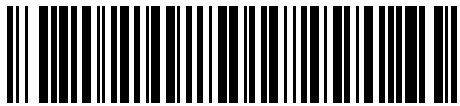
P 370/470 RF Scanner

Product Reference Guide

P 370/470 RF Scanner Product Reference Guide



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Symbol Technologies, Inc. One Symbol Plaza, Holtsville N.Y. 11742-1300

P 370/470 RF Scanner
Product Reference Guide

70-38495-01
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February 2000

symbol®

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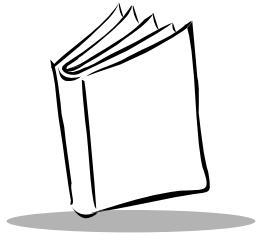

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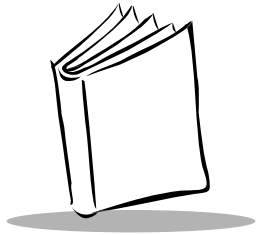

About This Manual

Introduction

The P 370/470 RF Scanner Product Reference Guide provides general instructions for setup, operation, troubleshooting, maintenance, and programming the P 370 industrial environment and P 470 retail environment RF scanners.

Chapter Descriptions

- Chapter 1, *The 370/470 RF Scanner*, describes the scanner, the battery, and the PL 370/470 Cradle.
- Chapter 2, *Set Up*, explains how to set up the scanner.
- Chapter 3, *Operation*, explains how to operate the scanner.
- Chapter 4, *Maintenance And Specifications*, talks about the maintenance and the specifications of the scanner and the cradle.
- Chapter 5, *Parameter Menus*, has all the optional parameter bar codes for personalizing your scanner.
- Appendix A, *Bar Code Information*, has information about bar codes.

Notational Conventions

The following conventions are used in this document:

- 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.

Related Publications

- *P 370/470 RF Scanner Quick Reference Guide*, p/n 72-38493-xx
- *PL 370/470 Cradle Quick Reference Guide*, p/n 72-38494-xx
- *MCL Designer for Phaser Series User's Guide*, p/n 70-37689-xx.

Service Information

If you have a problem with your equipment, contact the *Symbol Support Centers*. Before calling, have the model number, serial number, and several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is symbol readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given 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 to you.*

Symbol Support Centers

For service information, warranty information or technical assistance contact or call the Symbol Support Center in:

United States

Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, New York 11742-1300
1-800-653-5350

Canada

Symbol Technologies Canada, Inc.
2540 Matheson Boulevard East
Mississauga, Ontario, Canada L4W 4Z2
905-629-7226

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+46 84452900 (Outside Sweden)

If you purchased your Symbol product from a Symbol Business Partner, contact that Business Partner for service.

Warranty

Symbol Technologies, Inc ("Symbol") manufactures its hardware products in accordance with industry-standard practices. Symbol warrants that for a period of twelve (12) months from date of shipment, products will be free from defects in materials and workmanship.

This warranty is provided to the original owner only and is not transferable to any third party. It shall not apply to any product (i) which has been repaired or altered unless done or approved by Symbol, (ii) which has not been maintained in accordance with any operating or handling instructions supplied by Symbol, (iii) which has been subjected to unusual physical or electrical stress, misuse, abuse, power shortage, negligence or accident or (iv) which has been used other than in accordance with the product operating and handling instructions. Preventive maintenance is the responsibility of customer and is not covered under this warranty.

Wear items and accessories having a Symbol serial number, will carry a 90-day limited warranty. Non-serialized items will carry a 30-day limited warranty.

Warranty Coverage and Procedure

During the warranty period, Symbol will repair or replace defective products returned to Symbol's manufacturing plan in the US. For warranty service in North America, call the Symbol Support Center at 1-800-653-5350. International customers should contact the local Symbol office or support center. If warranty service is required, Symbol will issue a Return Material Authorization Number. Products must be shipped in the original or comparable packaging, shipping and insurance charges prepaid. Symbol will ship the repaired or replacement product freight and insurance prepaid in North America. Shipments from the US or other locations will be made F.O.B. Symbol's manufacturing plant.

Symbol will use new or refurbished parts at its discretion and will own all parts removed from repaired products. Customer will pay for the replacement product in case it does not return the replaced product to Symbol within 3 days of receipt of the replacement product. The process for return and customer's charges will be in accordance with Symbol's Exchange Policy in effect at the time of the exchange.

Customer accepts full responsibility for its software and data including the appropriate backup thereof.

Repair or replacement of a product during warranty will not extend the original warranty term.

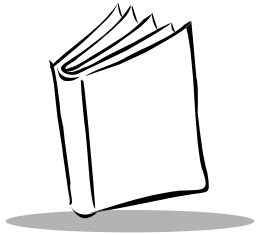
Symbol's Customer Service organization offers an array of service plans, such as on-site, depot, or phone support, that can be implemented to meet customer's special operational requirements and are available at a substantial discount during warranty period.

General

Except for the warranties stated above, Symbol disclaims all warranties, express or implied, on products furnished hereunder, including without limitation implied warranties of merchantability and fitness for a particular purpose. The stated express warranties are in lieu of all obligations or liabilities on part of Symbol for damages, including without limitation, special, indirect, or consequential damages arising out of or in connection with the use or performance of the product.

Seller's liability for damages to buyer or others resulting from the use of any product, shall in no way exceed the purchase price of said product, except in instances of injury to persons or property.

Some states (or jurisdictions) do not allow the exclusion or limitation of incidental or consequential damages, so the proceeding exclusion or limitation may not apply to you.



Chapter 1
The 370/470 RF Scanner

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Introduction

The RF scanner is a revolutionary, cordless approach to capturing bar coded data. The scanner communicates with your host computer through a low-power radio transmission instead of through a cable. With the RF scanner, you are free to scan and transmit without a physical cable to limit your movement, from as far away as 100 feet (30.5 meters), depending on your environment. This lets you take the scanner to where the work is, whether on the loading dock, the plant floor, the warehouse, or the POS checkout area. The RF scanner is Year 2000 compliant. There are two versions available:

- P 470: the retail RF version
- P 370: the industrial RF version.

Unless otherwise noted, the term RF scanner refers to both versions of the scanner.

The RF scanner successfully reads most code symbologies, densities, and colors, produced by a wide range of printing techniques, and scans at the rate of 36 scans per second. Refer to the *Decode Zone* on page 3-16.

Rechargeable Battery

In the handle of the scanner, there is a rechargeable lithium-ion battery. This provides all power to the scanner during operation. It provides 10 hours of use in a typical application. When fully depleted, the battery can be recharged to full charge in about 4 hours.

The Cradle

The PL 370/470 Cradle acts as a stand, receiver, host communication interface, and a charger for the RF scanner. It can sit on a desktop or be wall-mounted - whichever is more convenient. It receives data from the scanner via the antenna on the side of the cradle. The cradle then transmits that data to the host device through an attached cable. It also acts as a holder for the scanner.

The cradle also provides power for charging the scanner's battery (in the scanner). The cradle has a charge status indicator light that shows the status of the battery charging (Refer to Table 4-1 on page 4-4).

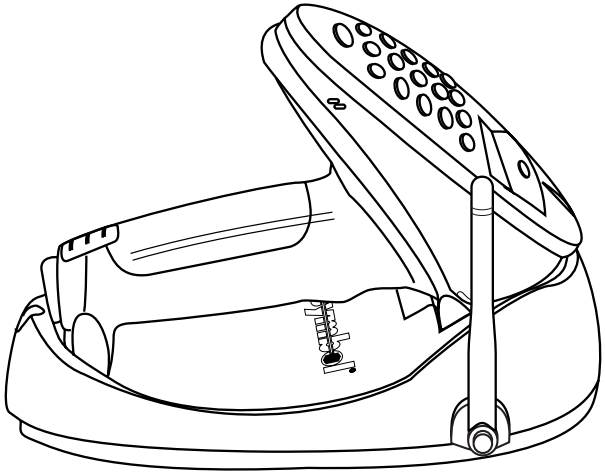


Figure 1-1. Scanner and Cradle

There are two versions of the cradle:

- PL 470 Cradle: retail RF version
- PL 370 Cradle: industrial RF version.

Accessories

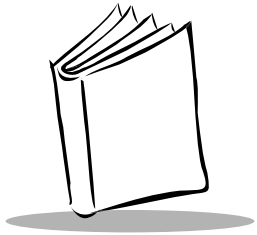
Required Accessories

The scanners are sent as a package with all required accessories. Optional accessories are available at extra cost.

Other available accessories for the RF scanner:

- Holster, p/n/ 11-35035-01
- Spare battery, p/n 50-14000-079
- Universal Battery Charger, p/n UBC2000-I500D
- UBC Adapter, p/n 21-32665-15

- Lanyard, p/n 21-37101-01
- Protective boot, p/n 11-36471-01
- Desk Stand, p/n 21-33687-01
- Spare power supply, p/n 59-14000-101.



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Set Up

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Introduction

This chapter covers the procedures for setting up the RF scanner and its accessories.

Unpacking

Remove the scanner from its packing and inspect it for damage. If the scanner was damaged in transit, call one of the telephone numbers listed in the section *Symbol Support Centers* on page x. KEEP THE PACKING. It is the approved shipping container and should be used if you ever need to return your equipment for servicing.

Cables

The following cables are used with the PL 370/470 Cradle:

- Synapse adapter cable (p/n 25-17821-01). Contact Symbol for the part number of the appropriate Synapse cable.
- RS-232 cable (p/n 25-17817-01).

Setting Up the Cradle

Set up of the cradle consists of:

- connecting the cradle to a host
- mounting the cradle on a wall, if desired
- pairing the scanner to the cradle.

Connecting to a Host

With some host types, the scanner is unable to answer host terminal polls if the appropriate host type is not selected. This may result in an error message generated by the host. To correct this situation, select the proper parameter set and initialize the host terminal. See Chapter *5*, *Parameter Menus* for more information.

There are two basic host communications options available:

- using an RS-232 cable
- using a Synapse cable.

RS-232 Connection

1. Make sure all host devices are powered down.
2. Plug the connector at the end of the cradle's cable into an appropriate RS-232 receiving port on the host device.
3. Plug the other end of the cable into the COM1 connector on the cradle.

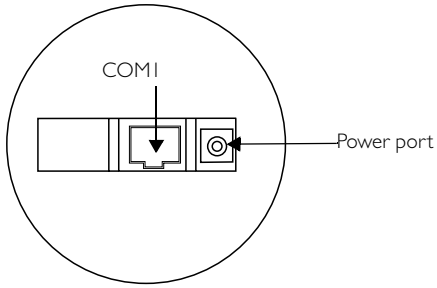


Figure 2-1. Ports on the Cradle

4. Connect the power connector of the power supply (p/n 59-14000-101) into the Power port on the cradle.
5. Connect the appropriate line cord to the power supply and into an AC receptacle.
6. The indicator light on the cradle blinks, signifying successful power-up.

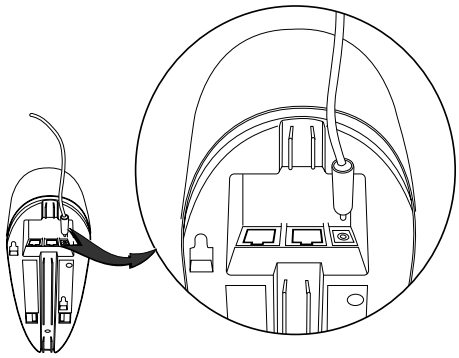


Figure 2-2. Power Supply Port

7. Rotate the antenna to the vertical position.

Using A Synapse Cable

1. Make sure all host devices are powered down.
2. Connect the Synapse Adapter cable to COM1 in the cradle (see Figure 2-1 on page 2-4).
3. Connect the Adapter cable to the Synapse Interface cable.
4. The Synapse Adapter cable has a flying power lead. Connect this lead to the receptacle in the Synapse Interface cable, as shown in Figure 2-3. See the Synapse guide for details.

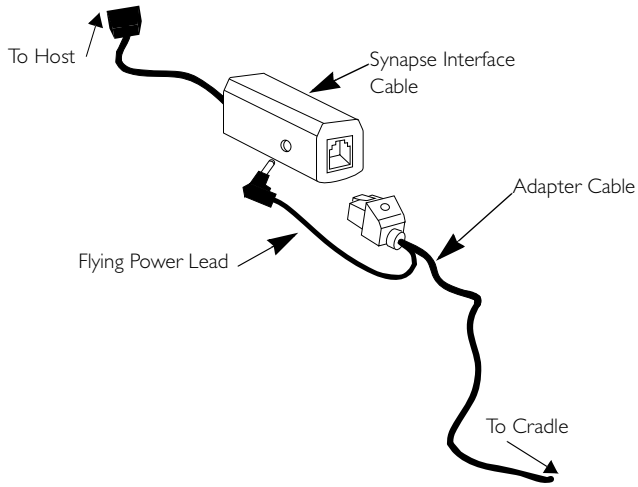


Figure 2-3. Synapse and Adapter Cable

5. Connect the Synapse Interface cable to the host.
6. Connect the power connector of the power supply (p/n 59-14000-101) into the Power port on the cradle (see Figure 2-2).
7. Connect the appropriate line cord to the power supply and into an AC receptacle.
8. The indicator light on the cradle blinks, signifying successful power-up.
9. Scan the appropriate Synapse bar codes to set up the Synapse cable for your specifications.
10. Rotate the antenna to the vertical position.

Wand Emulation, OCIA, OCR, Keyboard Wedges

See the appropriate Synapse cable instructions. An adapter cable is required.

Wall Mounting

Before wall-mounting the cradle, the scanner support tab must be changed from the desk-mount position to the wall-mount position.

1. Lift the scanner support tab out of the top part of the cradle and replace it in the wall-mount position.

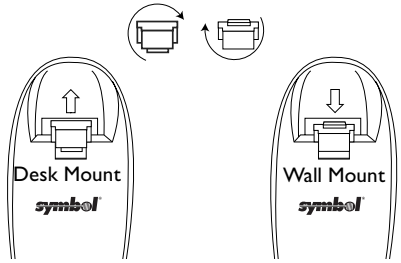


Figure 2-4. Scanner Support Tab

2. Seat the cables from the bottom of the cradle in the grooves along the length of it so that the bottom of the cradle is smooth.

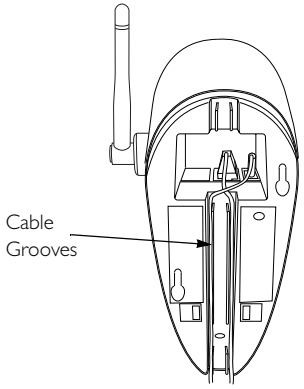


Figure 2-5. Placement of Cables

3. Fasten the two screws provided into the wall where the cradle will hang, leaving about 1/8" (0.3 cm) of the screw outside the wall for the cradle's wall mounting sockets (A template is provided for you in the *PL 370/470 Quick Reference Guide* p/n 72-38494-01).
4. Place the cradle over the screw heads and slide down until it fits into place. Slight pressure upwards should not move the cradle.

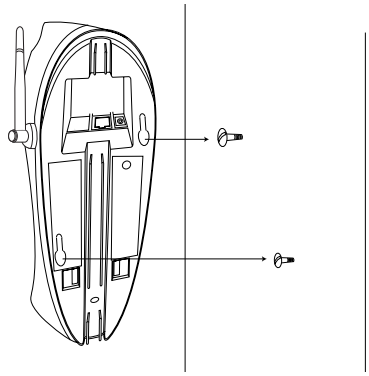


Figure 2-6. Securing Cradle to Wall

5. Position the antenna vertically (pointing toward the ceiling).
6. Place the scanner in the cradle.

Pairing the Scanner with the Cradle

The wireless "connection" between the scanner and the cradle is the low power radio transmission through RF transceivers in the both the scanner and cradle. The actual communication consists of bidirectional message packets. However, the scanner and cradle must be paired for this communication to work between the two devices.

Note: *After a new host is installed at the cradle, re-scan the pairing bar code. This allows the cradle to notify the scanner of the change in the host device.*

To pair the scanner with the cradle:

1. Scan the pairing bar code on the top of the cradle.
2. Insert the scanner into the cradle (recommended but not required). Note that you cannot scan data until this pairing is complete.
3. Information is exchanged (addressing, RF channels, etc.) between the scanner and the cradle. This occurs in a few seconds if the scanner is in the cradle or up to a minute if not in the cradle.
4. After the exchange is complete, the scanner and cradle are paired. Successful pairing is indicated by a **warble** beep; failure, or unsuccessful link, is indicated by a **Lo Hi** beep.

Optimizing RF Performance

The RF scanner is equipped with a low power 2.4 GHz radio. Depending on environmental conditions, it can have an RF transmission range of 100 feet (30.5 meters). Where environmental objects affect RF range and performance, do the following when you install the scanning system. This will help assure peak performance.

The cradle is a charger, host interface, and receiving station for RF transmission. Therefore, do not install the PL 470 inaccessibly under a table or buried in a desk drawer. At a minimum, mount the PL 470 on a table or desktop. For optimum RF performance, especially in difficult environments, mount the PL 470 on a wall as high as possible. But keep in mind the limits of interface cable length and charging accessibility. Proper base positioning gives you the best possible range and coverage performance from the RF scanning system.

Charging the Battery

Before its first use, the scanner's battery must be charged. It can be charged:

- using the cradle
- Using the UBC 2000.

Using the Cradle

1. Set up the cradle as described in *Setting Up the Cradle* on page 2-3.
2. Insert the scanner into the cradle, so that the nose of the scanner and tip of the handle seat into the receptacles.

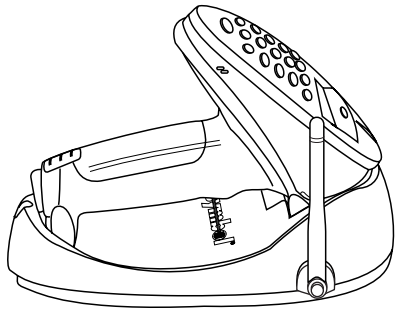


Figure 2-7. Placing the Scanner into the Cradle

3. Check the charge status indicator light. See Table 4-1 on page 4-4.

4. The battery fully charges in up to 4 hours.

The cradle recharges batteries in the scanner only when the scanner is in the cradle. A scanner with a dead battery starts charging immediately upon insertion into the cradle, whereas a scanner with a partially charged battery begins charging after approximately 15 minutes. The status of the scanner battery determines the charge rate. Note that the scanner can be removed from the cradle at any time.

Using the UBC 2000

The battery can be charged using the Universal Battery Charger UBC 2000. The UBC adapter for the P 370/470 scanner battery is required. Refer to the UBC 2000 guide for information on recharging the battery using the UBC 2000.

Battery Life

When batteries begin to run down, the scanner emits 4 high tone beeps. You then have about 25 scans remaining. Although lithium-ion batteries are rechargeable, they do have a limited life. In typical applications, the batteries should last about two years. As they begin to age, batteries do not hold a charge as long as when they were fresh; you have to charge them more often. A new battery (p/n 50-14000-079) can be obtained from Symbol Technologies. See your Symbol representative for more information.

Pairing the Scanner with the Cradle

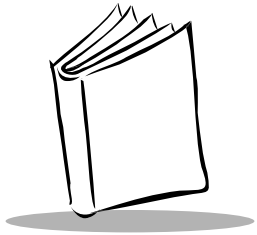
The wireless "connection" between the scanner and the cradle is the low power radio transmission through RF transceivers in the both the scanner and cradle. The actual communication consists of bidirectional message packets. However, the scanner and cradle must be paired for this communication to work between the two devices.

Note: *After a new host is installed at the cradle, re-scan the pairing bar code. This allows the cradle to notify the scanner of the change in the host device.*

To pair the scanner with the cradle:

1. Scan the pairing bar code on the top of the cradle.
2. Insert the scanner into the cradle (recommended but not required). Note that you cannot scan data until this pairing is complete.

3. Information is exchanged (addressing, RF channels, etc.) between the scanner and the cradle. This occurs in a few seconds if the scanner is in the cradle or up to a minute if not in the cradle.
4. After the exchange is complete, the scanner and cradle are paired. Successful pairing is indicated by a **warble** beep; failure, or unsuccessful link, is indicated by a **Lo Hi** beep.



Chapter 3
Operation

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Chapter 3. Operation

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Introduction

This chapter covers how to use the RF scanner. There are two ways to enter data into the scanner - scanning a bar code, or entering characters manually using the keypad.

Scanning

The scanner is pre-loaded with a default MCL application and default parameters and is ready-to-use right out of the box. If this is not what you need for your application, refer to the *MCL Designer Manual* for programming instructions and Chapter 5, *Parameter Menus* for scanning and communications parameters. If you need assistance, contact your local supplier or Symbol Support Center.

1. Make sure the bar code is in the correct scanning range. Aim and press the trigger. The scanner has read the symbol when:
   - You hear a beep.
   - The LED above the screen turns green.
   - The red laser turns off.

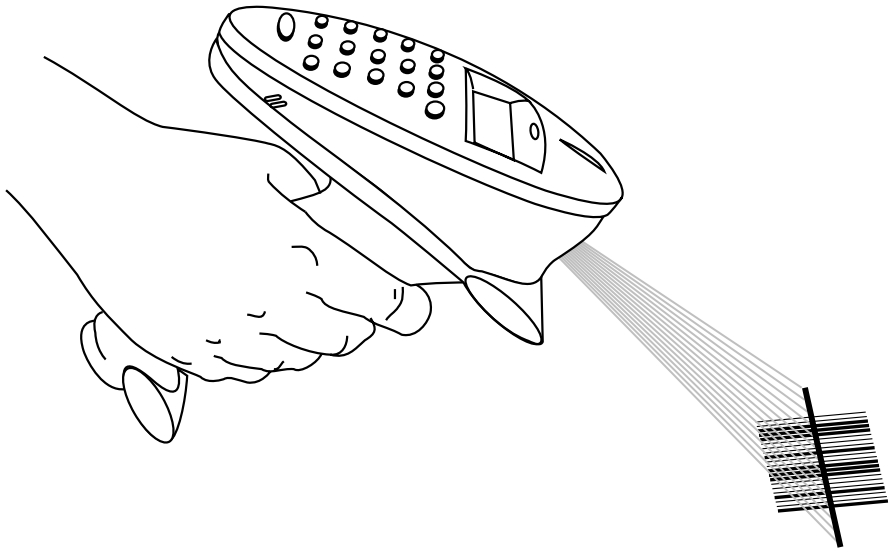


Figure 3-1. Scanning a Bar Code

Scan the Entire Symbol

- Your scan beam must cross every bar and space on the symbol.
- The larger the symbol, the farther away you should hold the scanner.
- Hold the scanner closer for symbols with bars that are close together.
- A short, high tone beep indicates a good decode.

Hold at an Angle

Do not hold the scanner directly over the bar code. Laser light reflecting *directly* back into the scanner from the bar code is known as specular reflection. This strong light can "blind" the scanner and make decoding difficult. The area where specular reflection occurs is known as a "dead zone."

You can tilt the scanner up to 65° forward or back and still achieve a successful decode. Simple practice quickly shows what tolerances to work within.

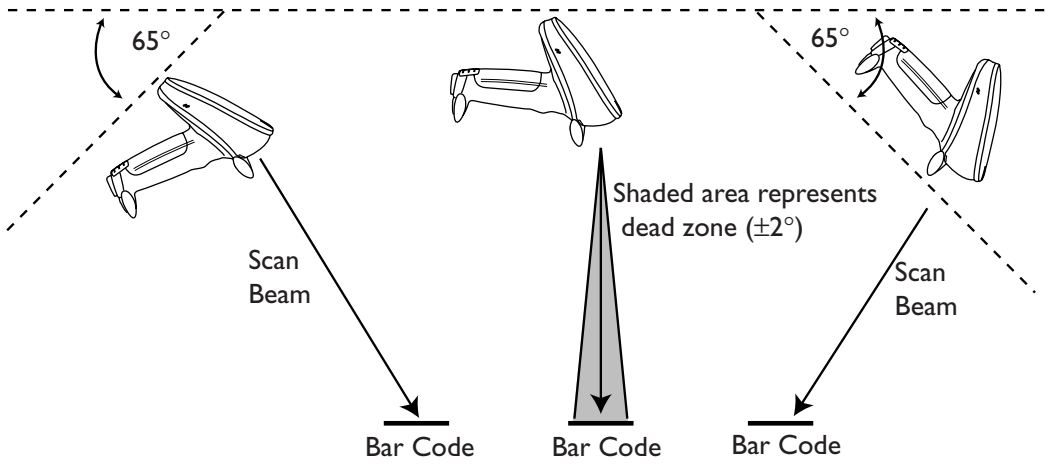


Figure 3-2. Maximum Tilt Angles and Dead Zone

Keypad Operation

In the default application supplied with the RF scanner, the keypad is enabled. If your application has enabled the keypad, you can enter the bar code's data using the keypad on the top of the scanner. To enter numeric characters, press the number key on the keypad. A high-pitched click lets you know that the entry was accepted. See Figure 3-3 on page 3-6.

To enter alpha characters, press the MODE key once to put the scanner in Alpha Mode. Press the numeric key with the letter you want above it - once for the first letter, quickly twice for the second letter, or quickly three times for the third letter. Every time you press the key, you hear a low-pitched click to let you know that the entry was registered but not accepted yet, and a high-pitched key click after a second or so to let you know that the entry was accepted. You can go from one key to another before hearing the high key click (i.e., from the "a" to the "d"), but you must first hear the high click to go to a different letter on the same key (i.e., the "a" to the "c").

To return to numeric mode, press the MODE key again.

To put a decimal point into numeric data, type in the numbers before the decimal point. Then press the Shift key, press the decimal, and press the Shift key again. Now resume typing in the numeric entry.

The * key and the "Function+Number" key combination are special keys that can be programmed for custom operations. To use the "Function+Number" key combination, press the Function key, release it, and then press the number key associated with the operation to perform. For more information on how to program these keys and what they mean, refer to the *MCL Designer User's Guide*.

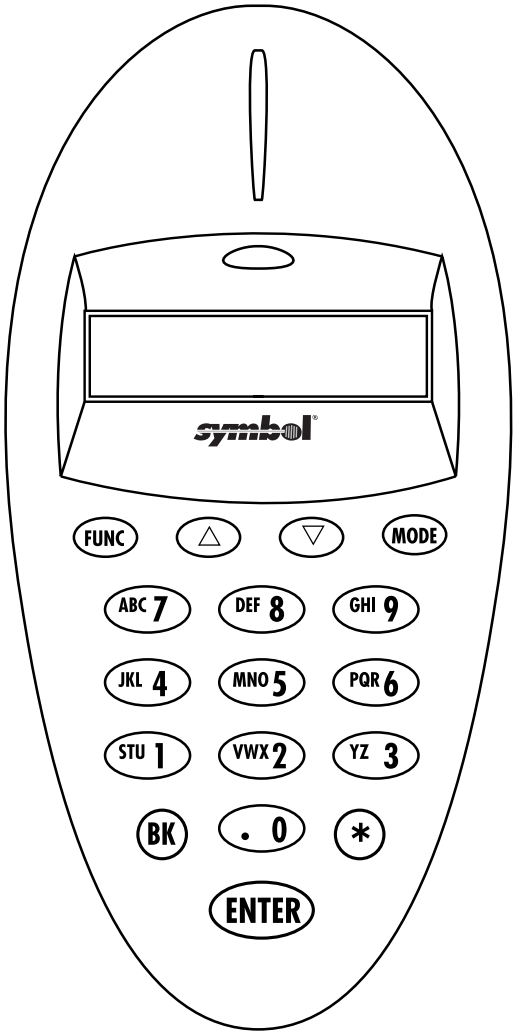


Figure 3-3. Scanner Keypad

Scanning Transmission Range

RF Communication Errors

RF communication errors occur when the scanner is out of range from the cradle during a scan data transmission attempt. A communication error is indicated by 4 beeps (LO HI LO HI) after a bar code is scanned, although the bar code data may appear on the host display. This happens when the cradle receives the bar code data but the scanner did NOT get the host response from the cradle, and therefore timed out.

The scanner reported an RF communication error because it did not see the host response before time-out. However, data may have been transmitted to the host. Since the data has been sent, normal communications must be re-established.

Restoring Normal RF Communications

Move the scanner closer to the cradle so the transceivers can communicate with each other better. Then re-scan the bar code. The scanner sounds a good decode beep and no error beeps. If the cradle had previously sent data to the host, it will not send this re-scanned data to the host. Resume normal scanning.

Default MCL Application

The scanner is shipped from the factory with a default MCL application installed. This application demonstrates most of the operations of the scanner, scanning and keyboard entry in POS modes of operation.

The default MCL application is created using the MCL-Designer application. The MCL-Link application is used to send and receive data to and from the scanner using a simple RS-232 link with a host computer.

Your MCL application may be different than what is described here. See your System Developer for more information.

Note: *The combination of the <FUNC> and <BK> keys are used throughout the default application to clear any entry or exit from an operation.*

When the unit is initially powered up (e.g., when a new battery is inserted), it displays the system start-up banner. Alternatively, the scanner can be reset manually using the <FN><*> key combination. The system banner appears as follows:

```
Symbol Technologies
    Phaser RF
```

Figure 3-4. Banner Screen

After 10 seconds, the System Banner is replaced by the system initialization screen:

```
SYMBOL TECHNOLOGIES
INITIALIZING ...
```

Figure 3-5. Initialization Screen

and finally, the scanner enters the POS scanning screen.

POS Application

In POS mode, the scanner can transmit bar codes and optional quantities to the cradle. The POS screen appears as follows:

```
SKU:
_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
```

Figure 3-6. POS Application Screen

Scanned bar codes automatically transmit to the host. Keyed bar codes transmit once you press the <ENTER> key. To enter a quantity, press the * key prior to scanning or keying any bar code data. Once you press the * key, the following screen appears:

```
Quantity:
_ _ _ _ _
```

Figure 3-7. POS Quantity Screen

Key in a quantity followed by the <ENTER> key. The SKU entry screen reappears. Scan or enter a SKU. The scanner sends the SKU to the host the keyed-in amount of times. For instance, if you type in a quantity of 6, the scanner sends that SKU to the host six times as if the SKU were scanned six times.

System Menu

The system menu contains utilities to allow the user to set up the scanner. To access the System Menu, press the <FN>* key combination to reset the scanner, and then <FN><BK>

within the first 10 seconds after the power up beep (while the *Banner Screen* is still shown). The scanner displays:

```
Phaser Setup
0. System Setup
```

Figure 3-8. Setup Screen

Pressing the Up and Down keys scrolls through the menu of available setup options:

0. System Setup
1. App. Control
2. Parameter Control
3. System Status
4. Version
9. Return to App.

Alternatively, press the associated numeric key to select the setup option directly (for advanced users who are already familiar with the options). Under each menu item is a sub-menu for more options:

0. System Setup
    0. Set RF Channel
    1. Set Contrast
    2. Set Scanner ID
    3. Set Host Type
    4. Set Scan Options
    9. Back To Main
1. App. Control
    0. Enter Host Mode
    1. Set Default App
    2. Load System Code

3. Enable Autoload

9. Back To Main

2. Parameter Control

0. Scan Parameter

1. Set Default Param

9. Back To Main

3. System Status

0. Battery Check

9. Back To Main

4. Version

9. Return to App.

Each of these options is described in the following sections.

System Setup Options

This group of options perform basic system functions. Within this option are the Set RF Channel, Set Contrast, Set Scanner ID, Set Host Type and Back To Main functions.

Set RF Channel

Allows users to set RF channel for communications between scanner and cradle.

```
Channel:        54
New Channel:    _ _
```

Figure 3-9. RF Channel Screen

Enter new channel number then press the <ENTER> key. A High-Lo-High-Lo tone is heard if the change is successful. A Low-High beep is heard if the change failed. Make sure that you have paired to a cradle and are within range before attempting to change a channel. Not all channels are available in all countries. If the channel is not legal to use in your country, an error beep will be heard instead of a successful warble. Contract the Symbol Support Center if you don not know what the available channels are for your country.

Set Contrast

Sets the contrast of the display. The scanner displays its current contrast level, and by using the up and down arrow keys the user can change the contrast. The default contrast level is 4, and the range is from 0 to 7, with 0 being the lightest and 7 being the darkest. To cancel the change, press the <FN><BK> keys, and to accept the change, press the <ENTER> key.

```
Display Contrast: 4
UP, DN, CL, EN
```

Figure 3-10. Set Contrast Screen

Set Scanner ID

Sets the MCL-Net address of the scanner. The scanner displays its current ID, and the user may key in a new value, between 1 and 254.

```
Enter Scanner ID:
(001 - 254) 001
```

Figure 3-11. Set Scanner ID Screen

Set Host Type

Sets the host to be used by the default application. The scanner displays its current host type. The user can select *Other* for an RS-232 or Synapse host or *MCL-Net* for an MCL host. The default setting is *Other*. Choosing MCL-Net enables the scanner to communicate with a host running MCL-Link. Choosing Other selects a standard RS-232 or Synapse host, as defined by the system installation. (If a Synapse cable is installed, it will be detected and used, otherwise the RS-232 host will be used.)

```
Set Host Type:
Other
```

Figure 3-12. Set Host Type Screen

Set Scan Options

This menu is used to control the format of data as transmitted by the default application when the Host Type is set to OTHER. This option does not affect data sent to the MCL-Net host. Note that unless special programming is implemented in the user's application, this setting will NOT affect the user's application. (See System Variable 24 in the *MCL-Designer for Phaser Series User's Guide*.)

```
1. Data As Is
2. PREFIX><DATA>
3. DATA><SUFFIX>
4. PFX><DATA><SFX>
5. Edit Prefix Code
6. Edit Suffix Code
```

Figure 3-13. Set Host Type Screen

The first option, Data As Is, indicates that the scanned data will be transmitted to the host with no modifications. The second option, <PREFIX><DATA>, indicates that a prefix code will be sent prior to the data. The prefix code is edited using option 5, and should consist of a one digit Key Category, followed by a three digit Key Code. See Table A-4 on page A-7 for a list of the Key Categories and Codes.

The third option, <DATA><SUFFIX>, indicates that a suffix code will be sent after the data. The suffix code is edited using option 6, with the same restrictions as the Prefix Code. The fourth option, <PFX><DATA><SFX>, indicates that both the prefix code and suffix code will be sent.

Note that the default value for these options is Data As Is. The default Prefix Code and Suffix Code are both set to 7013 (the extended keypad ENTER key, which most host variants will recognize as a carriage return/line feed).

Back To Main

Returns to the main menu, starting at 0. System Setup.

App. Control

The functions under this option allow you to control your application. Specifically, the Load New System and Set Default App functions.

Enter Host Mode

Puts the scanner into a mode to listen to MCL-Link commands from the host. The scanner must be in this mode prior to using the Project Send option in MCL-Designer. Users' applications can also place the scanner in this mode by executing an NS command.

```
MCLNet Host Mode?
EN=Y BK=N
```

Figure 3-14. Enter Host Mode Screen

Press the <ENTER> key to confirm the choice (Yes) or the <BK> key to cancel the choice (No). If you are to enter the MCLNet Host Mode, a confirmation screen displays warning that data may be lost. Press the <ENTER> key to continue or the <BK> key to cancel.

Set Default App

Restores the default application described above. The default application overwrites any downloaded application. (This option may be used to restore functionality to a scanner which has been loaded with a defective application.) Prior to resetting the default application, the user is prompted to confirm this operation:

```
Reset Default App?
EN=Y BK=N
```

Figure 3-15. Default Application Screen

Press the <ENTER> key to confirm the choice (Yes) or the <BK> key to cancel the choice (No).

Load System Code

Puts the scanner in download mode, and it is ready to receive a new application or an updated version of the system software from the host computer.

```
Download New System?
EN=Y BK=N
```

Figure 3-16. Load System Code Screen

Enable Autoload

Enables the automatic application download feature in the default application. This allows the user to remove the scanner from the box, pair it with the cradle, place the scanner in the cradle and automatically download the user's application to the scanner.

In order for this feature to operate properly, the cradle must be connected to a host running *MCL-Link*, and the user's host must be configured properly with specific files in specific locations (See Appendix A). If the user does not set up the host in the required manner, the scanner reverts to normal charging mode. This feature is enabled by default, but may be disabled by use of this System Menu item.

```
Autoload App?
Enabled
```

Figure 3-17. Autoload Application Screen

Selecting `Enabled` will enable this feature; `Disabled` with disable this feature. Note that this option ONLY affects the default application, and does not affect any user applications.

Parameter Control

These functions allow you to control the scanner parameters. Under this option are the Scan Parameters and Set Default Params functions.

Scan Parameters

Puts the scanner in a mode where parameter bar codes may be scanned. Parameter bar code scanning is disabled at all other times.

```
Scan Parameters
<FUNC><BK> to quit
```

Figure 3-18. Scan Parameters Screen

Set Default Params

Restores the default parameters in the scanner. The default parameters overwrite any scanned parameters. Prior to resetting the default parameters, the user is prompted for confirmation with a screen similar to the Default Application Confirmation screen.

```
Reset Default Parms?
     EN=Y BK=N
```

Figure 3-19. Set Default Parameter Screen

System Status

The function under this option allows you to perform some system checks. The specific function under this option is Battery Check.

Battery Check

Checks the battery status. The scanner responds with GOOD, LOW or DEAD! Low battery status indicates that the scanner will operate for approximately another 25 scans before it must be recharged. Dead battery status indicates that the scanner will probably not be able to sustain another scan cycle, and should be recharged immediately.

```
Battery Status
    Good
```

Figure 3-20. Battery Status Screen

Version

Displays the current version of MCL the scanner is running.

```
System: XXXXXXXX
MCL: X.X
```

Figure 3-21. Version Screen

Return to App

Exits the system setup mode and returns to the application (either the default application described above, or any downloaded application).

Decode Zone

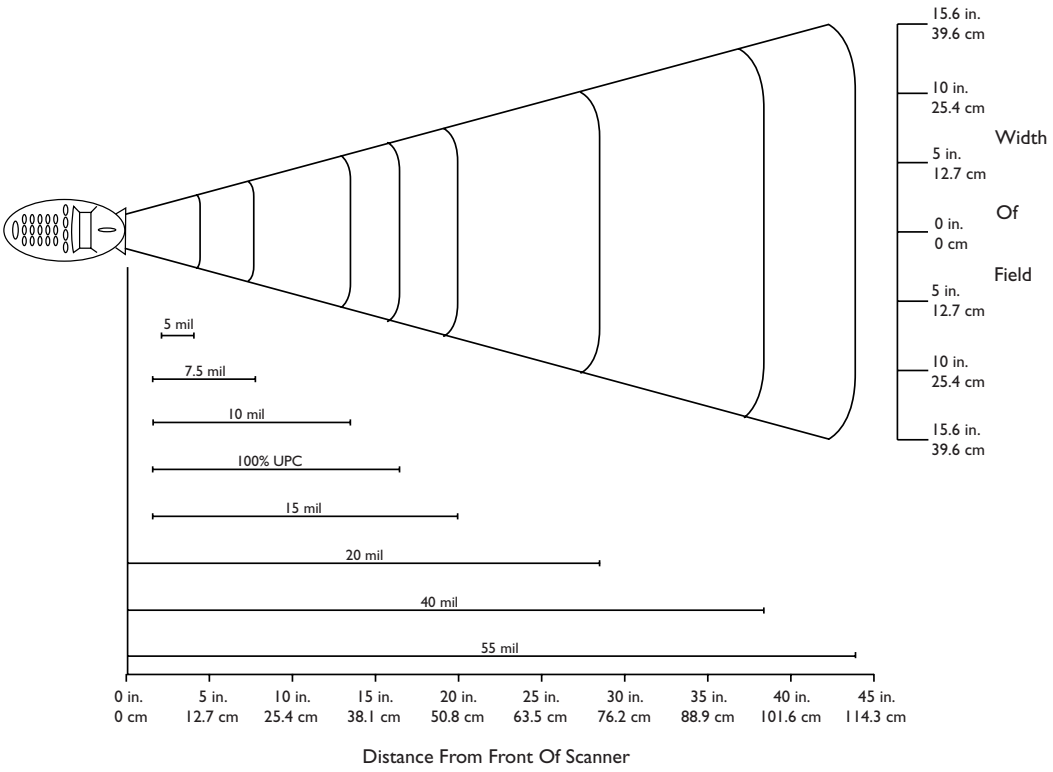


Figure 3-22. Standard Range Decode Zone

Troubleshooting

Nothing happens when you follow the operating instructions?

You Should

- Check that the power supply is attached to the cradle.
- Check for loose cable connections at the cradle, AC power supply, or host device.
- Check the scanner's battery.
- Make sure the device is programmed to read the type of bar code you want to scan.
- Check the symbol to make sure it is not defaced.
- Try scanning similar symbols of the same code type.
- Be sure you're within the proper scanning range.
- Make sure the scanner and cradle have been successfully paired.
- Make sure you are within the proper scanning and transmission range.

The scanner emits transmit errors (error beeps after decode)?

You Should

- Check that you are within scanning transmit range.
- Check that the scanner is successfully paired with the cradle.
- Check that the cradle is powered up and that it's cable connections are secure.

Note: *If after performing these checks the symbol still does not scan, contact your distributor or call the Symbol Support Center. See Symbol Support Centers on page page x for the telephone number.*

Installations in Spectrum24 or Other 2.4GHz Environments

When installing the RF scanner system in a Spectrum24 environment, follow the following general rules:

1. RF scanner location relative to a Spectrum24 Access Point can increase performance.

   Network products use Access Points (base stations) that are positioned fixed throughout the facility. The greatest performance for the RF scanner can be obtained when they are positioned at least 6 feet (1.8 m) from those other networks. Positioning the RF scanner closer than 3 feet (0.9 m) to another 2.4 GHz transmitter should be prevented.

2. Choice of channel can help optimize the RF scanner performance.

   The RF scanner has three channels that are not utilized by Spectrum24 (channels 81, 82, and 83)[1]. Select these channels for those RF scanner systems closest to the Spectrum24 transmitter. Note: Multiple scanners can occupy the same channels, especially in applications with lower scanning duty cycles. Channels 60 through 80 should be chosen next as these still provide added performance for an RF scanner system.

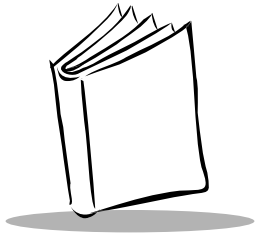
3. Increasing the number of RF scanner retries can improve the RF scanner system communication.

   The RF scanner by default is set to attempts communication four times before reporting an error. If Spectrum24 traffic is very heavy, you can increase this number of retries. Note that increasing the number of retries, may increases the time it will take to complete a transaction.

Programming the System

The scanner is programmed by MCL and by scanning sequences of bar codes; see the *MCL Designer for Phaser Series User's Guide* and Chapter 5, *Parameter Menus*.

1. Not available in some countries.



Chapter 4
Maintenance And Specifications

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Introduction

This chapter explains how to maintain your scanner and the specifications for it.

Maintenance

- Do not allow any abrasive material to touch the scanner window.
- Remove any dirt particles with a damp cloth.
- Wipe the scanner window using a damp cloth, and if necessary, a non-ammonia based detergent.
- Do not spray water or other cleaning liquids directly into the scanner window.
- If the contacts between the scanner and cradle become dirty, clean them with either a pencil eraser or a cotton swab dampened with alcohol.
- Change the battery when it no longer provides 8 hours of scanning in typical usage. This should occur after 2 years or more, depending on your daily use.

Changing the Battery

Once a battery is fully charged, it will generally last up to 10 hours without being returned to the cradle. By returning it to the cradle during the day, you extend this time.

Removing the Battery

1. Slide the release latch down using center indent and remove the cover.

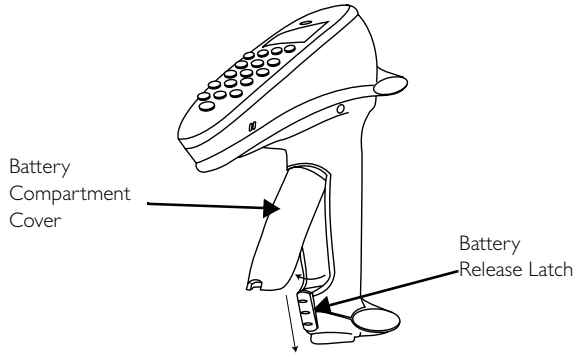


Figure 4-1. Removing the Battery Compartment Cover

2. Slide the battery towards the bottom of the scanner and then pull the bottom of the battery back and out of the scanner.

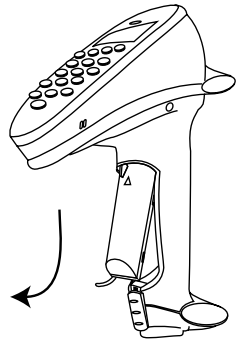


Figure 4-2. Pulling the Battery Out

Replacing the Battery

1. Place the top portion of the battery (curved side op, contacts toward top) into the scanner and then slide it up the handle.
2. Replace the battery compartment cover.
3. Slide the release latch up to secure the cover in place.

Charge Status LED Indications

The LED indicator on the cradle uses flashing patterns to display the charger status, as shown in the table below.

Table 4-1. Cradle LED Indications

LED	Status
Off	The scanner is not in the cradle.
Blinking Slowly	The scanner is properly seated in the cradle, but charging has not begun.
Blinking Rapidly	The battery is actively charging.
On	Battery charging is complete.

Technical Specifications

Table 4-2. Technical Specifications

Item	Description
Decode Capability	The RF scanner can be programmed to decode the following code types: UPC/EAN, Bookland EAN, Code 11, Code 39, Code 39 Full ASCII, Trioptic Code 39, Code 93, Codabar, Interleaved 2 of 5, Code 128, EAN 128, Discrete 2 of 5, MSI Plessey, and Coupon Code. Set code length(s) for any linear code type. The RF scanner can auto-discriminate between all of the above code types except for Code 39 and Code 39 Full ASCII. Transmission of decoded information depends on the capabilities of the attached terminal.
Scanner Beeper Operation	User-selectable: Enabled, Disabled.
Scan Repetition Rate	36 (± 5) scans/sec (bidirectional)
Roll (Skew) Tolerance	± 30° from normal
Pitch	± 65° from normal
Yaw	± 60° from normal
Decode Depth of Field	See *Decode Zone* on page 3-16.
Print Contrast Minimum	20% absolute dark/light differential, measured at the wavelength of the laser diode.
Ambient Light Immunity	
Artificial Lighting	450 ft. candles 4844 lux
Sunlight	8000 ft. candles 86112 lux (@8 in. (20 cm) on low density bar codes)
Operating Temperature **P370 (Industrial)** **P 470 (Retail)**	 -4° to 122°F -20° to 50°C 32° to 104°F 0° to 40°C
Storage Temperature	-40° to 140°F -40° to 60°C
Sealing: P 370 (Industrial)	Sealed to IP54 requirements.
Humidity	5% to 95% (non-condensing)

Table 4-2. Technical Specifications (Cont'd)

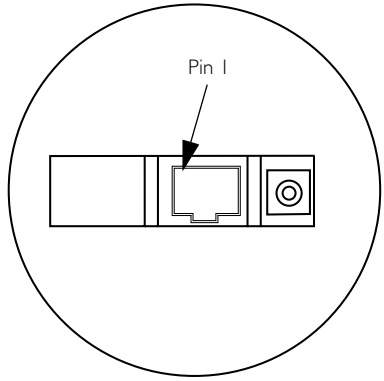
Item	Description
Durability (Scanner) **P370 (Industrial)** **P 470 (Retail)**	 6-ft. drop to concrete 1.8 m 5-ft. drop to concrete 1.5 m
Dimensions	
Height	7.0 in. (17.8 cm)
Width	9.2 in. (13.5 cm)
Depth	3.5 in. (9.8 cm)
Laser Classifications	CDRH Class II, IEC Class 1, IEC Class 2

Cradle Pin-outs

The following table shows the pin-outs for COM1 on the cradle.

Table 4-3. Pin-outs

Pin	Cradle
1	Reserved
2	VCC (Out)
3	Ground
4	Synapse Data
5	Synapse Clock
6	RXD IN
7	TXD OUT
8	DTR (Tied HI)
9	CTS - IN
10	RTS - OUT



Beeper Indications

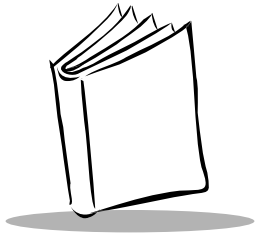
Table 4-4 list beep sequence and their meanings for standard beeps programmed into the scanner. Other applications written for the scanner can have their own beep sequences and therefore are not listed in this table. See your System Administrator for beep sequences and their meanings.

Table 4-4. Beeper Indications

Beeper Sequence	Indication	Default Application Display Message
Standard Use		
Short high tone	A bar code symbol was decoded (if decode beeper is enabled).	N/A
4 long low beeps	A host transmission error occurred. Data was not successfully sent to the host device. This occurs if a unit is not properly configured. Check option settings.	Error 00003 during transmit. Error 00009 during transmit. Error 00018 during transmit. Error 00247 during transmit. Error 00249 during transmit. Error 00253 during transmit.
5 Beeps - low tone	Convert or format error.	Error 00002during transmit. Error 00008during transmit.
Hi/Hi/Hi/Lo tone	RS-232 receive error.	Error 00005 during transmit.
4 Beeps - short Hi	Low battery.	Low Battery
4 Beeps - Lo/Hi/Lo/Hi	An RF transmission error has occurred. Move closer to the cradle and re-scan the bar code.	Error 00015 during transmit. Error 00016 during transmit. Error 00017 during transmit. Error 00024 during transmit.
Parameter Menu Scanning		
Short high tone	Correct entry scanned or correct menu sequence performed.	N/A
Note: Error messages can be costomized in your application.		

Table 4-4. Beeper Indications (Cont'd)

Beeper Sequence	Indication	Default Application Display Message
Lo/Hi tone	Input error, incorrect bar code or "Cancel" scanned, wrong entry, incorrect bar code programming sequence; remain in program mode.	N/A
Hi/Lo tone	Keyboard parameter selected. Enter value using bar code keypad.	N/A
Hi/Lo/Hi/Lo tone	Successful program exit with change in the parameter setting.	N/A
4 Beeps - Lo/Hi/Lo/Hi followed by 2 Beeps - Lo/Hi	Correct entry scanned or correct menu sequence performed in the scanner but communication error with cradle has occurred.	N/A
Note: Error messages can be costomized in your application.		



Chapter 5
Parameter Menus

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Introduction

This chapter has the optional parameter bar codes necessary to program the RF scanner.

Operational Parameters

The RF scanner is shipped with the settings shown in Table 5-1. These default values are stored in non-volatile memory and are preserved even when the scanner is powered down. You can change these default values by scanning the appropriate bar codes included in this manual. These new values replace the standard default values in memory. The default parameter values can be recalled by scanning the bar code in the section *Set Default Parameter* on page 5-11.

The scanner automatically detects which cable it is attached to, either an RS-232 or a Synapse cable. If it is attached to an RS-232 cable and has either an ICL, Nixdorf, or Fujitsu host interface, then scan the appropriate bar code from page 5-14 after power up. Any other RS-232 host interface works with the default setting.

If it is attached to a Synapse cable, plug everything together as described on page 2-5 and then follow the directions that come with the Synapse cable for setting up the host interface.

Note: *Parameter bar codes can only be scanned when the scanner is in the "system menu". Refer to System Menu on page 3-8 for more information.*

The following table lists the defaults for all parameters. If you wish to change any option, scan the appropriate bar code(s).

Table 5-1. Default Table

Parameter	Default	Page Number
Set Default Parameter	All Defaults	5-11
RS-232 Host Type	Standard	5-12
Host Response Timeout	5 seconds	5-15
RF Channel	No Default Setting	5-16
RF Retries	4	5-16
Sleep Time	10 seconds	5-18
Decimal Separator	Decimal Point (.)	5-19
Key Click	Enabled	5-20
Beeper Tone	High Frequency	5-21
Beeper Volume	High	5-22
Power Detect Beep	Enabled	5-23
Laser On Time	3.0 seconds	5-24
Beep After Good Decode	Enabled	5-25
Transmit “No Read” Message	Disabled	5-26
Linear Code Type Security Levels	1	5-27
Bi-directional Redundancy	Disabled	5-29

Table 5-1. Default Table (Continued)

Parameter	Default	Page Number
UPC/EAN		
UPC-A	Enabled	5-30
UPC-E	Enabled	5-30
UPC-E1	Disabled	5-30
EAN-8	Enabled	5-31
EAN-13	Enabled	5-31
Bookland EAN	Disabled	5-32
Decode UPC/EAN Supplementals	Ignore	5-33
Decode UPC/EAN Supplemental Redundancy	7	5-34
Transmit UPC-A Check Digit	Enabled	5-35
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UPC-E1 Preamble	System Character	5-38
Convert UPC-E to A	Disabled	5-39
Convert UPC-E1 to A	Disabled	5-40
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UPC/EAN Security Levels	0	5-43
UPC/EAN Coupon Code	Disabled	5-45

Table 5-1. Default Table (Continued)

Parameter	Default	Page Number
Code 128		
Code 128	Enabled	5-46
UCC/EAN-128	Enabled	5-47
Code 39		
Code 39	Enabled	5-48
Trioptic Code 39	Disabled	5-49
Set Length(s) for Code 39	2 to 55	5-51
Code 39 Check Digit Verification	Disabled	5-52
Transmit Code 39 Check Digit	Disabled	5-53
Code 39 Full ASCII Conversion	Disabled	5-54
Convert Code 39 to Code 32	Disabled	5-55
Code 32 Prefix	Disabled	5-56
Code 93		
Code 93	Disabled	5-57
Set Length(s) for Code 93	4-55	5-58
Interleaved 2 of 5		
Interleaved 2 of 5	Enabled	5-60
Set Length(s) for I 2 of 5	14	5-61
I 2 of 5 Check Digit Verification	Disabled	5-63
Transmit I 2 of 5 Check Digit	Disabled	5-64
Convert I 2 of 5 to EAN 13	Disabled	5-65

Table 5-1. Default Table (Continued)

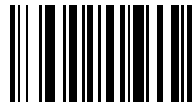
Parameter	Default	Page Number
Discrete 2 of 5		
Discrete 2 of 5	Disabled	5-66
Set Length(s) for D 2 of 5	12	5-67
Codabar		
Codabar	Disabled	5-69
Set Lengths for Codabar	5-55	5-71
CLSI Editing	Disabled	5-72
NOTIS Editing	Disabled	5-73
MSI Plessey		
MSI Plessey	Disabled	5-74
Set Length(s) for MSI Plessey	Any Length	5-76
MSI Plessey Check Digits	One	5-77
Transmit MSI Plessey Check Digit	Disabled	5-78
MSI Plessey Check Digit Algorithm	Mod 10/Mod 10	5-79
Data Options		
Transmit Code ID Character	None	5-81

Table 5-1. Default Table (Continued)

Parameter	Default	Page Number
RS-232C		
RS-232 Host Type	Standard	5-14
Baud Rate	9600	5-84
Parity	None	5-85
Check Receive Errors	Disabled	5-87
Hardware Handshaking	None	5-89
Software Handshaking	None	5-90
Host Serial Response Time-out	2 Sec.	5-92
RTS Line State (cable use only)	Low	5-93
Stop Bit Select	1	5-94
ASCII Format	8-Bit	5-94
Intercharacter Delay	0	5-95
MCL-Net		
MCL-Net Baud Rate	38400	5-95
MCL-Net Hex Addressing Mode	Disabled	5-98
Scanner Address	001	5-99
MCL-Net Transmit Retries	3	5-99
MCL-Net Frame Timeout	500 ms	5-99
MCL POS Host	Other	5-100
Scanner Decode Beep Type	1	5-101

Set Default Parameter

Scanning this bar code returns all parameters to the values listed in Table 5-1.



SET ALL DEFAULTS

Host Type

RS-232C Host Types

Most RS-232C hosts work fine with the default settings, however, three RS-232C hosts are set up with their own parameter default settings. Selecting the ICL, Fujitsu or Nixdorf RS-232C host interface sets the defaults listed below. These defaults take precedence over Standard RS-232 defaults. So, if you select the Fujitsu RS-232C first, and then select the Standard RS-232 defaults, the Fujitsu defaults still take precedence. To return to the factory set defaults, scan the **SET ALL DEFAULTS** bar code on page 5-11.

Table 5-2. Terminal Specific RS-232C

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

*In the Nixdorf Mode B, if CTS is Low, transmission of scan data is disabled. When CTS is High, bar code data is transmitted to the host.

Host Type

RS-232C Host Types

Selecting the ICL, Fujitsu, or Nixdorf RS-232C host interface enables the transmission of Code ID Characters as listed below. 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 hosts.

Table 5-3. Terminal Specific Code ID Characters

	ICL	FUJITSU	NIXDORF
UPC-A	"A"	"A"	"A"
UPC-E	"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"
Code 93	None	None	"L"
D 2 of 5	"H" <len>	None	"H"
UCC/EAN 128	"L" <len>	None	"P"
MSI/Plessey	None	None	"O"
Bookland EAN	"F"	"F"	"A"
Trioptic	None	None	None

Host Type

RS-232C Host Types

Scan the appropriate bar code below to select an RS-232C Host Interface.

STANDARD RS-232C

ICL RS-232C

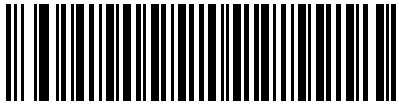
NIXDORF RS-232C Mode A

NIXDORF RS-232C Mode B

FUJITSU RS-232C

Host Response Timeout

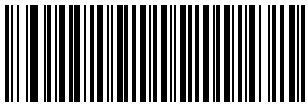
This parameter indicates how long the scanner will wait for a response from the cradle, after the cradle has sent its data to the attached host device. The timeout ranges from 5 seconds to 64 seconds, in 1 second increments. The default is 5 seconds.To change the timeout value, scan the bar code below, then scan two bar codes using the *Numeric Bar Codes* on page 5-102.



HOST RESPONSE TIMEOUT (RANGE OF 5 TO 64 SECONDS)

RF Channel

Select the RF channel for the radio transmission and reception. The channel ranges are nation dependent. To enter a range, scan the bar code below followed by 2 digits from the numeric bar code section (starting on page 5-102) to set the desired channel. If the channel is not legal for your country, an error beep will be heard instead of a successful warble. It is recommended that each scanner/cradle pair be set to a different channel than neighboring scanner/cradle pairs.



RF Channel

RF Retries

On a transmission, the radio will try a certain number of times to send the data prior to giving up if the receiving cradle is not responding. The following parameter allows the user to select how many retries should be tried. In a noisy radio environment, more retries should be selected or a different channel should be selected.

3 RETRIES

4 RETRIES

5 RETRIES

6 RETRIES

7 RETRIES

8 RETRIES

Sleep Time

Scan the bar code below to select how long the scanner will "stay awake" (not power down) in seconds after a trigger pull or a key press. First scan this bar code, then enter a range from 05 to 32, using the *Numeric Bar Codes* on page 5-102. It can stay awake from 5 seconds to 32 seconds.

Note: *Allowing the scanner to stay awake longer than originally programmed may affect the battery life time for that session before needing a charge.*

SLEEP TIME (RANGE OF 5 TO 32 SECONDS)

Decimal Separator

Scan the appropriate bar code below to select what separator to display when you hit the decimal point key on the keypad. Choose DECIMAL POINT (.) or COMMA (,).

DECIMAL POINT (.)

COMMA (,)

Key Click

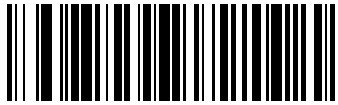
Scan the appropriate bar code below to select whether the keypad click is enabled or not. Choose ENABLE or DISABLE.

ENABLE

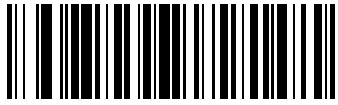
DISABLE

Beeper Tone

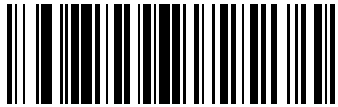
Scan the appropriate bar code below to select a decode beep frequency (tone). Choose LOW FREQUENCY, MEDIUM FREQUENCY, or HIGH FREQUENCY.



LOW FREQUENCY



MEDIUM FREQUENCY



HIGH FREQUENCY

Beeper Volume

Scan the appropriate bar code below to select a beeper volume. Choose LOW VOLUME, MEDIUM VOLUME, or HIGH VOLUME.

LOW VOLUME

MEDIUM VOLUME

HIGH VOLUME

Power Detect Beep

Scan the appropriate barcode below to enable or disable the Power Detection Beep.

POWER DETECT BEEP DISABLED

POWER DETECT BEEP ENABLED

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.

Scan the bar code below to set a Laser On Time. Next scan two numeric bar codes beginning on page 5-102 that correspond to the desired time. Time less than 1.0 second must have a leading zero. For example, to set a Time On 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 *CANCEL* on page 5-104.

Note: *Allowing the scanner to stay on longer than originally programmed may affect the battery life time for that session before needing a charge.*

LASER ON TIME

Beep After Good Decode

Scan the appropriate bar code below to select whether or not the scanner beeps after a good decode. If DO NOT BEEP is selected, the beeper still operates during parameter menu scanning and indicates error conditions.

BEEP AFTER GOOD DECODE

DO NOT BEEP AFTER GOOD DECODE

Transmit “No Read” Message

Scan the appropriate bar code below to select whether or not a “No Read” message is transmitted. When enabled, if a symbol does not decode, “NR” is transmitted. 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

The scanner offers four levels of decode security for linear code types (e.g., Code 39, Interleaved 2 of 5). Higher security levels are selected for decreasing levels of bar code quality. As security levels increase, the scanner's aggressiveness decreases.

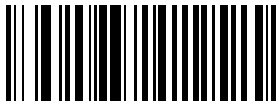
Select the security level appropriate for your bar code quality.

Note: *Does not apply to Code 128.*

Linear Security Level 1

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

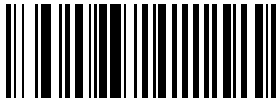
Code Type	Length
Codabar	All
MSI Plessey	4 or less
D 2 of 5	8 or less
I 2 of 5	8 or less



LINEAR SECURITY LEVEL 1

Linear Security Level 2

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



LINEAR SECURITY LEVEL 2

Linear Code Type Security Level (Continued)

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

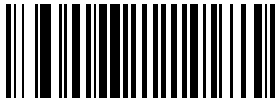
This parameter is only valid when a **Linear Code Type Security Level** (see page 5-27) is enabled. When this parameter is enabled, a bar code must be successfully scanned in both directions (forward and reverse) before being decoded.

ENABLE BI-DIRECTIONAL REDUNDANCY

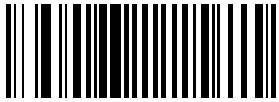
DISABLE BI-DIRECTIONAL REDUNDANCY

Enable/Disable UPC-E/UPC-A/UPC-E1

Scan the appropriate bar code below to enable or disable UPC-E or UPC-A.

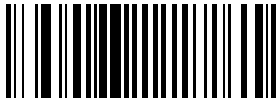


ENABLE UPC-E



DISABLE UPC-E

ENABLE UPC-A



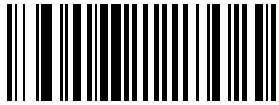
DISABLE UPC-A

ENABLE UPC-E1

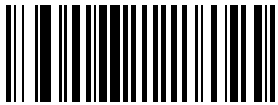
DISABLE UPC-E1

Enable/Disable EAN-8/EAN-13

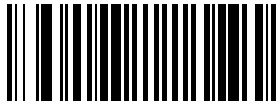
Scan the appropriate bar code below to enable or disable EAN-8 or EAN-13.



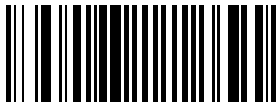
ENABLE EAN-8



DISABLE EAN-8



ENABLE EAN-13



DISABLE EAN-13

Enable/Disable Bookland EAN

Scan the appropriate bar code below to enable or disable Bookland EAN.

ENABLE BOOKLAND EAN

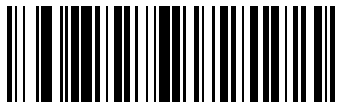
DISABLE BOOKLAND EAN

Decode UPC/EAN Supplementals

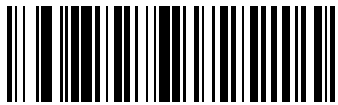
Supplementals are characters (either 2 or 5) that are added on according to specific code format conventions (e.g., UPC A+2, UPC E+2, EAN 8+2). Three options are available.

- If **Decode UPC/EAN with supplementals** is selected, UPC/EAN symbols without supplemental characters are not decoded.
- If **Ignore UPC/EAN with supplementals** is selected, UPC/EAN symbols with supplemental characters are decoded and the supplemental characters are ignored.
- If **Autodiscriminate UPC/EAN supplementals** is selected, UPC/EAN symbols, either with or without supplementals, are decoded. If selected, choose an appropriate *Decode UPC/EAN Supplemental Redundancy* value from the next page.

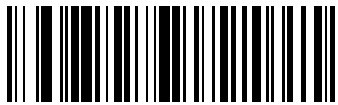
Note: *To minimize the risk of invalid data transmission, select whether to read or ignore supplemental characters.*



DECODE UPC/EAN WITH SUPPLEMENTALS



IGNORE UPC/EAN WITH SUPPLEMENTALS

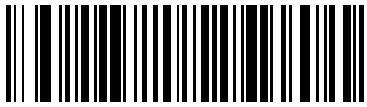


AUTODISCRIMINATE UPC/EAN SUPPLEMENTALS

Decode UPC/EAN Supplemental Redundancy

With Autodiscriminate UPC/EAN Supplementals selected, this option adjusts the number of times a symbol without supplementals is decoded before transmission. The range is from two to 20 times. Five or above is recommended when decoding a mix of UPC/EAN symbols with and without supplementals, and the autodiscriminate option is selected.

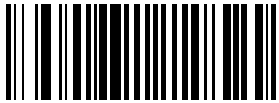
Scan the bar code below to select a decode redundancy value. Next scan two numeric bar codes beginning on page 5-102. Single digit numbers must have a leading zero. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.



DECODE UPC/EAN SUPPLEMENTAL REDUNDANCY

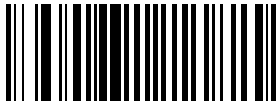
Transmit UPC-A/UPC-E/UPC-E1 Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPC-A, UPC-E, or UPC-E1 check digit.

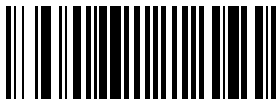


TRANSMIT UPC-A CHECK DIGIT

DO NOT TRANSMIT UPC-A CHECK DIGIT



TRANSMIT UPC-E CHECK DIGIT



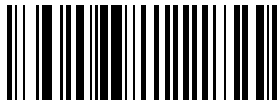
DO NOT TRANSMIT UPC-E CHECK DIGIT

TRANSMIT UPC-E1 CHECK DIGIT

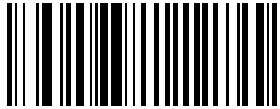
DO NOT TRANSMIT UPC-E1 CHECK DIGIT

UPC-A Preamble

Three options are given for lead-in characters for UPC-A 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>)

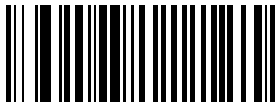


SYSTEM CHARACTER
(<SYSTEM CHARACTER> <DATA>)

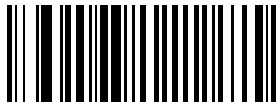
SYSTEM CHARACTER & COUNTRY CODE
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

UPC-E Preamble

Three options are given for lead-in characters for UPC-E 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>)

UPC-E1 Preamble

Three options are given for lead-in characters for UPC-E1 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>)

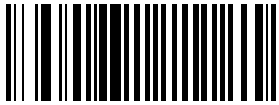
SYSTEM CHARACTER
(<SYSTEM CHARACTER> <DATA>)

SYSTEM CHARACTER & COUNTRY CODE
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

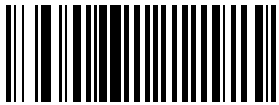
Convert UPC-E to UPC-A

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

Scanning **DO NOT CONVERT UPC-E TO UPC-A** allows you to transmit UPC-E (zero suppressed) decoded data.



CONVERT UPC-E TO UPC-A (ENABLE)



DO NOT CONVERT UPC-E TO UPC-A (DISABLE)

Convert UPC-E1 to UPC-A

This parameter converts UPC-E1 decoded data to UPC-A format before transmission. After conversion, data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).

Scanning **DO NOT CONVERT UPC-E1 TO UPC-A** allows you to transmit UPC-E1 decoded data.

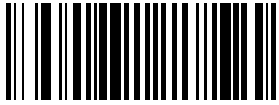
CONVERT UPC-E1 TO UPC-A
(ENABLE)

DO NOT CONVERT UPC-E1 TO UPC-A
(DISABLE)

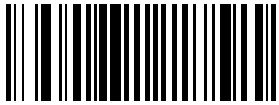
EAN Zero Extend

If 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

Convert EAN-8 to EAN-13 Type

When EAN Zero Extend is enabled, this parameter gives you the option of labeling the extended symbol as either an EAN-13 bar code, or an EAN-8 bar code.

When EAN Zero Extend is disabled, this parameter has no effect on bar code data.

TYPE IS EAN-13

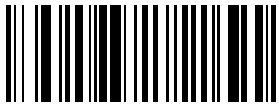
TYPE IS EAN-8

UPC/EAN Security Level

The scanner offers four levels of decode security for UPC/EAN bar codes. Increasing levels of security are provided for decreasing levels of bar code quality. There is an inverse relationship between security and scanner aggressiveness, so be sure to choose only that level of security necessary for any given application.

UPC/EAN Security Level 0

This is the default setting which allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding "in-spec" UPC/EAN bar codes.



UPC/EAN SECURITY LEVEL 0

UPC/EAN Security Level 1

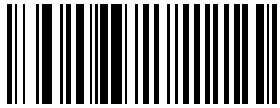
As bar code quality levels diminish, certain characters become prone to mis-decodes before others (i.e., 1, 2, 7, 8). If you are experiencing mis-decodes of poorly printed bar codes, and the mis-decodes are limited to these characters, select this security level.

UPC/EAN SECURITY LEVEL 1

UPC/EAN Security Level (Continued)

UPC/EAN Security Level 2

If you are experiencing mis-decodes of poorly printed bar codes, and the mis-decodes are not limited to characters 1, 2, 7, and 8, select this security level.



UPC/EAN SECURITY LEVEL 2

UPC/EAN Security Level 3

If you have tried Security Level 2, and are still experiencing misdecodes, select this security level. Be advised that selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selection of this level of security significantly impairs the decoding ability of the scanner. If this level of security is necessary, you should try to improve the quality of your bar codes.

UPC/EAN SECURITY LEVEL 3

UPC/EAN Coupon Code

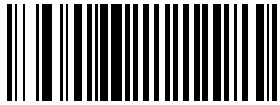
When this parameter is enabled, the scanner decodes UPC-A, UPC-A with 2 supplemental characters, UPC-A with 5 supplemental characters, and UPC-A/EAN128 bar codes. *AUTODISCRIMINATE UPC/EAN SUPPLEMENTALS* on page 5-33 must be enabled.

ENABLE UPC/EAN COUPON CODE

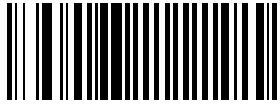
DISABLE UPC/EAN COUPON CODE

Enable/Disable Code 128

Scan the appropriate bar code below to enable or disable Code 128.



ENABLE CODE 128

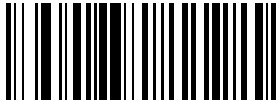


DISABLE CODE 128

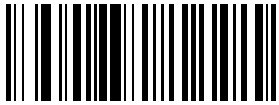
Note: *The "|" character and the NULL character cannot be embedded in the barcode to be scanned when using Code 128.*

Enable/Disable UCC/EAN-128

Scan the appropriate bar code below to enable or disable UCC/EAN-128. (See Appendix A, *Bar Code Information* for details on UCC/EAN-128.)



ENABLE UCC/EAN-128



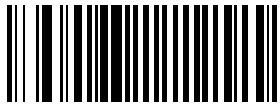
DISABLE UCC/EAN-128

Lengths for Code 128

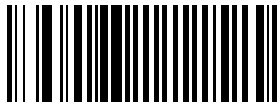
No length setting is required for Code 128. The default setting is Any Length.

Enable/Disable Code 39

Scan the appropriate bar code below to enable or 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 cannot be enabled simultaneously. If you get an error beep when enabling Trioptic Code 39, disable Code 39 Full ASCII and try again. To enable or disable Trioptic Code 39, scan the appropriate bar code below.

ENABLE TRIOPTIC CODE 39

DISABLE TRIOPTIC CODE 39

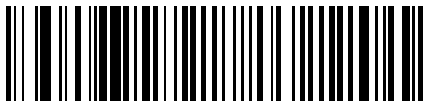
Set Lengths for Code 39

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.

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **Code 39 One Discrete Length**, then scan **1**, **4**, only Code 39 symbols containing 14 characters are decoded. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

CODE 39 - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. 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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.



CODE 39 - TWO DISCRETE LENGTHS

Set Lengths for Code 39 (Continued)

Length Within Range - This option allows you to decode a code type within a specified range. 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). Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

CODE 39 - LENGTH WITHIN RANGE

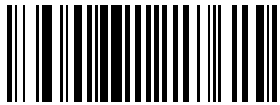
Any Length - Scanning this option allows you to decode Code 39 symbols containing any number of characters.

CODE 39 - ANY LENGTH

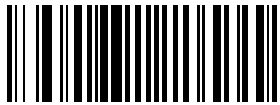
Code 39 Check Digit Verification

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 the appropriate bar code below 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

Scan the appropriate bar code below to enable or disable Code 39 Full ASCII.

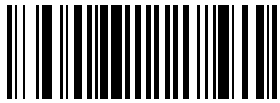
When enabled, the ASCII character set assigns a code to letters, punctuation marks, numerals, and most control keystrokes on the keyboard.

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.

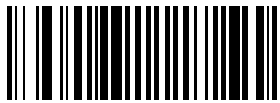
Code 39 Full ASCII interprets the bar code special character ($ + % /) preceding a Code 39 character and assigns an ASCII character value to the pair. For example, when Code 39 Full ASCII is enabled and a **+B** is scanned, it is interpreted as **b**, **%J** as **?**, and **$H** emulates the keystroke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

Code 39 Full ASCII and Trioptic Code 39 cannot be enabled simultaneously. If you get an error beep when enabling Code 39 Full ASCII, disable Trioptic Code 39 and try again.

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



ENABLE CODE 39 FULL ASCII



DISABLE CODE 39 FULL ASCII

Note: *The "|" character and the NULL character cannot be embedded in the barcode to be scanned when using Code 39 Full ASCII.*

Convert Code 39 to Code 32

Scan the appropriate bar code below to enable or disable converting 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

Scan the appropriate bar code below to enable or disable the prefix character "A" to all Code 32 bar codes.

Note: *Convert Code 39 to Code 32 must be enabled for this parameter to function.*

ENABLE CODE 32 PREFIX

DISABLE CODE 32 PREFIX

Enable/Disable Code 93

Scan the appropriate bar code below to enable or 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.

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

CODE 93 - ONE DISCRETE LENGTH

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

CODE 93 - TWO DISCRETE LENGTHS

Set Lengths for Code 93 (Continued)

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). Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

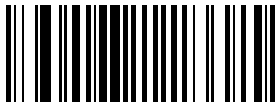
CODE 93 - LENGTH WITHIN RANGE

Any Length - Scanning this option allows you to decode Code 93 symbols containing any number of characters.

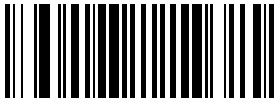
CODE 93 - ANY LENGTH

Enable/Disable Interleaved 2 of 5

Scan the appropriate bar code below to enable or 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.

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

I 2 of 5 - ONE DISCRETE LENGTH

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

I 2 of 5 - TWO DISCRETE LENGTHS

Set Lengths for Interleaved 2 of 5 (Continued)

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). Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

I 2 of 5 - LENGTH WITHIN RANGE

Any Length - Scanning this option allows you to decode I 2 of 5 symbols containing any number of characters.

Note: *Selecting this option may lead to mis-decodes for I 2 of 5 codes.*

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 the appropriate bar code 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. In order to accomplish this, the I 2 of 5 code must be enabled, one length must be set to 14, 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)

Enable/Disable Discrete 2 of 5

Scan the appropriate bar code below to enable or 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.

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

D 2 of 5 - ONE DISCRETE LENGTH

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, *CANCEL* on page 5-104.

D 2 of 5 - TWO DISCRETE LENGTHS

Set Lengths for Discrete 2 of 5 (Continued)

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). Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

D 2 of 5 - LENGTH WITHIN RANGE

Any Length - Scanning this option allows you to decode D 2 of 5 symbols containing any number of characters.

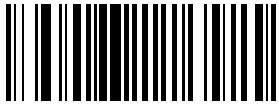
Note: *Selecting this option may lead to mis-decodes for D 2 of 5 codes.*

D 2 of 5 - ANY LENGTH

Enable/Disable Codabar

Scan the appropriate bar code below to enable or 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.

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

CODABAR - ONE DISCRETE LENGTH

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

CODABAR - TWO DISCRETE LENGTHS

Set Lengths for Codabar (Continued)

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). Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

CODABAR - LENGTH WITHIN RANGE

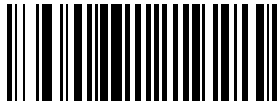
Any Length - Scanning this option allows you to decode Codabar symbols containing any number of characters.

CODABAR - ANY LENGTH

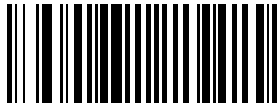
CLSI Editing

If 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.*



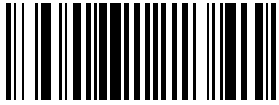
ENABLE CLSI EDITING



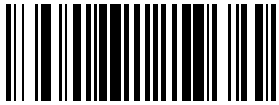
DISABLE CLSI EDITING

NOTIS Editing

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



ENABLE NOTIS EDITING



DISABLE NOTIS EDITING

Enable/Disable MSI Plessey

Scan the appropriate bar code below to enable or 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.

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

MSI PLESSEY - ONE DISCRETE LENGTH

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. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

MSI PLESSEY - TWO DISCRETE LENGTHS

Set Lengths for MSI Plessey (Continued)

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). Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

MSI PLESSEY - LENGTH WITHIN RANGE

Any Length - Scanning this option allows you to decode MSI Plessey symbols containing any number of characters.

Note: *Selecting this option may lead to mis-decodes for MSI Plessey codes.*

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.

ONE MSI PLESSEY CHECK DIGIT

TWO MSI PLESSEY CHECK DIGITS

Transmit MSI Plessey Check Digit

Scan the appropriate bar code 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

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. The code ID character precedes 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 Appendix A, *Bar Code Information* for AIM Identifiers.

Symbol Code ID Characters

A = UPC-A, UPC-E, EAN-8, EAN-13

B = Code 39

C = Codabar

D = Code 128

E = Code 93

F = Interleaved 2 of 5

G = Discrete 2 of 5, or Discrete 2 of 5 IATA

J = MSI Plessey

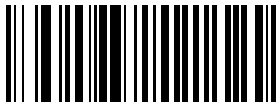
K = UCC/EAN-128

L = Bookland EAN

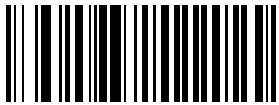
M = Trioptic Code 39

N = Coupon Code

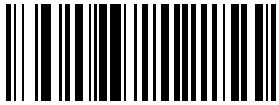
Transmit Code ID Character (Continued)



SYMBOL CODE ID CHARACTER



AIM CODE ID CHARACTER



NONE

Pause Duration

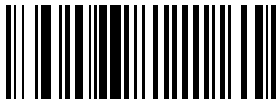
This parameter allows a pause to be inserted at any point in the data transmission. Pauses are set by scanning the bar code below followed by a two digit number (i.e. two bar codes), and are measured in 1/10 second intervals. For example, scanning bar codes “0” and “1” inserts a 1/10 second pause; “0” and “5” gives you a 1/2 second delay. Numeric bar codes begin on page 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

PAUSE DURATION

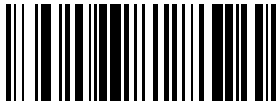
RS-232C Parameters

Baud Rate

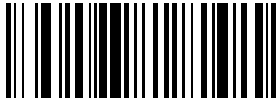
Baud rate is the number of bits of data transmitted per second. The scanner's baud rate setting should match the data rate setting of the host device. If not, data may not reach the host device or may reach it in distorted form.



BAUD RATE 600

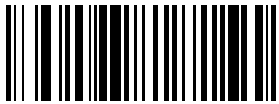


BAUD RATE 1200

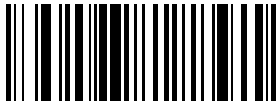


BAUD RATE 2400

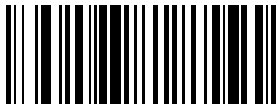
Baud Rate (Continued)



BAUD RATE 4800



BAUD RATE 9600



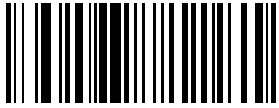
BAUD RATE 19,200

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.

If you select **ODD** parity, the parity bit has a value 0 or 1, based on data, to ensure that an odd number of 1 bits are contained in the coded character.



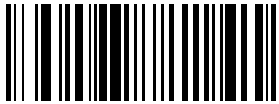
ODD

If you select **EVEN** parity, the parity bit has a value 0 or 1, based on data, to ensure that an even number of 1 bits are contained in the coded character.

EVEN

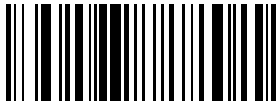
Parity (Continued)

Select **MARK** parity and the parity bit is always 1.



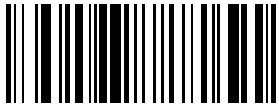
MARK

Select **SPACE** parity and the parity bit is always 0.



SPACE

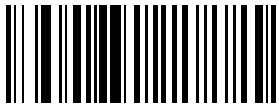
If no parity is required, select **NONE**.



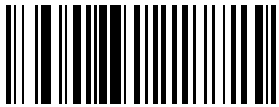
NONE

Check Receive Errors

Select whether or not the parity, framing, and overrun of received characters are checked. The type of parity used is selectable through the **PARITY** parameter.



CHECK FOR RECEIVED ERRORS



DO NOT CHECK FOR RECEIVED ERRORS

Hardware Handshaking

The data interface consists of an RS-232C port. The port has been designed to operate either with or without the hardware handshaking lines, RTS, *Request to Send*, and CTS, *Clear to Send*.

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

- The scanner reads the CTS line for activity. If CTS is asserted, the scanner waits up to two seconds for the host to negate the CTS line. If, after two 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 negated, the scanner asserts the RTS line and waits up to two seconds for the host to assert CTS. When the host asserts CTS, data is transmitted. If, after two 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 negates RTS 10 msec after sending the last character.
- The host should respond by negating CTS. The scanner checks for a negated CTS upon the next transmission of data.

During the transmission of data, the CTS line should be asserted. 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 above communications sequence fails, the scanner issues an error indication. In this case, the data is lost and must be rescanned.

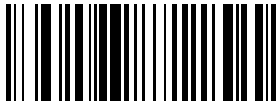
If Hardware Handshaking and Software Handshaking are both enabled, Hardware Handshaking will take precedence.

Note: *The DTR signal is jumpered active.*

Note: *When using RTS/CTS handshaking and a PL370/470 cradle, there is an 8 ms delay for the information to travel between the host and the scanner. If this setup is necessary, scan the Intercharacter Delay bar code on page 5-95 and set the delay for 10 ms or more.*

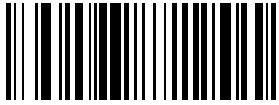
Hardware Handshaking (Continued)

Scan the bar code below if no Hardware Handshaking is desired.



NONE

Scan the bar code below to select Standard RTS/CTS Hardware Handshaking.



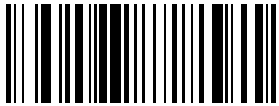
STANDARD RTS/CTS

When RTS/CTS Option 1 is selected, the cradle asserts RTS before transmitting and ignores the state of CTS. The scanner deasserts RTS when the transmission is complete.

RTS/CTS OPTION 1

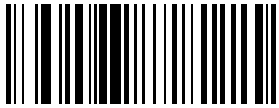
Hardware Handshaking (Continued)

When Option 2 is selected, 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 (default), the scanner issues an error indication and discards the data.



RTS/CTS OPTION 2

When Option 3 is selected, the scanner asserts RTS prior to any data transmission, regardless of the state of CTS. The scanner waits up to two seconds (default) for CTS to be asserted. If CTS is not asserted during this time, the scanner issues an error indication and discards the data. The scanner deasserts RTS when transmission is complete.



RTS/CTS OPTION 3

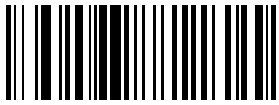
Software Handshaking

This parameter offers control of the data transmission process in addition to, or instead of, that offered by hardware handshaking. There are five options.

If Software Handshaking and Hardware Handshaking are both enabled, Hardware Handshaking takes precedence.

None

When this option is selected, data is transmitted immediately.



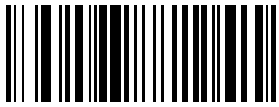
NONE

Software Handshaking (Continued)

ACK/NAK

When this option is selected, after transmitting data, the cradle expects either an ACK, *Acknowledge*, or NAK, *Negative Acknowledge*, response from the host. Whenever a NAK is received, the cradle 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 cradle issues an error indication and discards the data.

The cradle waits up to the programmable Host Serial Response Time-out to receive an ACK or NAK. If the cradle does not get a response in this time, it issues an error indication and discards the data. There are no retries when a time-out occurs.



ACK/NAK

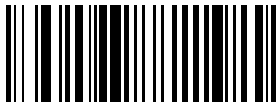
ENQ

When this option is selected, the cradle waits for an ENQ, *Enquiry*, character from the host before transmitting data. If an ENQ is not received within two seconds, the cradle issues an error indication and discards the data. The host must transmit an ENQ character at least every two seconds to prevent transmission errors.

ENQ

ACK/NAK with ENQ

This combines the two previous options.



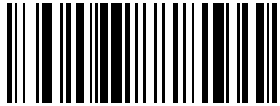
ACK/NAK with ENQ

Software Handshaking (Continued)

XON/XOFF

An XOFF, *Transmit Off*, character turns the scanner transmission off until the scanner receives an XON, *Transmit On*, 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 two 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.

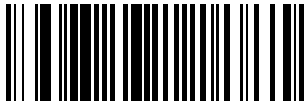


XON/XOFF

Host Serial Response Time-out

This parameter specifies how long the scanner waits for an ACK, NAK or CTS before determining that a transmission error has occurred. This only applies when in one of the ACK/NAK Software Handshaking modes, or RTS/CTS Hardware Handshaking option.

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 5-102. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.



HOST SERIAL RESPONSE TIME-OUT

RTS Line State

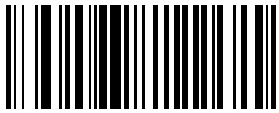
Scan the appropriate bar code below to set the idle state of the Serial Host RTS line. Choose LOW RTS line state or HIGH RTS line state.

HOST: LOW RTS

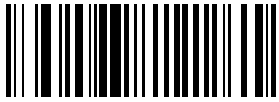
HOST: HIGH RTS

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 (one or two) selected depends on the number the receiving terminal is programmed to accommodate. Set the number of stop bits to match host device requirements.



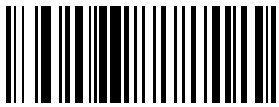
1 STOP BIT



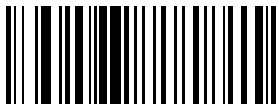
2 STOP BITS

ASCII Format

This parameter allows the cradle to interface with devices requiring a 7-bit or 8-bit ASCII protocol.



7-BIT



8-BIT

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 ms in 1 ms increments (if you are using a cradle and RTS/CTS handshaking, the delay period can range from 5 ms to 99 ms). After scanning the bar code below, scan two bar codes beginning on page 5-102 to set the desired time-out. If you make an error, or wish to change your selection, scan *CANCEL* on page 5-104.

IINTERCHARACTER DELAY

MCL-Net Parameters

MCL-Net Baud Rate

Baud rate is the number of bits of data transmitted per second. Scan the appropriate bar code below to set the MCL-Net baud rate. The default baud rate is 38400.

BAUD RATE 600

BAUD RATE 1200

BAUD RATE 2400

MCL-Net Baud Rate (Continued)

BAUD RATE 4800

BAUD RATE 9600

BAUD RATE 19200

BAUD RATE 38400

MCL-Net Hex Addressing Mode

Scan the appropriate bar code below to set the MCL-Net Hex addressing mode. The default mode is *Disabled*.

MCL-NET HEX ADDRESSING DISABLED

MCL-NET HEX ADDRESSING ENABLED

Scanner Address

Scan the following barcode, followed by 3 digits from the numeric barcode section (starting on page 5-102), to define the (decimal) address of the scanner in the range 001 to 254.

SCANNER ADDRESS

MCL-Net Transmit Retries

Scan the following barcode, followed by 2 digits from the numeric barcode section (starting on page 5-102), to define the number of retries in the range 1 to 10.

MCL-NET RETRIES

MCL-Net Frame Timeout

Scan the following barcode, followed by 2 digits from the numeric barcode section (starting on page 5-102), to define the amount of time to wait for an ACK or NAK from the host before retransmitting. The timeout is in 100 ms increments in the range 100 ms to 3000 ms.

MCL-NET FRAME TIMEOUT

MCL POS Host

Scan the appropriate barcode below to choose MCL-Net or Other as the host to be used by the default application during POS mode. Choosing MCL-Net enables the scanner to communicate with a host running MCL-Link. Choosing Other selects a standard RS-232 or Synapse host, as defined by the system installation. (If a Synapse cable is installed, it will be detected and used, otherwise the RS-232 host will be used.)

Note: *This parameter ONLY affects the default application. Users are free to program their own application to use NI/NO commands to interact with an MCL-Link host or SI/SO commands to communicate on the RS-232/Synapse interface*

POS USE MCL-NET HOST

POS USE OTHER HOST

Scanner Decode Beep Type

Select the type of beep for the scanner. This parameter is useful when two or more systems are installed in proximity of each other. Unique patterns can be set up to distinguish each system's receipt of bar code data.

BEEP TYPE 1

BEEP TYPE 2

BEEP TYPE 3

BEEP TYPE 4

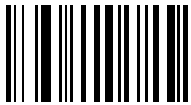
BEEP TYPE 5

Numeric Bar Codes

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

0

1



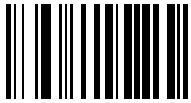
2

3

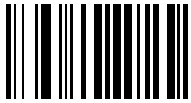
4

Numeric Bar Codes (Continued)

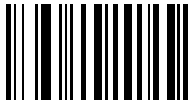
5



6



7



8

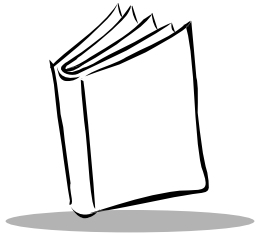
9

Numeric Bar Codes (Continued)

Cancel

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

CANCEL



Appendix A
Bar Code Information

UCC/EAN-128

UCC/EAN-128 is a convention for printing data fields with standard Code 128 bar code symbols. UCC/EAN-128 symbols are distinguished by a leading FNC 1 character as the first or second character in the symbol. Other FNC 1 characters are used to delineate fields.

When EAN-128 symbols are read, they are transmitted after special formatting strips off the leading FNC 1 character and replaces other FNC 1 characters with the ASCII 29 GS control character.

When AIM symbology identifiers are transmitted, the modifier character indicates the position of the leading FNC 1 character according to AIM guidelines. For example,]**c1** indicates a UCC/EAN-128 symbol with a leading FNC1 character.

Standard Code 128 bar codes which do not have a leading FNC 1 may still be used, but are not encoded according to the EAN-128 convention. Standard Code 128 and UCC/EAN-128 may be mixed in an application. The scanner autodiscriminates between these symbols and can enable or disable one or both code types via bar code menus. The following table indicates the behavior of the scanner in each of the four possible parameter settings.

Table A-1. Reading Standard Code128 & UCC/EAN 128

Standard Code 128	UCC/EAN-128	Effect and Example
Disable	Disable	No Code 128 symbols can be read.
Disable	Enable	Read only symbols with leading FNC 1. Examples: ^{FNC1}ABCD^{FNC1}E will be read as ABCD^{29}E A^{FNC1}BCD^{FNC1}E will be read as ABCD^{29}E ^{FNC1FNC1}ABCD^{FNC1}E will be read as ABCD^{29}E ABCD^{FNC1}E can not be read ABCDE can not be read
Enable	Disable	Read only symbols without leading FNC 1. Examples: ^{FNC1}ABCD^{FNC1}E can not be read A^{FNC1}BCD^{FNC1}E can not be read ^{FNC1FNC1}ABCD^{FNC1}E can not be read ABCD^{FNC1}E will be read as ABCD^{29}E ABCDE will be read as ABCDE
Enable	Enable	Read both types of symbols. Examples: ^{FNC1}ABCD^{FNC1}E will be read as ABCD^{29}E A^{FNC1}BCD^{FNC1}E will be read as ABCD^{29}E ^{FNC1FNC1}ABCD^{FNC1}E will be read as ABCD^{29}E ABCD^{FNC1}E will be read as ABCD^{29}E ABCDE will be read as ABCDE

AIM Code Identifiers

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

] = Flag Character (ASCII 93)
c = Code Character (see Table A-2)
m = Modifier Character (see Table A-3)

Table A-2. Code Characters

Code Character	Code Type
A	Code 39
C	Code 128/EAN-128
E	UPC/EAN
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 2 of 5
M	MSI Plessey
S	D2 of 5, IATA 2 of 5
X	Bookland EAN, Code 39 Trioptic, Coupon Code

The modifier character is the sum of the applicable option values based on the following table.

Table A-3. Modifier Characters

Code Type	Option Value	Option
Code 39	0	No check character or Full ASCII processing.
	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	
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	

Table A-3. Modifier Characters (Cont'd)

Code Type	Option Value	Option
Codabar	0	No check digit processing.
	1	Reader has checked check digit.
	3	Reader has stripped check digit before transmission.
	Example: A Codabar bar code without check digit, 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	Single check digit checked.
	1	Two check digits checked.
	2	Single check digit verified and stripped before transmission.
	3	Two check digits verified and stripped before transmission.
	Example: An MSI Plessey bar code 4123, with a single check digit checked, 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	
UPC/EAN	0	Standard packet in full EAN country code format, which is 13 digits for UPC-A and UPC-E (not including supplemental data).
	1	Two-digit supplement data only.
	2	Five-digit supplement data only.
	4	EAN-8 data packet.
	Example: A UPC-A 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	

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 scanner, 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**00012345678905]**E1**10.

Table A-4. ASCII Character Set

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1000	%U	CTRL 2	1024	$X	CTRL X
1001	$A	CTRL A	1025	$Y	CTRL Y
1002	$B	CTRL B	1026	$Z	CTRL Z
1003	$C	CTRL C	1027	%A	CTRL [
1004	$D	CTRL D	1028	%B	CTRL \
1005	$E	CTRL E	1029	%C	CTRL]
1006	$F	CTRL F	1030	%D	CTRL 6
1007	$G	CTRL G	1031	%E	CTRL -
1008	$H	CTRL H	1032	Space	Space
1009	$I	CTRL I	1033	/A	!
1010	$J	CTRL J	1034	/B	‘
1011	$K	CTRL K	1035	/C	#
1012	$L	CTRL L	1036	/D	$
1013	$M	CTRL M	1037	/E	%
1014	$N	CTRL N	1038	/F	&
1015	$O	CTRL O	1039	/G	‘
1016	$P	CTRL P	1040	/H	(
1017	$Q	CTRL Q	1041	/I	)
1018	$R	CTRL R	1042	/J	*
1019	$S	CTRL S	1043	/K	+
1020	$T	CTRL T	1044	/L	,
1021	$U	CTRL U	1045	-	-
1022	$V	CTRL V	1046	.	.
1023	$W	CTRL W	1047	/	/

Table A-4. ASCII Character Set (Cont'd)

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1048	0	0	1073	I	I
1049	1	1	1074	J	J
1050	2	2	1075	K	K
1051	3	3	1076	L	L
1052	4	4	1077	M	M
1053	5	5	1078	N	N
1054	6	6	1079	O	O
1055	7	7	1080	P	P
1056	8	8	1081	Q	Q
1057	9	9	1082	R	R
1058	/Z	:	1083	S	S
1059	%F	;	1084	T	T
1060	%G	<	1085	U	U
1061	%H	=	1086	V	V
1062	%I	>	1087	W	W
1063	%J	?	1088	X	X
1064	%V	@	1089	Y	Y
1065	A	A	1090	Z	Z
1066	B	B	1091	%K	[
1067	C	C	1092	%L	\
1068	D	D	1093	%M	]
1069	E	E	1094	%N	^
1070	F	F	1095	%O	_
1071	G	G	1096	%W	‘
1072	H	H	1097	+A	a

Table A-4. ASCII Character Set (Cont'd)

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1098	+B	b	1113	+Q	q
1099	+C	c	1114	+R	r
1100	+D	d	1115	+S	s
1101	+E	e	1116	+T	t
1102	+F	f	1117	+U	u
1103	+G	g	1118	+V	v
1104	+H	h	1119	+W	w
1105	+I	i	1120	+X	x
1106	+J	j	1121	+Y	y
1107	+K	k	1122	+Z	z
1108	+L	l	1123	%P	{
1109	+M	m	1124	%Q	|
1110	+N	n	1125	%R	}
1111	+O	o	1126	%S	~
1112	+P	p	1127		Undefined

Table A-4. ASCII Character Set (Cont'd)

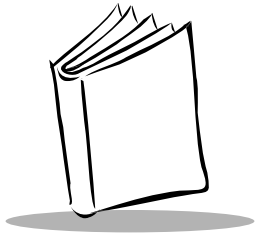
ALT Keys	Keystroke	ALT Keys	Keystroke	ALT Keys	Keystroke
2064	ALT 2	2075	ALT K	2086	ALT V
2065	ALT A	2076	ALT L	2087	ALT W
2066	ALT B	2077	ALT M	2088	ALT X
2067	ALT C	2078	ALT N	2089	ALT Y
2068	ALT D	2079	ALT O	2090	ALT Z
2069	ALT E	2080	ALT P	2091	ALT [
2070	ALT F	2081	ALT Q	2092	ALT \
2071	ALT G	2082	ALT R	2093	ALT]
2072	ALT H	2083	ALT S	2094	ALT 6
2073	ALT I	2084	ALT T	2095	ALT -
2074	ALT J	2085	ALT U		
Misc. Key	**Keystroke**	**Misc. Key**	**Keystroke**	**Misc. Key**	**Keystroke**
3001	PA 1	3009	CMD 7	3017	°
3002	PA 2	3010	CMD 8	3018	1/2
3003	CMD 1	3011	CMD 9	3019	¶
3004	CMD 2	3012	CMD 10	3020	§
3005	CMD 3	3013	¥	3021	|
3006	CMD 4	3014	£	3022	0/00
3007	CMD 5	3015	¤		
3008	CMD 6	3016	¬		

Table A-4. ASCII Character Set (Cont'd)

PF Keys	Keystroke	PF Keys	Keystroke	PF Keys	Keystroke
4001	PF 1	4009	PF 9	4017	PF 17
4002	PF 2	4010	PF 10	4018	PF 18
4003	PF 3	4011	PF 11	4019	PF 19
4004	PF 4	4012	PF 12	4020	PF 20
4005	PF 5	4013	PF 13	4021	PF 21
4006	PF 6	4014	PF 14	4022	PF 22
4007	PF 7	4015	PF 15	4023	PF 23
4008	PF 8	4016	PF 16	4024	PF 24
F Keys	**Keystroke**	**F Keys**	**Keystroke**	**F Keys**	**Keystroke**
5001	F 1	5014	F 14	5027	F 27
5002	F 2	5015	F 15	5028	F 28
5003	F 3	5016	F 16	5029	F 29
5004	F 4	5017	F 17	5030	F 30
5005	F 5	5018	F 18	5031	F 31
5006	F 6	5019	F 19	5032	F 32
5007	F 7	5020	F 20	5033	F 33
5008	F 8	5021	F 21	5034	F 34
5009	F 9	5022	F 22	5035	F 35
5010	F 10	5023	F 23	5036	F 36
5011	F 11	5024	F 24	5037	F 37
5012	F 12	5025	F 25	5038	F 38
5013	F 13	5026	F 26	5039	F 39

Table A-4. ASCII Character Set (Cont'd)

Numeric Keypad	Keystroke	Numeric Keypad	Keystroke	Numeric Keypad	Keystroke
6042	*	6049	1	6056	8
6043	+	6050	2	6057	9
6044	Undefined	6051	3	6058	Enter
6045	-	6062	4	6059	Num Lock
6046	.	6063	5	6060	00
6047	/	6064	6		
6048	0	6065	7		
Extended Keypad	**Keystroke**	**Extended Keypad**	**Keystroke**	**Extended Keypad**	**Keystroke**
7001	Break	7008	Backspace	7015	Up Arrow
7002	Delete	7009	Tab	7016	Dn Arrow
7003	Pg Up	7010	Print Screen	7017	Left Arrow
7004	End	7011	Insert	7018	Right Arrow
7005	Pg Dn	7012	Home	7019	Back Tab
7006	Pause	7013	Enter		
7007	Scroll Lock	7014	Escape		



Appendix B
Automatic Project Download

The Phaser P 370/470 RF scanner is shipped from the factory with a pre-installed default application. This application allows the scanner to be used "out of the box" for users who choose to do so. However, most users will prefer to load their own application into the scanner, so the default application implements an "Automatic Project Download" feature to simplify the process.

When the default application is running, and the scanner is placed into its paired cradle, the scanner will query the *MCL-Link* host for data in a file named "PHASER.CFG". The scanner will use the information in this file to find the project directory which the user wishes to have loaded into the scanner, and will then execute the PROJECT.CMD" script which exists in the directory. This script will automatically download all program and data files relevant to the project to the scanner and will reset the scanner making it ready to run the user's application.

In order to utilize this mechanism, the user needs only generate the PHASER.CFG file and place it in the directory specified in the *MCL-Link* setup screen as the "General path for data files". Any text editor may be used to create this file; the contents of the file are as follows:

```
X|<path name to the user's project>
```

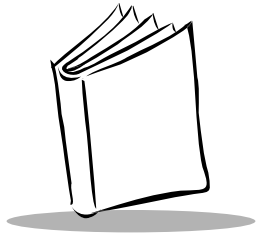
The X| at the beginning of the line are required for the MCL-Net CR command to recognize this file and read the data. The path name should include the entire path hierarchy. Also, all backslashes (\) in the path name should be replaced with the string "\5C", so that the MCL code running on the scanner does not inadvertently convert part of the path name to the equivalent Hex Character.

An example PHASER.CFG file is shown below:

```
x|c:\5Cmcl-p460\5cdesigner\5Csample1.prj
```

Note that designer always appends the .prj suffix to the directories it creates to store project files.

The PROJECT.CMD file will be automatically generated by the MCL-Designer application.



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_____

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