Cyclone™ M2000 Series

Product Reference Guide

symbol®
The Enterprise Mobility Company ™

Cyclone™ M2000 Series
Product Reference Guide

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symbol®
The Enterprise Mobility Company™

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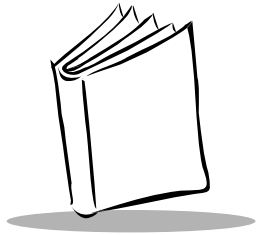
Revision History

Changes to the original manual are listed below:

Change	Date	Description
72E-39696-01	6/2000	Initial release
72E-39696-02	11/2000	Add M2007 USB information
72E-39696-03	12/2001	Update engineering and regulatory information
72E-39696-04	1/2005	Add Symbol Comm Port Emulation bar code
72E-39696-05	1/2005	Add information for avoiding scanner startup problems
72E-39696-06	11/2006	Update service information, add parameter bar codes for Bookland ISBN, Code 11, new UPC supplemental decode options, and security level



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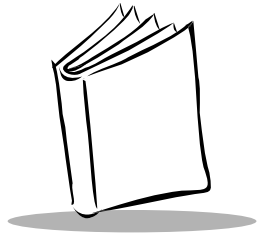


About This Guide

The *Cyclone™ M2000 Series Product Reference Guide* provides general information about setting up, programming, and operating the M2000 Scanner.

Chapter Descriptions

Following are brief descriptions of each chapter in this guide.

- Chapter 1, *Setting Up Your Scanner* provides information on connecting the scanner to the host.
- Chapter 2, *Scanning* describes how to use the scanner, defines operator feedback, and provides maintenance and troubleshooting tips.
- Chapter 3, *Parameter Menus* provides all the bar codes necessary to program your scanner.
- Chapter 4, *Advanced Data Formatting (ADF)* explains how to customize scanned data before transmission to your host.
- Appendix A, *Programming Reference* contains useful reference material such as ASCII tables and AIM code identifiers.
- Appendix B, *Specifications* provides the technical specifications, decode zones, and cable pinouts for the scanner.

Notational Conventions

The following conventions are used in this document:

- M2000 refers to all models of the M2000 Series scanners (M2004, M2005, and M2007).
- Italics are used to highlight specific items in the general text, and to identify chapters and sections in this and related documents.
- Bullets (♦) indicate:
  - action items
  - lists of alternatives
  - lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

Service Information

If there is a problem with the equipment, contact the regional Global Customer Interaction Center. For contact number information, visit: www.symbol.com/contactsupport for a Customer Interaction Center in your area. Before calling, have the model number, serial number and several bar code symbols at hand.

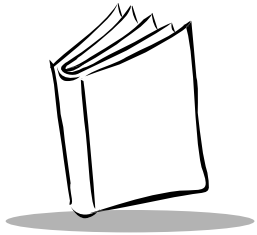
Call the Global Customer Interaction Center from a phone near the scanning equipment so that the service person can try to troubleshoot the problem. If the equipment is found to be working properly and the problem is reading bar codes, the Support Center will request samples of the bar codes for analysis at our plant.

If the problem cannot be solved over the phone, it may be necessary to return the equipment for servicing. If that is necessary, the Global Customer Interaction Center will provide specific directions.

Note: *Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent.*

If the Symbol product was purchased from a Symbol Business Partner, contact that Business Partner for service.

For the latest version of this guide go to:http://www.symbol.com/manuals.



Chapter 1
Setting Up Your Scanner

Introduction

The Cyclone™ M2000 Series scanner combines the benefits of multiple scan patterns (omnidirectional, semi-omnidirectional, 2D raster, and single scan line) with a light-weight, hands-free/hand-held design. The scanner's built-in stand seamlessly accommodates both counter-top and hand-held use. The scanner can be programmed to emit the preferred scan pattern for both counter-top and hand-held use.

The M2000 successfully reads most bar code symbologies, densities, and colors, produced by a wide range of printing techniques.

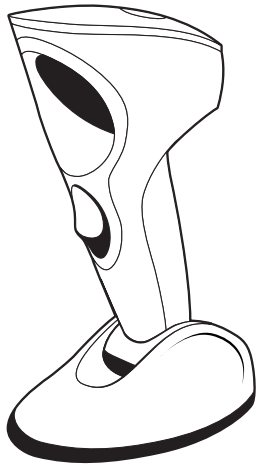


Figure 1-1. Cyclone M2000 Series Scanner

The M2000 scanner supports the following interfaces:

- M2004-I200 (RS-232C) contains on-board discrete RS-232C communications for connecting to RS-232C asynchronous terminals and host systems. It also accommodates Synapse™ “Smart Cables” which allow you to connect to a wide variety of host systems.
- M2004-I290 (RS-232C with EAS) also supports Checkpoint VII Electronic Article Surveillance (EAS).
- M2005-I200 (IBM 468X/469X) is fully compatible with the entire line of IBM 468X/469X terminals. It also accommodates Synapse Smart Cables.
- M2005-I290 (IBM 468X/469X with EAS) provides additional signal lines for EAS deactivation (Checkpoint VII).
- M2007-I200 (USB) connects to USB-capable host systems, including:
  - Desktop PCs and Notebooks
  - Apple™ iMac, G4, iBooks
  - IBM SurePOS terminals
  - Network computers.

  It also accommodates Synapse Smart Cables.
- M2007-I290 (USB with EAS) provides additional signal lines for EAS deactivation (Checkpoint VII).

Unpacking

Remove the scanner from its packing and inspect it for damage. If the scanner was damaged in transit, contact the Symbol Global Customer Interaction Center. See page xii for contact information. KEEP THE PACKING. It is the approved shipping container and should be used if you ever need to return your equipment for servicing.

Connecting your Scanner to a Host

To connect the M2000 to your host:

1. Power down the host.
2. Connect the interface cable to the receptacle in the back of the M2000 base. Listen for a click.

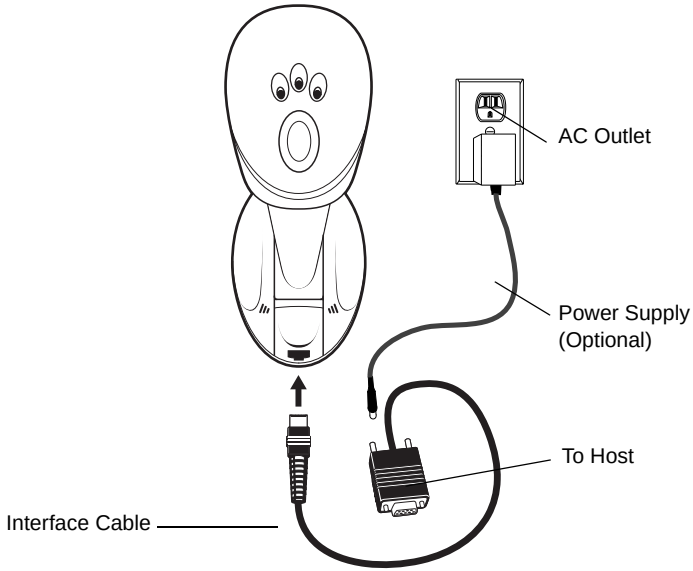


Figure 1-2. Plugging Connector into Scanner

3. Gently tug the cable to ensure the connector is properly secured.
4. Place the scanner on a flat surface. To initialize correctly, the scanner must be in counter-top (hands-free) mode during power up. (See the *Caution* statement on page 1-4.)
5. Connect the other end of the interface cable to the host (refer to your host manual to locate the correct port).
6. If necessary, plug the power supply into the power jack on the interface cable. Plug the other end of the power supply into an AC outlet.
7. If you are using a Synapse cable, the scanner autodetects your host. If you are using another cable, set the M2000 to communicate with your particular POS host by scanning the appropriate bar code(s) in Chapter 3, *Parameter Menus*.

8. Power up the host.
9. Three power-up beeps sound and all three LEDs light, indicating the scanner is operational.
10. Verify that the scanner is successfully reading bar codes and transmitting their content to the host.

Caution

This scanner is designed to self calibrate whenever power is applied. It must be standing upright on its base (so the bottom switch is depressed) each time the scanner is powered on. Failure to do so *may* cause erratic behavior of the scanner and/or a buzzing sound.

See *Troubleshooting* on page 2-11 if you are having problems after completing these steps.

Setting Up the M2007 (USB) Scanner

The M2007 connects through the USB and operates with USB capable hosts including:

- Desktop PCs and Notebooks
- Apple™ iMac, G4, iBooks
- IBM SurePOS terminals
- Network computers.

The following operating systems support the M2007 through USB:

- Windows 98, 2000, ME, NT 5.0
- MacOS 8.0 and above
- 4690 OS v2.3 and above.

Ask your vendor if your host supports USB, and if your version of the operating system supports USB. For more information on USB technology, hosts, and peripheral devices, visit *www.usb.org*.

Bus Power

An additional power supply is not required to operate the M2007 since the USB host or self-powered hub provides enough power.

To set up your M2007:

1. Connect the cable to the scanner.
2. Plug the series A connector in the USB host or hub, or plug the power+ connector in the IBM SurePOS terminal.
3. Select the USB device type. See ***USB Device Type*** on page 3-118.
4. On first installation when using Windows, the software prompts you to select or install the USB device driver. Follow the installation instructions on the screen. The scanner powers up during this installation.
5. If you are not using a North American keyboard, scan the appropriate country bar code under ***Country Selection*** on page 3-120.

If you are having any problems with your system, see *Troubleshooting* on page 2-11.

Switching Cables

Different cables are required for different hosts. To change the scanner cable:

1. Unplug the installed cable's modular connector by depressing the connector clip through the access hole on the bottom of the scanner with a paper clip.

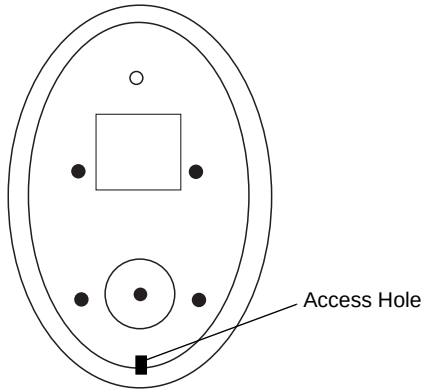


Figure 1-3. Bottom of M2000 Scanner

2. Carefully slide out the cable.

3. Follow the previous steps to connect a new cable.

Caution

Be sure you are using the correct cable for your host. Using a cable incompatible with the host may cause damage to your scanner or host.

Wall Mounting the Scanner

An optional wall-mount bracket is available for using the M2000 in “scanning from above” applications. To wall-mount the M2000:

1. Place the bracket in its desired location on the wall, and place a pencil mark on the wall through each keyhole in the bracket.
2. Remove the bracket, and insert three #6 screws into the pencil marks on the wall. Do not tighten them all the way; leave enough space for the bracket’s keyholes to slide onto.
3. Insert the bracket’s keyholes over the screws, and slide the bracket down to secure. If necessary, tighten the screws.

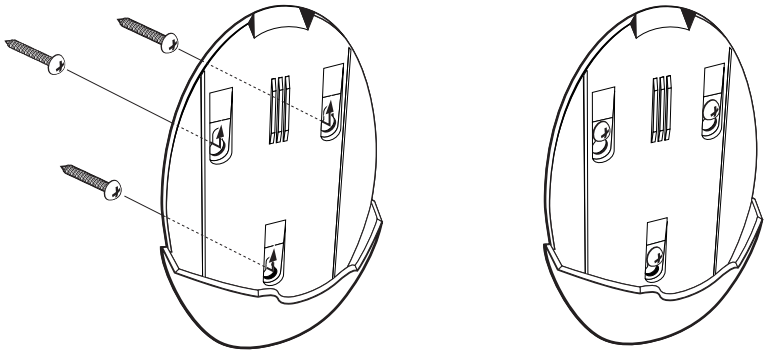


Figure 1-4. Installing the Wall Mount Bracket

4. Slide the base of the scanner into the bracket, oriented so the scan window faces down.

Accessories

Required Accessories

These items must be included to complete the system, and are available through contacting your local Symbol representative or business partner.

- Host interface cables for RS-232 operation (available in 6-foot and 8.5-foot lengths.)
  - 25-Pin Male D Connector (TxD on Pin 3)
  - 25-Pin Male D Connector (TxD on Pin 2)
  - 25-Pin Female D Connector (TxD on Pin 3)
  - 25-Pin Female D Connector (TxD on Pin 2)
  - 9-Pin Female D Connector (PC AT: TxD on Pin 3)
- 16-foot Synapse cable
- Synapse adapter cable
- Power supply (select one):
  - 115 VAC Power Supply
  - 220/240 VAC Power Supply (Europe)
  - 100 VAC Power Supply (Japan)
- User documentation (*Cyclone™ M2000 Series Product Reference Guide*).

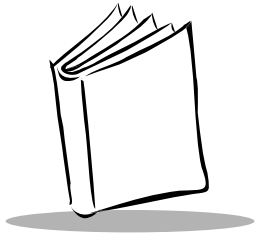
Optional Accessories

An optional Wall Mount Bracket is not included in the standard configuration, and is available through contacting your local Symbol representative or business partner.

Electronic Article Surveillance (EAS) (Optional)

Because there are several Checkpoint EAS systems available, your local Checkpoint representative should install the EAS cable. To contact your local Checkpoint representative inside the U.S. call 800-257-5540, ext. 4300. Outside the U.S., call (609) 848-1800, ext. 4300.

If you are using an EAS cable, refer to the Universal Cable EAS Installation Sheet (Symbol p/n 70-32824-xx).



Chapter 2
Scanning

Introduction

This chapter describes the various laser patterns and scanning modes available in the M2000 scanner, provides instructions and tips for scanning, and lists beeper and LED indications.

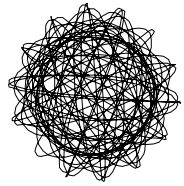
Scanning Modes

The M2000 may be used on the counter-top or in a hand-held orientation. In hand-held use, the scanner operates in triggered mode where you pull the trigger to activate the scan pattern and decode the bar code. In counter-top use, the scanner operates in continuous (constant-on) mode, where it automatically decodes a bar code presented in its field of view.

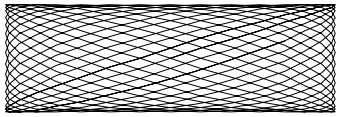
Laser Patterns

The scanner emits one of four laser patterns:

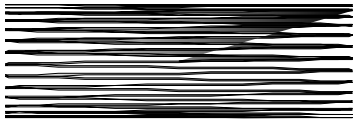
- **Cyclone Omnidirectional Scan Pattern** is a highly efficient scan pattern which decodes 1D and EAN/UCC reduced space symbologies in any orientation.



- **Cyclone Semi-omnidirectional Scan Pattern**, an alternative to the full omnidirectional pattern, scans highly truncated 1D and RSS bar codes. The bar code must be presented horizontally with no more than 20^{o} tilt.



- **Raster Scan Pattern** directly opens the laser to a full sized raster pattern. Decodes 1D, PDF-417, RSS, and Composite Codes.



- **Single Scan Line Pattern (Smart Raster)** creates a single scan line which opens vertically for PDF-417 symbols using the Smart Raster feature. This feature autodetects the type of bar code being scanned and adjusts its pattern accordingly. This provides optimal performance on 1D, PDF-417, EAN/UCC, RSS and Composite Codes.

One pattern can be selected for counter-top mode and another for hand-held mode via programming bar code in Chapter 3, *Parameter Menus*. For hand-held mode, you may alternatively select a pattern by pressing the Scan Pattern Mode Selector button when the scanner is lifted off the counter.

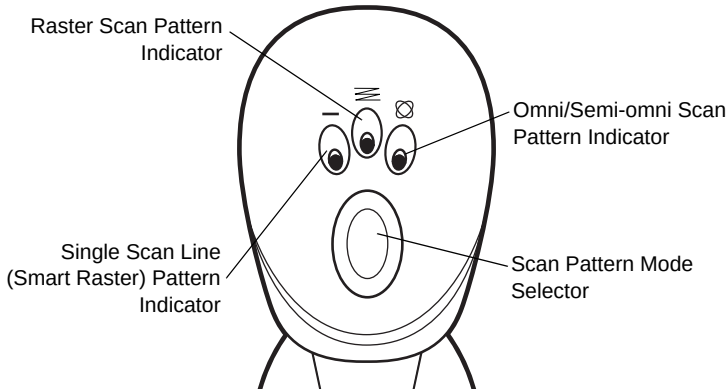


Figure 2-1. Top of M2000 Scanner

To scan in hand-held mode, pick up the scanner and hold it within the scanning range for the bar code. A sensor on the bottom of the scanner's stand detects when the scanner is lifted off the counter, and automatically switches to the programmed hand-held laser pattern.

Smart Raster

In Smart Raster operation, a trigger pull causes a single scan line pattern to appear. If the target is a 1-D bar code, the scanner decodes the symbol. If the target bar code is a 2-D bar code, the scanning patterns open up to a full, optimized raster pattern as soon as the scanner is properly aligned over the bar code.

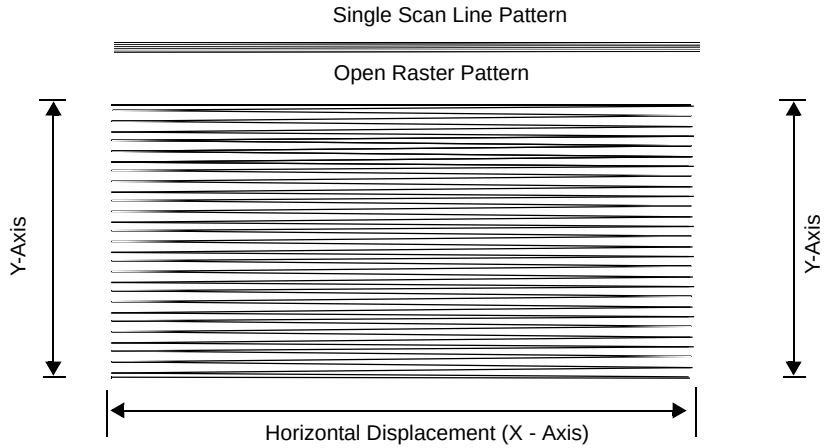


Figure 2-2. M2000 Scanning Patterns

Scanning 1D (and RSS) or 2D Bar Codes

When scanning a bar code:

- Keep the scan pattern parallel to the symbol's rows.
- Hold the scanner as still as possible.
- Hold the scanner at an angle which does not cause specular reflection (see *Specular Reflection* on page 2-7).
- Hold the scanner close for small symbols, and farther away for large symbols. Practice shows what works.

- When using the raster pattern, if the pattern does not cover the top and bottom of a 2D symbol, pull the scanner back until it does. Make sure the scan pattern extends *at least three quarters of an inch* beyond the edges of the bar code.

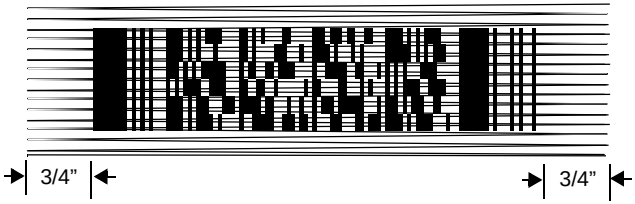


Figure 2-3. Raster Pattern Expanded Over PDF-417 Symbol

- If the vertical scan pattern is not high enough to cover a “tall” PDF-417 symbol, move the scanner slowly down toward the bottom of the symbol, keeping the beam horizontal to the rows, and then slowly back upward to the top. Alternatively, move the scanner further away from the bar code until the scan pattern covers a larger portion of the bar code in the vertical direction.

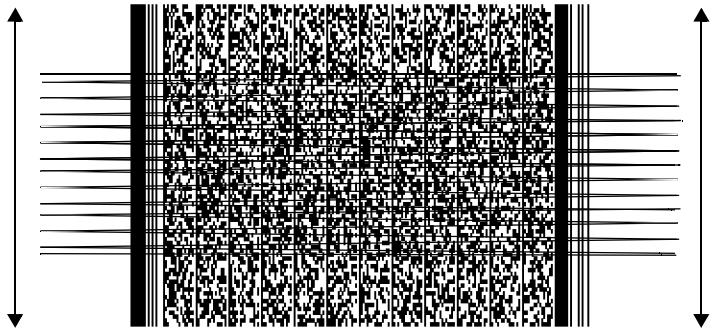


Figure 2-4. Moving Scan Pattern Upward and Downward on “Tall” PDF Symbol

- The scan beam does not have to be *perfectly* parallel with the top and bottom of the symbol (up to a 4^{o} tilt is permitted).
- Be sure the symbol is in good condition.

The scanner emits a short, high-tone beep and lights the three green LEDs to indicate a successful decode. Decoded data is transmitted to the host device. Be sure that the RS-232C or IBM 4683 parameters (e.g., baud rate, parity) are set properly. Communication parameters are described in Chapter 3, *Parameter Menus*.

Scanning Composite Bar Codes

Composite Code is a combination of a 1D symbol (RSS, UPC/EAN or UPC/EAN-128) and a 2D symbol (CC-A, CC-B or CC-C).

When scanning a barcode:

- Keep the scan pattern parallel to the 2D symbol's rows.
- Hold the scanner as still as possible.
- Hold the scanner at an angle which does not cause specular reflection (see *Specular Reflection* on page 2-7).
- Hold the scanner close for small symbols, and farther away for large symbols. Practice shows what works.
- When using the single scan line pattern, aim the scan line at the middle of the 2D portion. The scan pattern will open up to an optimized raster pattern and decode both the 2D and 1D portion of the Composite Code.

Aim the single scan line at the center of the 2D portion

Raster pattern will expand to decode both portions

Note: *It is not recommended to scan Composite Codes in the hands-free (on-counter) mode with a single scan line pattern. This will produce multiple reads of the bar code. To avoid this, scan the Composite Code in handheld mode.*
Composite Codes cannot be read with the Cyclone, Omnidirectional, or Semi-omnidirectional scan patterns.

The scanner allows the user to choose the beep mode to indicate a successful decode. Three options are available:

- Single Beep after both 1D and 2D symbols are decoded; the scanner emits a short, high-tone beep.
- Beep as each code type is decoded; the first decode beep is a short high tone beep if the 2D portion is scanned first, or a short low tone beep if the 1D portion is

scanned first.
The second decode beep is a short high tone.

- Double Beep after both 1D and 2D symbols are decoded; the scanner emits two short, high tone beeps.

Note: *Refer to Composite Beep Mode on page 3-32 for parameters.*

The scanner also lights the three green LEDs to indicate a successful decode.

Specular Reflection

When laser beams reflect *directly* back into the scanner from the bar code, they can “blind” the scanner and make decoding difficult. This is specular reflection.

To avoid this, scan the bar code so that the beam does not bounce *directly* back. But don’t scan at too oblique an angle; the scanner needs to collect scattered reflections from the scan to make a successful decode. Practice quickly shows what tolerances to work within.

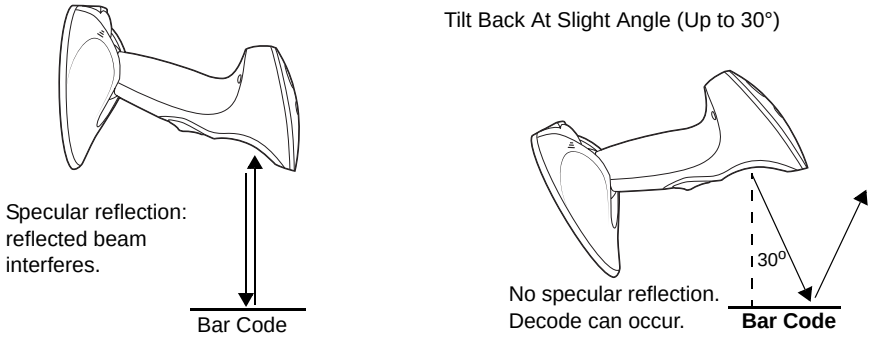


Figure 2-5. Avoiding Specular Reflection

When scanning a 1D bar code, there is only a small specular dead zone to avoid ($\pm$ 2^{o} from the direct laser beam). The specular dead zone is larger for scanning PDF-417 ($\pm$ 9^{o} from the direct laser beam). However, the scanner is not effective if its beams hit the bar code’s surface at an angle greater than 30^{o} from the normal to that surface.

Beeper Definitions

Table 2-1 provides standard beeper definitions.

Table 2-1. Standard Beeper Definitions

Beeper Sequence	Indication
Standard Use	
Short high tone	A non-composite bar code was decoded (if decode beeper is enabled).
3 short high tones	Power-on or reset. Occurs immediately after the scanner is turned on, indicating that the system software is working properly. If three beeps occur during normal operation, it is due to a reset and any work in progress is lost. If this occurs often, contact the Symbol Services Division.
Parameter Menu Scanning	
2 short high tones	Correct entry scanned or correct menu sequence performed.
High/low tone	Keyboard parameter selected. Enter value using numeric bar codes.
High/low/high/low tone	Successful program exit with change in the parameter setting.
Low/high tone	Input error, incorrect bar code, or “Cancel” scanned, wrong entry, incorrect bar code programming sequence; remain in program mode.
Communication	
4 short low tones	Communication error.
High/high/high/low tone	Receive error.
Low/high/low tone	ADF transmit error.
Composite Codes (default settings)	
Short high tone	Both portions of the barcode have been successfully decoded (if “Single Beep after both are decoded” mode is enabled).
2 short high tones	Scanner decoded 2D portion first and 1D portion second (if “Beep as each code type is decoded” mode is enabled).
1 short low tone and 1 short high tone	Scanner decoded 1D portion first and 2D portion second (if “Beep as each code type is decoded” mode is enabled).
2 short high tones	Both portions of the barcode have been successfully decoded (if “Double Beep after both are decoded” mode is enabled).

Macro PDF

Table 2-2 provides beeper definitions for Macro PDF mode. See *Macro PDF Features* on page 3-127 for an explanation of Macro PDF.

Table 2-2. Macro PDF Beeper Indications

Beeper Sequence	Indication
Error	
Long low tone	Hi-level decode error caused by incorrect symbol.
2 long low tones	File ID error. A bar code not in the current MPDF sequence was scanned.
3 long low tones	Out of memory. There is not enough buffer space to store the current MPDF symbol.
4 long low tones	Bad symbology. You scanned a 1-D or 2-D bar code in an MPDF sequence, a duplicate MPDF label, an incorrect sequence, or are trying to transmit an empty or illegal MPDF field.
5 long low tones	Flushing buffer.
Fast warble tone	Successful parameter scanned.
Decode Beep Sequence	
Short tone	Standard decode and transmit beep for all symbols.
Short low tone	1D portion of composite code was decoded. Decode beep follows when entire composite code is decoded.
Short high tone	2D portion of composite code was decoded. Decode beep follows when entire composite code is decoded.
Double short tone	MPDF symbol is buffered. A single beep indicates transmission of the buffered data.

LED Indications

The lit LED indicates the selected scan pattern for hand-held and counter-top mode. In hand-held mode, pressing the Scan Pattern Mode Selector button selects the next pattern, and lights the corresponding LED. (The counter-top laser pattern is selectable only via programming bar code.) When a bar code is successfully decoded, all three LEDs light momentarily.

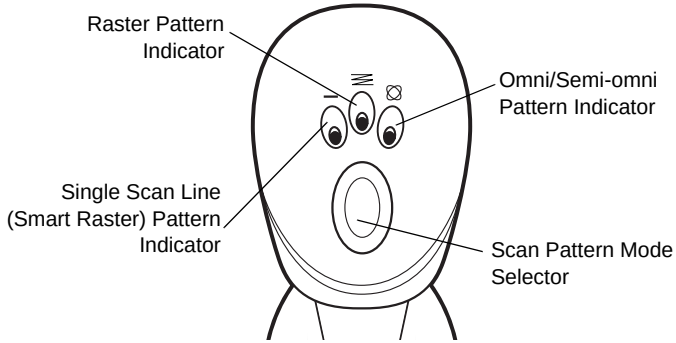


Figure 2-6. Laser Pattern Indicators

Maintenance

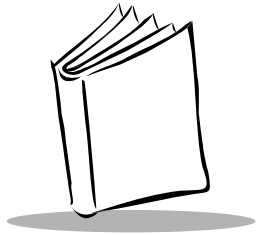
The M2000 scanner is designed to provide reliable service over an extended period of time. The only maintenance required is cleaning the exit window.

- Do not allow any abrasive material to touch the window.
- Remove any dirt particles with a damp cloth.
- Wipe the window using a tissue moistened with ammonia/water.
- Do not spray water or other cleaning liquids directly into the window.

Troubleshooting

Table 2-3. Troubleshooting

Problem	Possible Solution
Nothing happens when you follow the operating instructions.	Check the system power. Make sure you are using the correct interface cable for the host device. Check for loose cable connections. Make sure the scanner is programmed to read the symbology you are trying to read. See *Chapter 3, Parameter Menus*. Check the label to make sure it is not defaced; if damaged beyond its error correction capability, it will not decode. Try scanning a test symbol of the symbology you are trying to read.
Your scanner operates but scanned data is not displayed correctly.	Check the system power. Check for loose cable connections. Check that the communication parameters (baud rate, parity, stop bits, etc.) are set properly for the host device. If you're working with a Synapse cable, refer to your *Interface Guide.*
The laser does not activate, which is followed by a beep sequence.	You may be scanning in an inappropriately hot environment. Remove the scanner from the environment, or allow the laser to cool down.
Transmitting PDF bar code data through a scanner/wand emulation Synapse cable causes transmit errors.	The scanner/wand emulation Synapse cable has a transmission limit of approximately 46 characters. This does not apply to other Synapse cables.
For the M2007 (USB), no data transmits, or incorrect data transmits, or a low/low/low/low tone sounds.	Check cable connection to scanner and host. Make sure the correct device options and country code parameters are set for the currently attached scanner. Increase Intercharacter Delay.
USB parameters are not working.	Make sure you've selected the correct parameter set. If you scanned a Set Defaults bar code, re-enter your parameters.



Chapter 3
Parameter Menus

Introduction

The M2000 Series Scanner can be programmed to perform various functions, or activate different features. This chapter describes each feature and provides the programming bar codes necessary for selecting these features for your scanner. Before programming, follow the setup instructions in Chapter 1, *Setting Up Your Scanner*.

The M2000 Series Scanner is shipped with the default settings shown in Table 3-1 on page 3-3. These default values are stored in non-volatile memory and are preserved even when the scanner is powered down.

You can change the default values by scanning single bar codes or short bar code sequences in this chapter. These new values replace the standard default values in memory. The default parameter values can be recalled by scanning the *Set All Defaults* bar code on page 3-11.

Scanning Sequence Examples

In most cases you need to only scan one bar code to set a specific parameter. For example, if you want to set the baud rate to 9600, simply scan the **9600** bar code listed under *Baud Rate* on page 3-104. The scanner issues a warble tone, signifying a successful parameter entry.

If you want to set specific code lengths or specify Serial Response Time-Out, you have to scan several bar codes. This procedure is described later in this chapter.

Errors While Scanning

If you make an error during a scanning sequence, just rescan the correct parameter.

Default Table

Table 3-1 lists the defaults for all parameters, and the page number each parameter appears on. If you wish to change any option, scan the appropriate bar code(s).

Table 3-1. Default Table

Parameter	Default	Page #
Set Default Parameter	All Defaults	3-11
Host Type	See page 3-12	3-12
Scanning Options		
Hand-Held Scan Pattern Mode	Smart Raster	3-16
Hand-Held Scan Pattern Mode Selector	Enable	3-17
Counter-top Scan Pattern Mode	Cyclone	3-18
Raster Height	15	3-19
Raster Expansion Rate	11	3-19
Aiming Mode	Single Scan Line Raster	3-20
Trigger Mode	Level	3-21
Time-out Between Same Symbol	0.6 sec	3-22
Time-out Between Different Symbols	0.0 sec	3-22
Laser On Time	5.0 sec	3-23
Beep After Good Decode	Enable	3-23
Beeper Volume	High Volume	3-24
Beeper Tone	High Frequency	3-25
Transmit “No Decode” Message	Disable	3-25

Table 3-1. Default Table (continued)

Parameter	Default	Page #
Linear Code Type Security Levels: Hand-held Counter-top	 2 1	3-26
Bi-directional Redundancy	Disable	3-28
Autodiscriminate Response Time	1.0 second	3-28
Composite Codes		
Composite Codes CC-C	Disable	3-29
Composite Codes CC-A/B	Disable	3-30
TLC39	Disable	3-31
Composite Beep Mode	Double Beep	3-32
UPC/EAN		
UPCA	Enable	3-33
UPCE	Enable	3-33
UPCE1	Disable	3-34
EAN-8	Enable	3-34
EAN-13	Enable	3-35
Bookland EAN	Disable	3-36
UPC/EAN Coupon Code	Disable	3-37
Decode UPC/EAN Supplementals	Ignore	3-38
Decode UPC/EAN Supplemental Redundancy	12	3-44
Transmit UPCA Check Digit	Enable	3-44
Transmit UPCE Check Digit	Enable	3-45

Table 3-1. Default Table (continued)

Parameter	Default	Page #
Transmit UPCE1 Check Digit	Enable	3-45
UPCA Preamble	System Character	3-46
UPCE Preamble	System Character	3-47
UPCE1 Preamble	System Character	3-48
Convert UPCE to A	Disable	3-49
Convert UPCE1 to A	Disable	3-50
EAN-8 Zero Extend	Disable	3-51
Bookland ISBN Format	10	3-52
Linear UPC/EAN Decode	Disable	3-53
UPC/EAN Decode Performance	Enable	3-53
UPC Composite Mode	Never Linked	3-54
Code 128		
Code 128	Enable	3-55
UCC/EAN-128	Enable	3-55
ISBT 128	Disable	3-56
Code 128 Decode Performance	Enable	3-57
Code 39		
Code 39	Enable	3-58
Trioptic Code 39	Disable	3-58
Convert Code 39 to Code 32	Disable	3-59
Code 32 Prefix	Enable	3-60

Table 3-1. Default Table (continued)

Parameter	Default	Page #
Set Length(s) for Code 39	Length within Range: 01-55	3-61
Code 39 Check Digit Verification	Disable	3-63
Transmit Code 39 Check Digit	Disable	3-63
Code 39 Full ASCII Conversion	Disable	3-64
Code 39 Decode Performance	Enable	3-65
Code 93		
Code 93	Disable	3-66
Set Length(s) for Code 93	Length within Range: 04-55	3-67
Code 11		
Code 11	Disable	3-69
Set Lengths for Code 11	4 to 55	3-70
Code 11 Check Digit Verification	Disable	3-72
Transmit Code 11 Check Digit(s)	Disable	3-73
Interleaved 2 of 5		
Interleaved 2 of 5	Disable	3-74
Set Length(s) for I 2 of 5	1 Discrete Length: 14	3-75
I 2 of 5 Check Digit Verification	Disable	3-77
Transmit I 2 of 5 Check Digit	Disable	3-78
Convert I 2 of 5 to EAN 13	Disable	3-79

Table 3-1. Default Table (continued)

Parameter	Default	Page #
Discrete 2 of 5		
Discrete 2 of 5	Disable	3-80
Set Length(s) for D 2 of 5	1 Discrete Length: 12	3-81
Codabar		
Codabar	Disable	3-83
Set Lengths for Codabar	Length within Range: 05-55	3-84
CLSI Editing	Disable	3-86
NOTIS Editing	Disable	3-86
MSI Plessey		
MSI Plessey	Disable	3-87
Set Length(s) for MSI Plessey	Length Within Range: 06 - 55	3-88
MSI Plessey Check Digits	One	3-90
Transmit MSI Plessey Check Digit	Disable	3-90
MSI Plessey Check Digit Algorithm	Mod 10/Mod 10	3-91
PDF-417/MicroPDF-417		
PDF-417	Enable	3-92
MicroPDF-417	Disable	3-92
MicroPDF Performance	Standard	3-93
Code 128 Emulation	Disable	3-94

Table 3-1. Default Table (continued)

Parameter	Default	Page #
RSS Codes		
RSS-14	Disable	3-95
RSS-Limited	Disable	3-95
RSS-Expanded	Disable	3-96
Security Level	0	3-96
Data Options		
Transmit Code ID Character	None	3-98
Prefix/Suffix Values Prefix Suffix	 Enter Enter	3-100
Scan Data Transmission Format	Data as is	3-101
Decode Buffering	Single Scan Line/Raster: Disable Omni: Disable	3-103
RS-232 Options		
Baud Rate	9600	3-104
Parity	None	3-106
Check Parity	Enable	3-108
Hardware Handshaking	None	3-109
Software Handshaking	None	3-112
Stop Bit Select	1	3-114
Intercharacter Delay	0	3-114
Host Serial Response Time-out	2 sec	3-115

Table 3-1. Default Table (continued)

Parameter	Default	Page #
Host Serial RTS Line State	Low RTS	3-115
Beep on <BEL>	Disable	3-116
Data Transmission Format	8-bit	3-116
USB (M2007 only)		
Set USB Defaults	--	3-117
USB Device Type	IBM Hand-Held USB	3-118
Country Selection	North American, Standard	3-120
Keystroke Delay	No Delay (0 ms)	3-124
CAPS LOCK	Disable	3-125
Ignore Unknown Characters	Send Bar Codes with Unknown Characters	3-126
Macro PDF		
Macro PDF Transmit/Decode Mode	Buffer All Symbols/ Transmit Macro PDF when Complete	3-128
Transmit Each Symbol in Codeword Format	Disable	3-130
Transmit Unknown Codewords	Disable	3-131
Escape Character	None	3-132
ECI		
Delete Character Set ECIs	Enable	3-133
ECI Decoder	Enable	3-134

Table 3-1. Default Table (continued)

Parameter	Default	Page #
Transmit Macro PDF User-Selected Field		
Transmit File Name	Disable	3-135
Transmit Block Count	Disable	3-136
Transmit Time Stamp	Disable	3-136
Transmit Sender	Disable	3-137
Transmit Addressee	Disable	3-137
Transmit Checksum	Disable	3-138
Transmit File Size	Disable	3-138
Transmit Macro PDF Control Header	Disable	3-139
Last Block Marker	Disable	3-139
Flush Macro Buffer	N/A	3-140
Abort Macro PDF Entry	N/A	3-140

Set Default Parameter

Scanning this bar code returns all parameters to the values listed in Table 3-1 on page 3-3.

Set All Defaults

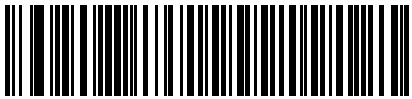
Host Type

If you're using a Synapse cable, your host is autodetected, so you don't have to scan a host bar code. If not, select an IBM 46XX or RS-232 host from the following bar code menus.

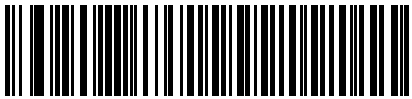
IBM 46XX Host Types

To select one of the following as a POS Interface, scan the appropriate bar code below.

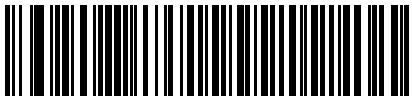
Note: *To properly communicate with 468X/9X terminals, the driver corresponding to the port being used must be loaded and enabled when you are configuring your terminal system. See your terminal's operating manual for details.*



Port 5B



Port 9B



Port 17/9E

RS-232C Host Types

Three RS-232C hosts are set up with their own parameter default settings (Table 3-2). Selecting the ICL, Fujitsu, or Nixdorf RS-232C terminal sets the defaults listed below. These defaults take precedence over standard defaults. So if you select Fujitsu RS-232C, then select the standard defaults, the Fujitsu defaults still apply.

Table 3-2. Terminal Specific RS-232C

Parameter	ICL	Fujitsu	Nixdorf Mode A/Mode B
Transmit Code ID	Yes	Yes	Yes
Data Transmission Format	Data/Suffix	Data/Suffix	Data/Suffix
Suffix	CR (1013)	CR (1013)	CR (1013)
Baud Rate	9600	9600	9600
Parity	Even	None	Odd
Hardware Handshaking	RTS/CTS Option 3	None	RTS/CTS Option 3
Software Handshaking	None	None	None
Serial Response Time-out	9.9 Sec.	2 Sec.	9.9 Sec.
Stop Bit Select	One	One	One
ASCII Format	8-Bit	8-Bit	8-Bit
Beep On <BEL>	Disabled	Disabled	Disabled
RTS Line State	High	Low	*Low = No data to send

*In the Nixdorf Mode B, if CTS is Low, scanning is disabled. When CTS is High, the user can scan bar codes.

RS-232C Host Types (continued)

Selecting the ICL, Fujitsu, or Nixdorf RS-232C terminal enables the transmission of Code ID characters as listed in Table 3-3. These Code ID characters are not programmable and are separate from the Transmit Code ID feature. The Transmit Code ID feature should not be enabled for these terminals.

Note: *These Code IDs do not apply when Standard RS-232C is selected.*

Table 3-3. Terminal-Specific Code ID Characters

Code Type	ICL	Fujitsu	Nixdorf
UPCA	A	A	A0
UPCE	E	E	C0
EAN-8	FF	FF	B
EAN-13	F	F	A
Code 39	C <len>	None	M
Codabar	N <len>	None	N
Code 128	L <len>	None	K
I 2 of 5	I <len>	None	I
UCC/EAN 128	L <len>	None	P
Bookland EAN	F	F	A

RS-232C Host Types (continued)

To select an RS-232C host interface, scan one of the following bar codes.

Standard RS-232C

ICL RS-232C

OPOS

Nixdorf RS-232C Mode A

Nixdorf RS-232C Mode B

Fujitsu RS-232C

Scanning Options

Hand-Held Scan Pattern Mode

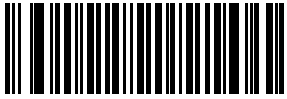
Select one of the following scan pattern options to use when the scanner is in hand-held use (see *Scanning Modes* on page 2-1 for descriptions):

Single Scan Line (Smart Raster) Pattern

Always Raster

Programmable Raster

Slab Pattern

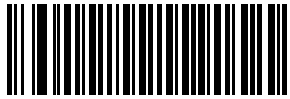


Omnidirectional Pattern

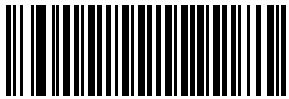
Semi-omnidirectional Pattern

Scan Pattern Mode Selector

Select whether the user can select the hand-held laser pattern via the Scan Pattern Mode Selector button.



Enable Mode Selector Button

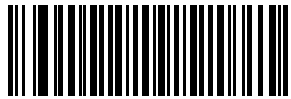


Disable Mode Selector Button

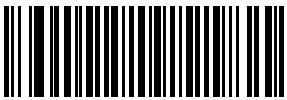
Counter-top Scan Pattern Mode

Select one of the following scan pattern options to remain on when the scanner is in counter-top (hands-free) use (see *Scanning Modes* on page 2-1 for descriptions).

Smart Raster



Always Raster



Omnidirectional Pattern

Semi-omnidirectional Pattern

Programmable Raster Height And Raster Expansion Speed

This parameter selects the laser pattern's height and rate of expansion, and is only used when Programmable Raster or Always Raster is enabled. This parameter is intended for very specific applications, and is usually not necessary.

Select the laser pattern's height and/or rate of expansion.

1. Scan the bar code for either **Raster Height** or **Raster Expansion Speed** below.
2. Scan two numeric bar codes beginning on page 3-141 that represent a two-digit value. Valid values are between 01 and 15.
3. If you make an error, or wish to change your selection, scan **Cancel on** page 143.

Raster Height (Default 15)

Raster Expansion Speed (Default 11)

Aiming Mode

For hand-held mode only, select either single scan line raster for aiming, or an aiming dot to appear for a normal or extended period of time.

Single scan line Raster
(No Aiming Dot)

Aiming Dot
Normal (200 ms) Timeout

Aiming Dot
Extended (400 ms) Timeout

Triggering Modes

Choose one of the options below to set the operation of the trigger.

- Level - A trigger pull activates the laser and decode processing. The laser remains on, and decode processing continues until a trigger release, a valid decode, or the Laser On Time-out is reached.
- Pulse - A trigger pull activates the laser and decode processing. The laser remains on and decode processing continues until a valid decode, or the Laser On Time-out is reached.
- Continuous - The laser is always on and decoding. Refer to the *Hand-Held Scan Pattern Mode* on page 3-16 and the *Counter-top Scan Pattern Mode* on page 3-18.

Level

Pulse

Continuous

Timeout Between Decodes

Timeout Between Decodes, Same Symbol

This option is used in continuous-on mode to prevent the beeper from continuously beeping when a symbol is left in the scanner's field of view. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds. The recommended interval is 0.6 seconds.

Timeout Between Decodes, Different Symbol

Timeout Between Decodes, Different Symbol is used in continuous-on mode to prevent the beeper from beeping when a different symbol appears in the scanner's field of view before the timeout period between decodes expires. This is programmable in 0.1 second increments from 0.0 to 9.9 seconds. The recommended value is 0.0 seconds.

Select the timeouts between decodes for the same or different symbols.

1. Scan the option bar code you wish to set.
2. Scan two numeric bar codes beginning on page 3-141 which correspond to the desired interval, in 0.1 second increments.
3. If you make an error, or wish to change your selection, scan **Cancel on** page 143**.**

Timeout Between Decodes - Same Symbol

Timeout Between Decodes - Different Symbols

Laser On Time

This parameter sets the maximum time decode processing continues during a scan attempt. It is programmable in 0.1 second increments from 0.5 to 9.9 seconds.

To set a Laser On Time, scan the bar code below. Next scan two numeric bar codes beginning on page 3-141 that correspond to the desired on time. Times less than 1.0 second must have a leading zero. For example, to set an on time of 0.5 seconds, scan the bar code below, then scan the “0” and “5” bar codes. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

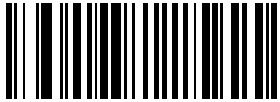
Laser On Time

Beep After Good Decode

Scan this symbol if you want the scanner to beep after a good decode.

Beep After Good Decode

Scan this symbol if you do not want the scanner to beep after a good decode. The beeper still operates during parameter menu scanning and indicates error conditions.



Do Not Beep After Good Decode

Beeper Volume

To select a decode beep volume, scan the **Low Volume, Medium Volume**, or **High Volume** bar code.

Low Volume

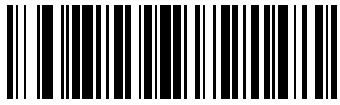
Medium Volume

High Volume

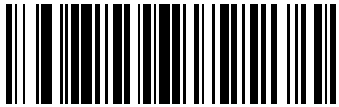
Beeper Tone

To select a decode beep frequency (tone), scan the appropriate bar code.

Low Frequency



Medium Frequency



High Frequency

Transmit “No Read” Message

When enabled, if a symbol does not decode, “NR” is transmitted. Any enabled prefix or suffixes are appended around this message.

When disabled, if a symbol does not read, nothing is sent to the host.

Enable No Read

Disable No Read

Linear Code Type Security Level

Note: *Does not apply to Code 128.*

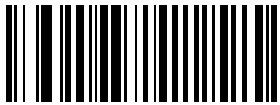
The M2000 offers four levels of decode security for linear code types (e.g., Code 39, Interleaved 2 of 5). Select a higher security level for poor quality bar codes. As security levels increase, the scanner's aggressiveness decreases.

Select the security level appropriate for your bar code quality.

Linear Security Level 1

The following code types must be successfully read twice before being decoded:

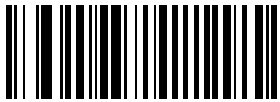
Code Type	Length
Codabar	All
MSI Plessey	4 or less
D 2 of 5	8 or less
I 2 of 5	8 or less



Linear Security Level 1

Linear Security Level 2

All code types must be successfully read twice before being decoded.



Linear Security Level 2

Linear Security Level 3

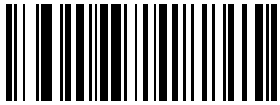
Code types other than the following must be successfully read twice before being decoded. The following codes must be read three times:

Code Type	Length
MSI Plessey	4 or less
D 2 of 5	8 or less
I 2 of 5	8 or less

Linear Security Level 3

Linear Security Level 4

All code types must be successfully read three times before being decoded.



Linear Security Level 4

Bi-directional Redundancy

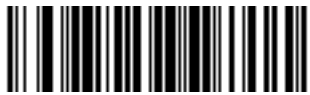
This parameter is only valid when a *Linear Code Type Security Level* is enabled (see page 3-26). When this parameter is enabled, a bar code must be successfully scanned in both directions (forward and reverse) before being decoded.

Enable Bi-directional Redundancy

Disable Bi-directional Redundancy

Autodiscriminate Response Time

This parameter extends the length of time during which the scanner tries to detect which host it is connected to on power up.



1 second

5 seconds

Composite Codes

Composite CC-C

Scan a bar code below to enable or disable composite bar codes of type CC-C. If you select Enable, EAN-128 (the associated 1D symbology) must also be enabled.

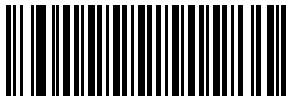
Enable CC-C

Disable CC-C

Composite CC-A/B

Scan a bar code below to enable or disable composite bar codes of type CC-A/B. To specify which CC-A/B composites are decoded, you may enable or disable the associated 1D symbology. For example, to allow all CC-A/B types, enable UPCA, UPCE, EAN-8, EAN-13, EAN-128, RSS-14, RSS-14 Limited and RSS-14 Expanded. Disabling any of these prevents that type of CC-A symbol from being decoded.

Enable CC-A/B

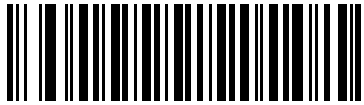


Disable CC-A/B

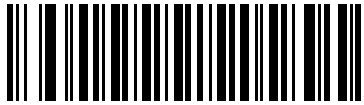
TLC39

Scan a bar code below to enable or disable Composite bar codes of type TLC-39.

Note: *Code39 must be enabled to scan TLC39 symbols.*



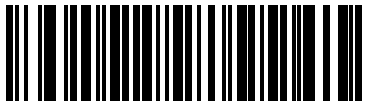
Enable TLC39



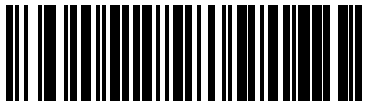
Disable TLC39

Composite Beep Mode

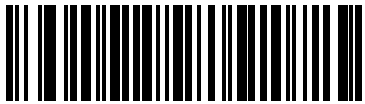
To select the number of decode beeps when a composite bar code is decoded, scan the appropriate bar code.



Single Beep after both are decoded



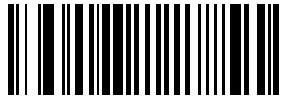
Beep as each code type is decoded



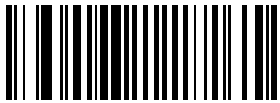
Double Beep after both are decoded

UPC/EAN

Enable/Disable UPCA



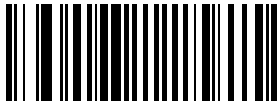
Enable UPCA



Disable UPCA

Enable/Disable UPCE

Enable UPCE



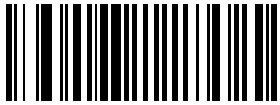
Disable UPCE

Enable/Disable UPCE1

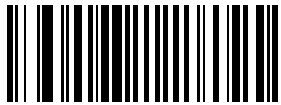
Enable UPCE1

Disable UPCE1

Enable/Disable EAN-8

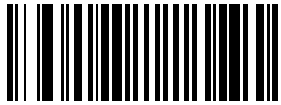


Enable EAN-8

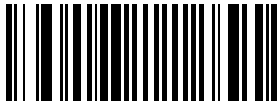


Disable EAN-8

Enable/Disable EAN-13



Enable EAN-13



Disable EAN-13

Enable/Disable Bookland EAN

Enable Bookland EAN

Disable Bookland EAN

Note: *If you enable Bookland EAN, select a Bookland ISBN Format on page 3-52. Also select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in Decode UPC/EAN Supplementals on page 3-38.*

UPC/EAN Coupon Code

When enabled, this parameter decodes UPCA barcodes starting with digit ‘5’, EAN-13 barcodes starting with digit ‘99’, and UPCA/EAN-128 Coupon Codes. UPCA, EAN-13 and EAN-128 must be enabled to scan all types of Coupon Codes.

Enable UPC/EAN Coupon Code

Disable UPC/EAN Coupon Code

Note: *Autodiscrimination of the EAN128 (right half) of a coupon code is controlled by the Decode UPC/EAN Supplemental Redundancy parameter.*

Decode UPC/EAN Supplementals

Supplementals are additionally appended characters (2 or 5) according to specific code format conventions (e.g., UPC A+2, UPC E+2, EAN 8+2). The following options are available:

- If you select **Ignore UPC/EAN with Supplementals**, and the scanner is presented with a UPC/EAN plus supplemental symbol, the scanner decodes UPC/EAN and ignores the supplemental characters.
- If you select **Decode UPC/EAN with Supplementals**, the scanner only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- If you select **Autodiscriminate UPC/EAN Supplementals**, the scanner decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *Decode UPC/EAN Supplemental Redundancy* on page 3-44 before transmitting its data to confirm that there is no supplemental.
- If you select one of the following **Supplemental Mode** options, the scanner immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *Decode UPC/EAN Supplemental Redundancy* on page 3-44 before transmitting its data to confirm that there is no supplemental. The scanner transmits UPC/EAN bar codes that do not have that prefix immediately.
  - **Enable 378/379 Supplemental Mode**
  - **Enable 978/979 Supplemental Mode**

Note: *If you select 978/979 Supplemental Mode and are scanning Bookland EAN bar codes, see Enable/Disable Bookland EAN on page 3-36 to enable Bookland EAN, and select a format using Bookland ISBN Format on page 3-52.*

  - **Enable 977 Supplemental Mode**
  - **Enable 414/419/434/439 Supplemental Mode**
  - **Enable 491 Supplemental Mode**
  - **Enable Smart Supplemental Mode** - applies to EAN-13 bar codes starting with any prefix listed previously.

- **Supplemental User-Programmable Type 1** - applies to EAN-13 bar codes starting with a 3-digit user-defined prefix. Set this 3-digit prefix using **Supplemental User-Programmable 1**.
- **Supplemental User-Programmable Type 1 and 2 -** applies to EAN-13 bar codes starting with either of two 3-digit user-defined prefixes. Set the 3-digit prefixes using **Supplemental User-Programmable 1** and **Supplemental User-Programmable 2.**
- **Smart Supplemental Plus User-Programmable 1** - applies to EAN-13 bar codes starting with any prefix listed previously or the user-defined prefix set using **Supplemental User-Programmable 1**.
- **Smart Supplemental Plus User-Programmable 1 and 2 -** applies to EAN-13 bar codes starting with any prefix listed previously or one of the two user-defined prefixes set using **Supplemental User-Programmable 1** and **Supplemental User-Programmable 2**.

- Select **Supplemental User-Programmable 1** to set a 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on page 3-141.
- Select **Supplemental User-Programmable 2** to set a second 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on page 3-141.

Note: *To minimize the risk of invalid data transmission, select whether to read or ignore supplemental characters.*

Select an option by scanning one of the following bar codes.

Ignore UPC/EAN With Supplementals

Decode UPC/EAN Supplementals (continued)

Decode UPC/EAN With Supplementals

Autodiscriminate UPC/EAN Supplementals

Enable 378/379 Supplemental Mode

Enable 978/979 Supplemental Mode

Decode UPC/EAN Supplementals (continued)

Enable 977 Supplemental Mode

Enable 414/419/434/439 Supplemental Mode

Enable 491 Supplemental Mode

Smart Supplemental Mode (All of the Above)

Decode UPC/EAN Supplementals (continued)

Supplemental User-Programmable Type 1

Supplemental User-Programmable Type 1 and 2

Smart Supplemental Plus User-Programmable 1

Smart Supplemental Plus User-Programmable 1 and 2

Decode UPC/EAN Supplementals (continued)

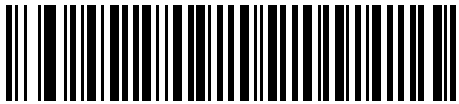
Supplemental User-Programmable 1

Supplemental User-Programmable 2

Decode UPC/EAN Supplemental Redundancy

With *Autodiscriminate UPC/EAN Supplementals* or one of the supplemental modes selected, this option adjusts the number of times a symbol without supplementals is decoded before transmission. The range is from 2 to 99 times. Twelve or above is recommended when decoding a mix of UPC/EAN symbols with and without supplementals.

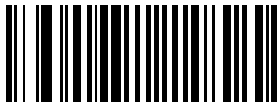
Scan the bar code below to select a decode redundancy value. Next scan two numeric bar codes beginning on page 3-141. Single digit numbers must have a leading zero. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.



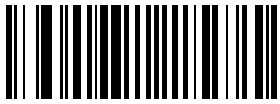
Decode UPC/EAN Supplemental Redundancy

Transmit UPCA Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPCA check digit.



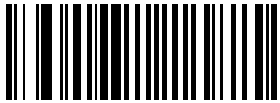
Transmit UPCA Check Digit



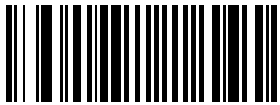
Do Not Transmit UPCA Check Digit

Transmit UPCE Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPCE check digit.



Transmit UPCE Check Digit



Do Not Transmit UPCE Check Digit

Transmit UPCE1 Check Digit

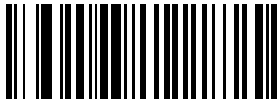
Scan the appropriate bar code below to transmit the symbol with or without the UPCE1 check digit.

Transmit UPCE1 Check Digit

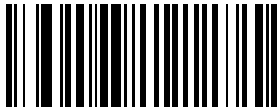
Do Not Transmit UPCE1 Check Digit

UPCA Preamble

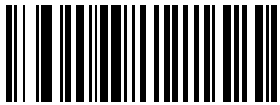
Three options are given for lead-in characters for UPCA symbols transmitted to the host device: transmit system character only, transmit system character and country code (“0” for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.



No Preamble
(<DATA>)



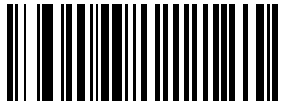
System Character
(<SYSTEM CHARACTER> <DATA>)



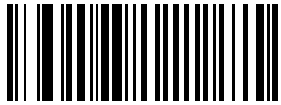
System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

UPCE Preamble

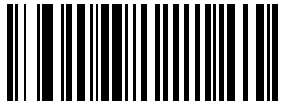
Three options are given for lead-in characters for UPCE symbols transmitted to the host device: transmit system character only, transmit system character and country code (“0” for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.



No Preamble
(<DATA>)



System Character
(<SYSTEM CHARACTER> <DATA>)



System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

UPCE1 Preamble

Three options are given for lead-in characters for UPCE1 symbols transmitted to the host device: transmit system character only, transmit system character and country code (“0” for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.

No Preamble
(<DATA>)

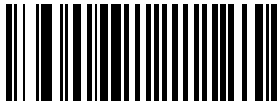
System Character
(<SYSTEM CHARACTER> <DATA>)

System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

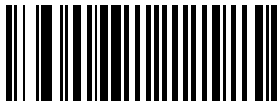
Convert UPCE to UPCA

This parameter converts UPCE (zero suppressed) decoded data to UPCA format before transmission. After conversion, data follows UPCA format and is affected by UPCA programming selections (e.g., Preamble, Check Digit).

Scanning **DO NOT CONVERT UPCE TO UPCA** allows you to transmit UPCE (zero suppressed) decoded data.



Convert UPCE To UPCA
(Enable)



Do Not Convert UPCE To UPCA
(Disable)

Convert UPCE1 to UPCA

This parameter converts UPCE1 (zero suppressed) decoded data to UPCA format before transmission. After conversion, data follows UPCA format and is affected by UPCA programming selections (e.g., Preamble, Check Digit).

Scanning **DO NOT CONVERT UPCE1 TO UPCA** allows you to transmit UPCE1 (zero suppressed) decoded data.

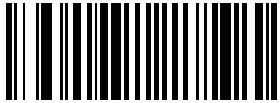
Convert UPCE1 To UPCA
(Enable)

Do Not Convert UPCE1 To UPCA
(Disable)

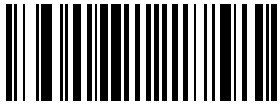
EAN Zero Extend

When this parameter is enabled, five leading zeros are added to decoded EAN-8 symbols to make them compatible in format to EAN-13 symbols.

Disabling this parameter returns EAN-8 symbols to their normal format.



Enable EAN Zero Extend



Disable EAN Zero Extend

Bookland ISBN Format

If you enabled Bookland EAN using *Enable/Disable Bookland EAN* on page 3-36, select one of the following formats for Bookland data:

- **Bookland ISBN-10** (default) - The scanner reports Bookland data starting with 978 in traditional 10-digit format with the special Bookland check digit for backward-compatibility. Data starting with 979 is not considered Bookland in this mode.
- **Bookland ISBN-13** - The scanner reports Bookland data (starting with either 978 or 979) as EAN-13 in 13-digit format to meet the 2007 ISBN-13 protocol.

Bookland ISBN-10

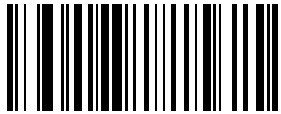
Bookland ISBN-13

Note: *For Bookland EAN to function properly, first enable Bookland EAN using Enable/Disable Bookland EAN on page 3-36, then select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in Decode UPC/EAN Supplementals on page 3-38.*

Linear UPC/EAN Decode

This option applies to code types containing two adjacent blocks (e.g., UPCA, EAN-8, EAN-13). When enabled, a bar code is transmitted only when both the left and right blocks are successfully decoded within one laser scan. Enable this option when bar codes are in proximity to each other.

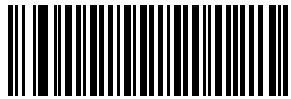
Enable Linear UPC/EAN Decode



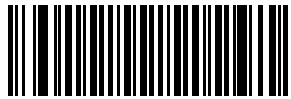
Disable Linear UPC/EAN Decode

UPC/EAN Decode Performance

Enabling this feature improves decoding of height-truncated UPC/EAN symbols.



Enable UPC/EAN Decode Performance



Disable UPC/EAN Decode Performance

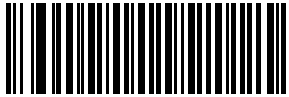
UPC Composite Mode

UPC symbols can be “linked” with a 2D symbol during transmission as if they were one symbol. Three options are offered for these symbols:

- If **UPC Never Linked** is selected, UPC bar codes are transmitted regardless of whether a 2D symbol is detected.
- If **UPC Always Linked** is selected, UPC bar codes are only transmitted when the 2D portion is detected.
- If **Autodiscriminate UPC Composites** is selected, the scanner determines if there is a 2D portion, then transmits the UPC portion only.

UPC Never Linked

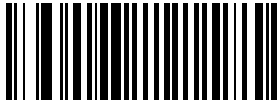
UPC Always Linked



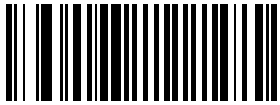
Autodiscriminate UPC Composites

Code 128

Enable/Disable Code 128

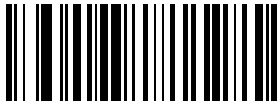


Enable Code 128

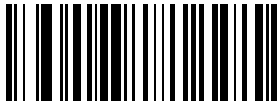


Disable Code 128

Enable/Disable UCC/EAN-128



Enable UCC/EAN-128



Disable UCC/EAN-128

Enable/Disable ISBT 128

Enable ISBT 128

Disable ISBT 128

Lengths for Code 128

No length setting is required for Code 128. The default setting is Any Length.

Code 128 Decode Performance

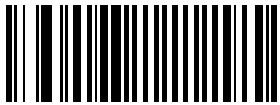
Enabling this feature may improve decoding of wide or height-truncated symbols.

Enable Code 128 Decode Performance

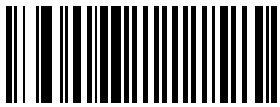
Disable Code 128 Decode Performance

Code 39

Enable/Disable Code 39



Enable Code 39



Disable Code 39

Enable/Disable Trioptic Code 39

Trioptic Code 39 symbols always contain six characters. Trioptic Code 39 and Code 39 Full ASCII should not be enabled simultaneously.

Enable Trioptic Code 39

Disable Trioptic Code 39

Convert Code 39 to Code 32

Scan a symbol below to select whether or not to convert Code 39 to Code 32.

Note: *Code 39 must be enabled in order for this parameter to function.*

Convert Code 39 To Code 32
(Enable)

Do Not Convert Code 39 To Code 32
(Disable)

Code 32 Prefix

Enable this parameter to add the prefix character “A” to all Code 32 bar codes. *Convert Code 39 to Code 32* must be enabled for this parameter to function.

Enable Code 32 Prefix

Disable Code 32 Prefix

Set Lengths for Code 39

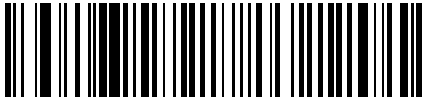
Lengths for Code 39 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. If Code 39 Full ASCII is enabled, **Length Within a Range** or **Any Length** are the preferred options. See Table A-4 on page A-9 for ASCII equivalents.

- **One Discrete Length** - Only codes containing a selected length are decoded. For example, if you select **Code 39 One Discrete Length**, then scan **1**, **4**, only Code 39 symbols containing 14 characters are decoded.
- **Two Discrete Lengths** - Only codes containing two selected lengths are decoded. For example, if you select **Code 39 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, only Code 39 symbols containing 2 or 14 characters are decoded.
- **Length Within Range** - A code type within a specified range is decoded. For example, to decode Code 39 symbols containing between 4 and 12 characters, first scan **Code 39 Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero).
- **Any Length** - Code 39 symbols containing any number of characters can be decoded.

Numeric bar codes begin on page 3-141. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Set Lengths for Code 39 (continued)

Code 39 - One Discrete Length



Code 39 - Two Discrete Lengths

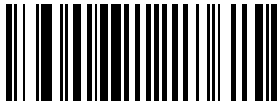
Code 39 - Length Within Range

Code 39 - Any Length

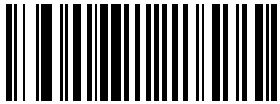
Code 39 Check Digit Verification

When enabled, this parameter checks the integrity of a Code 39 symbol to ensure it complies with specified algorithms.

Only those Code 39 symbols which include a modulo 43 check digit are decoded when this parameter is enabled.



Enable Code 39 Check Digit



Disable Code 39 Check Digit

Transmit Code 39 Check Digit

Scan a symbol below to select whether to transmit the data with or without the check digit.

Transmit Code 39 Check Digit (Enable)

Do Not Transmit Code 39 Check Digit (Disable)

Enable/Disable Code 39 Full ASCII

To enable or disable Code 39 Full ASCII, scan the appropriate bar code below.

When enabled, the ASCII character set assigns a code to letters, punctuation marks, numerals, and most control keystrokes on the keyboard.

The first 32 codes are non-printable and are assigned to keyboard control characters such as BACKSPACE and RETURN. The other 96 are called printable codes because all but SPACE and DELETE produce visible characters.

Code 39 Full ASCII interprets the bar code special character ($ + % /) preceding a Code 39 character and assigns an ASCII character value to the pair. For example, when Code 39 Full ASCII is enabled and a **+B** is scanned, it is interpreted as **b**, **%J** as **?**, and **$H** emulates the keystroke **BACKSPACE**. Scanning **ABC$M** outputs the keystroke equivalent of **ABC ENTER**. Refer to the Table A-4 on page A-9.

Code 39 Full ASCII and Trioptic Code 39 should not be enabled simultaneously.

The scanner does not autodiscriminate between Code 39 and Code 39 Full ASCII.

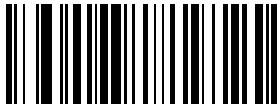
Enable Code 39 Full ASCII

Disable Code 39 Full ASCII

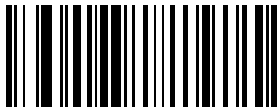
Code 39 Decode Performance

Note: *This option only applies when Code 39 One Discrete Length is selected.*

Enabling this feature may improve decoding of wide or height-truncated symbols.



Enable Code 39 Decode Performance



Disable Code 39 Decode Performance

Code 93

Enable/Disable Code 93

Enable Code 93

Disable Code 93

Set Lengths for Code 93

Lengths for Code 93 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. See Table A-4 on page A-9 for ASCII equivalents.

- **One Discrete Length** - This option allows you to decode only those codes containing a selected length. For example, if you select **Code 93 One Discrete Length**, then scan **1**, **4**, only Code 93 symbols containing 14 characters are decoded.
- **Two Discrete Lengths** - This option allows you to decode only those codes containing two selected lengths. For example, if you select **Code 93 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, only Code 93 symbols containing 2 or 14 characters are decoded.
- **Length Within Range** - This option allows you to decode a code type within a specified range. For example, to decode Code 93 symbols containing between 4 and 12 characters, first scan **Code 93 Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero).
- **Any Length** - Scanning this option allows you to decode Code 93 symbols containing any number of characters.

Numeric bar codes begin on page 3-141. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Set Lengths for Code 93 (continued)

Code 93 - One Discrete Length

Code 93 - Two Discrete Lengths

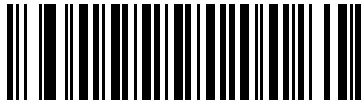
Code 93 - Length Within Range

Code 93 - Any Length

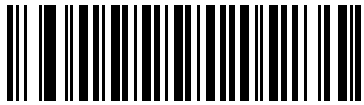
Code 11

Code 11

To enable or disable Code 11, scan the appropriate bar code below.



Enable Code 11



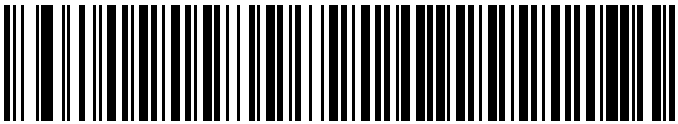
Disable Code 11

Set Lengths for Code 11

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 11 to any length, one or two discrete lengths, or lengths within a specific range.

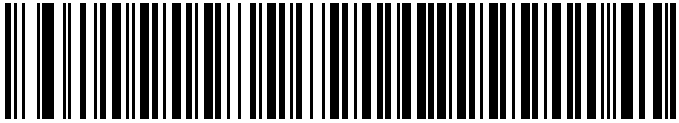
- **One Discrete Length** - Select this option to decode only Code 11 symbols containing a selected length. For example, if you select **Code 11 One Discrete Length**, then scan **1**, **4**, only Code 11 symbols containing 14 characters are decoded.
- **Two Discrete Lengths** - Select this option to decode only Code 11 symbols containing either of two selected lengths. For example, to decode only those Code 11 symbols containing either 2 or 14 characters, select **Code 11 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**.
- **Length Within Range** - Select this option to decode a Code 11 symbol with a specific length range. For example, to decode Code 11 symbols containing between 4 and 12 characters, first scan **Code 11 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero).
- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the scanner capability.

Numeric bar codes begin on page 3-141. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.



Code 11 - One Discrete Length

Set Lengths for Code 11 (continued)



Code 11 - Two Discrete Lengths

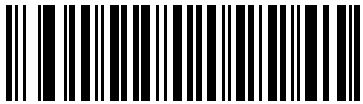
Code 11 - Length Within Range

Code 11 - Any Length

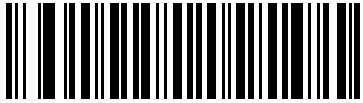
Code 11 Check Digit Verification

This feature allows the scanner to check the integrity of all Code 11 symbols to verify that the data complies with the specified check digit algorithm. This selects the check digit mechanism for the decoded Code 11 bar code. The options are to check for one check digit, check for two check digits, or disable the feature.

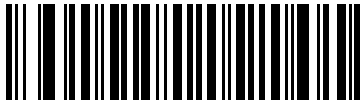
To enable this feature, scan the bar code below corresponding to the number of check digits encoded in your Code 11 symbols.



Disable Code 11 Check Digit Verification



One Check Digit

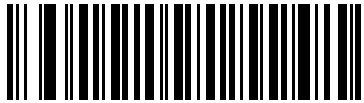


Two Check Digits

Transmit Code 11 Check Digits

This feature selects whether or not to transmit the Code 11 check digit(s).

Transmit Code 11 Check Digits (Enable)

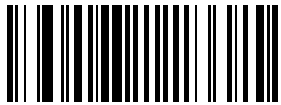


Do Not Transmit Code 11 Check Digits (Disable)

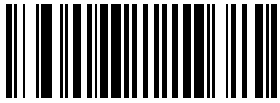
Note: *Code 11 Check Digit Verification must be enabled for this parameter to function.*

Interleaved 2 of 5

Enable/Disable Interleaved 2 of 5



Enable Interleaved 2 Of 5



Disable Interleaved 2 Of 5

Set Lengths for Interleaved 2 of 5

Lengths for I 2 of 5 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains, and includes check digits. See Table A-4 on page A-9 for ASCII equivalents.

- **One Discrete Length** - This option allows you to decode only those codes containing a selected length. For example, if you select **I 2 of 5 One Discrete Length**, then scan **1**, **4**, the only I 2 of 5 symbols decoded are those containing 14 characters.
- **Two Discrete Lengths** - This option allows you to decode only those codes containing two selected lengths. For example, if you select **I 2 of 5 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only I 2 of 5 symbols decoded are those containing 2 or 14 characters.
- **Length Within Range** - This option allows you to decode a code type within a specified range. For example, to decode I 2 of 5 symbols containing between 4 and 12 characters, first scan **I 2 of 5 Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero).
- **Any Length** - Scanning this option allows you to decode I 2 of 5 symbols containing any number of characters.

Numeric bar codes begin on page 3-141. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Set Lengths for Interleaved 2 of 5 (continued)

I 2 of 5 - One Discrete Length

I 2 of 5 - Two Discrete Lengths

I 2 of 5 - Length Within Range

Note: *Selecting this option may lead to misdecodes.*

I 2 of 5 - Any Length

I 2 of 5 Check Digit Verification

When enabled, this parameter checks the integrity of an I 2 of 5 symbol to ensure it complies with a specified algorithm, either USS (Uniform Symbology Specification), or OPCC (Optical Product Code Council).

Disable

USS Check Digit

OPCC Check Digit

Transmit I 2 of 5 Check Digit

Scan a symbol below to transmit the data with or without the check digit.

Transmit I 2 of 5 Check Digit
(Enable)

Do Not Transmit I 2 of 5 Check Digit
(Disable)

Convert I 2 of 5 to EAN-13

This parameter converts a 14 character I 2 of 5 code into EAN-13, and transmits to the host as EAN-13. To accomplish this, the I 2 of 5 code must be enabled, lengths must be set to decode 14-character symbols, and the code must have a leading zero and a valid EAN-13 check digit.

Convert I 2 of 5 to EAN-13 (Enable)

Do Not Convert I 2 of 5 to EAN-13 (Disable)

Discrete 2 of 5

Enable/Disable Discrete 2 of 5

Enable Discrete 2 Of 5

Disable Discrete 2 Of 5

Set Lengths for Discrete 2 of 5

Lengths for D 2 of 5 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains, and includes check digits. See Table A-4 on page A-9 for ASCII equivalents.

- **One Discrete Length** - This option allows you to decode only those codes containing a selected length. For example, if you select **D 2 of 5 One Discrete Length**, then scan **1**, **4**, the only D 2 of 5 symbols decoded are those containing 14 characters.
- **Two Discrete Lengths** - This option allows you to decode only those codes containing two selected lengths. For example, if you select **D 2 of 5 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only D 2 of 5 symbols decoded are those containing 2 or 14 characters.
- **Length Within Range** - This option allows you to decode a code type within a specified range. For example, to decode D 2 of 5 symbols containing between 4 and 12 characters, first scan **D 2 of 5 Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero).
- **Any Length** - Scanning this option allows you to decode D 2 of 5 symbols containing any number of characters.

Numeric bar codes begin on page 3-141. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Set Lengths for Discrete 2 of 5 (continued)

D 2 of 5 - One Discrete Length

D 2 of 5 - Two Discrete Lengths

D 2 of 5 - Length Within Range

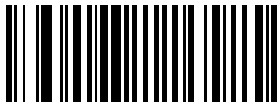
Note: *Selecting this option may lead to misdecodes.*

D 2 of 5 - Any Length

Codabar

Enable/Disable Codabar

Enable Codabar



Disable Codabar

Set Lengths for Codabar

Lengths for Codabar may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains. It also includes any start or stop characters. See Table A-4 on page A-9 for ASCII equivalents.

- **One Discrete Length** - This option allows you to decode only those codes containing a selected length. For example, if you select **Codabar One Discrete Length**, then scan **1**, **4**, the only Codabar symbols decoded are those containing 14 characters.
- **Two Discrete Lengths** - This option allows you to decode only those codes containing two selected lengths. For example, if you select **Codabar Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only Codabar symbols decoded are those containing 2 or 14 characters.
- **Length Within Range** - This option allows you to decode a code type within a specified range. For example, to decode Codabar symbols containing between 4 and 12 characters, first scan **Codabar Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero).
- **Any Length** - Scanning this option allows you to decode Codabar symbols containing any number of characters.

Numeric bar codes begin on page 3-141. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Set Lengths for Codabar (continued)

Codabar - One Discrete Length

Codabar - Two Discrete Lengths

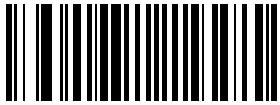
Codabar - Length Within Range

Codabar - Any Length

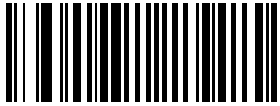
CLSI Editing

When enabled, this parameter strips the start and stop characters and inserts a space after the first, fifth, and tenth characters of a 14-character Codabar symbol.

Note: *Symbol length does not include start and stop characters.*



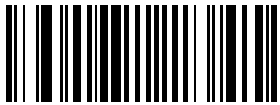
Enable CLSI Editing



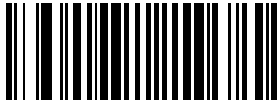
Disable CLSI Editing

NOTIS Editing

When enabled, this parameter strips the start and stop characters from decoded Codabar symbol.



Enable NOTIS Editing



Disable NOTIS Editing

MSI Plessey

Enable/Disable MSI Plessey

Enable MSI Plessey

Disable MSI Plessey

Set Lengths for MSI Plessey

Lengths for MSI Plessey may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains, and includes check digits. See Table A-4 on page A-9 for ASCII equivalents.

- **One Discrete Length** - This option allows you to decode only those codes containing a selected length. For example, if you select **MSI Plessey One Discrete Length**, then scan **1**, **4**, the only MSI Plessey symbols decoded are those containing 14 characters.
- **Two Discrete Lengths** - This option allows you to decode only those codes containing two selected lengths. For example, if you select **MSI Plessey Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only MSI Plessey symbols decoded are those containing 2 or 14 characters.
- **Length Within Range** - This option allows you to decode a code type within a specified range. For example, to decode MSI Plessey symbols containing between 4 and 12 characters, first scan **MSI Plessey Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero).
- **Any Length** - Scanning this option allows you to decode MSI Plessey symbols containing any number of characters.

Numeric bar codes begin on page 3-141. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Set Lengths for MSI Plessey

MSI Plessey - One Discrete Length

MSI Plessey - Two Discrete Lengths

MSI Plessey - Length Within Range

Note: *Selecting this option may lead to misdecodes.*

MSI Plessey - Any Length

MSI Plessey Check Digits

These check digits at the end of the bar code verify the integrity of the data. At least one check digit is always required. Check digits are not automatically transmitted with the data.

If two check digits is selected, an *MSI Plessey Check Digit Algorithm* must also be selected. See page 3-91.

One MSI Plessey Check Digit

Two MSI Plessey Check Digit

Transmit MSI Plessey Check Digit

Scan a symbol below to transmit the data with or without the check digit.

Transmit MSI Plessey Check Digit (Enable)

Do Not Transmit MSI Plessey Check Digit (Disable)

MSI Plessey Check Digit Algorithm

When the Two MSI Plessey Check Digits option is selected, an additional verification is required to ensure integrity. Either of the two following algorithms may be selected.

MOD 10/ MOD 11

MOD 10/ MOD 10

PDF-417/MicroPDF-417

Enable/Disable PDF-417

Enable PDF-417

Disable PDF-417

Enable/Disable MicroPDF-417

Enable MicroPDF-417

Disable MicroPDF-417

MicroPDF Performance

If your scanner is having trouble decoding MicroPDF symbols, select Selective Performance. Note that this may decrease decoding aggressiveness on some symbols.

Standard Performance for MicroPDF

Selective Performance for MicroPDF

Code 128 Emulation

When this parameter is enabled, the scanner transmits data from certain MicroPDF-417 symbols as if it was encoded in Code 128 symbols. Transmit AIM Symbology Identifiers must be enabled for this parameter to work.

If Code 128 Emulation is enabled, these MicroPDF-417 symbols are transmitted with one of the following prefixes:

-]C1 if the first codeword is 903-907, 912, 914, 915
-]C2 if the first codeword is 908 or 909
-]C0 if the first codeword is 910 or 911

If disabled, they are transmitted with one of the following prefixes:

-]L3 if the first codeword is 903-907, 912, 914, 915
-]L4 if the first codeword is 908 or 909
-]L5 if the first codeword is 910 or 911

Scan a bar code below to enable or disable Code 128 Emulation.

Enable Code 128 Emulation

Disable Code 128 Emulation

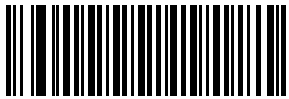
RSS Codes

RSS-14

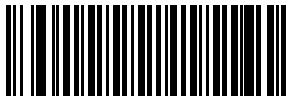
Enable RSS-14

Disable RSS-14

RSS-Limited



Enable RSS-Limited



Disable RSS-Limited

RSS-Expanded

Enable RSS-Expanded

Disable RSS-Expanded

Security Level

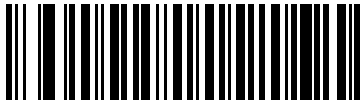
The scanner offers four levels of decode security for delta bar codes, which include the Code 128 family, UPC/EAN, and Code 93. Select increasing levels of security for decreasing levels of bar code quality. There is an inverse relationship between security and scanner aggressiveness, so choose only that level of security necessary for any given application.

- **Security Level 0:** This default setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **Security Level 1:** Select this option if misdecodes occur. This security level should eliminate most misdecodes.
- **Security Level 2:** Select this option if Security level 1 fails to eliminate misdecodes.
- **Security Level 3**: If Security Level 2 was selected and misdecodes still occur, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selecting this level of security significantly impairs the decoding ability of the scanner. If this level of security is necessary, try to improve the quality of the bar codes.

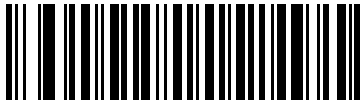
Security Level (continued)

Security Level 0

Security Level 1



Security Level 2



Security Level 3

Data Options

Transmit Code ID Character

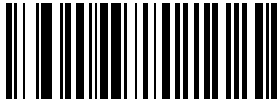
A code ID character identifies the code type of a scanned bar code. This may be useful when the scanner is decoding more than one code type. In addition to any single character prefix already selected, the code ID character is inserted between the prefix and the decoded symbol.

The user may select no code ID character, a Symbol Code ID character, or an AIM Code ID character. The Symbol Code ID characters are listed below; see *AIM Code Identifiers* on page A-1.

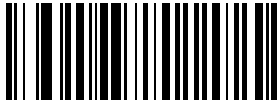
Table 3-4. Symbol Code ID Characters

Code Type	Symbol Identifier
UPCA, UPCE, UPCE1, EAN-13, EAN-8	A
Code 39, Code 32	B
Codabar	C
Code 128 (all variants)	D
Code 93	E
Interleaved 2 of 5	F
Discrete 2 of 5, D 2of 5 IATA	G
Code 11	H
MSI Plessey	J
UCC/EAN 128	K
Bookland EAN	L
Trioptic Code 39	M
Coupon Code	N
RSS (all variants)	R
Composite*	T
PDF-417, Micro PDF-417, Macro PDF-417, Micro MacroPDF-417	X
*Note: UPC/EAN Composite is transmitted in two portions, each with a "T" prefix.	

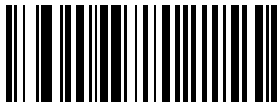
Transmit Code ID Character (continued)



Symbol Code ID Character



AIM Code ID Character



None

Prefix/Suffix Values

A prefix and/or one or two suffixes may be appended to scan data for use in data editing. These values are set by scanning a four digit number (i.e., four bar codes) that corresponds to key codes for various terminals. See the Table A-4 on page A-9 for ASCII values.

Note: *If a keyboard interface is being used, refer to the Synapse "Smart Cable" Interface Guide for keystroke values to be used as prefix/ suffix values.*

To set a PREFIX/SUFFIX value:

1. Scan the option bar code you wish to set.
2. Scan four *Numeric Bar Codes* beginning on page 3-141 which correspond to the ASCII value or keystroke value you wish to assign. The ENTER key is the default for all options.
3. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Scan Suffix (Value 1)

Scan Prefix (Value 2)

Note: *In order to use Prefix/Suffix values, the Scan Data Transmission Format must be set. See page 3-101.*

Scan Data Transmission Format

You may select one of the following options for scan data formats:

Standard: <data>
Option 1: <data> <SUFFIX>
Option 2: <PREFIX> <data> <SUFFIX>
Option 3: <PREFIX> <data>

<data> = scanned bar code data

<PREFIX> and <SUFFIX> as selected by the user.

To select a data transmission format:

1. Scan the **Scan Options** bar code.
2. Scan the bar code corresponding to the desired converted data format.
3. Scan **Enter**.
4. If you make a mistake, scan **Cancel** on the next page.

Note: *RS-232C hosts treat the extended keypad default suffix (7013) as ASCII data.*

Scan Options

Data As Is

<DATA> <SUFFIX>

Scan Data Transmission Format (continued)

<PREFIX> <DATA> <SUFFIX>

<PREFIX> <DATA>

Enter

Cancel

Decode Buffering

This option permits the scanner to store decoded data until the host device is ready to receive them. If the scanner reaches its capacity to store decoded symbols before the host is ready, subsequent trigger pulls have no effect until space is available.

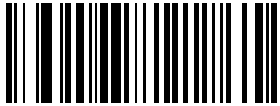
Enable Decode Buffering

Disable Decode Buffering

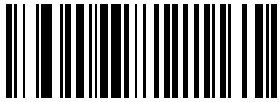
RS-232 Options

Baud Rate

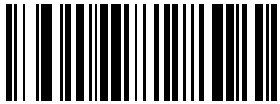
Baud rate is the number of bits of data transmitted per second. The scanner's baud rate setting should match the data rate setting of the host device. If not, data may not reach the host device or may reach it in distorted form.



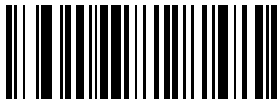
Baud Rate 300



Baud Rate 600

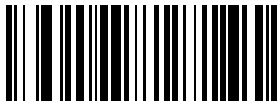


Baud Rate 1200

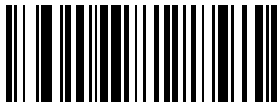


Baud Rate 2400

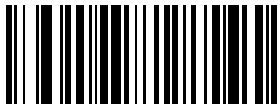
Baud Rate (continued)



Baud Rate 4800



Baud Rate 9600



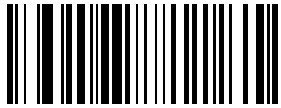
Baud Rate 19,200

Baud Rate 38,400

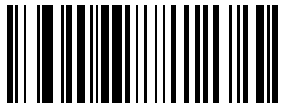
Parity

A parity check bit is the most significant bit of each ASCII coded character. Select the parity type according to host device requirements.

- **Odd** parity - the parity bit has a value 0 or 1, based on data, to ensure that an odd number of 1 bits is contained in the coded character.
- **Even** parity - the parity bit has a value 0 or 1, based on data, to ensure that an even number of 1 bits is contained in the coded character.
- **Mark** parity - the parity bit is always 1.
- **Space** parity - the parity bit is always 0.
- **None** - no parity is required.

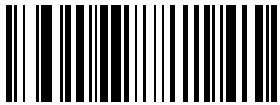


Odd

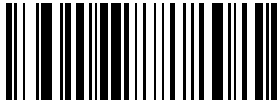


Even

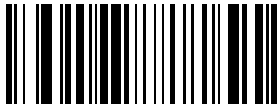
Parity (continued)



Mark



Space



None

Check Parity

Select whether or not the parity of received characters is checked. The type of parity used is selectable through the *Parity* parameter.

Check Parity

Do Not Check Parity

Hardware Handshaking

The host exchanges data with the scanner via a serial port, either with or without the hardware handshaking lines, *Request to Send (*RTS*)*, and *Clear to Send (*CTS*)*.

Standard RTS/CTS

If Standard RTS/CTS handshaking is selected, scanned data is transmitted according to the following sequence:

- The CTS line must initially be deasserted by the host. If the scanner detects that CTS is asserted (indicating that the host may still be receiving a previous transmission), the scanner waits up to 2 seconds for the host to deassert the CTS line. If, after 2 seconds (default), the CTS line is still asserted, the scanner sounds a transmit error and any scanned data is lost.
- When the CTS line is deasserted, the scanner asserts the RTS line and waits up to 2 seconds for the host to assert CTS. When the host asserts CTS, the scanner transmits the data. If, after 2 seconds (default), the CTS line is not asserted, the scanner sounds a transmit error and discards the data.
- When data transmission is complete, the scanner deasserts RTS 10 msec after sending the last character.
- The host responds by deasserting CTS. The scanner checks for a deasserted CTS upon the next transmission of data.

If CTS is deasserted for more than 50 ms between characters, the transmission is aborted, the scanner sounds a transmission error, and the data is discarded.

If the previous communications sequence fails, the scanner issues an error beep. In this case, the data is lost and must be rescanned.

Note: *The **DTR** signal is jumpered active.*

Other RTS/CTS Options

The following options offer alternatives to Standard RTS/CTS Handshaking.

- **RTS/CTS Option 1**: The scanner asserts RTS before transmitting and ignores the state of CTS. The scanner deasserts RTS when the transmission is complete.
- **RTS/CTS Option 2**: RTS is always high or low (user-programmed logic level). However, the scanner waits for CTS to be asserted before transmitting data. If CTS is not asserted within two seconds, the scanner issues an error beep and discards the data.
- **RTS/CTS Option 3**: The scanner asserts RTS before transmitting, regardless of the state of CTS. The scanner waits up to two seconds for CTS to be asserted. If CTS is not asserted during this time, the scanner issues an error beep and discards the data. The scanner deasserts RTS when transmission is complete.
- **RTS/CTS PC**: Standard RTS/CTS hardware handshaking used by the PC. The host can deassert CTS to prevent the scanner from transmitting, and the scanner can deassert RTS to prevent the host from transmitting.

Hardware Handshaking (continued)

***None**

Standard RTS/CTS

RTS/CTS Option 1

RTS/CTS Option 2

RTS/CTS Option 3

RTS/CTS PC

Software Handshaking

This parameter offers control of the data transmission process. It may be used instead of, but not in conjunction with, hardware handshaking. **ACK**/**NAK** handshaking may be combined with **ENQ** handshaking.

- **No Software Handshaking:** Data is transmitted immediately.
- **ACK/NAK Only:** When this option is selected, after transmitting data, the scanner expects either an ACK or NAK response from the host. When a NAK is received, the scanner transmits the same data again and waits for either an ACK or NAK. After three unsuccessful attempts to send data when NAKs are received, the scanner issues an error indication and discards the data.
- **ENQ Only**: When this option is selected, the scanner waits for an ENQ character from the host before transmitting data. If an ENQ is not received within 2 seconds, the scanner issues an error indication and discards the data. The host must transmit an ENQ character at least every 2 seconds to prevent transmission errors.
- **ACK/NAK with ENQ**: This combines the two previous handshaking options.
- **XON/XOFF**: An XOFF character turns the scanner transmission off until the scanner receives an XON character. There are two situations for XON/XOFF:
  - XOFF is received before the scanner has data to send. When the scanner has data to send, it then waits for an XON character before transmission. The scanner waits up to 2 seconds to receive the XON. If the XON is not received within this time, the scanner issues an error indication and discards the data.
  - XOFF is received during a transmission. Data transmission then stops after sending the current byte. When the scanner receives an XON character, it sends the rest of the data message. The scanner waits indefinitely for the XON.

Select the type of RS-232C software handshaking protocol.

Software Handshaking (Continued)

None

ACK/NAK

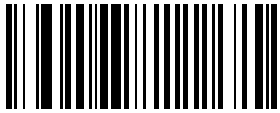
ACK/NAK with ENQ

ENQ Only

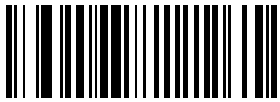
XON/XOFF

Stop Bit Select

The stop bit(s) at the end of each transmitted character marks the end of transmission of one character and prepares the receiving device for the next character in the serial data stream. The number of stop bits selected (one or two) depends on the number the receiving terminal is programmed to accommodate. Set the number of stop bits to match host device requirements.



1 Stop Bit



2 Stop Bits

Intercharacter Delay

Select the intercharacter delay option matching host requirements. The intercharacter delay gives the host system time to service its receiver and perform other tasks between characters. The delay period can range from no delay to 99 msec in 1 msec increments. After scanning the bar code below, scan two bar codes beginning on page 3-141 to set the desired time-out. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Intercharacter Delay

Host Serial Response Time-out

This parameter specifies how long the scanner waits for an ACK or NAK before resending. Also, if the scanner wants to send, and the host has already been granted permission to send, the scanner waits for the designated time-out before declaring an error.

The delay period can range from 0.0 to 9.9 seconds in 0.1 second increments. After scanning the bar code below, scan two numeric bar codes beginning on page 3-141. Time durations of less than 1.0 second require a leading zero. If you make an error, or wish to change your selection, scan the *Cancel* bar code on page 3-143.

Host Serial Response Time-out

Host Serial RTS Line State

This parameter sets the default host serial RTS line state to either high or low.

Host: Low RTS

Host: High RTS

Beep On <BEL>

When this parameter is enabled, the scanner issues a beep when a <BEL> character is detected on the serial data line. <BEL> alerts the user that an illegal entry or other important event has occurred.

Select whether to enable or disable this parameter.

Beep On <BEL> Character

Do Not Beep On <BEL> Character

Data Transmission - 7 or 8-Bit ASCII Data Format

This parameter determines whether data transmissions occur in the 7-bit or 8-bit ASCII format. Select this parameter according to the requirement of the receiving device. The default value is 8-bit ASCII.Select either 7-bit or 8-bit ASCII format for RS-232C communications.

7-Bit

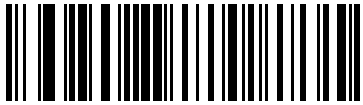
8-Bit

USB Parameters (M2007)

The following USB parameters apply to the M2007 (with or without Synapse) only.

Set USB Defaults

Scan the bar code below to set USB defaults for the parameters on the following pages.



Set USB Defaults

USB Device Type

The M2007 attaches to a USB host or hub and supports the USB device options below, depending on the host type and desired mode of operation.

The mode of operation can be dynamically changed. However, the scanner resets and re-enumerates each time a new mode is selected. The re-enumeration process can take a few seconds to complete, during which the scanner turns off, disconnects, and reconnects to the host.

HID Keyboard Emulation

In this mode, the scanned data is presented to the system as if coming from a USB HID (Human Interface Device) keyboard. Most operating systems have native support for this device, so no additional driver installation is required.

IBM SurePOS Hand-Held Bar Code Reader

This mode is supported by an IBM hand-held bar code reader driver on IBM SurePOS terminals.

IBM SurePOS Tabletop Bar Code Reader

This mode is supported by an IBM tabletop bar code reader driver on IBM SurePOS terminals.

Symbol Native Bar Code Reader

This mode is supported by a Symbol bar code reader driver and provides maximal flexibility and control over the scanner. The software will prompt you to select or install the driver. Follow the instructions on the screen.

Symbol COM Port Emulation

In this mode, scanned data is presented to the host as if it originated in a COM port. A Symbol driver is required to support this mode, but it provides compatibility for an application which supports a bar code reader attached to a COM port. The software will prompt you to select or install the driver. Follow the instructions on the screen.

Select the desired type of USB device. The default is IBM Hand-Held USB.

Note: *When changing USB Device Types, the M2007 turns off briefly and re-enumerates to properly communicate with the host.*

Default USB Type

IBM Hand-Held USB (Default)

IBM Table Top USB

HID Keyboard Emulation

Symbol Native USB

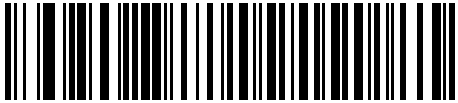
Symbol COM Port Emulation

Country Selection

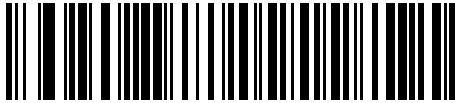
This setting applies only to the HID Keyboard Emulation device. The MacOS and Windows implement international keyboards differently. Select the desired country according to the USB host device. If your host platform does not appear here, select the Windows settings.

Note: *When changing the Country Selection, the M2007 turns off briefly and re-enumerates to properly communicate with the host.*

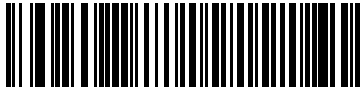
North American, Standard USB Keyboard



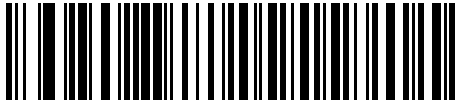
French, Windows



German, Windows

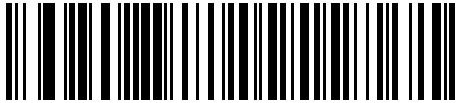


German, MacOS



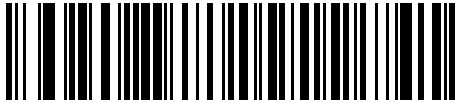
French Canadian, Windows

French Canadian, MacOS



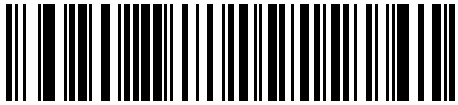
Spanish (Traditional), Windows

Spanish ISO, MacOS



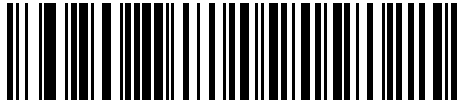
Italian, Windows

Italian, MacOS



Swedish, Windows

Swedish, MacOS



UK English, Windows

UK English, MacOS

French, MacOS

Japanese, Windows

Japanese, MacOS

Keyboard Emulation

Keystroke Delay

This option applies only to the HID Keyboard Emulation device. Select the desired delay between transmitted keystrokes. Only change this setting for slower host PCs that cannot accommodate the speed of data transmitted.

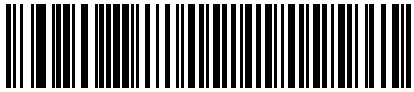
No Delay (0 ms)

Medium Delay (20 ms)

Long Delay (40 ms)

Keyboard Emulation - CAPS LOCK

This option applies only to the HID Keyboard Emulation device. By default, if a bar code is scanned, Caps Lock Override is disabled and the case of the bar code data is not preserved. For example, if the CAPS LOCK is off and an uppercase character is transmitted, the host reads this as a lowercase character. By selecting “Enable Caps Lock Override”, the caps lock is turned off during transmission to preserve the case of the bar code data, then restored after transmission.



Disable Caps Lock Override

Enable Caps Lock Override

Keyboard Emulation and IBM - Ignore Unknown Characters

This option applies only to the HID Keyboard Emulation device and IBM device. Unknown characters are characters the host does not recognize. When “Send Bar Codes With Unknown Characters” is selected, all bar code data is sent except for unknown characters, and no error beeps sound. When “Do Not Send Bar Codes With Unknown Characters” is selected, bar codes containing at least one unknown character are not sent to the host, and an error beep sounds.

Send Bar Codes With Unknown Characters

Do Not Send Bar Codes With Unknown Characters

Macro PDF Features

This section discusses programmable Macro PDF features fully supported by the M2000. Macro PDF is a special feature for concatenating multiple PDF symbols into one file. The M2000 can decode symbols that are encoded with this feature, however, the 64K version cannot buffer large sets of macro PDF symbols.

Caution

When printing, keep each Macro PDF sequence separate, as each sequence has unique identifiers. Do not mix bar codes from several Macro PDF sequences, even if they encode the same data. When scanning Macro PDF sequences, scan the entire sequence without interruption. If you scan a mixed sequence, you get two long low beeps for inconsistent file ID or inconsistent symbology error.

Program the required generic decode and data transmission parameters using the bar codes on the following pages. Use the same programming method for setting Macro PDF features as used for standard features.

Note that all parameter settings are stored in non-volatile memory and so are retained after powerdown.

Macro PDF Transmit / Decode Mode Symbols

Select only one of the four options below for handling the decoding of Macro PDF. The scanner can handle up to 64K bytes of decoded data, including any optional field information, except in the mode Transmit Each Macro PDF Symbol Decoded in Sequential Order, where there is no limit to the size of the Macro PDF set.

- Buffer All Symbols / Transmit Macro PDF When Complete activates transmission of all decode data from an entire Macro PDF sequence. Transmission does not occur until the entire Macro PDF sequence is scanned and decoded. This is the default option.

  If the decode data exceeds the limit of 64 symbols or 64K bytes, there is no transmission because the entire sequence has not been scanned. Use the parameter Flush Macro PDF Buffer to purge the buffer.
- Transmit Any Symbol in Set / No Particular Order causes transmission of data from up to 1024 Macro symbols as decoded, whether it is in sequential order or not.
- Scan in Sequence Only / Transmit in Sequence Without Buffering causes transmission of data from up to 1024 symbols within the Macro PDF sequence as decoded, provided the Macro PDF symbols are scanned in order. If you do not scan the symbols in order, an error occurs.
- When Buffer Scans Out of Order / Transmit Scans in Order is enabled, decode data from each symbol within the Macro PDF sequence is transmitted when decoded, provided that the Macro PDF symbols are scanned in order. Decode data from symbols out of order in the Macro PDF sequence is buffered. The scanner can buffer up to 64 symbols or 64K bytes.

Macro PDF Transmit / Decode Mode Symbols (Continued)

Buffer All Symbols /
Transmit When Complete

Transmit Any Symbol In Set /
No Particular Order

Scan In Sequence Only /
Transmit In Sequence Without Buffering

Buffer Scans Out Of Order/
Transmit Scans In Order

Transmit Symbols in Codeword Format

Enabling this activates transmission of each PDF symbol as directly decoded data codewords, whether that symbol is part of a macro PDF sequence or not. Note that data is output as codeword values — not as interpreted data.

“Codeword values” is an ASCII representation of a number from 000 to 928 for each codeword, preceded by an escape character. This escape character is a backslash. For example, the codeword value 005 is sent to the host in the form of \005 for GLIs, and \C005C for ECIs. This output format is based on the AIM USA Uniform Symbology Specification for PDF-417 (1994).

All output codewords take up exactly 4 characters for GLIs and 6 characters for ECIs. However, there may be nondecodable characters in the PDF symbol, such as a GLI sequence. This special codeword sequence activates a certain kind of interpretation to the encoded data. Non-decodable codewords like GLIs are embedded in the output stream just like any other codeword, e.g., \927\001.

Because GLIs are indistinguishable from other codewords in the output data stream, the host must intelligently recognize them as GLIs and process their interpretations.

Note that when a macro PDF sequence is transmitted, the last character in the last block of data transmitted is always \922 (if selected). This indicates the end of that macro PDF transmission.

Enable Transmit In Codeword Format

Disable Transmit In Codeword Format

Transmit Unknown Codewords

This enables using the output codeword format for transmitting any non-GLI or non-macro PDF codeword. If this is not enabled and an unknown codeword is found, a decode error beep sounds.

Transmit Unknown Codewords

Do Not Transmit Unknown Codewords

Escape Characters

This enables the backslash (\) character as an Escape character for systems that can process transmissions containing special data sequences. Scan a bar code below to either format special data (e.g., GLI escapes, MacroPDF-417 Control Block optional fields) according to the GLI (Global Label Identifier) protocol or the ECI (Extended Channel Interpretation) protocol, or to disable this parameter.

When ECI or GLI protocol is selected, backslashes encoded in the data will be doubled upon transmission. If 'None' is selected and a barcode containing an escape sequence is scanned, the scanner will emit an error beep.

ECI Protocol

GLI Protocol

None

Delete Character Set ECIs

This parameter enables the scanner to delete any escape sequences representing Character Set ECIs (also known as GLIs) from its buffer before transmission. In many receiving systems, Character Set ECIs can be removed without affecting the way data is displayed or processed.

When deletion is selected, the scanner transmits data from PDF-417 and MicroPDF-417 bar codes containing Character Set ECIs, even when the ECI Protocol is disabled.

Scan a bar code to delete or transmit character set ECIs.

Delete Character Set ECIs

Transmit Character Set ECIs

ECI Decoder

This parameter enables the scanner to interpret any Extended Channel Interpretations (ECIs) that are supported by the scanner firmware. This parameter has no effect on symbols that were not encoded using ECIs. This version of the product supports ECIs 000900 through 000913, used for efficient encoding of Common Data Syntax Format 00-99. If this parameter is disabled, and a symbol is scanned that was encoded using an ECI escape, the scanner transmits the ECI escape followed by the uninterpreted data.

Scan a bar code to enable or disable this option.

Enable ECI Decoder

Disable ECI Decoder

Transmit Macro PDF User-Selected Fields

When enabled, the following parameters cause transmission of the specified field in subsequently scanned Macro PDF-417 symbols. Unless transmission of a specific field is enabled, it is not transmitted. The options cannot be changed in the middle of a Macro PDF set entry. All user-selected fields are prefixed by \923 for GLIs, and \MO for ECIs. Tags and examples in the following parameters demonstrate GLI protocol, but the ECI tag can be used instead if ECI protocol is enabled.

Note: *Either ECI or GLI protocol must be enabled to transmit fields.*

Transmit File Name

Transmit File Name activates transmission of the file name field. The field character tag is \923\000. For example, the filename MANHOURS.WK1 is sent as: \923\000MANHOURS.WK1.

Enable File Name Transmit

Disable File Name Transmit

Transmit Block Count

Transmit Block Count activates transmission of the block count field. The field character tag is \923\001. For example, the field may be: \923\0011856.

Enable Transmit Block Count

Disable Transmit Block Count

Transmit Time Stamp

Transmit Time Stamp activates transmission of the time stamp field. The field character tag is \923\002. For example, the field may be: \923\0022123443243234.

Enable Transmit Time Stamp

Disable Transmit Time Stamp

Transmit Sender

Transmit Sender activates transmission of the sender field. The field character tag is \923\003. For example, the field may be: \923\003Symbol TechnologiesHoltsville, NY.

Enable Sender Transmit

Disable Sender Transmit

Transmit Addressee

Transmit Addressee activates transmission of the addressee field. The field character tag is \923\004. For example, the field may be: \923\004AIM USA.

Enable Addressee Transmit

Disable Addressee Transmit

Transmit Checksum

Transmit Checksum activates transmission of the checksum field. The field character tag is \923\006. For example, the field may be: \923\00663823.

Enable Checksum Transmit

Disable Checksum Transmit

Transmit File Size

Transmit File Size activates transmission of the file size field. The field character tag is \923\005. For example, the field may be: \923\005179234.

Enable File Size Transmit

Disable File Size Transmit

Transmit Macro PDF Control Header

Transmit Macro PDF Control Header activates transmission of the control header, which contains the segment index and the file ID. For example, the field may be: \92800000\725\120\343. The five digits after the \928 are the segment index (or block index), and \725\120\343 is the file ID.

Enable Macro PDF Control Header Transmit

Disable Macro PDF Control Header Transmit

Last Blocker Marker

Enable / Disable Last Block Marker enables marking the last block in the set by the codeword \922.

Enable Last Block Marker

Disable Last Block Marker

Flush Macro Buffer

This flushes the buffer of all decoded Macro PDF data stored to that point, transmits it to the host device, and aborts from Macro PDF mode.

Flush Macro PDF Buffer

Abort Macro PDF Entry

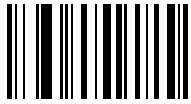
This clears all currently-stored Macro PDF data in the buffer without transmission and aborts from Macro PDF mode.

Abort Macro PDF Entry

Numeric Bar Codes

For parameters requiring specific numeric values, scan the appropriately numbered bar code(s).

0

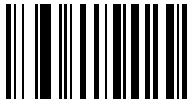


1

2

3

Numeric Bar Codes (continued)



4

5

6

7

Numeric Bar Codes (continued)

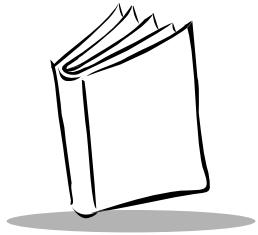
8

9

Cancel

If you make an error, or wish to change your selection, scan the bar code below.

Cancel



Chapter 4
Advanced Data Formatting (ADF)

Introduction

Advanced Data Formatting (ADF) is a means of customizing, or editing, the data scanned by the scanner before transmitting the data to your host device. Scanned data can be edited to suit your particular requirements.

ADF is implemented by scanning a related series of bar codes to create rules to apply to the scanned data. These bar codes appear later in this chapter.

Rules: Criteria Linked to Actions

In ADF, data is customized through **rules**. These rules perform specific actions when the data meets certain criteria. One rule may consist of single or multiple actions applied to single or multiple criteria.

For instance, a data formatting rule could be the following:

Criteria: *When scan data is Code 39, length 12,*
and data at the start position is the string "129",

Actions: *pad all sends with zeros to length 8,*
send all data up to X,
send a space.

In this example, if a Code 39 bar code of 1299X1559828 is scanned, the following is transmitted: 00001299<space>. If a Code 39 bar code of 1299X15598 is scanned, this rule is ignored because the length (10 characters) does not pass the criteria.

The rule specifies the editing conditions and requirements before data transmission occurs.

Using ADF Bar Codes

When you program a rule, make sure the rule is logically correct. Plan ahead before you start scanning.

To program each data formatting rule:

1. **Start the Rule**. Scan the **Begin New Rule** bar code on page 4-11.
2. **Criteria**. Scan the bar codes for all pertinent criteria. Criteria can include code type (e.g., Code 128), code length, or data that contains a specific character string (e.g., the digits “129”). These options are described in *Criteria* on page 4-14.
3. **Actions**. Scan all actions related to, or affecting, these criteria. The actions of a rule specify how to format the data for transmission. These options are described in *Actions* on page 4-28.
4. **Save the Rule**. Scan the **Save Rule** bar code on page 4-11. This places the rule in the “top” position in the rule buffer.

If you make errors during this process, some special-purpose bar codes may be useful: **Erase Criteria and Start Again**, **Erase Actions and Start Again**, **Erase Previously Saved Rule**, and **Erase All Rules**. See *Erase* on page 4-12.

Beeper Definitions for ADF on page 4-8 help guide you through the programming steps.

ADF Bar Code Menu Example

This section provides an example of how to enter an ADF rule to apply to scanned data.

An auto parts distribution center wants to encode manufacturer ID, part number, and destination code into their own Code 128 bar codes. The distribution center also has products that carry UPC bar codes, placed there by the manufacturer. The Code 128 bar codes have the following format:

MMMMMPPPPPDD

Where:M = Manufacturer ID

P = Part Number

D = Destination Code

The distribution center uses a PC with dedicated control characters for manufacturer ID <CTRL M>, part number <CTRL P>, and destination code <CTRL D>. At this center the UPC data is treated as manufacturer ID code.

The following rules need to be entered:

When scanning data of code type Code 128, send the next 5 characters, send the manufacturer ID key <CTRL M>, send the next 5 characters, send the part number key <CTRL P>, send the next 2 characters, send the destination code key <CTRL D>.

When scanning data of code type UPC/EAN, send all data, send the manufacturer ID key <CTRL M>.

To enter these rules, follow these steps:

Rule 1: The Code 128 Scanning Rule

Table 4-1. Code 128 Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	4-11	High High
2	Code 128	4-14	High High
3	Send next 5 characters	4-29	High High
4	Send <CTRL M>	4-56	High High
5	Send next 5 characters	4-29	High High
6	Send <CTRL P>	4-56	High High
7	Send next 2 characters	4-28	High High
8	Send <CTRL D>	4-54	High High
9	Save Rule	4-11	High Low High Low

Rule 2: The UPC Scanning Rule

Table 4-2. UPC Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	4-11	High High
2	UPC/EAN	4-15	High High
3	Send all remaining data	4-28	High High
4	Send <CTRL M>	4-56	High High
5	Save Rule	4-11	High Low High Low

If you made any mistakes while entering this rule, scan the **Quit Entering Rules** bar code on page 4-12. If you already saved the rule, scan the **Erase Previously Saved Rule** bar code on page 4-12.

Alternate Rule Sets

ADF rules may be grouped into one of five alternate sets that can be turned on and off when needed. This is useful when you want to format the same message in different ways. For example, a Code 128 bar code contains the following information:

Class (2 digits), Stock Number (8) digits, Price (5 digits)

This bar code might look like this:

245671243701500

where:

Class = 24

Stock Number = 56712437

Price = 01500

Ordinarily you would send this data as follows:

24 (class key)

56712437 (stock key)

01500 (enter key)

But, when there is a sale, you may want to send only the following:

24 (class key)

56712437 (stock key)

and the cashier keys the price manually.

To implement this, first enter an ADF rule that applies in the normal situation. This rule may look like this:

When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key, send the data that remains, send the Enter key.

The “sale” rule may look like this:

When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key.

To switch between the two sets of rules, a “switching rule” must be programmed. This rule specifies what type of bar code must be scanned to switch between the rule sets. For example, in the case of the “sale” rule above, the rule programmer wants the cashier to scan the bar code “M” before a sale. To do this, a rule can be entered as follows:

When scanning a bar code of length 1 that begins with “M”, select rule set number 1.

Another rule could be programmed to switch back.

When scanning a bar code of length 1 that begins with “N”, turn off rule set number 1.

The switching back to normal rules can also be done in the “sale” rule. For example, the rule may look like this:

When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key, turn off rule set 1.

It is recommended that you scan the **Disable All Rule Sets** bar code after programming a rule belonging to an alternate rule set.

In addition to enabling and disabling rule sets within the rules, you can disable them by scanning the appropriate bar codes in *Disable Rule Set* on page 4-13.

Rules Hierarchy (in Bar Codes)

The order of programming individual rules is important. The most general rule should be programmed first.

All programmed rules are stored in a buffer. As they are programmed, they are stored at the “top” of a rules list. If three rules have been created, the list would be configured as follows:

Third Rule

Second Rule

First Rule

When data is scanned, the rules list is checked from top to bottom to determine if the criteria matches (and therefore, if the actions should occur). Input is modified into the data format specified by the first matching set of criteria it finds. Be sure that your most general rule is the first one programmed.

For example, if the THIRD rule states:

When scanning a bar code of any length, send all data, then send the ENTER key.

And the SECOND rule states:

When scanning a Code 128 bar code of length 12, send the first four characters, then send the ENTER key, then send all remaining data.

If a Code 128 bar code of length 12 were scanned, the THIRD rule would be in effect. The SECOND rule would appear to not function.

Note also that ADF rules are actually created when you use the standard data editing functions. Scan options are entered as ADF rules, and the hierarchy mentioned above also applies to them. For the M2000, this applies to prefix/ suffix programming in the parameter *Scan Data Transmission Format.*

These rules reside in the same “rule list” as ADF Rules, so the order of their creation is also important.

Default Rules

Every unit has a default rule to send all scan data. Units with custom software may have one or more default rules burned in. The rules hierarchy checks user programmable rules first, then the default rules. Default rules can be disabled by entering the following general rule in the user programmable buffer:

When receiving scan data, send all data.

Since this rule always applies, ADF will never go into the default rules.

Beeper Definitions for ADF

The following table defines beep sequences that occur during rule entry.

Table 4-3. Beeper Definitions

Beeper Sequence	Indication
Normal Data Entry. Duration of tones are short.	
High-Low	Entry of a number is expected. Enter another digit. Add leading zeros to the front if necessary.
Low-Low	Entry of an alphabetic character is expected. Enter another character or scan the End of Message bar code.
High-High	Entry of Criterion/Action is expected. Enter another criterion or action, or scan the Save Rule bar code.
High-Low-High-Low	Rule saved. Rule entry mode exited.
High-Low-Low	All criteria or actions were cleared for rule currently being entered; continue entry of rule.
Low	Last saved rule was successfully deleted. The rule presently being entered is left intact.
Low-High-High	All rules are now deleted. The rule presently being entered is left intact. (This beep sequence has a different meaning outside of ADF.)
Error Indications. Duration of tones are very long.	
Low-High-Low-High	Out of rule memory. Erase some existing rules, then try to save rule again. (The current rule need not be re-entered.)
Low-High-Low	Cancel rule entry. Rule entry mode exited because of an error or the user asked to exit rule entry.
Low-High	Entry error, wrong bar code scanned. Re-enter criterion or action. All previously entered criteria and actions are retained. Criteria or action list is too long for a rule.

ADF Bar Codes

The following table helps you locate the bar codes you need to create an ADF rule.

Table 4-4. ADF Bar Codes

Bar Code	Description	Page
Special Commands		
Begin New Rule	Starts data formatting rule.	4-11
Save Rule	Completes and saves rule.	4-11
Erase	Erases criteria, actions, or rules.	4-12
Quit Entering Rules	Quits entering rules.	4-12
Disable Rule Set	Disables rule sets.	4-13
Criteria		
Code Types	Selects code types to be affected by rule.	4-14
Code Lengths	Defines the number of characters each code type must contain.	4-17
Message Containing A Specific Data String	Select whether formatting affects data that begins with or contains a specific character or data string.	4-23
Numeric Keypad	Used for specifying a data string.	4-25
Rule Belongs To Set	Selects which set a rule belongs to.	4-27
Actions		
Send Data	Sends all data that remains, sends all data up to a specific character, or sends N characters.	4-28
Send Pause	Inserts a pause.	4-32
Setup Field(s)	Moves the cursor in relation to a specified character.	4-32
Send Preset Value	Sends prefix and suffix values.	4-40

Table 4-4. ADF Bar Codes

Bar Code	Description	Page
Modify Data	Modifies data as follows:	4-40
♦ Remove All Spaces	♦ Removes all spaces in the send commands.	4-40
♦ Crunch All Spaces	♦ Leaves one space between words.	4-40
♦ Stop Space Removal	♦ Stops space removal.	4-41
♦ Remove Leading Zeros	♦ Removes all leading zeros.	4-41
♦ Stop Zero Removal	♦ Stops removal of zeros.	4-41
♦ Pad Data With Spaces	♦ Pads data to the left with spaces.	4-42
♦ Pad Data With Zeros	♦ Pads data to the left with zeros.	4-47
Beeps	Selects beep sequence for each rule.	4-53
Send Keystroke	Specifies control and keyboard characters to send.	4-54
♦ Control Characters	♦ Sends control characters.	4-54
♦ Keyboard Characters	♦ Sends keyboard characters.	4-59
♦ Send ALT Characters	♦ Sends ALT characters.	4-71
♦ Send Command Characters	♦ Sends command characters.	4-75
♦ Send Special Characters	♦ Sends special characters.	4-77
♦ Send Keypad Characters	♦ Sends keypad characters.	4-78
♦ Send Function Keys	♦ Sends function keys.	4-82
Turn On/Off Rule Sets	Turns rule sets on and off.	4-88
Alphanumeric Keyboard	Used to specify characters and strings when creating a rule.	4-89

Special Commands

Bar codes and explanations of the following special commands are provided on the next few pages.

- Begin New Rule
- Save Rule
- Erase
- Quit Entering Rules
- Disable Rule Set

Begin New Rule

Scan this bar code to start entering a new data formatting rule.

Begin New Rule

Save Rule

Scan this bar code to complete and save the rule you entered.

Save Rule

Erase

Use these bar codes to erase criteria, actions, or rules.

Erase Criteria And Start Again

Erase Actions And Start Again

Erase Previously Saved Rule

Erase All Rules

Quit Entering Rules

Scan this bar code to quit entering rules.

Quit Entering Rules

Disable Rule Set

Use these bar codes to disable rule sets.

Disable Rule Set 1

Disable Rule Set 2

Disable Rule Set 3

Disable Rule Set 4

Disable All Rule Sets

Criteria

Code Types

Select any number of code types to be affected. All selected codes must be scanned in succession, prior to selecting other criteria. If you don't select a code type, all code types are affected.

Code 39

Codabar

Code 128

Code 93

I 2 Of 5

D 2 Of 5

Code Types (continued)

UPCA

UPCE

UPCE1

EAN-8

EAN-13

EAN 128

Code Types (continued)

IATA 2 Of 5

MSI Plessey

Bookland EAN

Trioptic Code 39

PDF-417

ADF for Macro PDF-417
(Applies rule to each block in MPDF set.)

Code Lengths

Define the number of characters the selected code type must contain. Select one length per rule only. If you don't select a code length, selected code types of any length are affected.

Note: *These codes are used to set the code length only; this is not a keypad.*

1

2

3

4

5

6

Code Lengths (continued)

7

8

9

10

11

12

Code Lengths (continued)

13

14

15

16

17

18

Code Lengths (continued)

19

20

21

22

23

24

Code Lengths (continued)

25

26

27

28

29

30

Message Containing A Specific Data String

Select whether the formatting affects data that begins with a specific character or data string, or contains a specific character or data string.

Specific String at Start

To apply formatting to data that begins with a specific character or data string:

1. Scan the bar code below.
2. Enter a string representing the desired character or characters (up to a total of 8) using the *Alphanumeric Keyboard* beginning on page 4-89.
3. Scan **End Of Message** on page 4-100.

Specific String At Start

Specific String, Any Location

To apply formatting to data that contains a specific character or data string:

1. Scan the bar code below.
2. Scan a two-digit number representing the ***position*** (include a leading “zero” if necessary) using the *Numeric Keypad* on page 4-25.
3. Enter the desired character or characters (up to a total of 8) using the *Alphanumeric Keyboard* beginning on page 4-89.
4. Scan **End Of Message** on page 4-100.

Specific String Any Location

Any Message OK

By not scanning any bar code, all selected code types are formatted, regardless of information contained.

Numeric Keypad

Bar codes on this page should not be confused with those on the alphanumeric

keyboard.

0

1

2

3

4

5

6

7

8

9

Cancel

Rule Belongs To Set

Scan a bar code below to select which set a rule belongs to.

Rule Belongs To Set 1

Rule Belongs To Set 2

Rule Belongs To Set 3

Rule Belongs To Set 4

Actions

Select how to format the data meeting the defined criteria before transmission.

Send Data

Use the following bar codes to send all data that remains, send all data up to a specific character selected from the *Alphanumeric Keyboard* on page 4-89, or send the next N characters. N = any number from 1 to 254, selected from the *Alphanumeric Keyboard* on page 4-89.

Send Data Up To Character

Send All Data That Remains

Send Next Character

Send Next 2 Characters

Send Next 3 Characters

Send Data (continued)

Send Next 4 Characters

Send Next 5 Characters

Send Next 6 Characters

Send Next 7 Characters

Send Next 8 Characters

Send Next 9 Characters

Send Next 10 Characters

Send Next 11 Characters

Send Data (continued)

Send Next 12 Characters

Send Next 13 Characters

Send Next 14 Characters

Send Next 15 Characters

Send Next 16 Characters

Send Next 17 Characters

Send Data (continued)

Send Next 18 Characters

Send Next 19 Characters

Send Next 20 Characters

Send Next 50 Characters

Send Next 100 Characters

Send Next 150 Characters

Send Next 200 Characters

Send Next 250 Characters

Send Pause

Send Pause

Setup Field(s)

Use the following bar codes to move the cursor in relation to a specified character.

Note: *If there is no match when the rule is interpreted and the rule fails, the next rule is checked.*

Move Cursor To a Character

Scan the **Move Cursor To Character** bar code, then any printable ASCII character from the *Alphanumeric Keyboard* on page 4-89. This moves the cursor to the position after the matching character. If the character is not there, the rule fails and ADF tries the next rule.

Move Cursor To Character

Move Cursor to Start of Data

Scan this bar code to move cursor to the beginning of the data.

Move Cursor To Start

Move Cursor Past a Character

This parameter moves the cursor past all sequential occurrences of a selected character. Scan the **Move Cursor Past Character** bar code on page 4-33, then select a character from the *Alphanumeric Keyboard* on page 4-89. If the character is not there, the cursor does not move (i.e., has no effect).

Move Cursor Past Character

Skip Ahead “N” Characters

Scan one of these bar codes to select the number of positions ahead you wish to move the cursor.

Skip Ahead 1 Character

Skip Ahead 2 Characters

Skip Ahead 3 Characters

Skip Ahead 4 Characters

Skip Ahead (continued)

Skip Ahead 5 Characters

Skip Ahead 6 Characters

Skip Ahead 7 Characters

Skip Ahead 8 Characters

Skip Ahead 9 Characters

Skip Ahead 10 Characters

Skip Ahead (continued)

Skip Ahead 50 Characters

Skip Ahead 100 Characters

Skip Ahead 150 Characters

Skip Ahead 200 Characters

Skip Ahead 250 Characters

Skip Back “N” Characters

Scan one of these bar codes to select the number of positions back you wish to move the cursor.

Skip Back 1 Characters

Skip Back 2 Characters

Skip Back 3 Characters

Skip Back 4 Characters

Skip Back (continued)

Skip Back 5 Characters

Skip Back 6 Characters

Skip Back 7 Character

Skip Back 8 Characters

Skip Back 9 Characters

Skip Back 10 Characters

Skip Back (continued)

Skip Back 50 Characters

Skip Back 100 Characters

Skip Back 150 Characters

Skip Back 200 Characters

Skip Back 250 Characters

Send Preset Value

Use these bar codes to send preset values.

Send Value 1

Send Value 2

Modify Data

Modify data in the ways listed. The following actions work for all send commands that follow it within a rule. If you program *pad zeros to length 6, send next 3 characters, stop padding, send next 5 characters,* three zeros are added to the first send, and the next send is unaffected by the padding. These options do not apply to the **Send Keystroke** or **Send Preset Value** options.

Remove All Spaces

To remove all spaces in the send commands that follow, scan this bar code.

Remove All Spaces

Crunch All Spaces

To leave one space between words, scan this bar code. This also removes all leading and trailing spaces.

Crunch All Spaces

Stop Space Removal

Scan this bar code to disable space removal.

Stop Space Removal

Remove Leading Zeros

Scan this bar code to remove all leading zeros.

Remove Leading Zeros

Stop Zero Removal

Scan this bar code to disable the removal of zeros.

Stop Zero Removal

Pad Data With Spaces

To pad data to the left, scan the bar code containing the desired number of spaces. This parameter is activated by Send commands.

Pad Spaces To Length 1

Pad Spaces To Length 2

Pad Spaces To Length 3

Pad Spaces To Length 4

Pad Spaces To Length 5

Pad Spaces To Length 6

Pad Data with Spaces (continued)

Pad Spaces To Length 7

Pad Spaces To Length 8

Pad Spaces To Length 9

Pad Spaces To Length 10

Pad Spaces To Length 11

Pad Spaces To Length 12

Pad Data with Spaces (continued)

Pad Spaces To Length 13

Pad Spaces To Length 14

Pad Spaces To Length 15

Pad Spaces To Length 16

Pad Spaces To Length 17

Pad Spaces To Length 18

Pad Data with Spaces (continued)

Pad Spaces To Length 19

Pad Spaces To Length 20

Pad Spaces To Length 21

Pad Spaces To Length 22

Pad Spaces To Length 23

Pad Spaces To Length 24

Pad Data with Spaces (continued)

Pad Spaces To Length 25

Pad Spaces To Length 26

Pad Spaces To Length 27

Pad Spaces To Length 28

Pad Spaces To Length 29

Pad Spaces To Length 30

Stop Pad Spaces

Pad Data With Zeros

To pad data to the left, scan the bar code containing the desired number of zeros. This parameter is activated by Send commands. Use these bar codes to

pad data with zeros.

Pad Zeros To Length 1

Pad Zeros To Length 2

Pad Zeros To Length 3

Pad Zeros To Length 4

Pad Zeros To Length 5

Pad Zeros To Length 6

Pad Data With Zeros (continued)

Pad Zeros To Length 7

Pad Zeros To Length 8

Pad Zeros To Length 9

Pad Zeros To Length 10

Pad Zeros To Length 11

Pad Zeros To Length 12

Pad Data With Zeros (continued)

Pad Zeros To Length 13

Pad Zeros To Length 14

Pad Zeros To Length 15

Pad Zeros To Length 16

Pad Zeros To Length 17

Pad Zeros To Length 18

Pad Data With Zeros (continued)

Pad Zeros To Length 19

Pad Zeros To Length 20

Pad Zeros To Length 21

Pad Zeros To Length 22

Pad Zeros To Length 23

Pad Zeros To Length 24

Pad Data With Zeros (continued)

Pad Zeros To Length 25

Pad Zeros To Length 26

Pad Zeros To Length 27

Pad Zeros To Length 28

Pad Zeros To Length 29

Pad Zeros To Length 30

Stop Pad Zeros

Beeps

Select a beep sequence for each ADF rule.

Beep Once

Beep Twice

Beep Three Times

Send Keystroke (Control Characters and Keyboard Characters)

Scan the “Send __” bar code for the keystroke you wish to send.

Control Characters

Scan these bar codes to send control characters.

Send Control 2

Send Control A

Send Control B

Send Control C

Send Control D

Send Control E

Control Characters (continued)

Send Control F

Send Control G

Send Control H

Send Control I

Send Control J

Send Control K

Control Characters (continued)

Send Control L

Send Control M

Send Control N

Send Control O

Send Control P

Send Control Q

Control Characters (continued)

Send Control R

Send Control S

Send Control T

Send Control U

Send Control V

Send Control W

Send Control X

Control Characters (continued)

Send Control Y

Send Control Z

Send Control [

**Send Control **

Send Control]

Send Control 6

<FN3>6A14411F

Send Control -

Keyboard Characters

Use these bar codes to send keyboard characters.

Send Space

Send !

Send “

Send #

Send $

Send %

Send &

Send ‘

Keyboard Characters (continued)

Send (

Send)

Send *

Send +

Send ,

Send -

Send .

Send /

Keyboard Characters (continued)

Send 0

Send 1

Send 2

Send 3

Send 4

Send 5

Send 6

Send 7

Keyboard Characters (continued)

Send 8

Send 9

Send :

Send ;

Send <

Send =

Send >

Send ?

Keyboard Characters (continued)

Send @

Send A

Send B

Send C

Send D

Send E

Send F

Send G

Keyboard Characters (continued)

Send H

Send I

Send J

Send K

Send L

Send M

Send N

Send O

Keyboard Characters (continued)

Send P

Send Q

Send R

Send S

Send T

Send U

Send V

Send W

Keyboard Characters (continued)

Send X

Send Y

Send Z

Send [

**Send **

Send]

Send ^

Send _

Keyboard Characters (continued)

Send ‘

Send a

Send b

Send c

Send d

Send e

Send f

Send g

Keyboard Characters (continued)

Send h

Send i

Send j

Send k

Send l

Send m

Send n

Send o

Keyboard Characters (continued)

Send p

Send q

Send r

Send s

Send t

Send u

Send v

Send w

Keyboard Characters (continued)

Send x

Send y

Send z

Send {

Send |

Send }

Send ~

Send ALT Characters

Use these bar codes to send ALT characters

Send ALT 2

Send ALT A

Send ALT B

Send ALT C

Send ALT D

Send ALT E

Send ALT F

Send ALT G

Send ALT Characters (continued)

Send ALT H

Send ALT I

Send ALT J

Send ALT K

Send ALT L

Send ALT M

Send ALT N

Send ALT O

Send ALT Characters (continued)

Send ALT P

Send ALT Q

Send ALT R

Send ALT S

Send ALT T

Send ALT U

Send ALT V

end ALT W

Send ALT Characters (continued)

Send ALT X

Send ALT Y

Send ALT Z

Send ALT [

**Send ALT **

Send ALT]

Send ALT 6

Send ALT -

Send Command Characters

Send PA 1

Send PA 2

Send CMD 1

Send CMD 2

Send CMD 3

Send CMD 4

Send Command Characters (continued)

Send CMD 5

Send CMD 6

Send CMD 7

Send CMD 8

Send CMD 9

Send CMD 10

Send Special Characters

Send Yen Character

Send Pound Sterling Character

Send Bomb Character

Send Hook Character

Send Bullet Character

Send 1/2 Character

Send Paragraph Character

Send Section Character

Send Vertical Character

Send Keypad Characters

Send Keypad *

Send Keypad +

Send Keypad -

Send Keypad .

Send Keypad /

Send Keypad 0

Send Keypad 1

Send Keypad 2

Send Keypad 3

Send Keypad 4

Send Keypad Characters (continued)

Send Keypad 5

Send Keypad 6

Send Keypad 7

Send Keypad 8

Send Keypad 9

Send Keypad ENTER

Send Keypad
NUM LOCK

Send Keypad Characters (continued)

Send Break Key

Send Delete Key

Send Page Up Key

Send End Key

Send Page Down Key

Send Pause Key

Send Scroll Lock Key

Send Backspace Key

Send Tab Key

Send Print Screen Key

Send Keypad Characters (continued)

Send Insert Key

Send Home Key

Send Enter Key

Send Escape Key

Send Up Arrow Key

Send Down Arrow Key

Send Left Arrow Key

Send Right Arrow Key

Send Back Tab Character

Send Function Keys

Send F1 Key

Send F2 Key

Send F3 Key

Send F4 Key

Send F5 Key

Send F6 Key

Send F7 Key

Send F8 Key

Send F9 Key

Send F10 Key

Send Function Keys (continued)

Send F11 Key

Send F12 Key

Send F13 Key

Send F14 Key

Send F15 Key

Send F16 Key

Send F17 Key

Send F18 Key

Send F19 Key

Send F20 Key

Send Function Keys (continued)

Send F21 Key

Send F22 Key

Send F23 Key

Send F24 Key

Send F25 Key

Send F26 Key

Send F27 Key

Send F28 Key

Send F29 Key

Send F30 Key

Send Function Keys (continued)

Send PF1 Key

Send PF2 Key

Send PF3 Key

Send PF4 Key

Send PF5 Key

Send PF6 Key

Send PF7 Key

Send PF8 Key

Send PF9 Key

Send PF10 Key

Send Function Keys (continued)

Send PF11 Key

Send PF12 Key

Send PF13 Key

Send PF14 Key

Send PF15 Key

Send PF16 Key

Send PF17 Key

Send PF18 Key

Send PF19 Key

Send PF20 Key

Send Function Keys (continued)

Send PF21 Key

Send PF22 Key

Send PF23 Key

Send PF24 Key

Send PF25 Key

Send PF26 Key

Send PF27 Key

Send PF28 Key

Send PF29 Key

Send PF30 Key

Turn On/Off Rule Sets

Use these bar codes to turn rule sets on and off within a rule.

Turn On Rule Set 1

Turn On Rule Set 2

Turn On Rule Set 3

Turn On Rule Set 4

Turn Off Rule Set 1

Turn Off Rule Set 2

Turn Off Rule Set 3

Turn Off Rule Set 4

Alphanumeric Keyboard

Space

#

$

%

*****

+

-

.

Alphanumeric Keyboard (continued)

/

!

“

&

‘

(

)

:

Alphanumeric Keyboard (continued)

;

<

=

>

?

@

Alphanumeric Keyboard (continued)

[

\

]

^

_

`

Alphanumeric Keyboard (continued)

Bar codes on this page should not be confused with those on the numeric

keypad.

0

1

2

3

4

5

Alphanumeric Keyboard (continued)

Bar codes on this page should not be confused with those on the numeric

keypad.

6

7

8

9

Alphanumeric Keyboard (continued)

A

B

C

D

E

F

G

H

Alphanumeric Keyboard (continued)

I

J

K

L

M

N

O

P

Alphanumeric Keyboard (continued)

Q

R

S

T

U

V

Alphanumeric Keyboard (continued)

W

X

Y

Z

Cancel

End Of Message

Alphanumeric Keyboard (continued)

a

b

c

d

e

f

g

h

Alphanumeric Keyboard (continued)

i

j

k

l

m

n

o

p

Alphanumeric Keyboard (continued)

q

r

s

t

u

v

w

x

Alphanumeric Keyboard (continued)

y

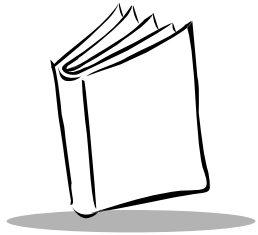
z

{

|

}

~



Appendix A
Programming Reference

AIM Code Identifiers

Each AIM Code Identifier contains the three-character string **]cm** where:

] = Flag Character (ASCII 93)
c = Code Character
m = Modifier Character

Table A-1. AIM Code Identifiers

Code Character	Code Type
A	Code 39, Code 39 Full ASCII, Code 32
C	Code 128 (all variants), Coupon (Code 128 portion)
E	UPC/EAN, Coupon (UPC portion)
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 2 of 5
L	PDF-417, Macro PDF-417, Micro PDF-417
M	MSI Plessey
S	Discrete 2 of 5, IATA
X	Bookland EAN, Code 39 Trioptic

See Table A-2 for information on RSS and Composite Codes.

Table A-2. Composite Code Data Formats (with AIM ID enabled)

1-D Component	Data Format	
	Standard Mode	**EAN-128 Emulation Mode**
EAN-13, UPCA, UPCE	1D:]E0 2D:]e0 See note 5	1D:]E0 2D:]C1 before each EAN-128 split transmission See notes 3 -5
EAN-8	1D:]E4 2D:]e0 See note 5	1D:]E4 2D:]C1 before each EAN-128 split transmission See notes 3 -5
RSS-14 **RSS Limited**	1D:]e0 2D:]e1 See note 2	]C1 before each EAN-128 split transmission See notes 3 -5
EAN-128 **RSS Expanded**	If the last AI in the EAN-128 is a predefined, fixed length:]e0 Otherwise,]e0 GS See note 2	]C1 before each EAN-128 split transmission See notes 3 and 4
Code 39 (TLC39)	*ANSI MH10.8.3M syntax:* 06 Format:]L2[]>$^{R}_{S}$06 $^{G}_{S}$ 6P 1D data $^{G}_{S}$ S 2D data $^{R}_{S}$ $^{E}_{T}$ 05 Format:]L2[]>$^{R}_{S}$05 $^{G}_{S}$ 906P 1D data $^{G}_{S}$ 8004 2D data $^{R}_{S}$ $^{E}_{T}$ See note 6	

Notes:

1. All Function 1 characters in the 1D and 2D are sent as $^{G}_{S}$ (ASCII character 29); the first Function 1 in EAN-128 is not transmitted.
2. In standard mode, data following the Composite Symbol Separator is prefixed with "]e1".
3. In EAN-128 emulation mode, each packet is split on an AI boundary and is never greater that 48 characters in length.
4. In EAN-128 emulation mode, data after the firth Composite Symbol Separator is discarded.
5. If the UPC/EAN component has a supplemental,]E1 precedes a 2-digit supplemental and]E2 precedes the 5-digit supplemental.
6. $^{R}_{S}$ is ASCII character 30 and $^{E}_{T}$ is ASCII character 4. The transmitted format (5 or 6) is data dependent.

The modifier character is the sum of the applicable option values based on Table A-3.

Table A-3. Modifier Characters

Code Type	Option Value	Option
Code 39		
	0	No Check character.
	1	Reader has checked one check character.
	3	Reader has checked and stripped check character.
	4	Reader has performed Full ASCII character conversion.
	5	Reader has performed Full ASCII character conversion and checked one check character.
	7	Reader has performed Full ASCII character conversion and checked and stripped check character.
	Example: A Full ASCII bar code with check character W, **A+I+MI+DW**, is transmitted as **]A7**AimId where 7 = (3+4).	
Trioptic Code 39		
	0	No option specified at this time. Always transmit 0.
	Example: A Trioptic bar code 412356 is transmitted as **]X0**412356	
Code 128		
	0	Standard data packet, No Function code 1 in first symbol position.
	1	Function code 1 in first symbol character position.
	2	Function code 1 in second symbol character position.
	Example: A Code (EAN) 128 bar code with Function 1 character in the first position, **FNC1** Aim Id is transmitted as **]C1**AimId	

Table A-3. Modifier Characters

Code Type	Option Value	Option
I 2 of 5		
	0	No check digit processing.
	1	Reader has validated check digit.
	3	Reader has validated and stripped check digit.
	Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as **]I0**4123	
Codabar		
	0	Standard Codabar
	1	ABC Codabar
	Example: A standard Codabar bar code, 4123, is transmitted as **]F0**4123	
Code 93		
	0	No options specified at this time. Always transmit 0.
	Example: A Code 93 bar code 012345678905 is transmitted as **]G0**012345678905	
MSI Plessey		
	0	Mod 10 check digit validated and transmitted.
	1	Mod 10 check digit validated but not transmitted.
	Example: An MSI Plessey bar code 4123, with Mod 10 check digit validated, is transmitted as **]M0**4123	
D 2 of 5		
	0	No options specified at this time. Always transmit 0.
	Example: A D 2 of 5 bar code 4123, is transmitted as **]S0**4123	

Table A-3. Modifier Characters

Code Type	Option Value	Option
UPC/EAN		
	0	Standard packet in full EAN country code format, which is 13 digits for UPCA and UPCE (not including supplemental data).
	1	Two digit supplement data only.
	2	Five digit supplement data only.
	4	EAN-8 data packet.
	Example: A UPCA bar code 012345678905 is transmitted as **]E0**0012345678905	
Bookland EAN		
	0	No options specified at this time. Always transmit 0.
	Example: A Bookland EAN bar code 123456789X is transmitted as **]X0**123456789X	
PDF-417, Micro PDF-417		
	0	Reader set to conform to protocol defined in 1994 PDF-417 symbology specifications. **Note:** When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte 92_{DEC} has been doubled in transmission.
	1	Reader set to follow the ECI protocol (Extended Channel Interpretation). All data characters 92_{DEC} are doubled.
	2	Reader set for Basic Channel operation (no escape character transmission protocol). Data characters 92_{DEC} are not doubled. **Note:** When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted.
	3	The bar code contains a UCC/EAN-128 symbol, and the first codeword is 903-907, 912, 914, 915.
	4	The bar code contains a UCC/EAN-128 symbol, and the first codeword is in the range 908-909.
	5	The bar code contains a UCC/EAN-128 symbol, and the first codeword is in the range 910-911.
	Example: A PDF-417 bar code ABCD, with no transmission protocol enabled, is transmitted as]L2ABCD.	

Table A-3. Modifier Characters

Code Type	Option Value	Option
RSS Family		
		No option specified at this time. Always transmit 0. RSS-14 and RSS-Limited transmit with an Application Identifier “01”. Note: In UCC/EAN-128 emulation mode, RSS is transmitted using Code 128 rules (i.e.,]C1).
	Example: An RSS-14 bar code 100123456788902 is transmitted as **]e**001100123456788902.	
EAN.UCC Composites (RSS, UCC/EAN-128, 2D portion of UPC composite)		
		Native mode transmission. Note: UPC portion of composite is transmitted using UPC rules.
	0	Standard data packet.
	1	Data packet containing the data following an encoded symbol separator character.
	2	Data packet containing the data following an escape mechanism character. The data packet does not support the ECI protocol.
	3	Data packet containing the data following an escape mechanism character. The data packet supports the ECI protocol.
EAN.UCC Composites (RSS, UCC/EAN-128, 2D portion of UPC composite)		
		UCC/EAN-128 emulation Note: UPC portion of composite is transmitted using UPC rules.
	1	Data packet is a UCC/EAN-128 symbol (i.e., data is preceded with]JC1).

According to AIM standards, a UPC with supplemental bar code is transmitted in one of the following formats:

]E0 (UPC chars) (terminator) **]E2** (supplemental) (terminator) or

]E2 (supplemental) (terminator) **]E0** (UPC chars) (terminator)

In the M2000, however, the format is changed to:

]E0 (UPC chars) **]E2** (supplemental)

Therefore, a UPC with two supplemental characters, 01234567890510, is transmitted to the host as a 21-character string, **]E0**0012345678905**]E2**10.

Prefix / Suffix Values

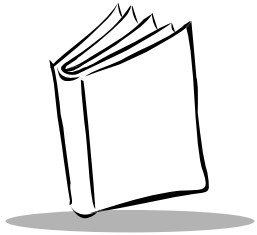
The values in Table A-4 can be assigned as prefixes or suffixes to scanned data. If you're using a keyboard interface, refer to the *Synapse "Smart Cable" Interface Guide* for keystroke prefix/suffix values.

Table A-4. Prefix/Suffix Values

Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character	Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character
1000	%U	NUL	1032	Space	Space
1001	$A	SOH	1033	/A	!
1002	$B	STX	1034	/B	“
1003	$C	ETX	1035	/C	#
1004	$D	EOT	1036	/D	$
1005	$E	ENQ	1037	/E	%
1006	$F	ACK	1038	/F	&
1007	$G	BELL	1039	/G	‘
1008	$H	BCKSPC	1040	/H	(
1009	$I	HORIZ TAB	1041	/I	)
1010	$J	LF/NW LN	1042	/J	*
1011	$K	VT	1043	/K	+
1012	$L	FF	1044	/L	‘
1013	$M	CR/ENTER	1045	-	-
1014	$N	SO	1046	.	.
1015	$O	SI	1047	/	/
1016	$P	DLE	1048	0	0
1017	$Q	DC1	1049	1	1
1018	$R	DC2	1050	2	2
1019	$S	DC3	1051	3	3
1020	$T	DC4	1052	4	4
1021	$U	NAK	1053	5	5
1022	$V	SYN	1054	6	6
1023	$W	ETB	1055	7	7
1024	$X	CAN	1056	8	8
1025	$Y	EM	1057	9	9
1026	$Z	SUB	1058	/Z	:
1027	%A	ESC	1059	%F	;
1028	%B	FS	1060	%G	<
1029	%C	GS	1061	%H	=
1030	%D	RS	1062	%I	>
1031	%E	US	1063	%J	?

Table A-4. Prefix/Suffix Values

Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character	Prefix/Suffix Value	Full ASCII Code 39 Encode Char.	ASCII Character
1064	%V	@	1097	+A	a
1065	A	A	1098	+B	b
1066	B	B	1099	+C	c
1067	C	C	1100	+D	d
1068	D	D	1101	+E	e
1069	E	E	1102	+F	f
1070	F	F	1103	+G	g
1071	G	G	1104	+H	h
1072	H	H	1105	+I	i
1073	I	I	1106	+J	j
1074	J	J	1107	+K	k
1075	K	K	1108	+L	l
1076	L	L	1109	+M	m
1077	M	M	1110	+N	n
1078	N	N	1111	+O	o
1079	O	O	1112	+P	p
1080	P	P	1113	+Q	q
1081	Q	Q	1114	+R	r
1082	R	R	1115	+S	s
1083	S	S	1116	+T	t
1084	T	T	1117	+U	u
1085	U	U	1118	+V	v
1086	V	V	1119	+W	w
1087	W	W	1120	+X	x
1088	X	X	1121	+Y	y
1089	Y	Y	1122	+Z	z
1090	Z	Z	1123	%P	{
1091	%K	[	1124	%Q	|
1092	%L	\	1125	%R	}
1093	%M	]	1126	%S	~
1094	%N	^	1127		Undefined
1095	%O	-			
1096	%W	‘	7013		ENTER



Appendix B
Specifications

M2000 Scanner Specifications

Table B-1 lists the specifications for the M2000 scanner.

Table B-1. Scanner Specifications

Item	Description
Power Requirements	5.2 VDC ± 5% @ 300 mA nominal
Laser Diode Power	0.7 mW, max.
Scan Pattern	
Start Time	0.065 sec. to 75% of steady state horizontal amplitude; 0.50 sec. to 90% of steady state vertical amplitude
Scan Amplitude	Horizontal: 34^{o} ±1.5^{o} Vertical (Omni): 34^{o} ±1.5^{o} Vertical (Raster): 12.5^{o} ±1.5^{o}
Scan Frequency	Horizontal: 320 Hz ±5 Hz Vertical (Omni): 295 Hz ±5 Hz Vertical (Raster): 10 Hz ±1 Hz
Frame Rate	25 frames/sec. 12.5 Hz ±1 Hz (vertical)
Optical Resolution	Can decode a 6.0 mil (minimum X-dimension) symbol (PDF-417); *Y-dimension must be 2X or greater.*
Angular Orientation Tolerances	
Pitch Tolerance	± 30^{o} (“front to back”)
Skew	± 15^{o} from plane parallel to symbol (“side-to-side”)

Table B-1. Scanner Specifications (continued)

Item	Description
Rotational Tolerance (Raster)	± 4° (for scanning PDF benchmark label, assuming 3:1 codeword aspect ratio). 1D code types depend on height of symbol.
Rotational Tolerance (Omnidirectional)	360° for 1D symbol
Rotational Tolerance (Semi-omni)	± 20° from horizontal
Dead Zone/Optical Throw	± 2° *(1-D symbologies)* or ± 9°*(PDF-417)* from beam direction
Print Contrast Resolution	35% *(1-D symbologies)* or 45% *(PDF-417)* absolute dark/light reflectance differential, measured at 650 nm.
Ambient Light Immunity	Up to 8000 ft.-candles of sunlight
Humidity	5 - 95% (non-condensing)
Shock	Multiple 4-ft./1.2m drops to concrete
Operating Temperature	0° to 40° C; 32° to 104° F
Storage Temperature	-40° to 60° C; -40° to 140° F
Scanner Connector (see *Cable Pinouts* on page B-5 for host-end connector of cables)	**10-pin modular** connector at base of handle: **Pin # / RS-232/IBM/Synapse / USB/Synapse** **1** Synapse clock/Flash download RxD (4683) / Synapse clock **2** + 5V / + 5V **3** Ground / Ground 4 Transmit (TxD)/RS-485A / VDD 5 Receive (RxD) / D+ 6 Ready to Send (RTS)/ RS-485B/ Synapse Data/Flash Download TxD (4683) / Synapse Data 7 Clear to Send (CTS) / D- 8 Download / Download 9 EAS / EAS 10 EAS / EAS
Coil Cable Length	6 ft.; 183 cm
Weight	12 oz.; 340 gm
Height	7.8 in.; 198 mm

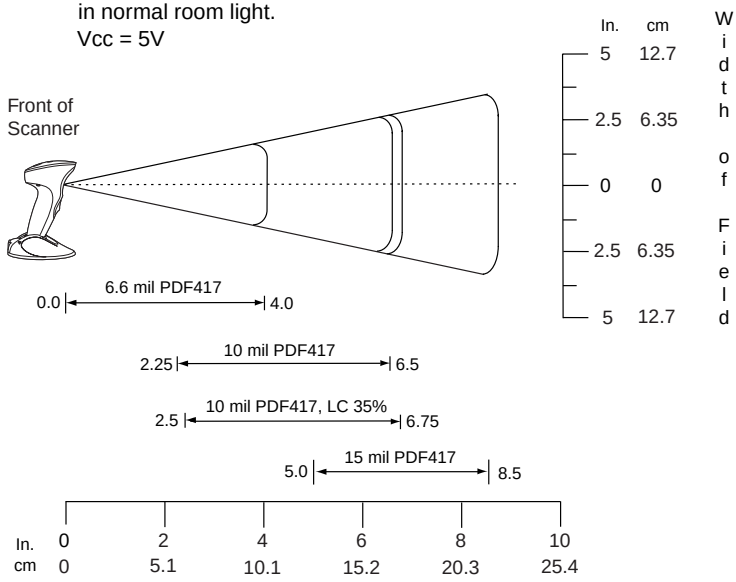
Table B-1. Scanner Specifications (continued)

Item	Description
Depth	5.4 in.; 137 mm
Width	3.4 in.; 86 mm
Decode Capability	1-D Symbologies: UPC/EAN, Bookland EAN, Code 39, Code 39 Full ASCII, Code 93, Code 128, Codabar, Interleaved 2 of 5, Discrete 2 of 5, MSI Plessey. Cannot autodiscriminate between Code 39 and Code 39 Full ASCII. 2-D Symbology: PDF-417, MicroPDF Composite Codes: UCC/EAN, RSS Code
Memory	64K x 16 RAM, 256K x 16 Flash

Decode Zones

Following are the decode distances for the M2000 scanner raster and omnidirectional patterns.

Note: Typical performance at 68˚F (20˚C) on high quality symbols in normal room light.
Vcc = 5V



Depth of Field

Figure B-1. M2000 Raster Pattern Decode Zone

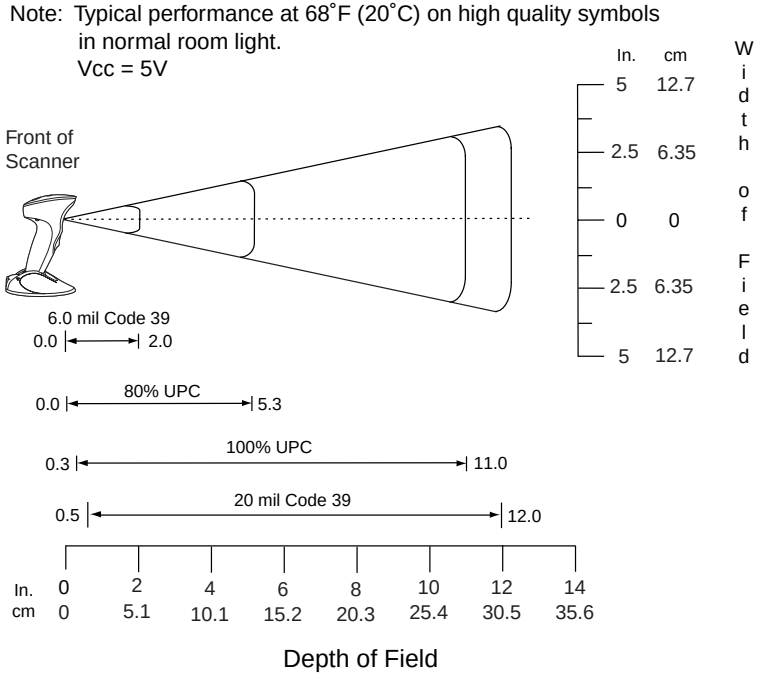


Figure B-2. M2000 Omnidirectional Pattern Decode Zone

Cable Pinouts

The following tables describe the pinouts for connector cables.

RS-232 Cable Pinouts

Table B-2. Single-Port RS-232C, 9-Pin Female D-Type Connector P/N 25-32465-01, -02

Pin	Signal	Function
2	RxD	Serial data receive input. Driven by the serial data transmit output on the device communicating with the scanner.
3	TxD	Serial data transmit output. Drives the serial data receive input on the device communicating with the scanner.
5	Ground	Power supply input ground pin and reference for both output signals. Must be capable of sinking all return current.
6	DTR	Data Terminal Ready. This signal is hardwired active.
7	RTS	Request-to-send handshaking output line. May be used optionally by the scanner to signal another device that data is available to send. Used only in conjunction with CTS line.
8	CTS	Clear-to-send handshaking input line. Used optionally by another device to signal the scanner that it may commence transmitting data. Used only in conjunction with RTS line.

Table B-3. Single-Port RS-232C, 8-Pin Female Siemens Nixdorf P/N 25-32469-01, -02

Pin	Signal	Function
SHELL	DRAIN	
1	+12V	Converted to +5V.
2	RxD	Serial data receive input. Driven by the serial data transmit output on the device communicating with the scanner.
3	TxD	Serial data transmit output. Drives the serial data receive input on the device communicating with the scanner.
5	Ground	Power supply input ground pin and reference for both output signals. Must be capable of sinking all return current.
6	DTR	Data Terminal Ready. This signal is hardwired active.
7	RTS	Request-to-send handshaking output line. Used optionally by the scanner to signal another device that data is available to send. Used only in conjunction with the CTS line.
8	CTS	Clear-to-send handshaking input line. Used optionally by another device to signal the scanner that it may commence transmitting data. Used only in conjunction with RTS line.

IBM 46XX Cable Pinouts

Table B-4. IBM 46XX Port 5B 8-Pin SDL Connector P/N 25-32466-01, -02

Pin	Signal	Function
3	GND	Power supply ground pin and reference for both output signals. Must be capable of sinking all return current.
4	Serial I/O A	Differential driver output/receiver input.
5	Serial I/O B	Differential driver output/receiver input.
6	+5V	Power.

Table B-5. IBM 46XX Port 9B 4-Pin SDL Connector P/N 25-32467-01, -02

Pin	Signal	Function
1	GND	Power supply ground pin and reference for both output signals. Must be capable of sinking all return current.
2	Serial I/O A	Differential driver output/receiver input.
3	Serial I/O B	Differential driver output/receiver input.
4	+12V	Power.

Table B-6. IBM 46XX Port 17 16-Pin SDL Connector P/N 25-32468-01, -02

Pin	Signal	Function
2	GND	Power supply ground pin and reference for both output signals. Must be capable of sinking all return current.
5	+5V	Power.
7	RS485 A	Differential driver output/receiver input.
8	RS485 B	Differential driver output/receiver input.
SHELL	DRAIN	

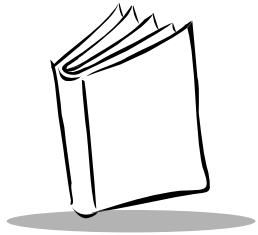
Table B-7. IBM Sure One, 8-Pin Connector
P/N 25-32470-01, -02

Pin	Signal	Function
2	RxD	Serial data receive input. Driven by the serial data transmit output on the device communicating with the scanner.
3	TxD	Serial data transmit output. Drives the serial data receive input on the device communicating with the scanner.
5, 6, 11	Ground	Power supply input ground pin and reference for both output signals. Must be capable of sinking all return current.
7, 10	+5V / +12V	Power.
12	DTR	Data Terminal Ready. This signal is hardwired active.
13	RTS	Request-to-send handshaking output line. Used optionally by the scanner to signal another device that data is available to send. Used only in conjunction with CTS line.
14	CTS	Clear-to-send handshaking input line. Used optionally by another device to signal the scanner that it may commence transmitting data. Used only in conjunction with RTS line.
FERRULE	DRAIN	

Synapse Cable Pinouts

Table B-8. 6-Pin Male Modular Connector for Synapse Cable
P/N 25-32463-01, -02

Pin	Signal	Function
1	SYNDATA	Synapse-compatible data line. Bi-directional.
2	SYNCLK	Synapse-compatible clock line. Bi-directional.
3	VCC	Power.
4	GND	Power supply ground pin and reference for both output signals. Must be capable of sinking all return current.



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