and verify the remote display reads between 19.99 and 20.01 lbs.
5. Place an additional 10.00 lb. weight on the center of the scale platter and verify the remote display reads between 29.99 and 30.01 lbs.
6. Remove all the weight from the scale platter and verify the display reads 0.00 lbs.

SCALE OPERATION

CALIBRATION VERIFICATION

U.S. Pounds (lbs.)

Shift Test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.00 lbs.
2. Place a 15.00 lb. weight on the scale platter in the center of zone A (see diagram) and verify the remote display reads between 14.99 and 15.01 lbs.
3. Remove the 15.00 lb. weight and verify the display reads 0.00 lbs.
4. Repeat steps 2 and three for each of the remaining zones (B, C, and D).
5. Verify that the remote display reads 0.00 lbs. when all weight has been removed.

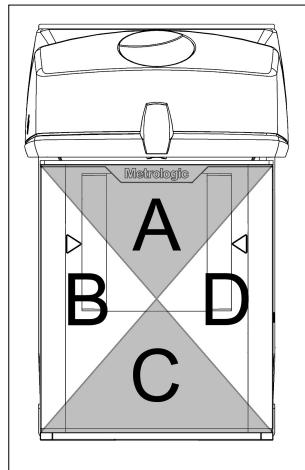


Figure 79. Shift Test Zones

Decreasing Load Test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.00 lbs.
2. Place a 30.00 lb. load on the center of the scale platter (use two 10.00 lb. weights and two 5.00 lb. weights). Verify the remote display reads between 29.99 and 30.01 lbs.
3. Remove a 10.00 lb. weight from the platter and center remaining weight. Verify that the remote display reads between 19.99 and 20.01 lbs.
4. Remove another 15.00 lbs. from the platter, center the remaining weight and verify the scale reads 5.00 lbs.
5. Remove all the weight from the platter and verify the scale has returned to 0.00 lbs.

Return to Zero Test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.00 lbs.

SCALE OPERATION

CALIBRATION VERIFICATION

Kilograms (kg)

The following tests verify if the scale's Calibration is accurate. For US Pounds see instructions starting on page 80.



The following tests are based on a 3-digit accuracy setting for kilograms.

- Increasing Load Test
- Shift Test
- Decreasing Load Test
- Return to Zero Test

Increasing Load test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.000 kg.
2. Place a 2.500 kg weight on the center of the scale platter and verify the display reads 2.500 kg.
3. Place an additional 2.500 kg weight on the center of the scale platter and verify the remote display reads 4.995 kg and 5.005 kg.
4. Place an additional 5.000 kg weight on the center of the scale platter and verify the remote display reads between 9.995 kg. and 10.005 kg.
5. Place an additional 5.000 kg weight on the center of the scale platter and verify the remote display reads between 14.995 kg. and 15.005 kg.
6. Remove all the weight from the scale platter and verify the display reads 0.000 kg.

SCALE OPERATION

CALIBRATION VERIFICATION

Kilograms (kg)

Shift Test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.000 kg.
2. Place a 7.500 kg weight on the scale platter in the center of zone A (see diagram) and verify the remote display reads between 7.495 kg. and 7.505 kg.
3. Remove the 7.500 kg weight and verify the display reads 0.000 lbs.
4. Repeat steps 2 and three for each of the remaining zones (B, C, and D).
5. Verify that the remote display reads 0.000 kg when all weight has been removed.

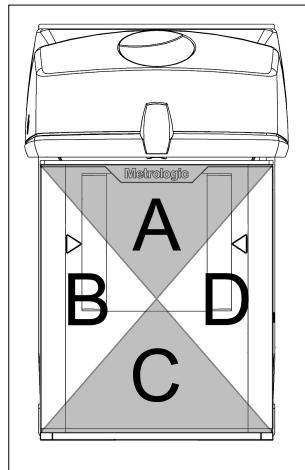


Figure 80. Shift Test Zones

Decreasing Load Test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.000 kg.
2. Place a 15.000 kg load on the center of the scale platter. Verify the remote display reads between 14.995 kg. and 15.005 kg.
3. Remove 7.500 kg from the platter and center remaining weight. Verify that the remote display reads between 7.495 kg. and 7.505 kg.
4. Remove another 5.000 kg from the platter, center remaining weight and verify the scale reads 2.500 kg.
5. Remove all the weight from the platter and verify the scale has returned to 0.000 kg.

Return to Zero Test

1. Ensure there is no load on the scale platter and verify the remote display reads 0.000 kg.

SCALE OPERATION

SECURITY SEAL INSTALLATION



The certification of the weighing mechanism of the scale version of this scanner is subject to federal, state and local Weights and Measures statutes and regulations and can only be performed by authorized government agencies and/or their duly registered agents. Each time the scale or weighing mechanism is calibrated, it should be properly sealed with a paper seal or a wire seal prior to being placed into service in commerce.

It is the responsibility of the owner of the scale to confirm compliance with the relevant Weights and Measures statutes and regulations applicable in your area by checking with the appropriate government agency before placing a newly calibrated unit into service or removing any official seals.

Type of seal to be used will depend on the guidelines specified by the local Weights and Measures authorities.

The security seal must only be installed if there were no errors during the scale calibration verification tests.

Pressure Sensitive Security Seal

1. Temporarily remove the platter and place it in a safe location.
2. Reinstall the calibration switch/button cover.

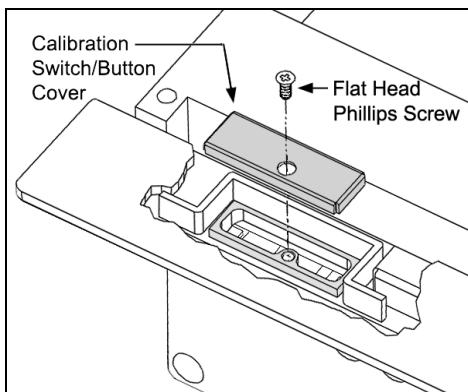


Figure 81. Calibration Switch/Button Cover

SCALE OPERATION

SECURITY SEAL INSTALLATION

Pressure Sensitive Security Seal

3. Apply the appropriate calibration security seal over the switch cover.

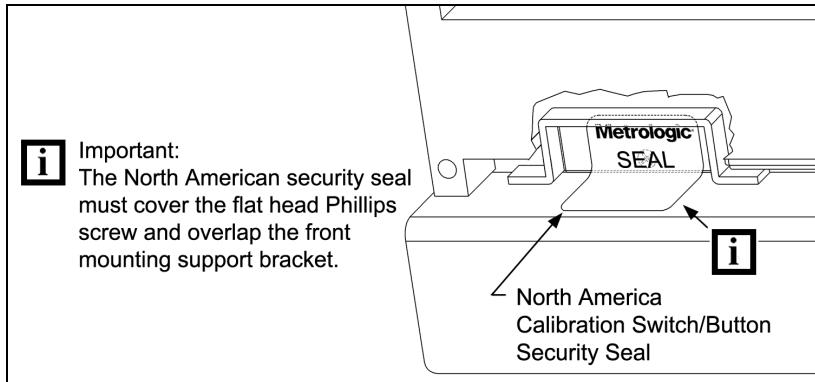


Figure 82. Calibration Switch/Button North America Security Seal Placement

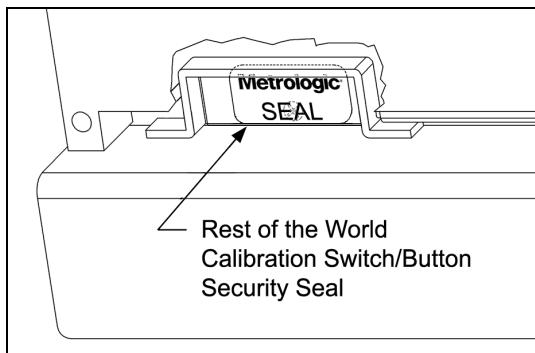


Figure 83. Calibration Switch/Button Rest of the World Security Seal Placement

4. Reinstall the platter.

SCALE OPERATION

SECURITY SEAL INSTALLATION

Wire Security Seal (Seal Conversion Kit 46-46890)

1. Temporarily remove the platter and place it in a safe location.
2. Install the calibration switch/button tabbed cover.
3. Secure the cover in place with the flat head Phillips screw provided.
4. Position the security seal cage over the tab on the calibration switch/button cover.
5. Thread the wire through the hole in the tab on the calibration switch/button cover and through the wire lock at the other end forming a loop (see figure 1).
6. Crimp the lock closed to secure the wire, then pack the wire and lock into the cage.
7. Insert the tab on the end of the transparent cage cover into the slot on the security cage then snap the other end into place over the security cage hook.
8. Reinstall the platter.

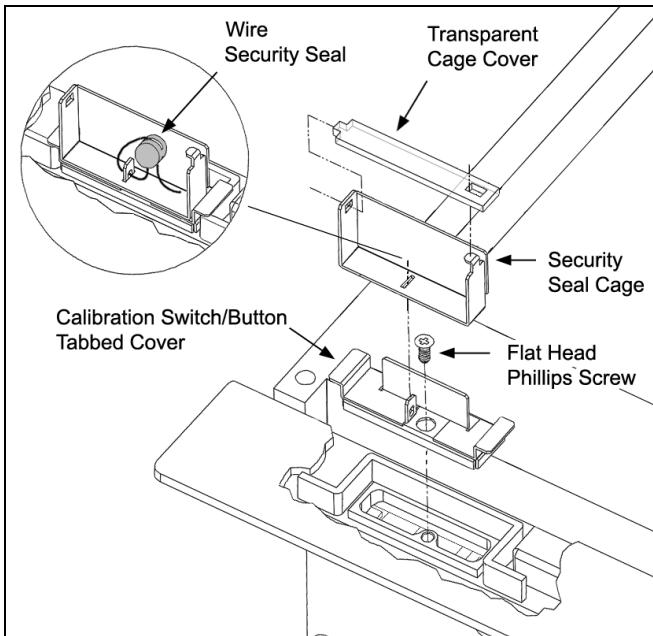


Figure 84. Calibration Switch/Button Wire Security Seal Assembly.

MAINTENANCE

DAILY MAINTENANCE

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

For the glass window:

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

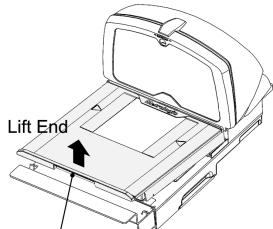
For the red window:

1. Use mild soap and water with lint free, non-abrasive cleaning cloth.
2. Gently wipe the scanner window.

Also make sure the debris channels are cleaned regularly.

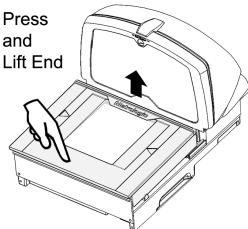
HORIZONTAL SCAN WINDOW REPLACEMENT

- 1** To remove the platter on an MS2020 or an MS2021, use the finger recess at the end of the platter to lift it off the unit.

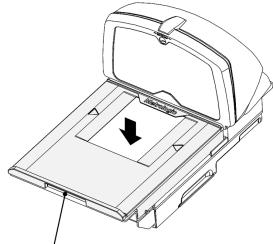


Finger recess on MS2020 & MS2021 models only.

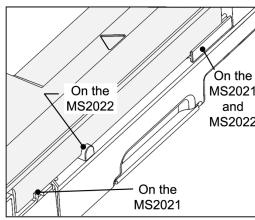
- To remove the platter on the MS2022, press down on the end of the platter then grip the opposite end and lift it off the unit.



- 2** Position the replacement platter in the support channel and over the alignment guide. The MS2020 scale unit does not have a support channel or alignment guide. The platter simply sits over the scale arms.



Finger recess on MS2020 & MS2021 models only.



Alignment Guides

Figure 85. Horizontal Scan Window Replacement (MS2021 and MS2022 Shown)

MAINTENANCE

VERTICAL SCAN WINDOW REPLACEMENT

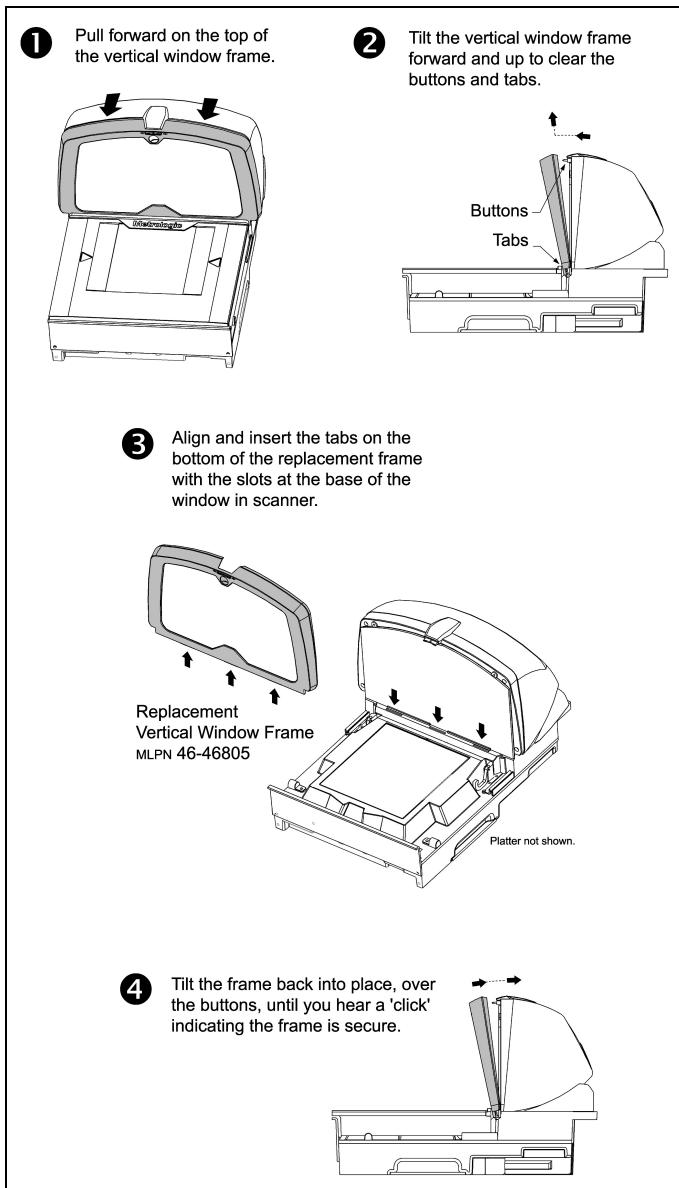


Figure 86. Vertical Scan Window Replacement (MS2022 Shown)

TROUBLESHOOTING

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.

Symptom	Possible Cause(s)	Solution
All Interfaces		
No LEDs, beep or motor spin.	No power is being supplied to the scanner.	Check the transformer, outlet and the power strip. Make sure the power cable is plugged into the scanner.
No LEDs, and no beep.	No power is being supplied to the scanner.	The host system cannot supply enough current to power the MS2020 series scanner. Use the power supply included with the scanner.
During power up the unit beeps 3 times.	A Non-volatile RAM failure.	Contact a Metrologic service representative, if the unit will not hold the programmed configuration.
During power up the unit razzes continuously.	A RAM or ROM failure.	Contact a Metrologic service representative, if the unit will not function.
During power up the unit razzes once and the blue LED flashes.	A VLD failure.	Contact a Metrologic service representative.
During power up the unit razzes twice and both LEDs flash.	Scanner motor failure.	Contact a Metrologic service representative.
There are multiple scans upon presentation of code.	The <i>same symbol timeout</i> is set to short.	Adjust same symbol timeout for a longer time.
The unit powers up but does not beep.	The beeper is disabled.	Enable the beeper.
	No volume is selected.	Select a volume.
	No tone is selected.	Select a tone.

TROUBLESHOOTING

Symptom	Possible Cause(s)	Solution
All Interfaces		
	The unit is trying to scan a particular symbology that is not enabled.	UPC/EAN and Code 128 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.	<p>The unit has been programmed for a character length lock or a minimum length and the bar code being scanned does not satisfy the programmed criteria.</p> <p><i>Typical of Non-UPC/EAN codes. The scanner defaults to a minimum of 4 character bar code.</i></p>	Verify that the bar code that is being scanned falls into the criteria.
The unit scans a bar code, but locks up after the first scan (<i>the white LED stays on</i>).	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. Make sure that the scanner is connected to the proper host port.
Scanner beeps at some bar codes and NOT form others of the same bar code symbology.	The print quality of the bar code is suspect.	The type of printer and/or the printer settings could be the problem.
	Check the character length lock.	Check the print mode or change the printer settings. For example change to econo mode or high speed.
	The aspect ratio of the bar code is out of tolerance.	

TROUBLESHOOTING

Symptom	Possible Cause(s)	Solution
All Interfaces		
	The unit is trying to scan a particular symbology that is not enabled.	UPC/EAN and Code 128 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 unit has been programmed for a character length lock or a minimum length and the bar code being scanned does not satisfy the programmed criteria.	Verify that the bar code that is being scanned falls into the criteria. <i>Typical of Non-UPC/EAN codes. The scanner defaults to a minimum of 4 character bar code.</i>
	The bar code may have been printed incorrectly.	Check if it is a check digit, character or border problem.
The unit beeps at some bar codes but 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.
	The minimum symbol length setting does not work with the bar code.	Check if the correct minimum symbol length is set.
RS232 Only		
The unit powers up OK and scans OK but does not communicate properly to the host.	The com port at the host is not working or is not 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 "RS232" data.
	The cable is not connected to the proper com port.	
	The com port is not operating properly.	

TROUBLESHOOTING

Symptom	Possible Cause(s)	Solution
RS232 Only		
The host is receiving data but the data does not look correct.	The scanner and host may not be configured for the same interface.	Check that the scanner and the host are configured for the same interface.
Characters are being dropped.	The intercharacter delay needs to be added to the transmitted output.	Add some intercharacter delay to the transmitted output by using the MetroSelect Configuration Guide (MLPN 00-02407B).
Aux Port Operation With Any Interface		
The secondary scanner is not functioning.		Refer to the user's guide provided with the secondary scanner.
	Cable (MLPN 54-54667) may not be connected to the proper port.	Ensure that the secondary scanner is connected to the MS2020 com port marked "Aux" port.
The secondary scanner powers up but data is not relayed to the host.	The auxiliary com port may not be operating properly.	* The MS2020 series must be programmed to enable the auxiliary port.
		The auxiliary input port's data format must match the main output format of the secondary scanner.
<ul style="list-style-type: none"> * Use MetroSet. For the auxiliary interface, choose "HoloTrak Decode" All remaining parameters will be automatically chosen. 		

TROUBLESHOOTING

RS232 DEMONSTRATION PROGRAM

If an RS232 scanner is not communicating with your IBM compatible PC, key in the following BASIC program to test that the communication port and scanner are working. This program is for demonstration purposes only. It is only intended to prove that cabling is correct, the com port is working, and the scanner is working. If the bar code data displays on the screen while using this program, it only demonstrates that the hardware interface and scanner are working. At this point, investigate whether the application software and the scanner configuration match. If the application does not support RS232 scanners, a software wedge program that will take RS232 data and place it into a keyboard buffer may be needed. This program tells the PC to ignore RTS-CTS, Data Set Ready (DSR) and Data Carrier Detect (DCD) signals. If the demonstration program works and yours still does not, jumper RTS to CTS and Data Terminal Reading (DTR) to DCD and DSR on the back of your PC.

```
10    CLS
20    ON ERROR GOTO 100
30    OPEN "COM1:9600,S,7,1,CS0,DS0,CD0,LF" AS #1
35    PRINT "SCAN A FEW BAR CODES"
40    LINE INPUT #1, BARCODE$
50    PRINT BARCODE$
60    K$ = INKEY$: IF K$ = CHR$(27) THEN GOTO 32766
70    GOTO 40
100   PRINT "ERROR NO."; ERR; " PRESS ANY KEY TO TERMINATE."
110   K$ = INKEY$: IF K$ = "" THEN GOTO 110
32766 CLOSE: SYSTEM
32767 END
```

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

Many functions of the scanner can be "programmed" - that is, enabled or disabled. The scanner is shipped from the factory programmed to a set of default conditions. The default parameter of the scanner 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	OCIA	RS232	IBM 46XX	USB
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		✓	✓	✓	✓
MOD 43 CD on Code 39		✓	✓	✓	✓
Transmit Mode 43 CD		✓	✓	✓	✓
Paraff		✓	✓	✓	✓
Paraff Lead "A"		✓	✓	✓	✓
Allow Paraff Failures		✓	✓	✓	✓
French PC Terminal			✓		
MSI-Plessey		✓	✓	✓	✓
Airline (15 digit) 2 of 5		✓	✓	✓	✓
Airline (13 digit) 2 of 5		✓	✓	✓	✓
Matrix 2 of 5		✓	✓	✓	✓
Telepen		✓	✓	✓	✓
UK Plessey		✓	✓	✓	✓
STD 2 of 5		✓	✓	✓	✓

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
MSI-Plessey 10/10 Check Digit		✓	✓	✓	✓
MSI-Plessey MOD 10 Check Digit		✓	✓	✓	✓
ITF Symbol Lengths	Variable	✓	✓	✓	✓
ITF Minimum Symbol Length	6	✓	✓	✓	✓
Symbol Length Lock	None	✓	✓	✓	✓
Minimum Symbol Length	4	✓	✓	✓	✓
Trioptic		✓	✓	✓	✓
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	*	✓	✓	✓	✓
DTS/SIEMENS		✓			
DTS/NIXDORF	*	✓			
NCR F		✓			
NCR S		✓			
Beeper Tone	Normal	✓	✓	✓	✓
Beep Transmit Sequence	Before Transmit	✓	✓	✓	✓
Beeper Volume	Loudest	✓	✓	✓	✓
Communication Timeout	None	✓	✓	✓	✓

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
Razzberry Tone on Timeout		✓	✓	✓	✓
Three Beeps on Timeout		✓	✓	✓	✓
No Beeps on Timeout	*	✓	✓	✓	✓
Fast Beep		✓	✓	✓	✓
Beep Twice on Supplements		✓	✓	✓	✓
No Beeps on Timeout	*	✓	✓	✓	✓
5 Retries Before Timeout		✓	✓	✓	✓
Timeout In ...	2 secs.	✓	✓	✓	✓
Laser Off Between Records		✓	✓	✓	✓
Variable Laser Off Delay	5 - 635 msec	✓	✓	✓	✓
Disable Button Control of Power Save Mode		✓	✓	✓	✓
Disable Button Control of Beep Volume		✓	✓	✓	✓
Flash LED on Good Scan	*	✓	✓	✓	✓
Reverse LED Convention		✓	✓	✓	✓
Flash LED on Good Scan	*	✓	✓	✓	✓
Enter Power Save Mode	61 mins.	✓	✓	✓	✓
Blink Power Save Mode		✓	✓	✓	✓
Laser OFF Power Save Mode		✓	✓	✓	✓
Laser & Motor OFF Power Save Mode		✓	✓	✓	✓
Dual Action Power Save Mode #1		✓	✓	✓	✓
Dual Action Power Save Mode #2	*	✓	✓	✓	✓
Same Symbol Rescan Timeout: 500 msecs Programmable in 50 msec steps (MAX 6.35 seconds)	*	✓	✓	✓	✓
Intercharacter Delay Programmable in 1 msec steps (MAX 255 msecs)	1 msecs 10 msecs in KBW	✓	✓	✓	

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
Number of Scan Buffers	1	✓	✓	✓	✓
UPC GTIN-14 Format		✓	✓	✓	✓
EAN-8 Enable	*	✓	✓	✓	✓
Transmit EAN-8 Check Digit	*	✓	✓	✓	✓
Convert EAN-8 to EAN-13		✓	✓	✓	✓
EAN-13 Enable	*	✓	✓	✓	✓
Transmit EAN-13 Check Digit	*	✓	✓	✓	✓
UPC-A Enable	*	✓	✓	✓	✓
Convert UPC-A to EAN-13		✓	✓	✓	✓
Transmit UPC-A Check Digit	*	✓	✓	✓	✓
Transmit UPC-A Number System	*	✓	✓	✓	✓
Transmit UPC-A Manufacturers ID.	*	✓	✓	✓	✓
Transmit UPC-A Item ID	*	✓	✓	✓	✓
UPC-E Enable	*	✓	✓	✓	✓
Empand UPC-E		✓	✓	✓	✓
Transmit UPC-E Lead '0'	*	✓	✓	✓	✓
Transmit UPC-E Check Digit		✓	✓	✓	✓
Disable UPC-E Auto Redundancy	*	✓	✓	✓	✓
Transmit Codabar Start/Stop Characters		✓	✓	✓	✓
Codabar CLSI		✓	✓	✓	✓
Dual Field Codabar		✓	✓	✓	✓
Tab Between Dual field Codabar		✓	✓	✓	✓
Codabar CLSI Check Digit		✓	✓	✓	✓
Codabar 7-Check Check Digit		✓	✓	✓	✓
Codabar Mod-16 Check Digit		✓	✓	✓	✓

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
Transmit MSI Plessey Check Digits		✓	✓	✓	✓
Number of MSI Plessey Check Digits	0	✓	✓	✓	✓
UK Plessey A to X Convert		✓	✓	✓	✓
UK Plessey Special 12 Character Format		✓	✓	✓	✓
Transmit UK Plessey Check Digit		✓	✓	✓	✓
EAN 128 Enable		✓	✓	✓	✓
Enable French Pharma		✓	✓	✓	✓
Enable Matrix 2 of 5 Check Digit		✓	✓	✓	✓
Enable Hong Kong 2 of 5		✓	✓	✓	✓
Enable Alpha Telepen		✓	✓	✓	✓
Telepen Convert Lead '^L' to 'E'		✓	✓	✓	✓
Enable Code 11 Check Digit		✓	✓	✓	✓
Parity	Space		✓		
Baud Rate	9600		✓		
8 Data Bits			✓		
7 Data Bits	*		✓		
Stop Bits	2		✓		
RTS / CTS Enabled			✓		
Message RTS			✓		
Character RTS	*		✓		
ACK / NAK			✓		
O / N Handshaking			✓		
Host Bell / Cancel			✓		
Xon / Xoff			✓		
No Transmit Without DTR Present			✓		
French PC Terminal Emulation			✓		

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
"D/E" Disable Command			✓	✓	✓
"Z/R" Disable Command			✓	✓	✓
"F/L" Laser Command			✓	✓	✓
"M/O" Motor Enable Commands			✓	✓	✓
Beep on Bell			✓	✓	✓
Razz on 'z'			✓	✓	✓
Activate on DTR			✓	✓	✓
Activate on DC2 Character			✓	✓	✓
Xmit No Read Message on DC2 Timeout			✓	✓	✓
No Transmit LED During No Read Message			✓	✓	✓
Programmable "No Read" Message			✓	✓	✓
Recv "I" = Transmit "METROLOGIC"			✓	✓	✓
Recv "i" = Transmit Scanner ID Byte			✓	✓	✓
STX Prefix			✓		✓
TAB Prefix			✓		✓
Metrologic Prefix			✓		✓
UPC Prefix			✓		✓
ETX Suffix			✓		✓
TAB Suffix			✓		✓
Carriage Return Suffix	*		✓		✓
Line Feed Suffix	*		✓		✓
UPC Suffix			✓		✓
Transmit LRC			✓		✓
Start LRC on 1 st Byte			✓		✓
Start LRC on 2 nd Byte			✓		✓

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
'c' Prefix for UPC			✓		✓
'\$' Prefix for UPC			✓		✓
Programmable Prefix Characters	10 avail		✓		✓
Programmable Suffix Characters	10 avail		✓		✓
Predefined Code ID Sets	Multiple Selections		✓		✓
Programmable Prefix for Code Types			✓		✓
Programmable Suffix for Code Types			✓		✓
Programmable Code Lengths	7 avail		✓	✓	✓
Code Selects	7 avail		✓	✓	✓
Code Select Timeout 0.1 to 25.5 seconds	5 sec		✓	✓	✓
Replace 1 Character in Transmission			✓		✓
Razz on Code Select Timeout	*		✓	✓	✓
Japan Dual Field Code Selects			✓	✓	✓
EAN-13 Only in Japan Dual Field			✓	✓	✓
Two Digit Supplements		✓	✓	✓	✓
Five Digit Supplements		✓	✓	✓	✓
Require Supplements		✓	✓	✓	✓
Remote Supplement Support		✓	✓	✓	✓
Two Digit Redundancy		✓	✓	✓	✓
Five Digit Redundancy		✓	✓	✓	✓
Enable Coupon Code 128		✓	✓	✓	✓
Transmit Coupon 'JC1'	*	✓	✓	✓	✓
Group Separator	*	✓	✓	✓	✓
Coupon Code Can Begin with '4'		✓	✓	✓	✓
Enable EAN-99 Coupon Code		✓	✓	✓	✓

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
Bookland		✓	✓	✓	✓
Convert Bookland to ISBN		✓	✓	✓	✓
Reformat ISBN		✓	✓	✓	✓
Transmit ISBN Check Digit		✓	✓	✓	✓
Bookland 977 2-Digit Supp Required		✓	✓	✓	✓
378 / 379 Supplements		✓	✓	✓	✓
414 / 419 Supplements		✓	✓	✓	✓
434 / 439 Supplements		✓	✓	✓	✓
Number System 2 Enables Supplements		✓	✓	✓	✓
Number System 5 Enables Supplements		✓	✓	✓	✓
100 msec to Find Supplement (100 - 800 msec)	*	✓	✓	✓	✓
Allow Code ID's with Supplements		✓	✓	✓	✓
High Density Codes	*	✓	✓	✓	✓
Medium Density Codes		✓	✓	✓	✓
Low Density Codes		✓	✓	✓	✓

DEFAULT SETTINGS

COMMUNICATION PARAMETERS

Default settings for “Aux” interface

The secondary scanner and the MS2020 series always communicates via RS232. Data is relayed to the host via various primary interfaces.

PARAMETER	DEFAULT	OCIA	RS232	IBM 46XX	USB
Aux Baud Rate	38400	✓	✓	✓	✓
Aux parity	none	✓	✓	✓	✓
Aux data bits	8	✓	✓	✓	✓
Aux stop bits	1	✓	✓	✓	✓
Aux character RTS	*	✓	✓	✓	✓
Aux message RTS		✓	✓	✓	✓
Aux Ack/Nak	*	✓	✓	✓	✓
Aux Xon/Xoff	*	✓	✓	✓	✓
Aux D/E commands		✓	✓	✓	✓
Aux M/O commands		✓	✓	✓	✓
Aux F/L commands		✓	✓	✓	✓
Aux Intercharacter Delay	1 msec	✓	✓	✓	✓
Aux PortData Format	None (Disabled)	✓	✓	✓	✓

SCANNER AND CABLE TERMINATIONS

SCANNER PINOUT CONNECTIONS

The MS2020 Series scanner interfaces terminate to 10-pin modular jacks located on the bottom of the units. The serial number label indicates the model number of the scanner.

DC Power	
Pin	Function
1	12VDC
2	Ground
3	5VDC

EAS	
Pin	Function
1	EAS In
2	EAS Out

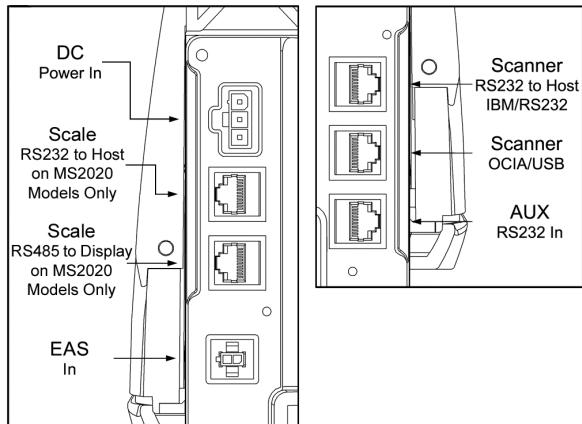


Figure 87. Connector Layout

Scale RS232 Port for Scale Data	
Pin	Function
1	Ground
2	Scale RS232 TX
3	Scale RS232 RX
4	Scale RS232 RTS
5	Scale RS232 CTS
6	NC
7	NC
8	NC
9	NC
10	Shield

Scale Manufacture Specific	
Pin	Function
1	Scale Display SIG0
2	Scale Display SIG1
3	Scale Display SIG2
4	Scale Display SIG3
5	Scale Display SIG4
6	Scale Display SIG5
7	Scale Display SIG6
8	Scale Display SIG7
9	NC
10	NC

SCANNER AND CABLE TERMINATIONS

SCANNER PINOUT CONNECTIONS

Scanner IBM to Host	
Pin	Function
1	Ground
2	RS232 TX
3	RS232 RX
4	RS232 RTS
5	RS232 CTS
6	RS232 DTR
7	IBM B-
8	IBM A+
9	NC
10	NC

Scanner RS232 to Host	
Pin	Function
1	Ground
2	RS232 TX
3	RS232 RX
4	RS232 RTS
5	RS232 CTS
6	RS232 DTR
7	NC
8	NC
9	NC
10	NC

USB or OCIA	
Pin	Function
1	Ground
2	OCIA Sdata
3	OCIA Sdata
4	OCIA RDATA
5	OCIA RDATA Return
6	OCIA Clock In / FS USB D+
7	OCIA Clock Out / +USBV
8	OCIA Clock In Return / USB D- FS
9	NC
10	Shield

Auxiliary Port RS232 IN Only	
Pin	Function
1	Ground
2	RS232 Receive Input
3	RS232 Transmit Output
4	RS232 RTS In
5	RS232 CTS Out
6	NC
7	NC
8	NC
9	+5V Out
10	NC

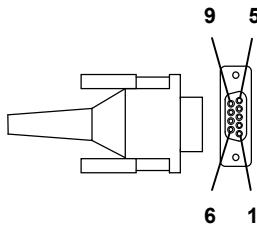
FS = Full Speed USB

SCANNER AND CABLE TERMINATIONS

CABLE CONNECTOR CONFIGURATIONS

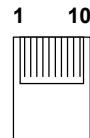
Cable Connector Configurations (Host End)

Cable MLPN 54-54xxx (xxx specifies connection to the host)	
Pin	Function
1	Shield Ground
2	RS232 Transmit Output
3	RS232 Receive Input
4	DTR Input
5	Power/Signal Ground
6	Reserved
7	CTS Input
8	RTS Output
9	+5VDC



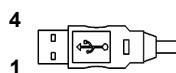
9-Pin D-Type Conn.

RS232 LSO/AUX Cable MLPN 54-54667	
Pin	Function
1	Ground
2	RS232 Transmit Output
3	RS232 Receive Input
4	RTS Output
5	CTS Input
6-10	N/C



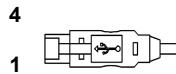
10-pin Modular Plug

Low Speed USB Power Cable (MLPN 54-54165, Type A non-locking)	
Pin	Function
1	PC+5V USB
2	D-
3	D+
4	Ground



USB Type A

Full Speed USB Power Cable (MLPN 54-54227A-N, Type A Locking)	
Pin	Function
1	PC+5V USB
2	D-
3	D+
4	Ground



Locking Type A with Power

LASER AND PRODUCT SAFETY

NOTICES

This equipment has been tested and found to comply with limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. Any unauthorized changes or modifications to this equipment could void the users authority to operate this device.

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.

Notice

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

Remarque

Cet appareil numérique de la classe A, conforme à la norme NMB-003 du Canada.

European Standard

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Funkstöreigenschaften nach EN 55022:1998

Warnung!

Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen.

Standard Europeo

Attenzione

Questo è un prodotto di classe A. Se usato in vicinanza di residenze private potrebbe causare interferenze radio che potrebbero richiedere all'utilizzatore opportune misure.

Attention

Ce produit est de classe "A". Dans un environnement domestique, ce produit peut être la cause d'interférences radio. Dans ce cas l'utilisateur peut être amené à prendre les mesures adéquates.

CAUTIONS

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 hazardous. L'emploi d'appareils optiques avec cet équipement laser augmente le risque d'endommagement de la vision.

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 aprirete 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.

LIMITED WARRANTY

The MS2020 Series scanners are manufactured by Metrologic at its Blackwood, New Jersey, U.S.A. facility. The MS2020 Series scanners have a two (2) year limited warranty from the date of manufacture. Metrologic warrants and represents that all MS2020 Series scanners are free of all defects in material, workmanship and design, and have been produced and labeled in compliance with all applicable U.S. 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, U.S.A. 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 the equipment failure is covered under this warranty, Metrologic shall, at 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 DAMAGES, 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.

Corporate Headquarters

Metrologic Instruments, Inc.
90 Coles Road
Blackwood, NJ 08012-4683

Customer Service: 1-800-ID-METRO
Tel: 856-228-8100
Fax: 856-228-6673
Email: info@metrologic.com
Website: www.metrologic.com

Germany

Metrologic Instruments GmbH
Dornierstrasse 2
82178 Puchheim b.
Munich, Germany

Tel: 49-89-89019-0
Fax: 49-89-89019-200
Email: info@europe.metrologic.com

PATENTS

“Patent Information

This METROLOGIC product may be covered by one or more of the following U.S. Patents:

U.S. Patent No.;

5,081,34; 5,343,027; 5,627,359; 5,686,717; 5,789,731; 5,828,049; 6,029,894; 6,209,789; 6,299,065

No license right or sublicense is granted, either expressly or by implication, estoppel, or otherwise, under any METROLOGIC or third party intellectual property rights (whether or not such third party rights are licensed to METROLOGIC), including any third party patent listed above, except for an implied license only for the normal intended use of the specific equipment, circuits, and devices represented by or contained in the METROLOGIC products that are physically transferred to the user, and only to the extent of METROLOGIC'S license rights and subject to any conditions, covenants and restrictions therein.”

Other worldwide patents pending.

INDEX

A

- AC 5, 24, 31, 34, 35, 37, 38,
40, 43, 49, 50
accessories 4, 5, 25, 33, 36, 39,
42, 45, 52
application 25, 42, 50, 52, 61, 93
audible 57
AUX 4, 11, 16, 92

B

- bar code 8, 24, 32, 35, 38, 41,
44, 51, 57, 58, 59, 64, 66, 87,
89–93
bar width 8
beep 57, 58, 66, 68, 89–93,
95, 96, 99
blue LED 2, 10, 15, 19, 57–59,
68, 89
button 67
calibration 71, 73
display 69, 74, 75
multi-function .. 10, 15, 19, 66, 67
scale zero 10, 69
test 75
tone 10, 15, 19, 66
volume 10, 15, 19, 66

C

- cable 4, 23, 24, 25, 89, 90, 92
dual 46
pinouts 103–105
routing 31–53
single 46
calibrate 23, 74
calibration
mode 73
test 70–86
caution 1, 6, 7, 13, 18, 22, 31,
33, 35, 36, 38, 39, 40, 42, 44,
45, 50, 52, 107
CE 107
checkstand 23, 24
class 106
Class 106
communication ... 25, 31, 34, 35, 37,
38, 40, 41, 43, 44, 49, 50, 58,
59, 91, 93, 94

compliance 31, 33, 35, 36,
38, 39, 40, 42, 44, 45, 50, 52,
72, 76, 108

components .. 10, 11, 15, 16, 19, 20
configuration 6, 34, 37, 40,
43, 50, 51, 57, 60, 61, 68, 89,
92, 93

connector 11, 12, 13, 16, 17,
18, 20, 21, 22, 53, 105
pinouts 103–105
current 9, 49, 57, 58, 89
customer service ii, 4, 42, 108

D

- DC 5, 9, 24, 103
debris channel 71
decode 8
default settings 68, 94–102
depth of field 8, 54
design specifications 8–9
diagnostic indicator 16, 20
dimensions 12, 14, 17, 21, 23
display 14, 16, 20, 61, 62, 63,
73, 75

E

- EAS 11, 16, 20, 53, 103
electrical 9, 24, 108
english 46
enviromental 9
error codes 61, 62, 63

F

- failure
error codes 61–63
indicator 57
modes 57, 60
flow 10, 15, 19, 27, 29
frame 7, 10, 19
full service access mode 73
function . 89, 99, 100, 101, 103–105

G

- ground 103–105

INDEX

H

- handles 7, 16, 20, 26
host 4, 31–53, 58, 59, 68,
 89–93, 94–102

I

- IBM 46xx 94–102
indicators 8
 audible 57
 beep 68
 diagnostic 61–63
 error codes 61–63
 failure 60, 61–63
 LED 68
 visual 58–59
input voltage 9
interface 3, 8, 11, 13, 16, 18, 22,
 44, 31–45, 49, 50, 51, 52, 89–
 93, 102, 103
IR 56

K

- keypad 73
kilograms 80, 82

L

- labels 13, 18, 22
laser aperture 10, 15, 19
LED 23, 57, 59, 68, 90, 96, 99
light source 8
locations ii

M

- maintenance 61, 87, 88
manual 1, 57
mechanical 8, 108
metric 46
model number 3
modes 64, 65
mounting 23, 27, 28, 29, 30
multi-function 10, 15, 19

N

- notices 106

O

- OCIA 8, 43, 44, 45, 94–102, 104

- Operation 106
operational
 specifications 8
optics engine module 6
output window 61, 87, 88

P

- parameters 94–102
parts 6
patents 109
PC 34, 37, 40, 43, 50, 93, 94, 98
platter 6, 7, 10, 11, 15, 19, 20,
 23, 25, 71, 72, 73, 74, 76, 83, 84
port 34, 37, 40, 43, 49, 50, 51,
 90, 91, 92, 93, 102, 103, 104
pounds 80
power save 64, 65, 67
power supply 5, 23, 24, 25, 31,
 34, 37, 40, 43, 49, 50, 89
prime 71
programming guide 4, 25, 41, 44, 64
property 109
protocols 68

R

- razzberry tone 57, 59, 60, 96
RDATA 104
remote display 14, 73, 83
repair 2, 60, 61, 62, 63, 108
RMA 108
RS232 8, 91, 93, 94–102, 105

S

- safety 106
scale 6, 9, 11, 23, 46
scan lines 2, 8
scan pattern 8
scan speed 8
scan zone 54
scanner
 interface 3
 pinouts 103–105
seal 72, 76, 84
secondary scanner 49, 50, 51, 52
SELV 31, 33, 35, 36, 38, 39, 40,
 42, 44, 45, 50, 52
specifications 8, 9, 52

INDEX

stand 69
storage 9
switch 11, 53
 cover 72, 76, 84
symbol 1

T

test 14, 68, 70–86, 93
 button 75
three-point support 28, 30
tone 10, 15, 19, 57, 66
transformer 5, 9
troubleshooting 89–93
two-point support 27, 29

U

USB 94–102

V

ventilation 9, 23
visual 59
voltage 4, 9, 31, 33–40, 42, 43,
 44, 45, 49, 50, 52
volume 10, 15, 19, 66

W

warranty 2, 89, 108
weight ... 8, 9, 10, 46, 71, 81, 82, 83
weights and measure 70–86
white LED 10, 15, 19, 57, 59,
 68, 90
window 6, 7, 10, 15, 19, 24,
 26, 87, 88

Z

zero... 10, 14, 15, 19, 69, 70, 74, 83



May 2004

Printed in the USA



0 0 - 0 2 9 8 3 B