



BCSETUP
Bar Code Reader Configuration Software

Programming Manual
Cat. No. Q02BAZ2

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to the product.



DANGER! Indicates information that, if not heeded, is likely to result in loss of life or serious injury.



WARNING Indicates information that, if not heeded, could possibly result in loss of life or serious injury.



Caution Indicates information that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

OMRON Product References

All OMRON products are capitalized in this manual. The terms *Unit and Module* are also capitalized when referring to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation "PLC" means Programmable Controller and is not used as an abbreviation for anything else.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.



Note Indicates information of particular interest for efficient and convenient operation of the product.

1, 2, 3... 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

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No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of information contained in this publication.

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About This Manual:

This manual describes BCSETUP, Omron's Bar Code Reader Configuration software, and includes the sections described below.

Please read this manual completely and be sure you understand the information provided before attempting to operate the system.

- Section 1 Provides a general introduction to the BCSETUP program, program installation, and executing the program from a PC.
- Section 2 Describes how to connect your Omron Bar Code Reader to a PC or terminal.
- Section 3 Explains some programming screens basics; moving around the programming screens, function keys, and on-line help.
- Section 4 Describes how to use the program. This chapter provides detailed descriptions of each parameter that is available for programming your Omron Bar Code Reader.
- Section 5 Explains how to change your Omron Bar Code Reader parameters using a terminal or host computer.

WARNING	Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.
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Section I

Getting Started

This chapter describes BCSETUP, the Omron Bar Code Reader configuration setup program and how to install it on your PC. This chapter also explains how to execute the program once it is installed on your PC.

This manual concentrates primarily on programming your Omron Bar Code Reader using a PC. For any information pertaining to using a terminal or programming with a host computer, refer to Section Five of this manual.

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Getting Started

**About Your
Diskette And
Your Manual**

Welcome to the BCSETUP Program, the tool for programming your Omron Bar Code Reader. The BCSETUP program is designed to be versatile and easy to use. Below is a list of a few tasks that this program allows you to perform on your Omron Bar Code Reader:

- Change bar code specifications
- Setup communication parameters
- Change Input/Output parameters
- Retrieve current parameters from your Omron Bar Code Reader
- Enter a Terminal emulation mode
- Save your operational parameters on your hard drive

This program is provided on a 3 1/2 inch Double Sided High Density (DS, HD) floppy diskette labelled **BCSETUP 3.3**. The disk looks as it does in the drawing below:

This Is Your Guide To The Program

The BCSETUP programming manual is your guide to programming your Omron Bar Code Reader using a PC or a terminal. In this manual, you will find instructions for:

- Installing the device setup program on your PC
- Executing the program from the Disk Operating System (DOS) prompt
- Connecting your Omron Bar Code Reader to a PC and a Terminal
- Using the on-line help function
- Using the different PC programming screens
- Changing the device operational parameters using a PC
- Changing the device operational parameters using a Terminal

This manual also provides you with a detailed description of every setup parameter available for your Omron Bar Code Reader.

Getting Started

**Equipment
Requirements**

To install and run the BCSETUP program on your PC, your equipment must meet the following standards:

- Hardware Type: 8086-based PC/AT or higher, or 100% compatible
- At least 2MB of hard disk space available
- RAM Memory: 640 KB
- Operating System: DOS V3.3 or higher
- Floppy Disk: 1.44MB, 3.5 inch drive
- Monitor: EGA, or VGA

Installing the Device Setup Program

All of the BCSETUP program files are located on the provided 3 1/2 inch floppy diskette. You must use the Omron Install/Utility to copy the files to your PC hard disk (usually referred to as 'C' drive). The Install/Utility is an easy to use program. Follow the steps below to install the BCSETUP program on your PC's hard drive.

Step 1 Insert your disk in drive A or B.

Step 2 Type **A:INSTALL** if you inserted your BCSETUP disk into drive A or type **B:INSTALL** if you inserted your BCSETUP disk in drive B. Press <ENTER>. The Omron Install/Utility creates a directory called BCSET33 on the 'C' drive (your hard drive), and all the files on the floppy diskette are copied to this directory.

The following displays on your screen:

****Creating a directory for BCSETUP software**
****Copying files into BCSETUP directory**

If your PC already contains a BCSETUP directory, during installation, the message ****Directory for BCSETUP already exists** displays. The files are added to that directory. If you have files of the same name, they will be overwritten.

When all the files are copied, the C:\BCSET33> prompt displays. To execute the program, type BCSETUP, and press <ENTER>. (Refer to Section Three and Four to learn how to use the Device Setup Program.)



As soon as you have completed the installation procedures, you should retrieve your device parameters and save them to disk (usually your 'C' drive). Refer to Section Four.



It is not recommended to run the DOS version of BCSETUP in a Windows MS-DOS box. To ensure proper communications with your Bar Code Reader, it is necessary for you to exit Windows and run BCSetup in DOS mode.

To accomplish this from within Windows 95, do the following:

- Click the Start button, click Shut Down, and then click Restart The Computer in MS-DOS Mode.

To accomplish this from within Windows 3.1 or 3.11, do the following:

- From Program Manager, click File, and then click Exit Windows.
- An Exit Windows message box will appear with the prompt. This will end your Windows session. Click OK.

Getting Started

Executing The Setup Program From DOS

If the BCSETUP program is already installed on your system, and you want to execute the program from the DOS command line, follow the steps below:

Step 1 From any directory, type `CD C:\BCSET33`, and press `<ENTER>`.

Step 2 Type `BCSETUP`, and press `<ENTER>`. The program executes, and the program introductory screen displays, as shown to the right.

Refer to:

- Section Two for instructions on connecting your Omron Bar Code Reader to a PC/terminal
- Section Three for instructions on how to maneuver around screens within the program
- Section Four for instructions on how to program your Omron device using a PC
- Section Five for instructions on how to program your Omron Bar Code Reader using a terminal



*Omron Bar Code Reader Configuration Program Introductory Screen
For VGA & EGA Monitors*

Connecting Your Omron Bar Code Reader to a PC /Terminal

Section 2

Connecting Your Omron Bar Code Reader to a PC/Terminal

This chapter explains how to connect your Omron Bar Code Reader to a PC or a terminal. Before you can begin setting up your Omron Bar Code Reader, it must be connected to a PC or a terminal to establish communication between them.

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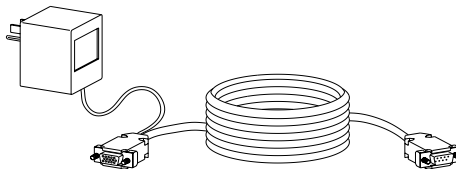
Connecting Your Omron Bar Code Reader to a PC/Terminal

Connecting Your Device To A PC

Omron recommends that you purchase the Programming Kit for your bar code reader. This kit provides you with the cables that you need to connect your Omron Bar Code Reader to a PC. If you would like to purchase the Programming Kit, call your Omron distributor with the following information:

<u>Part Name</u>	<u>Part Number</u>
Programming Kit	V559-A25C

Programming Kit



To connect your Omron Bar Code Reader to the PC using the Programming Kit.



If your PC has a 25 pin serial connector, you can use any standard 9 pin to 25 pin mating connector adapter to make the connection.

- Step 1** Plug in the 15 pin connector on the Programming Kit labelled P1 to the 15 pin communication connector on the back of your Omron Bar Code Reader.
- Step 2** Plug in the 9 pin Connector end of your Programming Kit labelled PC to a 9 pin serial port on your PC.
- Step 3** Use a small standard slotted screwdriver to tighten the screws on the strain reliefs at both ends.
- Step 4** Plug the Programming Kit in the appropriate wall socket.

Connecting Your Omron Bar Code Reader to a PC /Terminal

Connecting to A PC Without the Programming Kit

If you choose not to purchase the Programming Kit, you need to make your own cables. The following pinout diagrams show typical RS232 communication cable pin connections from your PC to your Omron Bar Code Reader with connector and cable specifications.

Specifications

15 pin connector - Assmann part # A-HDF15LL-T or equivalent

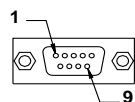
9 pin connector - CINCH part # DEM-9S or equivalent

Cable - Manhattan Part # M3264, Alpha part # 2254/4, or equivalent

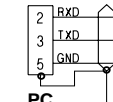
15 pin & 9 pin strain relief - Northern Technologies part # C88300004 or equivalent

NOTE: All connectors are shown from the soldering side.

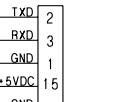
Standard 9 Pin PC Connector



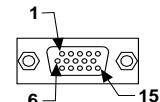
9 Pin Female "D"



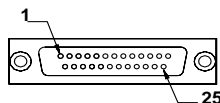
15 Pin Female "D"



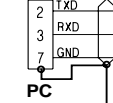
Model 20



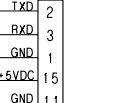
Standard 25 Pin PC Connector



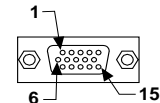
25 Pin Female "D"



15 Pin Female "D"



Model 20



V550-A20 To PC Connections

Connecting Your Omron Bar Code Reader to a PC/Terminal

Connecting Your Device To A Terminal

If you are using a terminal to program your Omron Bar Code Reader, you need to make your own cables. The following pinout diagrams below show typical RS-232 communication cable pin connections from your terminal to your Omron Bar Code Reader and connector and cable specifications. These pin connections are correct for most terminals. Your terminal may be different. Before you begin making your cable, check your terminal documentation to make sure these pin connections are accurate.

Specifications

15 pin connector - Assmann part # A-HDF15LL-T or equivalent

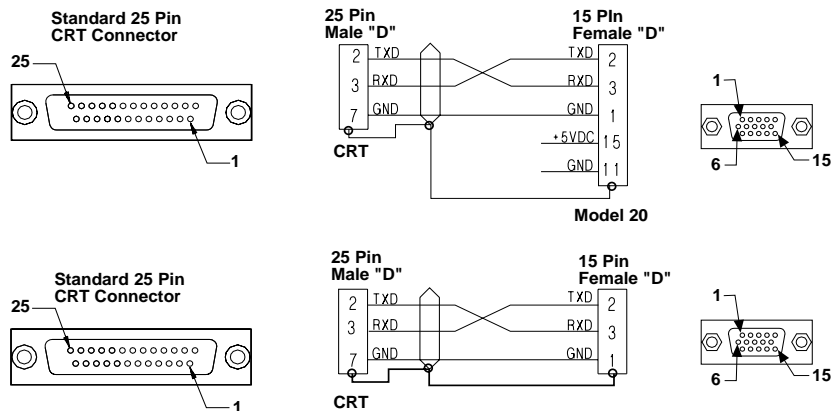
25 pin connector - CINCH part # DEM-25P or equivalent

Cable - Manhattan Part #M3264, Alpha part # 2254/4, or equivalent

25 pin strain relief - Northern Technologies part # C88220004 or equivalent

15 pin strain relief - Northern Technologies part # C88300004 or equivalent

NOTE: All connectors are shown from the soldering side.



Terminal To Omron Bar Code Reader Connections

Section 3

Programming Screen Basics

This chapter describes the function keys that are on the device setup programming screens, and how to use them. This chapter also serves as a guide for moving around the programming screens, and for accessing the Omron Bar Code Reader Configuration Program on-line help screens.

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Programming Screen Basics

Using Program Screens

The Omron Bar Code Reader Configuration Program has two types of screens: menu and data entry. You make selections from menus, and you enter data in fields on the data entry screens. This section describes how to move through the different screens in the program, and how to enter data. Press <F1> - Help and then page down while you are running the program for a brief description of this information.

Main Menu

There are two ways to select an option from the Main Menu:

1. Press the number or letter corresponding to the screen or function that you want.
2. Use the up and down arrow keys to move the cursor to highlight the menu option that you want, and press <ENTER>.

Exiting Screens

To return to a previous screen from any other screen: press <ESC>, except from option eight (Terminal Mode).

From Terminal Mode, press <F5> to return to the previous screen.

Programming Screen Basics

Data Entry Screens

The remaining screens require you to enter data or scroll through selections. The screen cut out below shows different ways to enter information.

Forward

To move the cursor forward through fields one field at a time: press the down arrow () or press <ENTER>

Backward

To move the cursor backward through fields one field at a time: press the up arrow ().

Data Entry

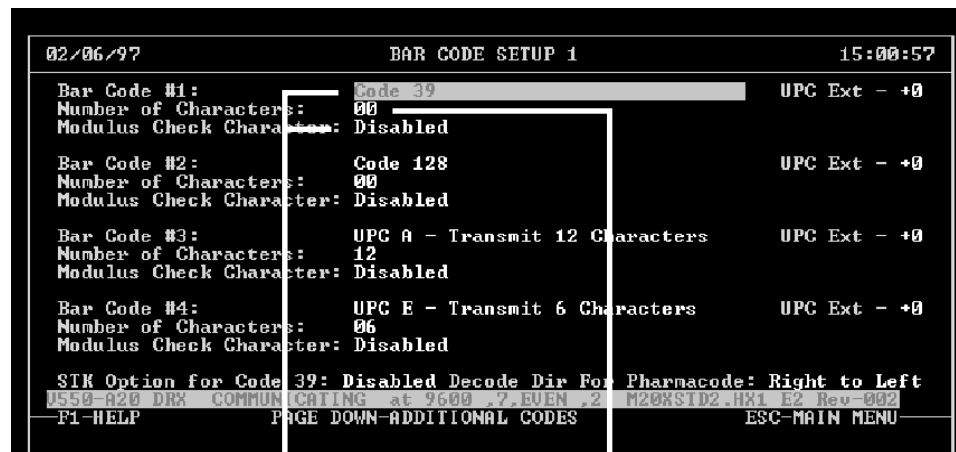
To change a field that requires you to enter a value or other data: type the information in the field, and press <ENTER> or the up or down arrows to move to another field.

Making Selections

To change a field that offers selections: press the left arrow key to scroll backward through the selections and the right arrow keys or space bar to scroll forward through the selections, and press <ENTER> or the up or down arrows to move to another field.

Exiting the Screen

To return to a previous screen from any other screen: press <ESC>.



Use the left/right arrow keys or space bar to scroll through different code types

Type the data you want, and press <ENTER>, to go to the next field

Programming Screen Basics

Using Function Keys in the Program

The Omron BCSETUP program allows you to enter operating parameters for your Omron Bar Code Reader. The last section explained how to move around the screens and enter or select parameters. This section explains how to use the function keys at the bottom of the screens.

Where To Find Function Keys

Some function keys are on all of the screens. Some function keys are only on specific screens. In either case, you can always find the available function keys at the bottom of the screen.

To use any of the functions listed:
press the function key that corresponds with the function that you want to perform.

Function Keys Located On Every Screen

The following function keys are available on every screen.

F1 - HELP

This is The Omron Bar Code Reader Configuration Program On-line Help access key. You can press this key from any screen except other help screens. For more information about on-line help, refer to the next section (Using On-Line Help).

ESC - MAIN MENU

When you press the **ESC** key from any data entry screen, the Setup Menu displays. When you press the **ESC** key from a help screen, the screen that was displayed when you pressed the **F1** key displays. This key is not enabled on the Terminal Screen. To display the Setup Menu from the Terminal Screen, press the **F5** key.

Function Keys Located On Specific Screens

The following keys are available on specific screens.

PAGE DOWN - VIEW MORE

This key is available on the Programming Screen, on-line help screens, and on the directory listing screens. Press this key to view more error messages or list of files on the screen, if the information fills more than one screen.

PAGE UP - VIEW PREVIOUS

This key is available on the Programming Screen, on-line help screens, and on the directory listing screens. Press this key to view the previous screen of error messages, or list of files if you had used **PAGE DOWN** before.

F2 - TOGGLE DUPLEX

This key is available on only the Terminal Screen. Press this key to toggle between Half Duplex and Full Duplex. When you select full duplex, you see only the data transmitted from your unit. When you select half duplex, you see what you type and the data transmitted from your unit.

F2 - DIRECTORY LISTING

This key is available on only the Restore Parameters Screen and Save Parameters Screen. Press this key to display all the files in the specified directory. You can enter a path of up to 12 characters. If you do not specify a path, the BCSETUP directory is listed.

F3 - CLR SCR

This key is available on only the Terminal Screen. Press this key to clear all data that is displayed on the screen.

F4 - CTRL MODE

This key is available on only the Terminal Screen. Press this key to toggle between ON and OFF. If you set Control Mode On, you can see the control characters as they are received or as you enter them. For example, when control mode is on and you enter <CTRL>+, {STX} displays. If control mode is off, and you enter <CTRL>+, nothing displays.

F6 - TOGGLE COMMUNICATIONS PORT

This key is available on only the Main Setup Screen. Press this key to select the PC communications port that your device is on. You can choose between COM 1 and COM 2.

Programming Screen Basics

**Using
On-line Help**

This section describes the Omron On-line help functions. On-line help is available from every screen that has F1-HELP at the bottom.

Using The Help Screens

The help screens are designed to provide you with a brief description of the field that the cursor is in at the time you press the key. There is a help screen provided for each data entry field and each Setup Menu option.

When you press the <F1> key from any data entry screen or menu screen, a help screen displays that describes the information that is expected in that particular field or about that particular menu option. For example, if you press the F1 key when the cursor is in the Bar code #1 field on the Bar Code Setup Screen, a help screen displays that explains the different bar code types that your device can read.

To access the on-line help screen:
Press the <F1> key

When you are viewing a help screen, press the page down key to see more information, and press the page up screen to view the previous screen of information, if you have already pressed the page down key.

The last screen of information of every help function is designed to provide you with a brief description of field editing and field maneuvering keys. This information describes how to move through fields and enter or select data.

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Main Menu

There are two ways to select an option from the Main Menu:

1. Press the number or letter corresponding to the screen or function that you want.
2. Use the up and down arrow keys to move the cursor to highlight the menu option that you want, and press <ENTER>.

Exiting Screens

To return to a previous screen from any other screen: press <ESC>, except from option eight (Terminal Mode).

From Terminal Mode, press <F5> to return to the previous screen.

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To move the cursor forward through fields one field at a time: press the down arrow () or press <ENTER>

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Data Entry

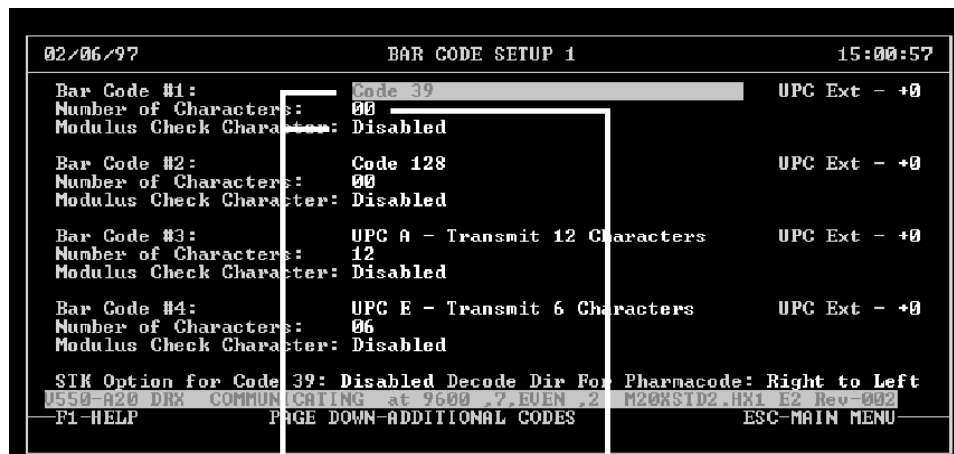
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This key is available on only the Terminal Screen. Press this key to clear all data that is displayed on the screen.

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To access the on-line help screen:
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Programming Your Omron Bar Code Reader Using a PC

Section 4

Programming Your Omron Bar Code Reader Using a PC

This chapter describes how to use the Omron Bar Code Reader Configuration Program, once you have installed it (Refer to Section One). This menu-driven program is designed to allow you to setup your Omron Bar Code Reader to fit your application's needs. This chapter also provides a detailed description of each parameter that is available for programming your Omron Bar Code Reader.

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Programming Your Omron Bar Code Reader Using a PC

Entering The Device Setup Program



Refer to Section Three for a review of how to move around screens and enter parameters.

As soon as you execute the Omron Bar Code Reader Configuration Program as described in Section One (Executing The Setup Program From DOS) the program detects what type of monitor you have. If you have an EGA or VGA monitor, the introductory screen displays, as shown below. If you have any other kind of monitor, such as CGA or monochrome, a similar introductory screen displays.

To summarize executing the Device Setup Program from your hard drive, follow the steps below:

Step 1 From any directory, type `CD C:\BCSET33`, and press `<ENTER>`.

Step 2 Type `BCSETUP`, and press `<ENTER>`. The program executes, and the introductory screen displays, as shown below.



Omron Bar Code Reader Configuration Program Introductory Screen

When the introductory screen displays, it remains on the screen until you press `<ENTER>`. After you press `<ENTER>`, the Program Information Screen displays as shown to the right.

Programming Your Omron Bar Code Reader Using a PC

The Information Screen

After you press <ENTER> from the introductory screen, the Program Information Screen displays as shown below. The intention of this screen is to provide you with a brief introduction of what you can do with the Omron Bar Code Reader Configuration Program.

To display the Setup Main Menu after you read the information screen, press <ENTER>.

```
02/06/95  OMRON BAR CODE READER CONFIGURATION SOFTWARE Ver 3.0  4:53:18
This setup program allows you to do the following:
-- Configure the B550-02A Bar Code Reader
-- Save your configuration on your hard drive (this allows you to
  program units in the future)
  Display any data received from your device on your PC monitor
  Access online help screens

NOTE: Before proceeding with this program, see your device operation
      manual for directions on connecting your device to your PC.

      PRESS ENTER TO CONTINUE
```

**Omron Bar Code Reader Configuration
Program Information Screen**

Programming Your Omron Bar Code Reader Using a PC

Selecting a Communications Port

You need to select the communication port every time you enter the BCSETUP Program. To change the communication port while you are running the program, press <F6> at the Main Menu.

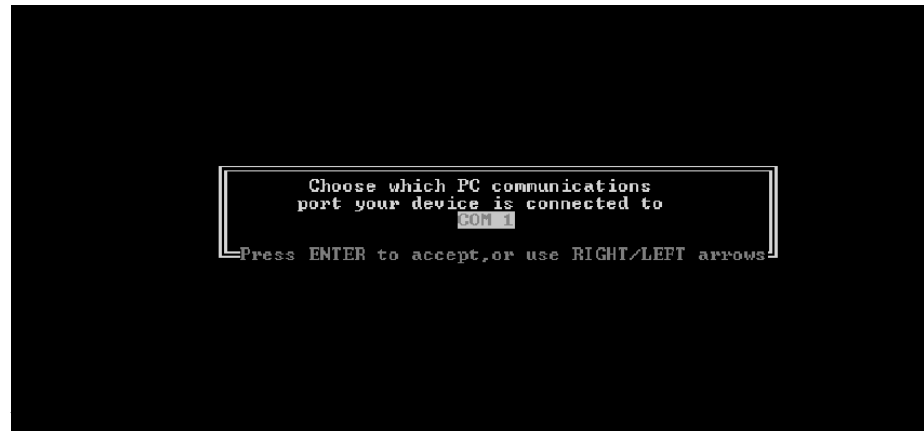
Every time you run the BCSETUP, you need to select the PC communications port to which your Omron Bar Code Reader is connected.

After you press <Enter> from the Introductory screen, a window displays that prompts you to enter the communication port that your Omron Bar Code Reader is connected to, as shown below.

To select the communications port:

Use the left or right arrow key, or space bar to toggle between COM 1 and COM2. When the port that you want displays, press <ENTER>.

After you select your communications port and press the <ENTER> key, the Main Menu displays, as shown to the right.



After you choose the communication port for your Omron Bar Code Reader, and the Main Menu displays, a small window appears at the bottom left of the Main Menu. This is the Autobaud window. When your Omron Bar Code Reader is properly connected to your PC, the Autobaud function automatically determines the device connected to the PC and its communication framing. An example of the Autobaud window would look as follows if a V550-A20 was connected to your PC:

```
V550-A20 Communicating at 19.2k, 7, Even, 2 M2LSTD E2 Rev-000
```

If your Omron Bar Code Reader is not connected properly, or for some reason it is not communicating with your PC, the Autobaud window will display "**Device not responding at ...**," and the Autobaud window will continue to search for a device and its appropriate framing until a valid connection is made.

Programming Your Omron Bar Code Reader Using a PC

Using The Device Setup Main Menu

Your Omron Bar Code Reader must be communicating with the PC to use options 1, T, and C from the Main Menu.

To make a selection from the Main Menu: type the number or letter that corresponds to the function that you want, or use your <up/down> arrows to highlight the function that you want and press <ENTER>.

```

02/06/97          OMRON - BCSETUP  Version 3.3          14:59:44
                MAIN MENU
                1) Retrieve Setup from Device
                2) Communication Setup
                3) Trigger Setup
                4) Input/Output Setup
                5) Bar Code Setup
                6) Hardware Setup
                7) Program Mode
                8) Save Setup to Disk
                9) Retrieve Setup From Disk
                T) CRT Mode
                C) Custom Selections
                E) Exit to DOS

                To select option, highlight option and press enter
                or press the desired number.
0550-A20 DRX COMMUNICATING at 9600 .7.EVEN .2 M20KSTD2.HX1 E2 Rev-002
F1-HELP          F2-TOP OF BAUD LIST          F6-TOGGLE PC COM PORT-COM 1

```

Omron Bar Code Reader Setup Main Menu

Function Keys

F1 - Help

Displays a brief description of the highlighted menu option, and describes screen maneuvering and data entry.

F2 - Top Of Baud List

Starts the autobaud from the fastest rate. As the baud rates become smaller, the connection to your Bar Code Reader becomes slower. Press this key, if you are sure your device is set up to communicate at a higher baud rate.

F6 - Toggle Communications

Allows you to toggle between COM 1 and COM 2. This selects the PC communication port that your Bar Code Reader is connected to.

Programming Your Omron Bar Code Reader Using a PC

Exiting the Program

You can exit BCSETUP only from the Main Menu. Once the menu is displayed on the screen, press <E> (Exit to DOS), or use the up and down arrow keys to scroll to option <E>, and then press <ENTER>. The "**Press any key to exit the program, ESC to continue.**" message displays. Press any key to display the DOS command line (C:\BCSET33>), or press <ESC> to continue using BCSETUP.

If the Main Menu is not displayed, and you want to exit the program, press <ESC> until the Main Menu is displayed. You should not have to press <ESC> more than two or three times to display this menu. If pressing <ESC> does not work, your PC may be locked-up. In this Case you may have to reboot your computer.

If you want your Bar Code Reader to continue to use the new parameters, make sure you save all the parameters to your device before you exit the program (option E),

Programming Your Omron Bar Code Reader Using a PC

Retrieve Setup Parameters From Device

If you want to use parameters from a previously setup Bar Code Reader, make sure you retrieve that device's parameters.

Your Omron Bar Code Reader must be connected and communicating with the PC, to use this menu option.

After you enter BCSETUP and select the PC communications port that your Omron Bar Code Reader is connected to, you need to retrieve the existing device parameters and send them to your PC. This allows you to see the parameters that your Bar Code Reader currently uses, and make the necessary changes.

If you attempt to use this option, and your device is not communicating with your PC, the following displays:

[Attention]

Device must be communicating to use this option

[Press any key to clear this window]

To retrieve the parameters from your device: from the Main Menu, press <1>. The PC beeps once, and the following window displays at the bottom of the screen.

[Attention]

Please wait establishing link with scanner

[Press any key to clear this window]

Then the following message displays:

[Attention]

EEPROM data received from the device

[Press any key to clear this window]

Programming Your Omron Bar Code Reader Using a PC

Retrieving Parameters From Your PC

You must enter up to eight alphanumeric characters for a valid name. For example, PARAM1.

A .SAV extension is automatically added to every file name.

At this point, the device parameters have been copied to your PC. Press any key to remove the window from your screen. You can now begin changing the parameters to meet your application needs. If settings are stored on your PC hard disk that you want to use in your Omron Bar Code Reader, you can restore them only from the BCSET33 directory.

To restore parameters from your PC hard disk: select option 9 (Retrieve Setup from Disk) from the Main Menu, and the screen below displays.

Type the name of the file you want to retrieve, and press <ENTER>. If the file is found, the following message displays: "**File xxxxxxxx.SAV restored, Press any key to clear this window**". Press any key to clear the window. If you enter an incorrect file name, the following displays: "**File xxx could not be opened. Press any key to clear this window.**" Press any key to clear the window.



Restore Parameters From PC Hard Disk Screen

Function Keys

F1 - Help

Displays a brief description of the screen, and describes screen maneuvering and data entry.

F2 - Directory Listing

Displays files in the BCSET33 directory with only the .SAV extension. Use the page up and page down keys to scroll through the listing by screen. Press <ESC> to exit the listing, and display the Restore Parameters Screen.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

After you have entered parameters for a particular Bar Code Reader, you should save them to the hard disk in your PC. This allows you to use the same parameters for other devices in the future.

Programming Your Omron Bar Code Reader Using a PC

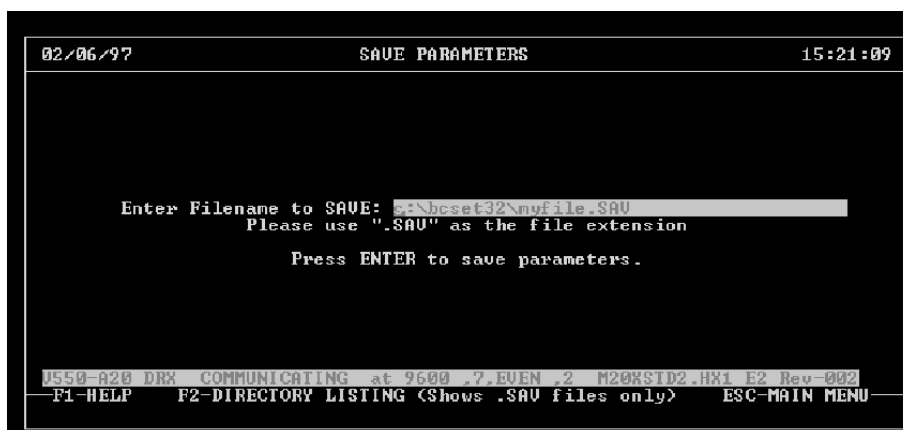
Saving Parameters To Your PC

You must enter up to eight alphanumeric characters for a valid name. For example, PARAM1.

A .SAV extension is automatically added to every file name.

After you enter the parameters for a particular device, you should save them to the hard disk in your PC. This allows you to use the same parameters for other devices in the future. This is particularly handy if you ever make accidental changes to your device, and you need to return to a particular setup. If you save the parameters to hard disk, you can easily recover the parameters.

To save parameters to your PC hard disk: select option 8 (Save Setup to Disk) from the Main Menu, and the screen below displays. Type the name of the file that you want to retrieve, and press <ENTER>. The PC beeps once, and a message displays informing you that the file has been saved.



Save Parameters To PC Hard Disk Screen

Function Keys

F1 - Help

Displays a brief description of the highlighted option, and describes screen maneuvering and data entry.

F2 - Directory Listing

Displays files in the BCSET33 directory with the .SAV extension. Use the page up and page down keys to scroll through the listing by screen. Press <ESC> to exit the listing, and display the Restore Parameters Screen.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

The parameters are saved to the BCSET33 directory.

Programming Your Omron Bar Code Reader Using a PC

**How To Send
Output To
Your Screen**

BCSETUP provides you with a way to use your PC as a Terminal. Option T from the Main Menu displays the Terminal Screen. The Terminal Screen places your PC in a Terminal emulation mode. This option not only allows you to view messages from your Omron Bar Code Reader, but it also allows you to send one setup command at a time to your device, instead of using the menus provided with this setup program. Refer to **Section Five** (Programming Your Omron Bar Code Reader Using A Terminal or Host) for a list of these commands, and instructions on how to enter them.

To test your unit to make sure your unit is programmed correctly for your application, scan your bar code while you are watching the Terminal screen. If the bar code reads, your unit is set up properly.

To display the Terminal Screen:

Select option T (Terminal Mode) from the Main Menu, and press <ENTER>. The Terminal Screen is blank with the exception of a few function keys at the bottom.

Help Screen

When you press <F1> from the Terminal Screen, the help screen displays. This particular help screen contains large amounts of information, including all the Terminal commands you can use from the Terminal Screen.

Using the Duplex Modes

From this screen, you can press <F2> to toggle between half duplex and full duplex mode. When you are in half duplex mode, everything you enter from the keyboard is shown on the screen. If you toggle to full duplex mode, you can not see anything that you type.

When you are programming your device, always leave this screen set on half duplex mode so you can see the commands you enter.

Using Control Mode

From this screen you can press <F4> to toggle between Control mode ON and Control mode OFF. When control mode is OFF, you do not see any control characters. For example, if you press <CTRL>, you will see nothing on the screen. If control mode is ON, you see the control character that is represented by what you type.

For example, if you press <CTRL>, you will see {STX} on the screen. For a description of control characters, refer to Appendix A.

Programming Your Omron Bar Code Reader Using a PC

Your Omron Bar Code Reader must be connected and communicating with the PC, to use this menu option.

From the Function Key Setup Screen, press <F1> (Change Comm Setup) to change the communication framing, and override the autobaud function.

Clearing the Terminal Screen

When the terminal screen contains information that you do not want, press <F3> to clear all the entries on the screen.

Exiting the Terminal Screen

When you exit the Terminal Screen, the Main Menu displays. Press <F5>, to exit the Terminal Screen.

Programming Using Function Keys

BCSETUP allows you to assign up to 10 commonly used commands to function key sequences. Press <ALT> + <F> to display the Function Key Sequence Screen. You can enter these commands the same way you enter them on a Terminal. Refer to Chapter 5 of this manual for more information about entering Terminal commands. Once you assign a command to a function key sequence, you need to use only that function key sequence to execute the command.

```

02/06/97                FUNCTION KEY SETUP SCREEN                15:35:46

ALT-F1 = <ESC><ESC><ESC>
ALT-F2 = <ESC><STX>5000<CR><ESC>
ALT-F3 = <ESC><STX>5001<CR><ESC>
ALT-F4 = <ESC><STX>5002<CR><ESC>
ALT-F5 = <ESC><STX>1600<CR><ESC>
ALT-F6 = <ESC><STX>1603<CR><ESC>
ALT-F7 = <ESC><STX>1604<CR><ESC>
ALT-F8 =
ALT-F9 =
ALT-F10=

      Baud Rate: 9600   Data Bits: 7   Stop Bits: 2   Parity: EUEN

* Note F1 is used to override the autobaud comm values

-----F1-CHANGE COMM SETUP                ESC-TERMINAL SCREEN-----

```

Using Function Key Sequences To Program Your Bar Code Reader

Press <F1> to change the communication framing. Press <ESC> to exit this screen, and display the Terminal Screen.

Programming Your Omron Bar Code Reader Using a PC

Sending the Parameters To Your Omron Bar Code Reader

After you enter the setup parameters on the PC, you need to save them to your Omron Bar Code Reader. This screen allows you to transmit these parameters from the PC to your device. This screen also displays any error messages that might occur during this process.

To display the Programming Screen:

Select option 7 (Program Mode) from the Device Setup Main Menu. The Programming Screen displays.

Use the left and right arrow keys or the space bar to scroll through the following options:

- Transfer Settings to Device and Save
- Transfer Settings to Device and Use
- Reset Device to Default Values

Transfer Settings to Device and Save

Select this option when you want to transfer the parameters from your PC to your Omron Bar Code Reader, and have the parameters saved in the device EEPROM. This is a permanent way of saving parameters. When you stop power to the device, these parameters are not lost.

Transfer Settings to Device and Use

Select this option when you want to transfer the parameters from your PC to your Omron Bar Code Reader without saving them. You can use these parameters until you power down your device. When you power down your device and power it back up again, these settings are lost. The device uses the previously saved parameters.

Reset Device to Default Values

Select this option when you want to reset your Omron Bar Code Reader to use the original factory set parameters.

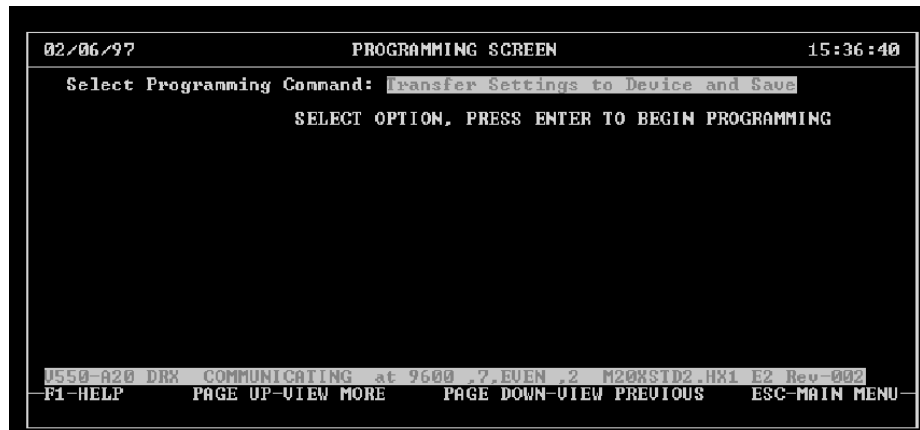
Programming Errors

When you press <ENTER> to begin programming, one of the following two messages displays: "**No Programming Errors Were Found**" or "**The Following Errors Were Found**". If the later of these two messages displays, message(s) follow that inform you where to go within the BCSETUP programming screens to correct the problem.

To set up your Omron Bar Code Reader for the types of bar codes that it will read and information about those bar codes, you must use the Bar Code Setup Screen.

Programming Your Omron Bar Code Reader Using a PC

Your Omron Bar Code Reader must be connected and communicating with the PC, to use this menu option.



Programming Screen

The following are some messages that can appear at the bottom of the programming screen:

```

Attempting to program the device
Programming attempt in progress
Device not responding cannot begin programming
Device successfully programmed
x errors detected in the programming of the device
Programming aborted

```

Function Keys

ENTER - Program

Programs your Omron Bar Code Reader. If there are no errors, a message confirms this. If there are errors, a message displays confirming this and the errors are listed. Use your page up and page down keys to scroll through the errors.

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

PAGE DOWN - View More

Displays the next error, if there are any.

PAGE UP - View Previous

Displays the previous error, if there are any.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Programming Your Omron Bar Code Reader Using a PC

Using the Bar Code Setup Screen

Custom commands may be available only if your unit has custom software.

Use the Bar Code Setup Screen when you want to change settings that pertain to the bar code your device is reading. From this screen, you can change the following:

- The type of bar code your device reads
- The length of the bar code
- The Modulus Check (if used)

To display the Bar Code Setup Screen:
Press <5> (Bar Code Setup) from the Main Menu. The Bar Code Setup Screen displays, as shown to the right.

Moving Around The Screen

To move around the fields on the Bar Code Setup screen:
Use your <**down arrow**> or press <**ENTER**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

Use the <**left/right arrows**> or the <**space bar**> to change selections within a field for the Bar Code fields and the Modulus Check Character fields.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                BAR CODE SETUP 1                15:56:10
Bar Code #1:           Code 39                          UPC Ext - +0
Number of Characters:  00
Modulus Check Character: Disabled

Bar Code #2:           Code 128                        UPC Ext - +0
Number of Characters:  00
Modulus Check Character: Disabled

Bar Code #3:           UPC A - Transmit 12 Characters   UPC Ext - +0
Number of Characters:  12
Modulus Check Character: Disabled

Bar Code #4:           UPC E - Transmit 6 Characters    UPC Ext - +0
Number of Characters:  06
Modulus Check Character: Disabled

STK Option for Code 39: Disabled Decode Dir For Pharmacode: Right to Left
U550-A20 COMMUNICATING at 19.2K.7.EVEN 2 M20LSTD2.HX1 E2 Rev-002
F1-HELP                PAGE DOWN-ADDITIONAL CODES      ESC-MAIN MENU

```

Bar Code Setup 1**Function Keys****F1 - Help**

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

PAGE DOWN - Additional Codes

Your unit may have the capability to read up to eight code types for each trigger cycle. Press this key to display Bar Code Setup 2 screen. This screen is identical to Bar Code Setup 1, except it contains parameters for Bar Codes five through eight.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Programming Your Omron Bar Code Reader Using a PC

Changing The Bar Code Type

Bar code types define how the bars and spaces represent the human readable numbers and letters. Bar code types are also known as symbologies. Your Omron Bar Code Reader is capable of reading up to eight different bar code types per trigger cycle. You would change your bar code type if you are using a different type of bar code than the one that is currently programmed in to your device. You select the bar code types from the Bar Code Setup screen. The Bar Code Setup Screen, as shown to the right, contains four fields where you can enter bar code types. When you press Page Down the Bar Code Setup 2 screen displays, which you can use to select bar code types five through eight.

To display the Bar Code Setup Screen:

Press <5> (Bar Code Setup) from the Device Setup Main Menu.

When you select **Code 39**, you can enable or disable the STK option. When STK is enabled, the code 39 bar code is decoded in reverse order.

How To Select A Bar Code Type
To select a bar code type:

Use your <**down arrow**> or press <**ENTER**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

Once the field that you want is highlighted, use the <**left/right arrows**> to scroll through the bar code types.

For the scanner to accurately decode **PharmaCode**, you need to tell the scanner from which direction to start reading the bar code.

The available bar code types for your Omron Bar Code Reader are:

No Code Length Required

- No Code Type Selected
- UPC A - Transmit 10 characters
- UPC E - Transmit 6 characters
- UPC A - Transmit 12 characters
- UPC E - Transmit 12 characters
- EAN 13
- EAN 8

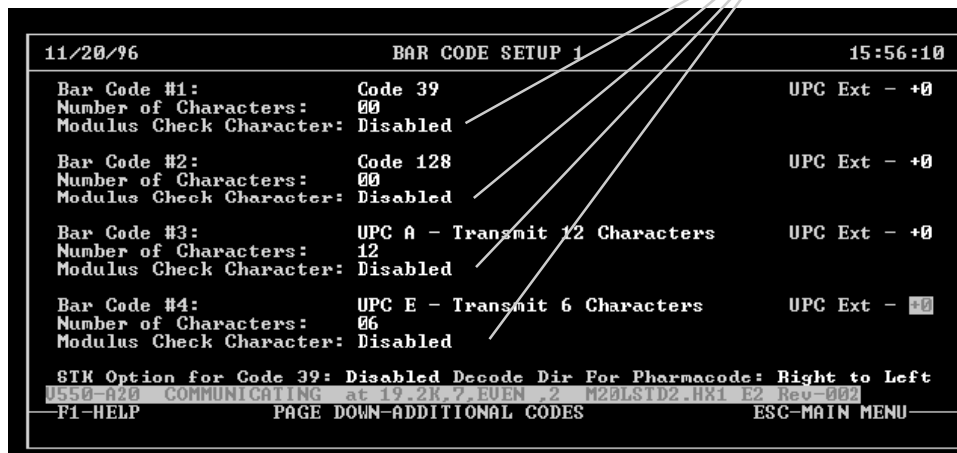
Code Length Required

- Straight 2 of 5
- Interleaved 2 of 5
- EDP & STI
- Code 39
- Code 128
- Codabar Transmit Start/Stop
- Codabar Don't Transmit Start/Stop
- AS-10
- 10 Bit Periodic Binary
- Code 93
- Pharmacode - upon request
- Two Custom Selections
- Variable

Programming Your Omron Bar Code Reader Using a PC

After you enter the bar code type, enter the bar code length for the code types that require it. Refer to the available types list on the previous page and the Entering Bar Code Lengths section of this manual.

Bar Code Type Selection Fields



Changing Bar Code Types

UPC Extensions

If you select UPC or EAN bar code types, you must fill in the UPC EXT. field. You can enter either a two or five character extension in this field. Enter a zero (0) for no extension.

Use the <down arrow> to move from a UPC or EAN bar code field to the UPC EXT. field. Extension choices can be incremented by using the <left/right arrows>.

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

PAGE DOWN - Additional Codes

Your unit may have the capability to read upto eight code types for each trigger cycle. Press this key to display Bar Code Setup 2 screen. This screen is identical to Bar Code Setup 1, except it contains parameters for Bar Codes five through eight.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Programming Your Omron Bar Code Reader Using a PC

Entering Bar Code Lengths

Bar Code Lengths are the number of characters in the bar code. You can enter the number of characters for a particular bar code from only the Bar Code Setup Screen.

To display the Bar Code Setup Screen:
Press <5> (Bar Code Setup) from the Main Menu.

How To Enter The Number Of Characters

To enter the number of characters a particular bar code has, not including start and stop characters:

When you change from a code type that does not require a code length to a code type that does require a code length, the field automatically changes to variable length, and MOD checks are disabled.

Use your <**down arrow**> or press <**ENTER**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

Once the “number of characters field” that you want is highlighted, type the number of characters, and then press <**ENTER**>. This field allows you to enter from 00 - 50. Type 00 when you want to read variable length bar codes.

You **must** make a valid entry in the bar code length field (00-50) for the following bar code types: (Refer to Changing Bar Code Types)

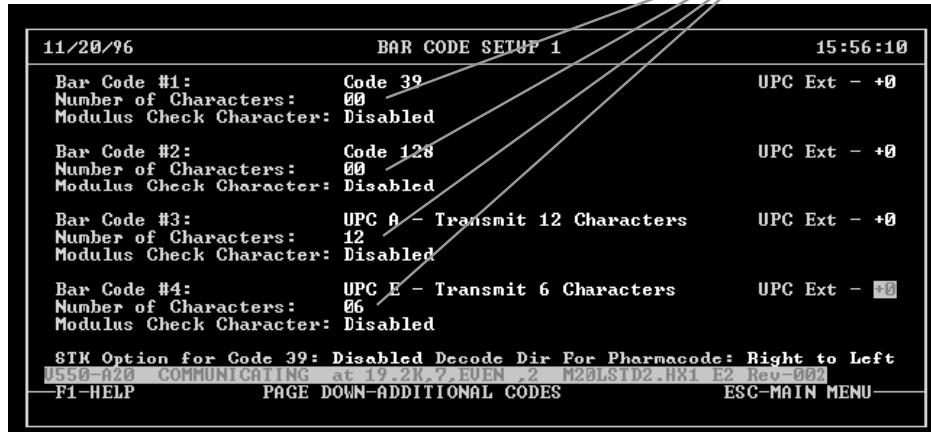
- Straight 2 of 5
- Interleaved 2 of 5
- Code 128
- Codabar
- Code 39
- EDP & STI
- AS-10
- 10 Bit Periodic Binary
- Code 93
- Pharmacode - upon request
- Two Custom Selections

You should not use variable length bar codes with the I 2 of 5 or S 2 of 5 bar code types.

The cursor automatically skips the bar code length field for bar code types other than the ones listed above.

Programming Your Omron Bar Code Reader Using a PC

Bar Code Length
Entry Fields



Entering Number Of Characters

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

PAGE DOWN - Additional Codes

Your unit may have the capability to read upto eight code types for each trigger cycle. Press this key to display Bar Code Setup 2 screen. This screen is identical to Bar Code Setup 1, except it contains parameters for Bar Codes five through eight.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

You can enter 00 - 50 in this field for bar code types that require code lengths. Enter 00 to read variable length bar codes except for the I 2 of 5 bar code type. I 2 of 5 and S 2 of 5 should not use variable lengths.

Programming Your Omron Bar Code Reader Using a PC

Using Modulus Checks

It is not necessary to enter the check digit for UPC, EAN, or Code 128 bar codes, because they have a built in check digit. This function is necessary only if you have added a custom check digit.

A Modulus (Mod) check character is a mathematical check to ensure the accuracy of a read. Certain bar codes use Mod check character(s) to determine if that bar code was scanned correctly. You can select the type of Modulus Check from only the Bar Code Setup Screen.

To display the Bar Code Setup Screen:
Press <5> (Bar Code Setup) from the Main Menu.

How To Select A Modulus Check

To select a Modulus check:

Use your <**down arrow**> or press <**ENTER**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

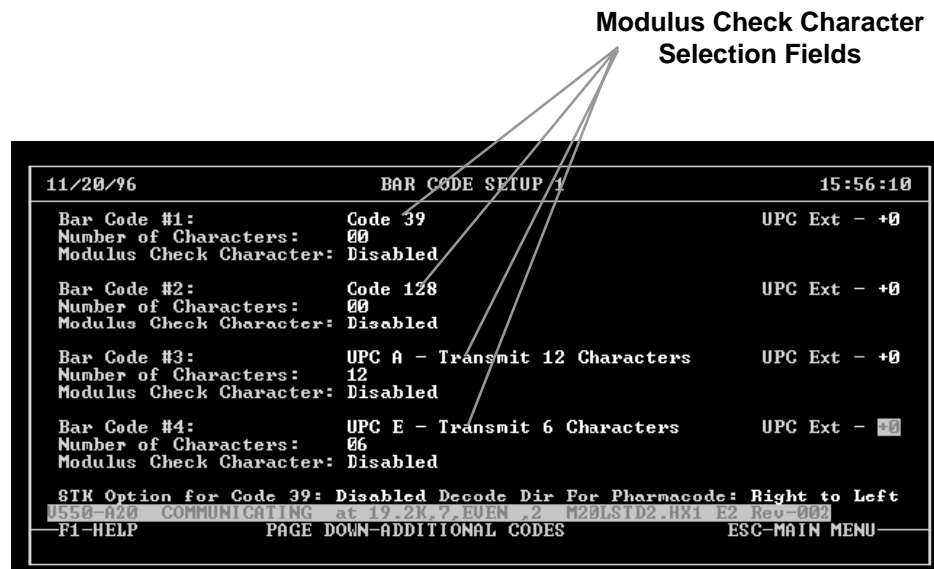
Once the Modulus Checkfield that you want is highlighted, use the <**left/right arrows**> to scroll through the Modulus checks.

The available Modulus Checks for your Omron Bar Code Reader are:

- Disabled
Select Disabled when the bar code contains no check digits.
- Modulus 10
Frequently used to check Interleaved 2 of 5 bar codes. However, you can use Modulus 10 with other bar code symbologies.
- Modulus 43
Frequently used to check Code 39 bar codes. However, you can use Modulus 43 with other bar code symbologies.
- Double Add Double Check
Frequently used to check Codabar bar codes.
- Custom Selection 1
Select this if you have a custom modulus check set up from the factory, and you want to use it.

A description of some Modulus check calculations are on the following two pages.

Programming Your Omron Bar Code Reader Using a PC

**Bar Code Setup Screen****Function Keys****F1 - Help**

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

PAGE DOWN - Additional Codes

Your unit may have the capability to read upto eight code types for each trigger cycle. Press this key to display Bar Code Setup 2 screen. This screen is identical to Bar Code Setup 1, except it contains parameters for Bar Codes five through eight.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Programming Your Omron Bar Code Reader Using a PC

If You Suspect A Modulus Check Error

If your bar code looks o.k., and it does not read, or you disable the Modulus check and it does read, you may want to perform these Modulus Check calculations to ensure the Mod character is correct.

MOD 10 CHECK

Formula: (Sum of odd digits) * 3 + (Sum of even digits) +
Check Character

The Label scanned equals 1 2 3 4 5 6 7 8 9 0 0 5
The last character is the check character

(Sum of odd digits) X 3 + (Sum of even digits) + Check Character=

$$(1+3+5+7+9+0) \quad X \quad 3 + (2+4+6+8+0) \quad + \quad 5 \quad = 100$$

Least Significant Digit = '0'

MOD 43 CHECK

Formula: (Sum of all characters as weighted in table) / 43 =
Quotient X Remainder Y

Y is the check character. The value of Y is determined from the Code 39 reference table. Start/Stop characters are not used in check character generation. The Code 39 reference table is a translator for Code 39.

The label scanned equals E 1 2 3 2 1 1 4 1 1 U
Code Table Value 14 1 2 3 2 1 1 4 1 1

Check Character

$$\begin{aligned} &(\text{Sum of all digits}) / 43 = \text{Quotient X Remainder Y} \\ &(14 + 1 + 2 + 3 + 2 + 1 + 1 + 4 + 1 + 1) / 43 = \text{Quotient 0 Remainder 30} \end{aligned}$$

When referring to the odd or even digits, the formula is using the values in the odd or even position. For example 6, 2, and 4 are in the odd positions in the sequence 672943.

If the least significant digit (last digit in the answer to the calculation) does not equal zero, the code is invalid. Start/Stop characters are not used in check character generation.

Programming Your Omron Bar Code Reader Using a PC

Your remainder must be the code table value for the check digit. For this particular example the code is valid, because '30' is the code value for 'U' in the Code 39 Reference Table.

Character	Value	Character	Value	Character	Value
0	0	F	15	U	30
1	1	G	16	V	31
2	2	H	17	W	32
3	3	I	18	X	33
4	4	J	19	Y	34
5	5	K	20	Z	35
6	6	L	21	-	36
7	7	M	22	.	37
8	8	N	23	space	38
9	9	O	24	\$	39
A	10	P	25	/	40
B	11	Q	26	+	41
C	12	R	27	%	42
D	13	S	28		
E	14	T	29		

Code 39 Reference Table

Programming Your Omron Bar Code Reader Using a PC

**Entering
Trigger
Parameters**

A trigger cycle is what informs your device to begin and end looking for a bar code. There are a number of ways that your device can perform this function. Use the Trigger Setup Screen when you want to change settings to your device that have to do with triggering your device. From this screen, you can change the following:

- Number of codes to transmit for a trigger cycle
- The scanner trigger type
- The minimum number of decodes before a valid read
- The number of scans before exiting read
- The trigger timer and watchdog timer

To display the Trigger Setup Screen:
Press <3> (Trigger Setup) from the Main Menu.

Moving Around The Screen

To move around the fields on the Trigger Setup screen:
Use your <**down arrow**> or press <**ENTER**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

Use the <**left/right arrows**> or <**space bar**> to change selections within a field.

Programming Your Omron Bar Code Reader Using a PC

```
11/20/96          TRIGGER REQUIREMENTS          15:59:26
-----
Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
If serial trigger: S      Start of Read      E      End of Read
Trigger state: Standard

      Minimum Number of decodes for a valid read: 03
      Number of scans before exiting read: 01

      Trigger Timer: 000 x 10 milliseconds
      Continuous Laser: Disabled/Trigger Controlled
      Watchdog Timer: 00 x 50 milliseconds

0550-020 COMMUNICATING at 19.2K, 7, EVEN, 2, M20LSTD2.HX1 E2 Rev-002
F1-HELP          ESC-MAIN MENU
```

*Trigger Setup Screen***Function Keys**

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Programming Your Omron Bar Code Reader Using a PC

Number Of Codes To Transmit

Use this field to program the number of bar codes the unit must read and transmit for each trigger cycle. From this field you can select:

- a fixed number of bar codes to read (1-8)
Select one of these when you want to send a fixed number of bar codes.
- one bar code for each code buffer enabled
Select this when you want to send one bar code for each code buffer that is enabled.
- all bar codes that have been decoded during that Trigger cycle.
Select this when you want to send all the bar codes that have been decoded during that trigger cycle.

To display the Trigger Setup Screen:

Press <3> (Trigger Setup) from the Main Menu.

Moving Around The Screen

To move around the fields on the Trigger Setup screen:

Use your <**down arrow**> or press <**ENTER**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When your cursor is in the Number of codes to transmit per trigger cycle, use the <**left/right arrows**> or <**space bar**> to change selections within a field.

Programming Your Omron Bar Code Reader Using a PC

```
11/20/96                TRIGGER REQUIREMENTS                15:59:26

Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
  If serial trigger: S      Start of Read      E      End of Read
  Trigger state: Standard

  Minimum Number of decodes for a valid read: 03
  Number of scans before exiting read: 01

  Trigger Timer: 000 x 10 milliseconds
  Continuous Laser: Disabled/Trigger Controlled
  Watchdog Timer: 00 x 50 milliseconds

USS0-a20 COMMUNICATING at 19.2K, 7, EVEN, 2, M20LSTD2.HX1 E2 Rev-002
F1-HELP                                ESC-MAIN MENU
```

***Number of Bar Codes the Unit must
Read For Each Trigger Cycle***

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Trigger Type Selections

Use this field to select the way your device is going to be triggered. Your Omron Bar Code Reader can be triggered in any of the following different ways:

Serially Controlled

Programs your Omron Bar Code Reader to wait for a serially downloaded start of read character from the host to start and end the read for each trigger cycle. You must choose a start of read/end of read characters when you make this selection. Refer to the next section (Entering Start/End Of Read Characters).

Continuous Read - Trigger Timer Dependent

Programs your device to read a bar code placed under the scan line once, and not read that same code again until the trigger timeout condition is met. If the trigger timeout is programmed to 999, the scanner will not read that exact same bar code again until it scans a different code. A no read message is not possible while in this mode.

Continuous Read - Transmit Continuously

Programs your Omron Bar Code Reader to always look for a bar code, and transmit everything it reads, regardless of duplicates.

Hardware Controlled

The trigger signal is controlled by an external source. This could be one of several variations of presence detectors (photoelectric sensors, proximity sensors, etc.), a voltage level, an open collector, a form A or C closure, etc. The trigger input would normally be active when the bar code is present.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                TRIGGER REQUIREMENTS                15:59:26
Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
If serial trigger: S      Start of Read      E      End of Read
Trigger state: Standard
        Minimum Number of decodes for a valid read: 03
        Number of scans before exiting read: 01
        Trigger Timer: 000 x 10 milliseconds
        Continuous Laser: Disabled/Trigger Controlled
        Watchdog Timer: 00 x 50 milliseconds
U550-A20 COMMUNICATING at 19.2K, 2, EVEN, 2 M20LSTD2.HX1 E2 Rev-002
F1-HELP                ESC-MAIN MENU

```

To display the Trigger Setup Screen:
Press <3> (Trigger Setup) from the Main Menu.

Selecting A Trigger Type

Moving Around The Screen

To move around the fields on the Trigger Setup screen:
Use your <down arrow> or press <ENTER> to move the cursor forward through the fields.

Use your <up arrow> to move back through the fields.

When your cursor is in the Number of codes to transmit per trigger cycle, use the <left/right arrows> or <space bar> to change selections within a field.

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Start Of Read/End Of Read Characters

When you select serially controlled device trigger type (Refer to **Trigger Type Selections**), you need to enter start of read and end of read characters. These characters are any hexadecimal ASCII characters that inform your Omron Bar Code Reader when to start and stop looking for a valid bar code.

To display the Trigger Setup Screen:

Press <3> (Trigger Setup) from the Main Menu.

Moving Around The Screen

To move around the fields on the Trigger Setup screen:

Use your <**down arrow**> or press <ENTER> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in either the start of read or end of read field:

Type one character that you want to be used to begin or end the trigger cycle. The following characters are acceptable in these fields:

To enter start/stop characters, you must have "Serially Controlled" selected for scanner trigger type. Refer to the last section (Trigger Type Selections).

You must use the terminal screen to enter a null character. Since the ESC character is used to enter setup mode, do not use it in this field.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                                TRIGGER REQUIREMENTS                                15:59:26
Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
  If serial trigger: S      Start of Read      E      End of Read
  Trigger state: Standard
      Minimum Number of decodes for a valid read: 03
      Number of scans before exiting read: 01
      Trigger Timer: 000 x 10 milliseconds
      Continuous Laser: Disabled/Trigger Controlled
      Watchdog Timer: 00 x 50 milliseconds
USS0-a20 COMMUNICATING at 19.2K, 2, EVEN, 2, M20LSTD2.HX1 E2 Rev-002
F1-HELP                                ESC-MAIN MENU

```

a-z, A-Z 0-9, . > < ; : " ' / ? { } [] | \ + = _ - ! @ # \$ % ^ & * ()
and any control characters

Start of Read And End Of Read Trigger Characters

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Trigger State

Use this field to select the state of the hardware triggering device used with your Omron Bar Code Reader. The following are the available selections from the Trigger Setup Screen.

Standard

When you select this option, the device is in the "enabled" state when the incoming signal is high.

Inverted

When you select this option, the device is in the "enabled" state when the incoming signal is low.

To display the Trigger Setup Screen:

Press <3> (Trigger Setup) from the Main Menu.

Moving Around The Screen

To move around the fields on the Trigger Setup screen:

Use your <**down arrow**> or press <ENTER> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When your cursor is in the Trigger State Field, use the <**left/right arrows**> or <**space bar**> to change selections within a

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                TRIGGER REQUIREMENTS                15:59:26

Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
  If serial trigger: S      Start of Read      E      End of Read
  Trigger state: Standard

  Minimum Number of decodes for a valid read: 03
  Number of scans before exiting read: 31

  Trigger Timer: 000 x 10 milliseconds
  Continuous Laser: Disabled/Trigger Controlled
  Watchdog Timer: 00 x 50 milliseconds

USS0-020 COMMUNICATING at 19.2K.7.EVEN .2 M20LSTD2.HX1 E2 Rev-002
F1-HELP                                ESC-MAIN MENU

```

field.

***Choose A Trigger State That
Best Fits Your Application***

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Entering Minimum Number Of Decodes For Valid Read

This field allows you to enter the minimum number of decoded scans that are needed for a bar code to be considered valid. The term used for this value is win. The default value for win is three (3). When you are using a continuous read trigger type, the data is transmitted when the number of valid decodes equals the win value. At the end of a trigger cycle, when you are using hardware or serial trigger types, the number of valid reads is checked against the win value to make sure the minimum requirements were met.

How To Enter The Value

Select option three from the Main Menu (Trigger Setup).

When the Input/Output Requirements Screen displays, use the following keystrokes to enter the start and stop characters:

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in the Minimum Number of decodes for a valid read field:

Type the value that you want (00-99).

In standard read and transmit mode, you can set the scanner to a maximum of 99 decodes for a good read to occur.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                TRIGGER REQUIREMENTS                15:59:26

Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
If serial trigger: S      Start of Read      E      End of Read
Trigger state: Standard

Minimum Number of decodes for a valid read: 03
Number of scans before exiting read: 04

Trigger Timer: 000 x 10 milliseconds
Continuous Laser: Disabled/Trigger Controlled
Watchdog Timer: 00 x 50 milliseconds

J550-A20 COMMUNICATING at 19.2K, 2, EVEN, 2 M20LSTD2.HX1 E2 Reu-002
F1-HELP                ESC-MAIN MENU

```

If you set this value to zero, it is the same as setting it to one. If the minimum is not reached, a no-read is output from your device.

Trigger Setup Screen Cut Out For The Minimum Number Of Decodes For A Valid Read

Why You Would Want To Change This Value

If you are using a high speed conveyor, and you are receiving two scans for each bar code, you would want to set this value for two, because if you set it higher, you would never receive a valid read. This would ensure that you receive the valid reads.

When two codes are read in a trigger cycle, do not set this value above 5.

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Entering Number Of Scans Before Exiting Trigger Cycle

You might want to change the number of scans before transmitting, to be sure that you receive the data before the end of the trigger cycle.

The number that you enter in this field, informs your Omron Bar Code Reader to transmit after an assigned number of valid reads that occur or to transmit at the end of a single trigger cycle. When you are using hardware or serial trigger types, the device first checks to see if the number of scans equals the setting in this field, then it checks the win value setting to make sure it has met the requirements for a valid read. If it has met the requirements, it transmits the data.

How To Enter The Value

Select option three from the Main Menu (Setup Screen Main Menu).

When the Trigger Setup Screen displays, use the following keystrokes to enter the start and stop characters:

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in the Number of Scans Before Exiting field:
Type the number (00-99) that you want.

Enter 00 to allow the unit to read until the end of that trigger cycle.

This function is not valid when you are using a continuous read trigger type.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                                TRIGGER REQUIREMENTS                                15:59:26

Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
If serial trigger: S      Start of Read      E      End of Read
Trigger state: Standard

Minimum Number of decodes for a valid read: 03
Number of scans before exiting read: 01

Trigger Timer: 000 x 10 milliseconds
Continuous Laser: Disabled/Trigger Controlled
Watchdog Timer: 00 x 50 milliseconds

ISS0-020 COMMUNICATING at 19.2K,7.EVEN ,2 M20LSTD2.HX1 E2 Rev-002
F1-HELP                                ESC-MAIN MENU

```

If your device is set for continuous read trigger type, This field is not used, and the scan head will transmit on the Win count. Refer to **Entering The Minimum Number Of Decodes For A Valid Read Section** of this chapter.

***Trigger Setup Screen Cut Out For
Entering The Number Of Scans Before Exit***

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

To display the Trigger Setup Screen:
Press <3> (Trigger Setup) from the Main Menu.

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Trigger Timer

This value defines the duration of the trigger cycle, unless the end of trigger occurs first. Use this function when the host needs the data at a fixed time after the beginning of a trigger cycle. The timer is set in 10 millisecond increments.

For example, if you want to hold the output for 500 milliseconds, you would enter a 50 in this field.

Your unit accepts any value between 00 and 99. To disable this function enter 00. If the function is disabled, the scanner always transmits at the end of the trigger cycle.

Continuous Laser

In this field, select whether the unit's laser remains on at all times or whether it is controlled by the triggering device. If this field is set at **Enabled** then the laser will stay on independent of the triggering device. If this field is set at **Disabled/Trigger Controlled**, the laser will be on only when the triggering device is in the enabled state.

Watchdog Timer

This field defines the amount of time the scanner has after the end of a trigger cycle to process all the remaining data and begin to transmit. This is helpful when there is an excessive amount of noise in the

Programming Your Omron Bar Code Reader Using a PC

Trigger Timer
 Continuous Laser
 Watchdog Timer

```

11/20/96          TRIGGER REQUIREMENTS          15:59:26

Number of Codes to Transmit Per Trigger Cycle: 1 Code per Trigger
Scanner trigger type: Continuous Read-Transmit Continuously
If serial trigger: S      Start of Read      E      End of Read
Trigger state: Standard

Minimum Number of decodes for a valid read: 03
Number of scans before exiting read: 01

Trigger Timer: 000 x 10 milliseconds
Continuous Laser: Disabled/Trigger Controlled
Watchdog Timer: 00 x 50 milliseconds

J550-A20 COMMUNICATING at 19.2K.7.EVEN ,2 M20LSTD2.HX1 E2 Rev-002
F1-HELP          ESC-MAIN MENU
  
```

scan line. If the timer is disabled, the scanner has no time limit for processing.

Timers And Trigger Controller Function

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

**Setting Up
Hardware**

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Use the Hardware Setup Screen when you want to change settings to your device that have to do with mechanical features on your device.

From this screen, you can change the following:

- Laser Intensity
- The scanner trigger type
- Scan window features
- Diagnostics

To display the Hardware Setup Screen:

Press <6> (Hardware Setup) from the Main Menu.

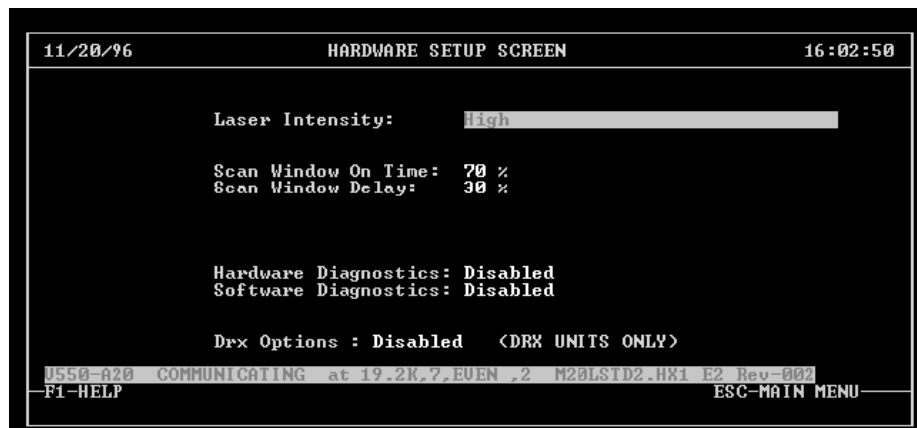
Moving Around The Screen

To move around the fields on the Trigger Setup screen:

Use your <**down arrow**> or press <**ENTER**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

Programming Your Omron Bar Code Reader Using a PC



Use the <left/right arrows> or <space bar> to change selections within a field for the laser intensity, diagnostics, and DRX options fields.

Hardware Setup Screen

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Changing Laser Intensity

Use this field to adjust the brightness of the laser beam. The higher the laser intensity, the brighter the laser beam. If you have a shiny bar code and there is too much light reflecting back to your scanner, you may want to set your laser intensity to low.

Use your space bar or the left and right arrow keys to select between the following laser intensity levels:

LOW

HIGH

Automatic Laser Control V550-A20 (non-X models only)

Toggle Intensities V550-A20

If you can not find the appropriate laser intensity for your application, set your device for ALC (Automatic Laser Control).

This setting will select the intensity that works **best for your application**. If you receive a good read using the alternating intensity then you know that one of the settings works for your application. Choose one of the other intensities to see if that works for your application.

How To Enter The laser Intensity

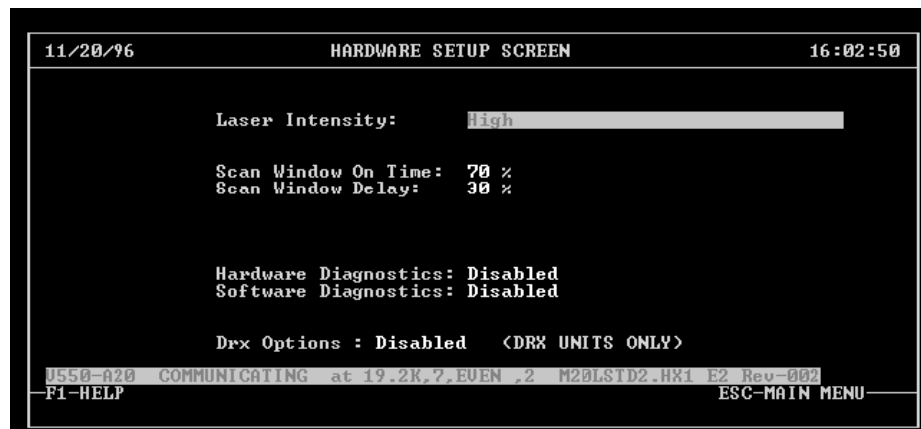
Select option six from the Main Menu (Hardware Setup Screen).

When the Hardware Setup Screen displays, use the following keystrokes to select the appropriate laser intensity:

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

Programming Your Omron Bar Code Reader Using a PC



When the cursor is in the laser intensity field:

Use your <left/right> arrow keys or <space bar> to scroll through the options.

Use the left and right arrow keys or the space bar to select the Laser Intensity

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Adjusting Scan Window Settings

Use this field to change the settings for the Scan Window On Time and Scan Window Delay Fields.

Scan Window On Time

This option allows you to control the length of your scan line. Enter this value as a percentage of the total possible scan time.

Scan Window Delay

This option allows you to control where, in the scan window, the scan line begins. Enter this value as a percentage of the total possible scan time.

How To Enter The Scan Window Settings

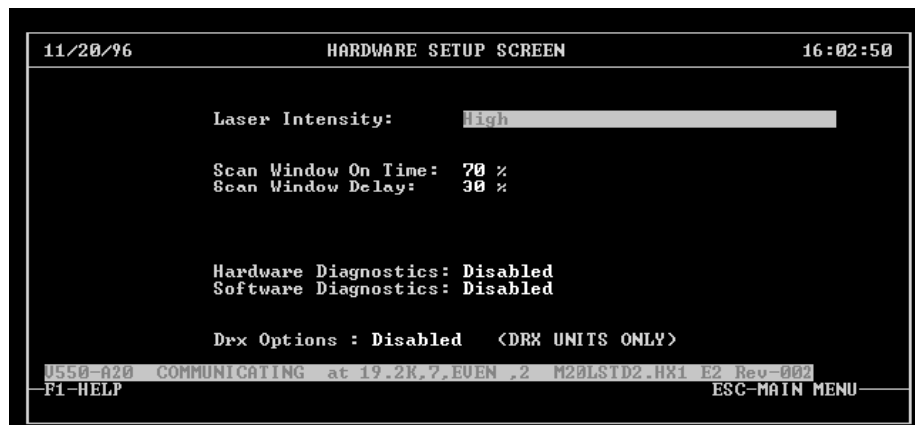
Select option six from the Main Menu (Hardware Setup Screen).

When the Hardware Setup Screen displays, use the following key-strokes to enter the appropriate scan window percentages:

Use your **<down arrow>** to move the cursor forward through the fields.

Programming Your Omron Bar Code Reader Using a PC

Your scanner is set at the factory for the maximum scan line length and should not be changed unless the scan line length is too large.



The percentage values of the scan delay and the scan on time functions CANNOT add up to be more than 100%.

Use your <up arrow> to move back through the fields.

When the cursor is in one of the scan window fields:

Type the percentage that best fits your application

Enter the scan window percentages in this field that best fit your application

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Diagnostics

From the Hardware Setup Screen, you can set up hardware and software diagnostics.

Hardware

This field allows you to enable or disable the hardware diagnostics.

The hardware diagnostics alert you of the following failures:

- motor failures
- laser diode failures
- interboard communication failures

When a failure is detected and the hardware diagnostics are enabled, a message is sent out of the primary serial port.

Software

This option allows you to enable or disable the software diagnostics.

These diagnostics can assist you in determining how well a scanner is reading at a given distance on a particular bar code. The following modes are available:

- Disabled
- Code Bar + Space Counts
- # of Good Reads per 100 scans
- # of Good Reads per # of trigger

After enabling one of the software diagnostic options, enter the Terminal mode to display the results. These modes are disabled after turning off power. They are for setup purposes only, therefore BC-SETUP does not retrieve the current diagnostic setting.

How To Select A Diagnostics Mode

Select option six from the Main Menu (Hardware Setup Screen).

When the Hardware Setup Screen displays, use the following keystrokes to enter the appropriate diagnostics mode:

Use your **<down arrow>** to move the cursor forward through the fields.

Use your **<up arrow>** to move back through the fields.

Programming Your Omron Bar Code Reader Using a PC



When the cursor is in one of the scan window fields:

Use the **<space bar>** to select the best diagnostics mode for your application.

***Select the diagnostics mode
that best fits your application***

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted,

Programming Your Omron Bar Code Reader Using a PC

DRX is optional and may not be available on the unit you are using.

and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Selecting DRX Options

Use this field to enable or disable your unit's DRX functionality. DRX technology reconstructs sequential bar code segments into a valid bar code. DRX is optional and may not be available on the unit you are using.

How To Enter Enable/Disable DRX

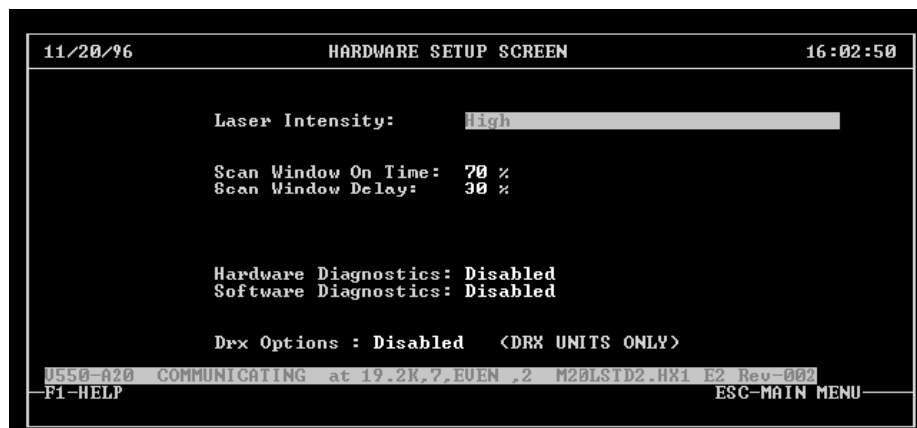
Select option six from the Main Menu (Hardware Setup Screen).

When the Hardware Setup Screen displays, use the following key-strokes to enter the appropriate scan window percentages:

Use your <**down arrow**> to move the cursor forward through the fields.

Programming Your Omron Bar Code Reader Using a PC

If BCSETUP displays a DRX enable error while programming the unit, your unit does not have DRX capabilities. Contact your Omron distributor to purchase a unit with DRX capabilities.



Use your **<up arrow>** to move back through the fields.

When the cursor is in the DRX options field:

Use your **<left/right>** arrow keys or **<space bar>** to enable or disable DRX.

Enable or Disable the DRX Options

Programming Your Omron Bar Code Reader Using a PC

Using The Communication Setup Screen

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Use the Communication Setup Screen when you want to change settings to your device that have to do with communicating with other devices. From this screen, you can change the following:

- The communication framing
- The communication protocol
- The message formatting
- The number of bar codes scanned for each read
- The delimiter between consecutive bar codes and between a bar code and its quality

To display the Communication Setup Screen:

Press <2> (Communication Setup) from the Device Setup Main Menu. The Communication Setup Screen displays, as shown to the right.

Moving Around The Screen

Programming Your Omron Bar Code Reader Using a PC

```
11/20/96          COMMUNICATIONS SETUP <COML>          16:06:13
  Baud Rate: 19.2K Data Bits: 7 Stop Bits: 2 Parity: EVEN
  Communications Protocol: EIA232 Point To Point      Multidrop Id :01
  Device Protocol: Read And Transmit                 Number of NAKS :03
  Transmit Header : <STX>
  Transmit Trailer : <CR><LF>
  Receive Header  : <STX>
  Receive Trailer  : <CR><LF>
  No Read Message : NO<SP>READ
  Delimiter Between Multiple Codes :-
  Delimiter Between Data and Code Quality:<SP>
  J550-A20 COMMUNICATING at 19.2K,7,EVEN,2 M20LSTD2.HX1 E2 Rev-002
  F1-HELP                                     ESC-MAIN MENU
```

To move around the fields on the Communication Setup screen:
Use your **<down arrow>** or press **<ENTER>** to move the cursor forward through the fields.

Use your **<up arrow>** to move back through the fields.

Use the **<left/right arrows>** or **<space bar>** to change selections within a field for fields that allow selection instead of data entry.

Programming Your Omron Bar Code Reader Using a PC

Bar Code Communication Setup Screen**Function Keys**

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Changing Communication Framing

This section provides an explanation of the communication framing parameters that your Bar Code Reader will use to communicate with other devices, and how to change them. These parameters are on the Communication Setup Screen, as shown to the right.

You can change the following framing parameters for your Omron Bar Code Reader. Each parameter is described in the following pages:

- Baud Rate
- Data Bits
- Stop Bits
- Parity

How To Enter Communication Framing Parameters

Select option two from the Device Setup Main Menu (Communication Setup).

Programming Your Omron Bar Code Reader Using a PC

You must program your Omron Bar Code Reader to use the same communication framing as the device that it will communicate with.

```

11/20/96          COMMUNICATIONS SETUP <COM1>          16:06:13
  Baud Rate: 19.2K Data Bits: 7 Stop Bits: 2 Parity: EVEN
  Communications Protocol: EIA232 Point To Point      Multidrop Id :01
  Device Protocol: Read And Transmit                 Number of NAKS :03

  Transmit Header : <STX>
  Transmit Trailer : <CR><LF>
  Receive Header  : <STX>
  Receive Trailer  : <CR><LF>
  No Read Message : NO<SP>READ

  Delimiter Between Multiple Codes :-
  Delimiter Between Data and Code Quality:<SP>

1550-020 COMMUNICATING at 19.2K,7,EVEN,2 M201STD2.HX1 E2 Rev-002
F1-HELP                                     ESC-MAIN MENU

```

When the Communications Setup Screen displays, use the following keystrokes to change the parameters that you want:

Use your **<down arrow>** to move the cursor forward through the fields.

Use your **<up arrow>** to move back through the fields.

When the cursor is in the communication framing field that you want:

Use your **<left/right>** arrow keys or **<space bar>** to scroll through the options.

Programming Your Omron Bar Code Reader Using a PC

Use the up and down arrows to move between the framing fields

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Baud Rate

The baud rate is a unit of measurement that determines the number of bits that can be transmitted per second (bps) between your Omron Bar Code Reader and the device to which it is communicating.

You would want to change the baud rate to speed up or slow down the travel of communication between your Omron Bar Code Reader and the device to which it communicates. Make sure the baud rate is the same for both devices.

When the BAUD RATE field is highlighted, use your <left/right> arrow keys or <space bar> to scroll through the following options:

300
600
1200
2400
4800
9600
19.2K (19200)
38.4K (38400)
57.6K (57600)

You must program your Omron Bar Code Reader to use the same communication framing as the device that it will communicate with.

Programming Your Omron Bar Code Reader Using a PC

Data Bits

The data bits are the number of bits that represent a single character in a message. There can be seven or eight data bits. You might want to change the number of data bits in your transmission to seven because it is slightly faster than eight.

When the cursor is in the DATA BITS field, use your <left/right> arrow keys or <space bar> to scroll through the following options:

7
8

Stop Bits

The stop bits inform the device that the data has been completely transmitted. There can be one or two stop bits. You might want to change the number of stop bits in your transmission because some older units require two stop bits, and newer units can handle one or two.

When the cursor is in the STOP BITS field, use your <left/right> arrows or <space bar> to scroll through the following stop bit options:

1
2

Programming Your Omron Bar Code Reader Using a PC

Parity

Parity is a mathematical check digit that is added to each single character within a message, to make the sum of set bits (bits=1) even or odd.

When the cursor is in the PARITY field, use your <left/right> arrows or <space bar> to scroll through the following options:

EVEN
ODD
MARK (always a '1')
SPACE (always a '0')
NONE

Changing Communications Protocols

This section describes how to select the Communication Protocol for your Omron Bar Code Reader. You can enter these protocols on the Communications Setup Screen, as shown to the right. You would want to change the type of communication protocol if you have communication needs that one protocol does not provide. For example, if you want to communicate with a device that is further than 50 feet away, you will probably need to use RS-422 instead of RS-232.

Communications protocol is a set of rules that govern the communication between your Omron Bar Code Reader and the device that it is communicating with. Your Omron Bar Code Reader supports the following types of communication protocols:

- EIA232 Point To Point

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96          COMMUNICATIONS SETUP <COM1>          16:06:13
  Baud Rate: 19.2K Data Bits: 7 Stop Bits: 2 Parity: EVEN
  Communications Protocol: EIA232 Point To Point      Multidrop Id :01
  Device Protocol: Read And Transmit                 Number of NAKS :03
  Transmit Header : <STX>
  Transmit Trailer : <CR><LF>
  Receive Header : <STX>
  Receive Trailer : <CR><LF>
  No Read Message : NO<SP>READ
  Delimiter Between Multiple Codes : -
  Delimiter Between Data and Code Quality:<SP>
  I550-A20 COMMUNICATING at 19.2K,7,EVEN,2 M20LSTD2.HX1 E2 Rev-002
  F1-HELP                                     ESC-MAIN MENU

```

Your device will read and transmit using EIA232.

- Two Wire Multidrop
Your device will use Multidrop communications with two wire EIA485.
- EIA422 Point To Point
Your device will read and transmit using EIA422.

Multidrop ID Field

When you select Multidrop Communication Protocol, you need to enter an ID Number. The Multidrop ID Number field is located to the right of the Communications Protocol Field on the Communication Setup Screen. Enter a two digit ID number in this field (from 01 to 99). All the parameters relating to multidrop are changed to the correct values.

Use the left and right arrow keys or the space bar to select the appropriate communications protocol

How To Enter Communications Protocols

Select option two (Communication Setup) from the Main Menu.

When the Communications Setup Screen displays, use the following keystrokes to change the parameters that you want:

Use your **<down arrow>** to move the cursor forward through the fields.

Use your **<up arrow>** to move back through the fields.

Programming Your Omron Bar Code Reader Using a PC

When the cursor is in the Communication Protocol field:

Use your <left/right> arrow keys or <space bar> to scroll through the options.

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

If the Omron Bar Code Reader does not receive anything from the host, and the beginning of another trigger cycle occurs, your Omron Bar Code Reader assumes an ACK is received.

Changing Device Protocol

Device protocol is part of communications protocol. The device protocol determines when to send a message, resend a message, or whether to send a message at all. You can enter these protocols on the Communications Setup Screen, as shown to the right.

Your Omron Bar Code Reader supports the following types of device protocols:

- Read and Transmit
- Ack/Nak Enabled
- XON/XOFF Enabled
- RTS/CTS Enabled

You need to change the device protocol if you want to change the way the messages are being handled between devices.

For example, if you want your Omron Bar Code Reader to retransmit a message if the host computer sends a no acknowledge (NAK), possibly because the message was garbled, select the Ack/Nak Enabled option.

The following are device protocol descriptions:

Read and Transmit - This disables all protocols. Your Omron Bar Code Reader will read a bar code, and then send it to the host.

ACK/NAK - Allows the host computer to request your Omron Bar Code Reader to retransmit garbled messages. If the message is successfully received, the host should respond with an ACK.

XON/XOFF - (Software) Allows the host to stop and start transmission from your Omron Bar Code Reader. An XOFF (Ctrl-S) will stop transmission, and XON message (Ctrl-Q) will start transmission.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                COMMUNICATIONS SETUP <COM1>                16:06:13
  Baud Rate: 19.2K      Data Bits: 7  Stop Bits: 2      Parity: EUEN
  Communications Protocol: EIA232 Point To Point      Multidrop Id   :01
  Device Protocol: Read And Transmit                 Number of NAKS :03

  Transmit Header   : <STX>
  Transmit Trailer  : <CR><LF>

  Receive Header    : <STX>
  Receive Trailer   : <CR><LF>

  No Read Message   : NO<SP>READ

  Delimiter Between Multiple Codes   :-
  Delimiter Between Data and Code Quality:<SP>

U550-A20 COMMUNICATING at 19.2K,7,EUEN ,2 M20LSTD2.HX1 E2 Rev-002
F1-HELP                                     ESC-MAIN MENU

```

RTS/CTS - (Hardware) Allows the host to stop and start transmission from your Omron Bar Code Reader. Your Omron Bar Code Reader controls Request To Send (RTS), and the host computer controls Clear To Send (CTS).

Ack/Nak Device Protocol (Number of NAKS)

When you select ACK/NAK device protocol, you must enter the number of NAKs in the NUMBER OF NAKS field. This field contains the number of NAKS that your Omron Bar Code Reader must receive in a row before it discards that data and moves on to the next message.

Type a two digit number that represents the number of NAKs that your device must receive.

Device Protocol Cut Out

How To Enter Device Protocols

Select option two from the Main Menu (Communication Setup).

When the Communications Setup Screen displays, use the following keystrokes to change the parameters that you want:

Programming Your Omron Bar Code Reader Using a PC

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in the Device Protocol field:

Use your <**left/right**> arrow keys or <**space bar**> to scroll through the options.

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Message Handling Setup

Message handling determines the characters transmitted and received at the beginning and end of a message. When a message is transmitted or received, that message must begin with a header to warn that the message is starting, and end with a trailer to warn that the message is finished. You can enter message headers and trailers on the Communications Setup Screen, as shown to the right.

When the scan head scans the bar code, the message would be as follows:

STX	123456	CR
Header	Code	Trailer

You would change the message handling setup, if you want to change the format of messages sent to and received from your Omron Bar Code Reader. The following are descriptions for Omron Bar Code Reader message handling:

Receive Header

This field contains the character(s) that must be transmitted to your Omron Bar Code Reader to signify the beginning of a message.

Receive Trailer

This field contains the character(s) that must be transmitted to your Omron Bar Code Reader to signify the end of a message.

Transmit Header

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                COMMUNICATIONS SETUP (COM1)                16:06:13
-----
Baud Rate: 19.2K      Data Bits: 7  Stop Bits: 2  Parity: EVEN
Communications Protocol: EIA232 Point To Point  Multidrop Id :01
Device Protocol: Read And Transmit              Number of NAKS :03

Transmit Header  : <STX>
Transmit Trailer : <CR><LF>

Receive Header   : <STX>
Receive Trailer  : <CR><LF>

No Read Message  : NO<SP>READ

Delimiter Between Multiple Codes  :-
Delimiter Between Data and Code Quality:<SP>

U550-A20 COMMUNICATING at 19.2K,7,EVEN ,2 M20LSD2.HX1 E2 Rev-000
F1-HELP                                     ESC-MAIN MENU

```

This field contains the character(s) that your Omron Bar Code Reader transmits to signify the beginning of a message.

Transmit Trailer

This field contains the character(s) that your Omron Bar Code Reader transmits to signify the end of a message.

How To Enter Headers and Trailers

Select option two from the Device Setup Main Menu (Communication Setup).

When the Communications Setup Screen displays, use the following keystrokes to change the parameters that you want:

Use your **<down arrow>** or **<space bar>** to move the cursor forward through the fields.

Use your **<up arrow>** to move back through the fields.

Message Handling Cut Out From The communications Setup Screen

To enter control characters, you must press the **<CTRL>** key and then the character. For example, to enter a {STX}, press **<CTRL>** and then a **** while you still have **<CTRL>** pressed.

Use the Terminal Screen to enter a null character..

Programming Your Omron Bar Code Reader Using a PC

Make the no read message unique, so you can determine the difference between the no read message and other received messages. "NO READ" is an example of a good no read message.

When the cursor is in one of the header or trailer fields:

Type the characters that you want to begin or end your message with. The following characters are acceptable in these fields:

a-z, A-Z 0-9, . > < ; : " ' / ? { } [] | \ + = _ - ! @ # \$ % ^ & * ()
and any control characters

Refer to the end of Chapter Five for a Hexadecimal & Decimal Character ASCII Table.

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Setting The No Read Message

The no read message displays when your Omron Bar Code Reader is either expecting to see a bar code and does not pass through the laser beam, or the laser beam passes through the bar code and it still does not decode it. You can enter a no read message on the Communications Setup Screen, as shown to the right. Below is a list of some of the reasons why you receive a no read message:

- The bar code is damaged
- The bar code is printed with poor quality
- The bar code is out of range of the depth of field
- For some reason the item with the bar code was kept from passing under the laser beam

The contents of a no-read data field are dependent on the way the No-read message is programmed:

If the No-Read message is entered as more than one character, those

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96          COMMUNICATIONS SETUP <COML>          16:06:13
  Baud Rate: 19.2K Data Bits: 7 Stop Bits: 2 Parity: EVEN
  Communications Protocol: EIA232 Point To Point      Multidrop Id :01
  Device Protocol: Read And Transmit                  Number of NAKS :03
  Transmit Header : <STX>
  Transmit Trailer : <CR><LF>
  Receive Header  : <STX>
  Receive Trailer  : <CR><LF>
  No Read Message : NO<SP>READ
  Delimiter Between Multiple Codes : -
  Delimiter Between Data and Code Quality:<SP>
1550-A20 COMMUNICATING at 19.2K,7,EVEN .2 M20LSTD2.HX1 E2 Rev-002
F1-HELP          ESC-MAIN MENU

```

exact characters appear as no-read data no matter what code lengths are programmed. The length of the data fields of the read and the no-read messages may or may not be equal.

If the No-Read message is entered as a single character and the bar code length is fixed, the data field will fill to the code length with that character if a no-read occurs. The length of the data fields of the read and no-read messages will be equal.

If the No-Read message is entered as a single character and the code length is variable, the data field will use that single character if a no-read occurs. No matter what code lengths are actually being read, the field is truncated to a single character. The length of the data fields of the read and no-read messages will not be equal unless the bar code actually being read is a one character bar code.

If the No-Read message is entered and you are reading one bar code per trigger cycle with multiple codes enabled, the no read message will look only at the first bar code type enabled.

Programming Your Omron Bar Code Reader Using a PC

Entering The No Read Message

A trigger cycle is defined as the amount of time the scanner is looking for a bar code.

How To Enter The No Read Message

Select option two from the Main Menu (Communication Setup). When the Communications Setup Screen displays, use the following keystrokes to change the no read message:

Use your <**down arrow**> to move the cursor forward through the fields. Use your <**up arrow**> to move back through the fields.

When the cursor is in the No Read Message field:

Type up to 15 characters that you want in your no read message. The following characters are acceptable in this field:

a-z, A-Z 0-9 , . > < ; : " ' / ? { } [] | \ + = _ - ! @ # \$ % ^ & * ()
and any control characters

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Setting Delimiter Between Multiple Codes

The character between multiple bar codes is any character that you want to use as a separator between the transmitted bar codes.

If you chose to read multiple bar codes for each trigger cycle:

The bar codes are transmitted in the order that they were placed in the code buffer. Refer to the **Change A Bar Code Type** section of this Chapter.

You need to enter a separator character that is placed between the bar code information so your device will be able to recognize the difference between one bar code and the bar codes surrounding it. This character is called a delimiter.

The two options available in the Multiple Codes Scanned Per Read field are Y and N.

If you select Y, your device will read and decode as many bar codes that pass in front of the scanner during one trigger cycle.

If you select N, your device will read and decode only the first bar code that passes in front of the scanner during one trigger cycle.

If you select Y, the scanner must be set up to all the code types that will be read. You must also use a delimiter between the bar codes.

Programming Your Omron Bar Code Reader Using a PC

If a no read occurs while you are reading multiple bar codes, the no read is transmitted after the last code buffer.

```

11/20/96          COMMUNICATIONS SETUP <COM1>          16:06:13
-----
Baud Rate: 19.2K Data Bits: 7 Stop Bits: 2 Parity: EVEN
Communications Protocol: EIA232 Point To Point      Multidrop Id :01
Device Protocol: Read And Transmit                 Number of NAKS :03

Transmit Header : <STX>
Transmit Trailer : <CR><LF>

Receive Header  : <STX>
Receive Trailer  : <CR><LF>

No Read Message : NO<SP>READ

Delimiter Between Multiple Codes : -
Delimiter Between Data and Code Quality:<SP>

USSB-B20 COMMUNICATING at 19.2K,7,EVEN ,2 M20LSTD2.HX1 E2 Rev-002
F1-HELP                                     ESC-MAIN MENU

```

How To Select Multiple Bar Codes Per Read

Select option two from the Device Setup Main Menu (Communication Setup). When the Communications Setup Screen displays, use the following keystrokes to move to the Multiple Codes Scanned Per Read field:

Use your **<down arrow>** to move the cursor forward through the fields.

Use your **<up arrow>** to move back through the fields.

When the cursor is in the protocol field that you want:

Use your **<left/right>** arrow keys to scroll through the options.

Selecting a Delimiter

If you select a Y in the Multiple Codes Scanned Per Read field, the next field that you need to change is the Delimiter Between Multiple Codes field. Press the down arrow to move to this field. This field allows you to change the character that separates two consecutive bar codes.

The following character has a special function in this field: Enter an X for no character between the bar codes

Programming Your Omron Bar Code Reader Using a PC

A trigger cycle is defined as the amount of time the scanner is looking for a bar code.

For example,

If you place an * in this field, the result would be as follows:

CODE1*CODE2

The * is the delimiter between bar codes.

When your cursor is in the Multiple Codes Scanned Per Read field and you selected a Y in this field, press the down arrow to move to the Delimiter Between Multiple Codes field. Type the character that you want to use to separate your bar codes. The following characters are acceptable:

**a-z, A-Z 0-9, . > < ; : " ' / ? { } [] | \ + = _ - ! @ # \$ % ^ & * ()
and any control characters**

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Setting Delimiter Between Code and Quality

The character between the bar code and the quality (QQ) is any character that you want to use as a separator between the transmitted bar code and bar code quality (accepted number of valid scans during a single trigger cycle).

You would want to change the character between the bar code and quality to distinguish between the actual bar code data and the bar code quality information. You change the delimiter in the Delimiter Between Data and Code Quality field as shown to the right.

For example,

If you place an * in the Delimiter Between Data and Code Quality field, the result would be as follows:

CODE*QQ

The following characters have special functions in this field: Enter an N for no character between the bar code data and the code quality. Enter an X for no code quality to be transmitted.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96          COMMUNICATIONS SETUP <COM1>          16:06:13
-----
Baud Rate: 19.2K Data Bits: 7 Stop Bits: 2 Parity: EVEN
Communications Protocol: EIA232 Point To Point Multidrop Id :01
Device Protocol: Read And Transmit Number of MARKS :03

Transmit Header : <STX>
Transmit Trailer : <CR><LF>

Receive Header : <STX>
Receive Trailer : <CR><LF>

No Read Message : NO<SP>READ

Delimiter Between Multiple Codes :-
Delimiter Between Data and Code Quality:<SP>

M550-A20 COMMUNICATING at 19.2K,7,EVEN,2 M20LSTD2.HX1 E2 Rev=000
F1-HELP ESC-MAIN MENU

```

The * is the delimiter between code and quality.

How To Enter The Delimiter

Select option two from the Device Setup Main Menu (Communication Setup).

When the Communications Setup Screen displays, use the following keystrokes to change the delimiter between the bar code and the

Programming Your Omron Bar Code Reader Using a PC

**Using the Input/
Output Screen**

quality:

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in the Delimiter Between Data and Code Quality field:

Type any one of the following characters to use as the delimiter:

a-z, A-Z 0-9, . > < ; : " ' / ? { } [] | \ + = _ - ! @ # \$ % ^ & * ()
and any control characters

Delimiter Between Code Data And Code Quality**Function Keys**

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

Programming Your Omron Bar Code Reader Using a PC

```
11/20/96          INPUT/OUTPUT REQUIREMENTS          16:08:47

Verifier Function Status: Verifier Function Disabled
Downloaded Verify Code :
  RELAY1/OUT 0/NUC/NO MATCH output timer value: 99 x 50 milliseconds
  RELAY2/OUT 1/GO/MATCH output timer value   : 99 x 50 milliseconds
Number of consecutive NUC's or NO MATCH's until the NUC output is fired:01

1550-020 COMMUNICATING at 19.2K, 2, EVEN, 2 M20LSTD2.HX1 E2 Rev-002
F1-HELP          ESC-MAIN MENU
```

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Use the Input/Output Requirements Screen when you want to change settings to your device that have to do with data entered into the device and data exiting the device.

From this screen, you can change the following:

- A verifier used to check bar codes for accuracy
- Timer values

Programming Your Omron Bar Code Reader Using a PC

To display the Input/Output Requirements Screen:

Press <4> (Input/Output Requirements) from the Device Setup Main Menu. The Input/Output Requirements Screen displays, as shown to the right.

Moving Around The Screen

To move around the fields on the Input/Output Requirements Screen:

Use your <**down arrow**> or press <ENTER> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

Use the <**left/right arrows**> to change selections within a field for fields that allow selection instead of data entry.

Using The Input/Output Screen

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Using The Scanner As A Verifier

This function allows you to use your Bar Code Reader as a verifier. There are two methods that you can use to have your scanner perform this function. You can have a bar code or assigned serial data in memory that can be used to check other bar codes against this stored value for accuracy. If the bar code does not match the data in memory or no bar code is detected, the NVC (non valid code) output is initiated. The following selections are available from the Verifier Function Status Field:

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                INPUT/OUTPUT REQUIREMENTS                16:08:47

Verifier Function Status: Verifier Function Disabled
Downloaded Verify Code :
RELAY1/OUT 0/NUC/NO MATCH output timer value: 99 x 50 milliseconds
RELAY2/OUT 1/GO/MATCH output timer value : 99 x 50 milliseconds
Number of consecutive NUC's or NO MATCH's until the NUC output is fired:01

J550-020 COMMUNICATING at 19.2K, 2, EVEN, 2 M20LSTD2.HX1 E2 Rev-002
F1-HELP                ESC-MAIN MENU

```

- Verify Each Code Read Against A Download Code
- Verify Each Code Read Against The First Code Read
- Verifier Function Disabled

You could use the verifier function to establish a one lane sorter or to send items down a reject lane.

For example, you have products of X and Y. All of product X have the same bar code, and all of product Y have the same bar code. Your goal is to divert any product other than product X into a bin, and let product X continue to the end of the conveyor.

You can use one of the following two methods for each scan head to achieve this goal:

METHOD 1 (First Code): Use the first bar code scanned as the verify data (Verify Each Code Read Against The First Code Read).

Pass one of product X in front of the scanner (be sure the bar code is read). Whenever your device receives a message that does not match the bar code on product X, that product is diverted to the bin. This ensures that all of product X continues to the end of the conveyor.

METHOD 2 (Serial Download): Download the verify data through the serial port (Verify Each Code Read Against A Downloaded Code). This is the same as method one, except instead of scanning product X, you enter the bar code man readable number in the field below the verifier field labelled **SERIAL MSG**. The maximum length for verify data is 50 characters.

Programming Your Omron Bar Code Reader Using a PC

NVC output is a NO READ output if the verify function is not enabled, and the GO is output after a good read if the verify is enabled, as long as RTS/CTS is not enabled.

How To Enter the Verifier

Select option three from the Device Setup Main Menu (Input/Output Requirements).

Verifier Function Cut-Out

When the Input/Output Requirements Screen displays, use the following keystrokes to change the parameters that you want:

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in the Verifier Function Status Field:

Use your <**left/right**> arrow keys or the <**space bar**> to scroll through the options.

Entering The Downloaded Verify Code

If you choose to Verify Each Code Read Against A Downloaded Code, you must enter a downloaded verify code in the next field. To enter the downloaded verify code:

Once your cursor is in the Verifier Function Status field, press the down arrow once, and enter up to 50 characters in this field, to use as the verify code.

Function Keys

F1 - Help

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Changing Output Timer Values

Your Omron Bar Code Reader has two output timers. The output timer fields on the Input/Output Requirements screen, as shown to the right allow you to enter the timer values (in 50 millisecond increments). The number you enter in the field is the amount of time in 50

Programming Your Omron Bar Code Reader Using a PC

```
11/20/96          INPUT/OUTPUT REQUIREMENTS          16:08:47

Verifier Function Status: Verifier Function Disabled
Downloaded Verify Code :
  RELAY1/OUT 0/NVC/NO MATCH output timer value: 99 x 50 milliseconds
  RELAY2/OUT 1/GO/MATCH output timer value   : 99 x 50 milliseconds
Number of consecutive NUC's or NO MATCH's until the NUC output is fired:01

USS0-A20 COMMUNICATING at 19.2K, 2, EVEN, 2, M20LSTD2.HX1 E2 Rev-002
F1-HELP          ESC-MAIN MENU
```

the following two output timers.

NVC/NO MATCH
GO/MATCH

NVC/NO MATCH Output Timer

In this field you can set the number of milliseconds that you want to hold the output timer that is activated when you receive a non valid bar code or a no match.

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GO/MATCH Output Timer

In this field you can set the number of milliseconds that you want to hold the output timer that is activated when you receive a go or a match. The GO/MATCH output is not active if RTS/CTS protocol is enabled.

How To Enter The Timer Value

Select option three from the Device Setup Main Menu (Input/Output Setup).

When the Input/Output Setup Screen displays, use the following keystrokes to enter the start and stop characters:

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in the Output Timer field that you want:
Type the number (1-99) in milliseconds that you want.

Enter 00 to disable that particular output timer.
Enter 99 to hold the timer until the next trigger cycle.

Programming Your Omron Bar Code Reader Using a PC

```

11/20/96                INPUT/OUTPUT REQUIREMENTS                16:08:47

Verifier Function Status: Verifier Function Disabled
Downloaded Verify Code :
  RELAY1/OUT 0/NUC/NO MATCH output timer value: 99 x 50 milliseconds
  RELAY2/OUT 1/GO/MATCH output timer value   : 99 x 50 milliseconds
Number of consecutive NUC's or NO MATCH's until the NUC output is fired:01

US50-A20 COMMUNICATING at 19.2K,?,EVEN ,2 M20LSTD2.HX1 E2 Rcu=00%
F1-HELP                ESC-MAIN MENU

```

Function Keys**F1 - Help**

Displays a brief description of the field that is currently highlighted, and describes screen maneuvering and data entry.

ESC - Main Menu

Exits this screen, and displays the Main Menu.

Setting The NVC Counter

The NVC (Non Valid Code) Counter prevents the NVC\NO MATCH output from being activated until the number of no-reads and/or no-matches in succession is equal to the value of this counter. This is designed for high speed verifier applications where the conveyor should not be stopped for a single no-read or no-match.

If the counter is set for zero (00), the NVC output will not be activated.

How To Enter The NVC Counter Value

Select option three from the Device Setup Main Menu (Input/Output Requirements).

When the Input/Output Requirements Screen displays, use the following keystrokes to enter the start and stop characters:

Use your <**down arrow**> to move the cursor forward through the fields.

Use your <**up arrow**> to move back through the fields.

When the cursor is in the Number Of Consecutive NVCs field:

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Section 5

Programming Your Omron Bar Code Reader Using a Terminal or Host

This chapter explains how to change your Omron Bar Code Reader operating parameters using a terminal or host computer. You are shown the format of the commands you will use to change the parameters and how to enter these commands. This chapter also provides you with all the commands that you can use for your Omron Bar Code Reader and a brief description of each command. The last section of this chapter contains a Decimal and Hexidecimal Character ASCII table for your reference. For a more detailed description of each command, refer to Chapter Four of this manual.

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Entering Terminal Setup Mode

When you supply power to your Omron Bar Code Reader, you can either begin scanning bar codes, or you can change the operating parameters for your device.

If you are using a Terminal to change your Omron Bar Code Reader parameters, Use the following sections in this chapter as a guide. If you are using a PC to change your Omron Bar Code Reader parameters, refer to Section Four of this manual.

After you have connected your Omron Bar Code Reader to a Terminal, as explained in Section Three of this manual, you need to enter setup mode.

To enter setup mode for your Omron Bar Code Reader: press the <ESC> key three times. Enter the following command to review the current settings for your Omron Bar Code Reader:

<ESC><STX>5000<CR><ESC> - **software**

<ESC><STX>5001<CR><ESC> - **hardware**

Setup Command Format

The format of every Omron Bar Code Reader setup command is the same. Every command begins with a **header** (warns the device that a message is starting), has **data** in the middle (the command representing what you want the device to do), and ends with a **trailer** (warns the device that the message is finished). The following is a breakdown of what an actual command looks like:

Command:	ESC STX	1600	CR ESC
	↓	↓	↓
Definition:	Header	Data	Trailer

Programming Your Omron Bar Code Reader Using a Terminal or Host

Entering Setup Commands

To enter a setup command into your device, use the keyboard that is connected to your or Terminal or host computer. **Refer to Chapter Three of this manual** for instructions on how to connect a Terminal to your Omron Bar Code Reader. Press <CAPS LOCK> on your keyboard to make all entries in capital letters. To enter the setup commands, there are specific key strokes that you must use in the appropriate order for the header, data, and trailer. When you enter setup commands, the screen does not display everything you type. The following is an example of what the command looks like on the screen, after you type the whole command:

S_x1600

Entering The Header

To enter the header for a setup command, there are three key strokes that you must perform.

1. Press the <ESC> key, and then release the <ESC> key.
2. Press and hold the <CTRL> key.
3. Press the key, and then release the <CTRL> and keys.

The result of these three key strokes is as follows: the screen displays an **S_x** on most Terminals, and the beginning of your command (**ESC STX**) is entered.

Programming Your Omron Bar Code Reader Using a Terminal or Host

Entering The Data

There are three different types of data for the setup commands. Each command is described briefly in this chapter. If you need detailed descriptions, refer to Chapter Four in this manual. For most of the commands you enter the 4 digit data. Some commands require you to enter two digits followed by a hexadecimal equivalent of an ASCII character. Other commands require you to enter a three digit decimal equivalent of an ASCII character. The ASCII Character Table is at the end of this chapter.

When you enter the data, the screen displays the digits you typed, not necessarily what they represent.

For example,

To enter data for some commands, type the first digit, second digit, third digit, fourth digit. (**2300**)

To enter data for some commands, type the first digit, second digit, hexadecimal value. (**3324**) **24** is the hexadecimal value for \$.

To enter data for some commands, type the three digit decimal equivalent of an ASCII character. (**068**) this is the decimal equivalent for **D**.

After each command entry, you must wait for a response from the device.

Entering The Trailer

To enter the trailer for a setup command, there are three key strokes that you must perform.

1. Press and hold the **<CTRL>** key.
2. Press the **<M>** key, and then release the **<CTRL>** and **<M>** keys.
3. Press the **<ESC>** key, and then release the **<ESC>** key.

The results of these three key strokes is the end of your command (**CR ESC**). The screen does not display the command if you are not in Terminal program mode, but the cursor moves back to the beginning of the command.

Programming Your Omron Bar Code Reader Using a Terminal or Host

Device Response

Your Omron Bar Code Reader does not have a display. To monitor any possible device responses or errors that may occur, you must have your Terminal in program mode.

If you enter invalid information while you set up the unit, a NAK is transmitted out of your Omron Bar Code Reader Serial Port.

The following two messages are received:

<STX><ACK><CR><LF> - Indicates a valid message

<STX><NAK><CR><LF> - Indicates an invalid message

If your Omron Bar Code Reader has a display, and an error occurs, the last valid entry displays until you make another valid entry. If you make an invalid entry, the "ERROR" message displays.

Programming Your Omron Bar Code Reader Using a Terminal or Host

**Terminal
Setup
Commands**

The remainder of this section lists all the available Terminal setup commands for your Omron Bar Code Reader. For more details about a particular function, refer to the corresponding section in Section Four of this manual.

01xx - CODE TYPE

When entering bar code types, you must select the code buffer number to make that code type current. As soon as any code buffer is selected, any existing code type, length, and mod check are cleared from that buffer. The code type is selected and then the code length, if needed. If the code buffer is not selected before the other entries, the current code buffer will be altered. This would be the last code buffer selected of code one if no other code buffers have been selected since power up. The mod check, if needed is a separate command.

- 00 = No code type selected
- 01 = Straight 2 of 5
- 02 = Interleaved 2 of 5
- 03 = EDP/STI
- 04 = Code 39
- 05 = Code 128
- 06 = UPCA - transmit 10 characters
- 07 = UPCE - transmit 6 characters
- 08 = UPCA - transmit 12 characters
- 09 = UPCE - transmit 12 characters
- 10 = EAN-13
- 11 = EAN-8
- 12 = Codabar - don't transmit start/stop characters
- 13 = Codabar - transmit start/stop characters
- 14 = AS-10
- 15 = 10 Bit Periodic Binary
- 16 = Code 93
- 17 = PharmaCode (Available upon request)

02xx - CODE LENGTH (chars)

- 00 = variable length
- xx = number of characters in code

03xx - COMMUNICATIONS PROTOCOL

- 00 = 232 point to point
- 01 = 485 2 wire multidrop
- 03 = 422 point to point

Programming Your Omron Bar Code Reader Using a Terminal or Host

04xx - MULTIDROP UNIT ID

xx = decimal ascii number (1 - 99)

05xx - FLOW CONTROL

00 = enable ack/nak protocol
01 = enable xon/xoff
02 = enable rts/cts
03 = disable all flow control

06xx - NUMBER OF RETRANSMITS

xx = decimal ascii number (1 - 99)

07xx - TRANSMIT HEADER

00 = disable header
01 = start entry of header
02 = end entry of header
04xxx.. = input entire header, x = ascii character

08xx - UPC EXTENSIONS

00 = none
01 = 2 character extension
02 = 5 character extension

(need to select the code buffer, command 23xx, and a UPC/EAN code in order to enable the extensions)

09xx - TRANSMIT TRAILER

00 = disable trailer
01 = start entry of trailer
02 = end entry of trailer
04xxx.. = input entire trailer, x = ascii character

10xx - RECEIVE HEADER

00 = disable header
01 = start entry of header
02 = end entry of header
04xxx.. = input entire header, x = ascii character

11xx - RECEIVE TRAILER

00 = disable trailer
01 = start entry of trailer
02 = end entry of trailer
04xxx.. = input entire trailer, x = ascii character

12xx - BAUD RATE

00 = 300 baud
01 = 600 baud
02 = 1200 baud
03 = 2400 baud

Programming Your Omron Bar Code Reader Using a Terminal or Host

04 = 4800 baud
05 = 9600 baud
06 = 19.2 k baud
07 = 38.4 k baud
08 = 57.6 k baud
09 = 115.2k baud (available upon special order on the V550-A20)

13xx - DATA BITS

00 = 7 data bits
01 = 8 data bits

14xx - PARITY

00 = even parity
01 = odd parity
02 = mark parity
03 = space parity
04 = no parity

15xx - STOP BITS

00 = 1 stop bit
01 = 2 stop bits

16xx - EEPROM COMMANDS

00 = save settings to eeprom
02 = abort settings entered
03 = use settings, but don't save to eeprom
04 = reinitialize

19xx - DECODE DIRECTION (only used when PharmaCode is enabled)

00 = decode from right to left (in the direction of scan)
01 = decode from left to right (opposite direction of scan)

21xx - CODE QUALITY DELIMITER

4E = no delimiter between code and quality
58 = quality not transmitted
xx = hex ascii value

22xx - NO READ MESSAGE

00 = disable no read message
01 = start entry of no read message
02 = end entry of no read message
04xxx.. = input entire message, x = ascii character

Programming Your Omron Bar Code Reader Using a Terminal or Host

23xx - SELECT CODE BUFFER

- 00 = code 1
- 01 = code 2
- 02 = code 3
- 03 = code 4
- 04 = code 5
- 05 = code 6
- 06 = code 7
- 07 = code 8

24xx - TRIGGER TYPE

- 00 = hardware trigger
- 01 = software trigger
- 02 = continuous read, trigger timer dependent
- 03 = continuous read, continuous transmit
- 04 = one code per read
- 05 = multiple codes per read

25xx - TRANSMIT ON QUALITY

- 00 = end of trigger
- xx = quality to transmit on (00 - 99)

26xx - START OF SERIAL TRIGGER CHARACTER

- xx - hex ascii value

27xx - END OF SERIAL TRIGGER CHARACTER

- xx - hex ascii value

28xx - TRIGGER STATE

- 00 = non-inverted
- 01 = inverted

30xx - HARDWARE DIAGNOSTICS

- 00 = disabled
- 01 = enabled
- 03 = display all diagnostic error counters
- 50 = clear all diagnostic error counters

31xx - SOFTWARE DIAGNOSTICS

- 00 = disabled
- 01 = code diagnostics (bar and space counts)
- 03 = scan diagnostics (# of good reads out of 100 scans)
- 04 = good read diagnostics (# of reads / # of triggers)

Programming Your Omron Bar Code Reader Using a Terminal or Host

32xx - MOD CHECK VALUES

00 = disable all mod checks
 01 = mod 10 for code 1
 02 = mod 43 for code 1
 03 = mod 10 for code 2
 04 = mod 43 for code 2
 05 = mod 10 for code 3
 06 = mod 43 for code 3
 07 = mod 10 for code 4
 08 = mod 43 for code 4
 09 = mod 10 for code 5
 10 = mod 43 for code 5
 11 = mod 10 for code 6
 12 = mod 43 for code 6
 13 = mod 10 for code 7
 14 = mod 43 for code 7
 15 = mod 10 for code 8
 16 = mod 43 for code 8
 17 = Double Add Double Check (Hitachi check) for code 1
 18 = Double Add Double Check (Hitachi check) for code 2
 19 = Double Add Double Check (Hitachi check) for code 3
 20 = Double Add Double Check (Hitachi check) for code 4
 21 = Double Add Double Check (Hitachi check) for code 5
 22 = Double Add Double Check (Hitachi check) for code 6
 23 = Double Add Double Check (Hitachi check) for code 7
 24 = Double Add Double Check (Hitachi check) for code 8

33xx - CODE DELIMITER

58 = no delimiter between codes
 xx = hex ascii value

34xx - NUMBER OF CODES TO TRANSMIT PER TRIGGER CYCLE

00 = one code for each code buffer enabled
 xx = 01-08 codes
 99 = all valid codes read (codes that have reached win)

37xx - SCAN WINDOW DELAY

xx = 10 - 90 (% of scan)

38xx - SCAN WINDOW ON TIME

xx = 10 - 90 (% of scan)

39xx - VERIFIER

00 = disabled
 01 = start entry of code to be verified
 02 = end entry of code to be verified
 03 = first code verifier
 If verifier is enabled, out0 & out1 are match and no match.
 04xxx.. = input entire buffer, x = ascii character

Programming Your Omron Bar Code Reader Using a Terminal or Host

41xx - STK OPTION (only used with code 39)

00 = disabled

01 = enabled

42xxx - TRIGGER TIMER (used with hardware or serial trigger, 2400 and 2401)

000 = disable timer

xxx = decimal ascii value (000 - 999)

trigger time = $xxx * 10\text{ms}$ **42xxx - TRIGGER TIMER (used with continuous read, 2402)**

999 = don't read the same code twice in a row

xxx = time to wait before reading the same code again

decimal ascii value (001 - 998)

time = $xxx * 10\text{ms}$ **45xx - WIN**

xx = decimal ascii number of scans for a valid code

46xx - OUT0 TIMER (NVC/NO MATCH)

00 = disabled

99 = hold relay until next trigger

xx = decimal ascii value (00 - 99)

relay time = $xx * 50\text{ms}$ **47xx - OUT1 TIMER (GO/MATCH)**

00 = disabled

99 = hold relay until next trigger

xx = decimal ascii value (00 - 99)

relay time = $xx * 50\text{ms}$ **48xx - NUMBER OF NVC'S**xx = number of consecutive NVC's until the NVC relay is fired
(00 - 99)**5000 - MENU DUMP****5001 - HARDWARE MENU DUMP****55xx - WATCH DOG TIMER**

00 = disabled

xx = decimal ascii value (00 - 99)

maximum process time after end of trigger = $xx * 50\text{ms}$ **60xx - SCAN RATE**

xx = decimal ascii value (00 - 31)

speed = $xx * 50 \text{ scans / sec}$

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61xx - LASER INTENSITY

- 01 = low intensity
- 02 = full intensity
- 13 = Automatic Laser Control
- 15 = toggle intensities

6251 - OUT1 = SCAN SIGNAL**63xx - HEAD TYPE**

- 01 = low density optics (500 scans/sec)
- 02 = high density optics (300 scans/sec)
- 03 = high speed (700 scans/sec)
- 15 = variable motor speed (use 60xx command to set)

64xx - CONTINUOUS LASER MODE

- 00 = disabled - trigger controlled laser
- 01 = enabled - laser is on all the time

Programming Your Omron Bar Code Reader Using a Terminal or Host

**DRX
Commands**

If your Omron Bar Code Reader has DRX capabilities, use the following commands to change the DRX parameters, using a Terminal. These DRX parameters are defaulted to the best values for the majority of applications. You rarely need to adjust these values. Make sure you have a complete understanding of DRX technology and these commands before you begin using them.

DRX DIAGNOSTICS

This command allows you to enter different DRX diagnostic modes. To enter the command, use the following sequence of keys:

<ESC><CTRL>70XX<CTRL><M><ESC>

XX = This represents the input values for the bit map of the DRX diagnostics mode. With this command, you can enable/disable DRX, enable/disable reprocess, and display the learn results in any combination. The range of values for xx is 00h-FFh. The default setting is 80h. The following are the hexadecimal values to enable the functions individually:

DRX	80 hex
Reprocess	2 hex
Display Learn Results	1 hex

If you want to activate any combination of these functions, add the hex values together; for example, if you want to enable DRX and display the learn results enter the command number 7081.

MINIMUM TRANSITIONS

This command allows you to enter the minimum number of transitions (without a quiet zone) that the DRX needs before the data is saved. To enter the command, use the following sequence of keys:

<ESC><CTRL>71XX<CTRL><M><ESC>

NOTE: The sequences of bars/spaces less than this value are ignored.

XX= This represents the minimum number of transitions. The range of values for xx is 01-99. The default setting is nine transitions.

MAXIMUM CLUSTER QUALITY

This command allows you to enter a value to establish the number of open and close patterns that are needed to determine that a valid bar

Programming Your Omron Bar Code Reader Using a Terminal or Host

code has been reconstructed, and there is no longer a need to process anymore data.

To enter the command, use the following sequence of keys:

<ESC><CTRL>73XX<CTRL><M><ESC>

XX= This represents the total number of opens and closes that a cluster needs before reaching the end of data. The range of values for xx is 01-99. The default setting is zero.

DRX OVERLAY RATIO

This command, along with the overlay multiplication factor below, establishes a constant that is used for calculating the percent that the elements can vary. To enter the command, use the following sequence of keys:

<ESC><CTRL>74XX<CTRL><M><ESC>

XX= This represents the percentage that the smallest transitions are allowed to vary to be similar. The range of values for xx is 01-99. The default setting is 60%. The greater the count (bar width) of the bar, the smaller the percentage the bar width can vary.

DRX OVERLAY MULTIPLICATION FACTOR

This command, combined with the overlay ratio command above, establishes a constant used for calculating the percent that elements can vary. To enter the command, use the following sequence of keys:

<ESC><CTRL>75XX<CTRL><M><ESC>

XX= This represents the multiplication factor used when calculating the percentage of allowed variance for larger transitions. The range of values for xx is 01-99. The default setting is 13.

%variance in the width of bar or space =
 OVERLAY RATIO - (SQRT(width) * MULTIPLICATION FACTOR)

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MINIMUM PULSE WIDTH

This command allows you to set the minimum amount of time, in nano- seconds, for the beam to cross a bar or space. To enter the command, use the following sequence of keys:

`<ESC><CTRL>1700XXX...<CTRL><M><ESC>`

XXX...= This represents the size of the pulse width of in nanoseconds. The default setting is 1000 nanoseconds.

MAXIMUM PULSE WIDTH

This command allows you to set the maximum amount of time, in nano- seconds, for the beam to cross a bar or space. To enter the command, use the following sequence of keys:

`<ESC><CTRL>1800XXX...<CTRL><M><ESC>`

XXX... = This represents the size of the pulse width of in nanoseconds. The default setting is 35000.

DUMP DRX SETTINGS TO THE SERIAL PORT

This command allows you to send all the programmed DRX settings to the serial port. To enter the command, use the following sequence of keys:

`<ESC><CTRL>5002<CTRL><M><ESC>`

FACET LEARN MODE

The facets in the scan head need to be learned. You can identify if the offsets have already been learned, if the idle LED toggles at a constant rate. If the offsets are unknown or are incorrect, the idle LED will blink twice, then pause, blink twice, then pause, etc.

To perform an offset learn, CODE #1 in the setup menu needs to be initial- ized to a specific bar code that will be used during the learn. The offset learn process looks for the correct number of transitions for this code (surrounded by quiet zones). Variable length codes default using the transitions for the smallest allowable code size for the given code type.

Make sure that the minimum pulse width and the maximum pulse width are set to the correct values for the code type being used. Once the code is set up, exit setup mode (use or save).

If the offsets are not learned, the unit will continue to function. However, the DRX capabilities of the unit will be greatly diminished.

Programming Your Omron Bar Code Reader Using a Terminal or Host

Place the code in front of the unit in a stationary position. It is very important that the code is not moving at all during the learn, and that all the scan lines pass through the code. Start the trigger. To begin the learn process, send a <CNTRL><L> (0Ch) to the unit.

LEARN DIAGNOSTICS

If the display learn results option is enabled, the results of the learn is sent out the serial port. Once the learn is complete, the SYNC time, OFFSET, and learn variance for each facet is transmitted. The variance represents how good or bad the learn was. Each count represents 100 nanoseconds of jitter on a given facet.

A rule of thumb is that the largest jitter on any facet plus the size of the mirror wheel raster can not exceed 1/2 of a character width. The software will not allow a variance larger than one microsecond. If one is seen, the learn will be restarted, and the "bad" learn's variance will be transmitted out the serial port.

Glossary of Terms

ACK - A control character sent to acknowledge that a transmission block has been received.

Address - A unique designation for the location of data or the identity of a smart device; allows each device on a single communications line to respond to its own message.

AEL (Accessible Emission Limit) - The average power limitations of electronic radiation from a laser light source as defined by the CDRH.

AIM - Automatic Identification Manufacturers, a trade association.

Alignment - The position of a scanner or light source in relation to the target of a receiving element.

Alphanumeric - The character set which contains letters, digits and other characters such as punctuation marks.

Ambient Light - The lighting conditions in the scanning area. Ambient light can interfere with successful scanning of bar codes.

ANSI (American National Standards Institute) - The principle standards development group in the U.S. A non-profit, non-governmental group supported by over 1000 trade organizations, professional societies, and companies. Member body to the ISO (International Standards Organization).

Aperture - Term used on the required CDRH warning labels to describe the laser exit window.

ASCII (American Standard Code for Information Interchange) - A seven bit plus parity code established by ANSI to achieve compatibility between data services.

Aspect Ratio - The ratio of height to width of a bar code symbol. A code twice as high as wide would have an aspect ratio of 2; a code twice as wide as high would have an aspect ratio of $\frac{1}{2}$ or 0.5.

Asynchronous Transmission - Transmission in which the time intervals between transmitted characters may be of unequal length. Transmission is controlled by start and stop bits at the beginning and end of each character.

Autodiscrimination - The ability of bar code reading equipment to recognize and correctly decode more than one bar code symbology.

Autodistinguish - The ability of a scanner to recognize a selectable number of different symbologies and process the data without operator intervention; this is a prerequisite feature of linear bar code scanners employed in open systems.

Bar - The dark elements of a printed bar code symbol.

Bar Code - An array of rectangular bars and spaces that are arranged in a predefined pattern to represent elements of data referred to as characters.

Bar Code Character - A single group of bars and spaces that represent an individual number, letter, or other symbol.

Bar Code Density - The number of characters that can be represented in a linear unit of measure. Bar code density is often referred to in characters per inch (CPI).

Bar Code Label - A label that carries a bar code and can be affixed to an article.

Bar Code Reader - A device that examines a printed spacial pattern and decodes the encoded data.

Bar Height - The height of the shortest bar in a bar code.

Bar Length - The bar dimension perpendicular to the bar width.

Bar Width - The thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

Baud Rate - A unit used to measure communications speed or data transfer rate; represents the number of discrete conditions or events per second.

BCC (Block Check Character) - Used to check transmission accuracy, a character transmitted by the sender after each message block and compared with a block check character computed by the receiver.

Bed Width - The width of the conveyor bed measured in inches.

BEL - A control character that is used when there is a need to call for attention; it may control alarm or attention devices.

Belt Width - The width of the conveyor belt measured in inches.

Bidirectional - A bar code symbol capable of being read successfully independent of scanning direction.

Bit (Binary Digit) - The contraction of binary digit, the smallest unit of information in the binary system; a one or zero condition.

Bottom Read - When the scanner is mounted under the conveyor to read codes on the bottom of the boxes or on the front or back of the boxes. If used there is not enough clearance for a standard front or back read.

BPS (Bits per Second) - Unit of data transmission rate. See baud rate.

Buffer - A temporary storage device used to compensate for a difference in data rate and data flow between two devices (typically M).

Byte - A binary element string functioning as a unit, usually shorter than a computer "word". Eight-bit bytes are most common. Also called a "character".

CDRH - (National Center for Devices and Radiological Health) This organization (a service of the Food and Drug Administration) is responsible for the safety regulations governing acceptable limitations on electronic radiation from laser devices. Omron is in compliance with the CDRH regulations.

Character - A single group of bars and spaces in a code that represent an individual number, letter, punctuation mark or other

graphic element. Used as part of the organization, control, or representation of data.

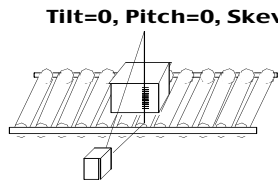
Check Character - A character (usually at the end of the code) that is used to perform a mathematical check to ensure the accuracy of a scan of the bar code.

Code Orientation - The relationship of the bar code with reference to the bar code reader's reading zone. Typical code orientations are Ladder and Picket Fence.

Code Length - The length of the bar code measured from the start of the first bar to the end of last bar.

Code Placement - Variation in code placement affects the ability of a scanner to read a code. The terms Tilt, Pitch, and Skew deal with the angular variations of code placement in the X, Y and Z axes. Variations in code placement affect the pulse width and therefore the decoding of the code. Pulse width is defined as a change from the leading edge of a bar or space to the trailing edge of a bar or space over time. Pulse width is also referred to as a transition. Tilt, pitch, and skew impact the pulse width of the code.

Changes to this code presentation cause the bar codes to appear smaller to the scanner which results in a smaller pulse width. Each of these variations has a different effect on a scanner reading these codes and the combination of the variations leads to more complicated effects.



Code Quality - The number of scans successfully decoded during a read cycle.

Communications Protocol - The rules governing exchange of information between devices connected together on the same communications line.

Conveyor Speed - The speed that the conveyor is moving measured in feet per minute. Conveyor speed directly impacts the time that the code is in front of the scanner; therefore, it affects the number of reads that are possible.

CR (Carriage Return) - An ASCII or EBCDIC control character that moves the cursor or print mechanism to the left margin.

CTS (Clear to Send) - The Modem interface signal that indicates to the DTE device to begin transmission.

Depth of Field - The distance between the maximum and minimum plane in which a symbol can be read. This range is from the specified optical throw to the far reading distance.

Dot Matrix Printer - A dot matrix printer is an impact printer that consists of a series of pins arranged in an array. The pins strike an inked ribbon against the label stock to form the bar code and characters. This is the most common type of printer used to print labels on-demand. Some dot matrix printers use a moving print head and stationary stock. The print head moves across the label,

printing one dot at a time, to complete one line. The print head then begins printing the next line. Other dot matrix printers use a stationary print head. These printers typically print one line at a time and are therefore much quicker than a printer with a moving print head. **Common Problems with dot matrix printing:** The printed ink (bars) tends to expand or "bleed". This causes the size of the bars of a code to expand while shrinking the spaces. There tends to be small gaps between pins of a dot matrix printed bar. This can lead to problems with scanners because these gaps can appear as spaces. Ribbon wear is a factor when printing dot matrix codes. If a printer uses a circular type ribbon (ribbon is used over and over again) the contrast of the bar code diminishes over time. A bar code printed with an old ribbon can be more difficult to read than one printed with a new ribbon. **Benefits of dot matrix printing:** It is inexpensive to print bar codes using dot matrix printers.

Downloading - The process of sending configuration parameters, operating software or related data from a central source to remote stations.

DRX (Data Reconstruction) - A technology that collects, reconstructs, and decodes partial scans to provide valid bar code data.

DSR (Data Set Ready) - An RS-232 modem interface control signal which indicates that the terminal is ready for transmission.

DSR (Data Terminal Ready) - Modem interface signal which alerts the modem that the DTE device is ready for transmission.

Duplex Transmission - See Full and Half Duplex.

EDI (Electronic Data Interchange) - A method by which data is electronically transmitted from one point to another.

EIA-232 - Interface between data terminal equipment and data communication equipment employing serial binary data interchange.

EIA-422 - Electrical characteristics of balanced-voltage digital interface circuits.

EIA-485 - The recommended standard of the Electronic Industry Association that specifies the electrical characters of generators and receivers for use in balanced digital multipoint systems.

Element - Dimensionally the narrowest width in a character - bar or space.

ENQ (Enquiry) - A transmission control character used as a request for a response from a remote station. (^E)

ESC (Escape) - A control character which is used to provide additional control functions. It alters the meaning of a limited number of continuously following bit combinations. (^I)

ETX (End of Text) - A transmission control character that terminates a text.

Even Parity - A data verification method in which each character must have an even number of on bits.

Far Distance - The distance (in inches) from the face of the scanner to the **farthest** point at which a code can be successfully scanned.

Front Read - The scanner is mounted to read bar codes on the leading edge of a box as it passes the scanner. In a front read application, the scanner can be mounted above or on the side of the conveyor.

Full Duplex (FDX) - Simultaneous, two-way, independent transmission in both directions.

Half Duplex (HDX) - Transmission in either direction, but not simultaneous.

Handshaking - Exchange of predetermined signals between two devices establishing a connection. Usually part of a communications protocol.

Height-of-Scan - The maximum vertical scanning dimension of a moving beam scanner at a specific distance from the face of the scanner.

Helium Neon Laser - The type of laser most commonly used in bar code scanning. Because the laser beam is bright red, bars must not be printed with red ink since they would be indistinguishable from the code's background.

Ink Jet Printing - Ink jet is a non-contact printer that projects drops of ink at a printing surface. The sprayed drops are controlled electronically to form a bar code. **Common Problems with laser printing:** Its main restriction is that ink jet printing is usually capable of printing only low density codes. **Benefits of laser printing:** Because ink-jet printers are non-contact and non-impact, they can print bar codes on a variety of contoured, rough, and delicate surfaces. Capable of printing random or sequential information on labels. Ink jet printers can print directly on cartons and avoid the cost of label stock.

Input/Output Modules - Since many scanners are operating in environments that have electrical noise problems, it is helpful to have equipment electrically isolated from other equipment. The standard method for isolating inputs and outputs is through the use of OPTICALLY ISOLATED INPUT/OUTPUT MODULES. These flexible modules allow the scanner to control high voltage outputs that are susceptible to noise. Since they are isolated from each other the noise is not picked up in the scanner. Omron PLC modules are available as input and output versions. Maximum current is limited by the input modules. Input modules can be used for photoelectric trigger inputs. Output modules are commonly used to control diverters, alarms, external relays, etc.

Intercharacter Gap - The space between two adjacent bar code characters in a discrete code.

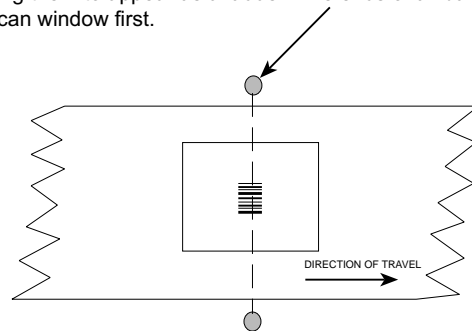
Interface - A shared boundary defined by common physical interconnection characteristics, signal characteristics and meanings of interchanged signals.

Interleaved Bar Code - A bar code in which characters are paired together using bars to represent the first character and spaces to represent the second.

I/O (Input/Output) - The keyboard and a printer, are examples of I/O devices. I/O activity is different from computational activity. When a program sends a document to the printer, it is engaging in I/O activity; when the program sorts a list of terms, it is engaging in computational activity.

Jumper - A wire that connects a number of pins on one end of a cable only, such as looping back Request to Send from Clear to Send pins 4 and 5.

Ladder Orientation - Presentation to the scanner of a bar code such that the bars are positioned horizontally on the product, causing them to appear as a ladder. The ends of all bars will enter the scan window first.



Laser Gun - A hand-held non-contact laser scanner that is usually activated with a trigger.

Laser Scanner - An optical bar code reading device using a low energy laser light beam as its source of illumination.

Laser Printing - Laser printers use a pulsed or rastered laser light source to positively charge an image on a dielectric cylinder of an electrostatic printing mechanism. Toner used in the laser printing process adheres to the charged portion of the cylinder. This toner is then transferred to paper using heat. **Common Problems with laser printing:** The labels are more expensive than those used in dot matrix printers. **Benefits of laser printing:** Labels can be printed at various speeds. Laser printed bar code labels are high quality and very accurate.

LCD (Liquid Crystal Display) - A low-power display often used for notebook computers. An LCD consists of a liquid crystal solution between two sheets of polarizing material. An electric current causes each crystal to act like a shutter that can open to allow light past or close to block the light.

LED (Light Emitting Diode) - A semiconductor generally made from gallium arsenide, that can serve as a visible or near infrared light source when voltage is applied continuously or in pulses. LEDs have extremely long lifetimes when properly operated.

LF (Line Feed) - An ASCII control character that moves the cursor or print mechanism to the next line. (^J)

Memory Address - A specific location, usually expressed as a hexadecimal number, in the computer's RAM.

Mil - One thousandth of an inch (0.001 inch). Bars and spaces of codes are commonly referred to as being a certain number of mils wide. 1 mil = 0.0254 mm.

Misread - The scanner incorrectly decodes a bar code as it passes through the scan zone.

Moving-Beam - Rather than using a stationary laser beam and relying on product movement for a single scan, a multi-facet mirror wheel and motor is used to 'move' the beam across the code several times while in motion itself.

Moving-Beam Bar Code Scanner - A device that dynamically searches for a bar code symbol by sweeping a moving optical beam through a field of view called the scanning zone. Automatic bar code reader that reads codes by sweeping a moving optical beam through a field of view. Moving-beam scanners are usually mounted in a fixed position and read codes as they pass by.

Multidrop Line - A single communications circuit that interconnects many stations, each of which contains terminal devices. See EIA-485.

NAK (Negative Acknowledgment) - A control character used to indicate that the previous transmission block was in error and the receiver is ready to accept retransmissions.

Narrow Bar (NB)/Narrow Space (NS) - Smallest code element, bar or space, in the bar code symbol. Also known as the X dimension.

NCDRH - (National Center for Devices and Radiological Health) This organization (a service of the Food and Drug Administration) is responsible for the safety regulations governing acceptable limitations on electronic radiation from laser devices. Omron is in compliance with the NCDRH regulations.

Near Distance - The distance (in inches) from the face of the scanner to the **closest** point at which a code can be successfully scanned.

NEMA (National Electrical Manufacturers Association) - In order to rate the quality of an enclosure, NEMA has developed a system for rating all enclosures. A partial list of NEMA enclosure types is shown below:

NEMA Ratings

3 Enclosures are intended for indoor or outdoor use primarily to provide protection against windblown dust, rain, and sleet, and is undamaged by the formation of ice on the enclosure.

4 Enclosures are intended for indoor or outdoor use primarily to provide protection against windblown dust and rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure.

4X Enclosures are intended for indoor or outdoor use primarily to provide protection against corrosion windblown dust and rain, splashing water, and hose directed water; undamaged by the formation of ice on the enclosure.

6 Enclosures are intended for use indoors or outdoors where occasional submersion is encountered.

12 Enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt, and dripping noncorrosive liquids.

13 Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil, noncorrosive coolant.

NVC (Non-Valid Code) - Defines the condition that occurs when an object has been scanned and no bar code could be decoded. Usually, this indicates that either no code was on the object or the code was badly damaged and could not be decoded.

No-Read - When the scanner is unable to decode a bar code as it passes through the scan zone.

Non-Read - The absence of data at the scanner output after an attempted scan due to no code, defective code, scanner failure or operator error.

Odd Parity - A data verification method in which each character must have an odd number of on bits.

Omnidirectional - Orientation is unpredictable and can be ladder, picket fence, or any angle in between. A single scan line is not sufficient to scan bar codes oriented omnidirectionally.

Operating Range - The sum of the scanner's optical throw and depth-of-field.

Optical Throw - Measured distance from the scanner's window to the near reading distance of the depth of field. Typically, this is the closest a bar code can be to the scanner's window and still be properly decoded.

Optimum Reading Distance - Typically, the center of the depth of field.

OCR - Optical Character Recognition.

Orientation - The alignment of the code's bars and spaces to the scan head. Often referred to as vertical (picket fence) and horizontal (ladder).

Oversquare - Used to describe bar codes that are taller (from top to bottom of the bars) than they are wide (from first to last bar).

Package Detection

Trigger - The standard abbreviation for a signal indicating that an object is passing by the scanner is called Trigger. This signal indicates to the scanner to start or stop reading.

Trigger Cycle - The time during which the scanner is attempting to read the bar code.

Hardware Trigger - This is an electrical signal from a relay, photoelectric or proximity sensor, or limit switch indicating that an object is passing by the scanner.

Start and End of Trigger - The trigger cycle begins when the photoelectric sensor is blocked and continues until the photoelectric sensor is unblocked. Relay decisions and data communication take place after the end of the trigger signal.

Serially Controlled Trigger - A serial message from an external device that controls the trigger cycle.

Continuous Read - This form of trigger requires no input signal. The scanner is continuously attempting to decode bar codes. When a scanner is in Continuous Read, there is no way of determining if there is a package present or a NO-READ.

Package Spacing - This is the spacing between items on a conveyor. Package spacing is measured one of two ways: Leading edge of one box to leading edge of the next or trailing edge of one box to trailing edge of the next. Package spacing is critical to system operations.

Parameter - A value or opinion that you specify to a program. A parameter is sometimes called a *switch* or an *argument*.

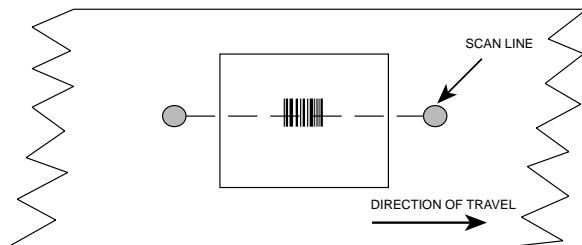
Parity Bit - A bit that is set at "0" or "1" in a character to ensure that the total number of 1 bits in the data field is even or odd.

Pen Scanner - A pen-like device either connected by wire to a device, or self-contained, used to read bar codes. Requires direct contact with the symbol.

Peripheral Device - An internal or external device, such as a printer, a disk drive, or a keyboard, connected to a computer.

Photoelectric Sensor - Used as a presence detector to identify objects in the bar code reader's reading zone. A retroreflective photoelectric sensor emits a beam and is used with a reflector to create a photoelectric circuit. When the beam is blocked by an object, breaking the circuit, a signal called TRIGGER is sent to the bar code reader.

Picket Fence Orientation - Presentation of a bar code such that the bars are positioned vertically on the product, causing them to appear as a picket fence. The first bar will enter the scan window first.



Pitch - Rotation of a code pattern about the X-axis. The normal distance between center line or adjacent characters.

Polarized Laser - A specialized laser source used in high glare environments.

Polling - A means of controlling devices on a multipoint line.

Protocol - A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.

Pulse Width - A change from the leading edge of a bar or space to the trailing edge of a bar or space over time. Pulse width is also referred to as a transition.

Queue - Data held in a buffer until it is used or transmitted.

Quiet Zone - Required distance before the first bar and after the last bar of the code that must be free of marks or printing.

Raster - The process of projecting the laser beam at varied angles spaced evenly from each other. Typically, the mirror wheel surfaces are angled to create multiple scan lines instead of a single beam.

Raster Mirror Wheel - The standard mirror wheel forms the laser line that is projected from the scanner. Although the mirror wheel projects 8 separate lines (for an 8-sided mirror wheel), the speed of the sweep makes it appear that it is actually one line. This type of mirror wheel is adequate for a **ladder** orientation because the laser line will pass from the bottom to the top of the code. For a **picket fence** orientation the standard mirror wheel is not always adequate. One problem facing the **picket fence** orientation is that the same portion of the code is being repeatedly scanned. If the printing quality at this point is not good the label may not be scanned even though other parts of the label are good. Another problem for a **picket fence** orientation is the placement of the label. If the placement is off enough a single scan line will not read all the bar codes presented to the scanner.

Read Zone - Area in front of the scanner's window in which the bar code should appear for scanning. This zone consists of the scan window and the raster width (if used).

Reflectance - The amount of light returned from an illuminated surface.

Request To Send (RTS) - An RS-232 modem interface signal which indicates that the DTE has data to transmit.

Resolution - The narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.

Response Time - The elapsed time between the generation of the last character of a message at a terminal and the receipt of the first character of the reply. It includes terminal delay and network delay.

RPM - Revolutions per minute.

RS-232 - Interface between data terminal equipment and data communication equipment employing serial binary data interchange.

RS-422 - The Electronic Industries Association standard that specifies the electrical characteristics of balanced voltage digital interface circuits.

RS-485 - The Electronic Industries Association standard that specifies the electrical characters of generators and receivers for use in balanced digital multipoint systems.

Scan - A single pass of the laser beam over the code or a portion of the code. The search for a bar code symbol that is to be optically recognized.

Scan Area - The area intended to contain a symbol.

Scan Window - The usable length of the scanning beam that may detect the bar codes. The scan window is perpendicular to the depth of field.

Scanner - An electronic device that optically converts printed information into electrical signals. These signals are sent to the decoder logic.

Scanner Orientation - Relationship of the scan head with reference to the bar code's location on products. The scan head must be set up to insure that all code bars and spaces are bisected at the same time. Typically, either side read or top read is used for picket fence or ladder code orientations.

Self-checking - A bar code or symbol using a checking algorithm which can be independently applied to each character to guard against undetected errors.

Serial Transmission - The most common transmission mode; serial, information bits are sent sequentially on a single data channel.

SERIAL ASYNCHRONOUS TRANSMISSION OF DATA: The V550-A20 is capable of communicating via the following interfaces: RS-232, RS-422, and RS-485.

When data is transmitted serially from a communications port, the information is transferred between the two devices one data bit at a time. The data flow can follow one of three different communications modes: simplex, half duplex, or full duplex. Each character of data within the data flow is transported in a binary bit frame called the asynchronous data frame.

The start bit begins each frame. A low voltage signal on the data communications line marks the beginning of the start bit, at which point the receiving device begins looking for binary zeros and ones (0's and 1's).

The following five to eight data bits (the number depends on the format used) comprise the binary character.

For error detection, an optional parity bit can define whether the total number of zeros or ones was even or odd. There are five different parity selections as shown below:

ODD - last data bit is a logical 0 if the total number of logical 1's in the first seven data bits is odd.

EVEN - last data bit is a logical 0 if the total number of logical 1's in the first seven data bits is even.

MARK - last data bit is always a logical 1 (i.e.: high/mark).

SPACE - last data bit is always a logical 0 (i.e.: low/space).

OFF (NONE) - last data bit is not present.

The method used to catch errors by using parity bits is as follows: When the transmitter frames a character, it tallies the number of 0's and 1's within the frame and attaches a parity bit. (The parity bit varies according to whether the total is even or odd.) The receiving end then counts the 0's and 1's and compares the total to the odd or even recorded by the parity bit. If a discrepancy is noticed by the receiving end, it can flag the error and request a retransmission of the data.

A stop bit is used to signal the end of the character. (Stop bits are typically one or two bits in length. The slower the transmission speed, the more stop bits required for recognition of the end of the data frame.)

In addition to the direction of data flow and the data framing, there are other considerations to insure uniform transmissions. Certain operating parameters must be followed to prevent the loss of valuable data.

The first consideration is the speed of transmission, known as baud rate. Serial data transmission is measured in bits per second (BPS). The baud rate selections available for the V550-A20 are: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, and 57600. To enable two devices to interact, they must both be transmitting/receiving data at the same baud rate. If it is not possible to do this, there must be a buffer (typically additional storage memory) that accommodates the differences in communications speed.

Many serial communications links also use a flow control system to handle data transmission in addition to memory buffers.

X-ON/X-OFF Protocol

A common type of flow control is the X-ON/X-OFF protocol. When

a receive buffer nears its memory capacity, the receiving device sends an ASCII X-OFF signal to the transmitting device, telling it to stop sending data. When the memory buffer has enough space to handle more data, the X-ON signal is sent to the transmitting device, telling it to start sending data again.

ACK/NAK Protocol

Another common protocol is ACK/NAK protocol. When the device transmits a message to the host, the host responds with either an ACK (06H) or a NAK (15H). If the host transmits an ACK to the device, the device deletes its transmit message and the communication sequence is complete. If the host transmits a NAK, the device will retransmit. The device resends data a maximum of three times. Optionally this may be changed to 1, 2, 3, or infinite retransmits by the user. If the device receives a fourth NAK, it will delete the data in its transmit buffer and display "MAX REXMITS".

A transmitting device ignores ACK and NAK characters received during data transmission. If, for example, a device receives a NAK during a data transmission, it will not resend the data at the completion of the transmission.

The device also has a retransmit timer. This timer is activated each time the device transmits data to the host. If the timer runs for two seconds (this is also changeable) and the device does not receive an ACK or NAK from the host, a timeout occurs and the device retransmits its data. Each time the device retransmits because of a timeout, it treats the timeout the same as receiving a NAK from the host computer. If the device does not receive an ACK before the end of the fourth timeout, it will delete the data in its transmit buffer and display "MAX REXMITS". The device deletes data in its transmit buffer and displays the error message when any combination of four timeouts and NAKs from the host occurs.

When the device receives a message from the host, it calculates the BCC for the message and compares the calculated BCC to the received BCC. If the two values match, the device transmits an ACK, ending the communication. If the values do not match, the device transmits a NAK to the host and waits for the host to retransmit the message. The host, like the device, should retransmit a maximum of three times.

The sequence number starts at zero (30H) and is incremented each time a device transmits a new message. When the sequence number reaches nine (39H), it wraps around to one (31H). If the sequence number skips a number, the receiving device knows that a message was lost. If the same sequence number is received on two sequential messages, the second message is responded to with an ACK or NAK (as appropriate) and ignored.

Shielding - Protective covering that eliminates electromagnetic and radio frequency interference.

Side Read - The scanner is mounted to read the side of a box as it passes by the head.

Signal - An impulse or fluctuating electrical quantity (i.e.: a voltage or current) the variations of which represent changes in information.

Skew - Rotation about the Y-axis. Rotational deviation from correct horizontal and vertical orientation; may apply to single character, line or entire encoded item.

Space - The lighter elements of a bar code symbol formed by the background between bars.

Specular Reflections - A condition when the laser light is reflected back from the code's surface at an angle equal, or nearly equal, to the angle of incidence of the laser light. This condition makes it difficult for the scan head to detect the differences in light variation caused by the code's bars and spaces.

Stacked Codes - 16K and Code 49 are examples where a long symbol is broken into sections and "stacked" one upon another similar to sentences in a paragraph. Extremely compact codes.

Start Bit - In asynchronous transmission, the first bit or element in each character, normally a space, that prepares the receiving equipment for the reception and registration of the character.

Stop Bit - The last bit in an asynchronous transmission, used to indicate the end of a character, normally a mark condition, that serves to return the line to its idle or rest state.

STX (Start of Text) - A transmission control character that precedes a text and is used to terminate a heading. (^B)

Symbol - A combination of characters including start/stop and checksum characters, as required, that form a complete scannable bar code.

Symbologies

Code 39 - A bar code with a full alphanumeric character set, a unique start and stop character, and three other characters. The name is derived from its code structure, which is 3 wide elements out of a total of 9 elements. The nine elements consist of five bars and four spaces.

Code 128 - A bar code symbology capable of encoding the full ASCII 128 character set. It encodes these characters using fewer code elements per character resulting in a more compact code. It features a unique start and stop character for bidirectional and variable length decoding, both bar and space character parity for character integrity, a check character for symbol integrity, a function character for symbol linking, and spare function characters for unique application definition and/or future expansion.

Interleaved 2 of 5 (I 2of5) - A bar code with a numeric character set with different start and stop characters. The name is derived from the method used to encode two characters. In the symbol, two characters are paired together using bars to represent the first character and the spaces to represent the second. This interleaved structure allows information to be encoded in both the bars and the spaces. A start character, bar and space arrangement, at one end, and a different stop character bar and space arrangement at the other end, provide for bidirectional decoding of this symbol.

Thermal Printing - Thermal printers use heated print heads and special heat activated paper. There are two types of thermal printers. One uses a method similar to the dot matrix printer where an array of heated dots move along the paper and form the character or bar code. The other method uses a heated bar and the paper moves across the bar. Another type of thermal printer is called a Thermal Transfer printer. The main difference between this type of printer and a thermal printer is the use of heat sensitive ribbons as opposed to heat sensitive paper. This type of printing is permanent on label stock. **Common Problems with**

thermal printing: Since the paper used is heat activated the labels will deteriorate over time in a warm environment. Infrared scanners cannot detect the bar codes and consequently a visible red light laser must be used to scan these codes. **Benefits of thermal printing:** Thermal printers are quiet and inexpensive.

Thermal Transfer - A printing system like thermal except a one-time ribbon is used and common paper is used as a substrate. Eliminates the problems of fading or changing color inherent in thermal printing.

Tilt - Rotation around the Z axis. Used to describe the position of the bar code with respect to the laser scan line.

Trigger - A signal, typically provided by a photoelectric or proximity sensor, that informs the bar code reader of the presence of an object within its reading zone.

UCC (Uniform Code Council) - The organization that administers the UPC and other retail standards.

Undersquare - Used to describe bar codes that are longer (from the first to last bar) than they are high (from the top to bottom of the bars).

Vane Raster - Decreases the amount of scans possible due to a smaller percentage of scans bisecting the code.

Verifier - A device that makes measurements of the bars, spaces, quiet zones and optical characteristics of a symbol to determine if the symbol meets the requirements of a specification or standard.

Vibrating Vane - A variable raster that can have an unlimited number of raster lines. It covers a larger area and is adjustable.

Wand Scanner - A hand-held contact laser scanner that an operator guides across the bar code.

Wedge - A device that plugs in between a keyboard and a terminal. It allows data to be entered either by keyboard or by various types of scanners.

Wide Bar (WB)/Wide Space (WS) - Widest code element, bar or space, in the bar code symbol.

Wide to Narrow Ratio - Dividing the size of the wide elements by the size of the narrow elements of a bar code yields the bar and space ratios. Bar and space ratios can differ. **NOTE:** If the narrow bar and narrow space are equal and the wide bar and wide space are equal, then you calculate only one ratio.

"X" Dimension - The dimension of the narrowest bar and narrowest space in a bar code.

XON - A control character sent by the receiving device to signal the transmitting device to begin sending data.

XOFF - A control character sent by the receiving device to signal the transmitting device to stop sending data.

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