

Series 3300

System Administration Manual

59040-00-90

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Symbol Technologies, Inc.
116 Wilbur Place
Bohemia, N.Y. 11716

FCC Requirements

This device must operate in compliance with Federal Communications Commission (FCC) Rules and Regulations Parts 15 and 68. See FCC registration label (located on bottom of equipment) for FCC registration and ringer equivalence (REN) numbers.

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

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all, areas the sum of the RENs should not exceed five. To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum REN for the calling area.

If the terminal equipment (see FCC registration label for equipment identification) causes harm to the telephone network, the telephone company will notify you in advance; however, if advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice so that you may make the necessary modifications to maintain uninterrupted service.

Data Equipment

Data terminal equipment that has been registered must use the following jacks for each type of operation: permissive - RJ11C, programmable - RJ41S and RJ458, fixed loss loop - RJ41S.

Radio Interference Notice

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

Service Information

In the event of equipment malfunction, all repairs of this equipment must be performed by Symbol Technologies, Inc. or an authorized agent; it is the user's responsibility to report the need for service to Symbol Technologies, Inc. or an authorized agent. If the trouble is causing harm to the telephone network, the telephone company may request you to remove the equipment from the network until the problem is resolved.

Service is available under various options: to determine which option is best for you and where to obtain it, please call or write:

Symbol Technologies, Inc.
116 Wilbur Place.
Bohemia, NY 11716
U.S.A.
(516) 563-2400

If you need to ship a terminal to a Service Center, you must send it in an approved container designed to prevent damage in transit. If the original container is not available, ask your Service Center to order another.

Make sure the terminal is turned off when you pack it. Leave the battery pack installed so that it can be checked. A battery pack will be returned to you with the terminal. Pack the terminal carefully. Fill out the prenumbered tag included with the terminal when it was shipped to you. If the original tag is not available, ask the Service Center for another.

Fill out the adhesive-backed portion of the shipping label with the address of your Service Center. Tear off this portion of the label and place it on the outside of the container. Remove your copy of the shipping tag and place the rest of the tag inside the container with the terminal.

If you need to contact the Service Center about a terminal you have shipped to them, please be ready to give the shipping tag number to the Customer Support Representative so your equipment may be located more easily.

Canadian Compliance

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves but should contact the electric inspection authority or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100. An alphabetic suffix is also specified in the Load Number for the appropriate ringing type (A or B), if applicable. For example, LN = 20 A designates a Load Number of 20 and an "A" type ringer.

This equipment is a Class A digital apparatus which complies with Radio Interference Regulations, CRC c.1374.

Please contact your local Symbol Technologies, Inc. representative for support and service.

Symbol Technologies, Inc.
Canadian Sales and Service
93 Skyway Avenue
Unit 106, Building B
Etobicoke, Ontario
Canada
Phone: 416 674-1497

European Service

For service in European countries, please contact:

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13 Oaklands Park
Fishponds Road
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Berkshire, England RG11 2FD
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About This Manual

About This Manual

The Series 3300 System Administration Manual provides basic operational instructions required for tasks usually regarded as administrative. This includes general care and use instructions, as well as instructions for booting, loading programs, and troubleshooting the Series 3300 computer.

Manual Structure

This manual is divided into four chapters and three appendices:

Chapter 1 provides a brief overview of the Series 3300, including accessories and configuration options.

Chapter 2 provides instructions for initializing and maintaining the 3300, including replacing and charging the batteries and downloading application programs.

Chapter 3 describes basic operational procedures, including powering on and off, various boot procedures, and miscellaneous information relevant to operating the system.

Chapter 4 describes some error messages, trouble shooting suggestions, and other suggestions towards identifying and correcting operational problems.

Appendix A describes the pin assignments for Series 3300 ports.

Appendix B illustrates the keyboard character assignments.

Appendix C provides a table of communications status codes and their interpretation.

Related Publications

PDT 3300 Quick Reference Guide (59040-00-89)

PRC 3310 Quick Reference Guide (59040-01-89)

Series 3300 with Integrated Scan Module Quick Reference Guide (59040-04-89)

Series 3000 System Software Manual (59045-00-94)

Series 3000 Application Programmer's Guide (59045-00-92)

Series 3000 Application Programmer's Reference Manual (59045-00-93)

The Series 3300 System

This chapter provides a brief overview of the Series 3300 system, accessories, and options.

Introduction

The Series 3300 is an environmentally sealed, lightweight, battery powered, hand held computer designed for use as a portable data collection device. Data can be entered using the keyboard, a bar code scanner, or other devices. In many applications, a Series 3300 computer is used as a remote terminal which is used to collect and store data that is later uploaded to a host computer.

The Series 3300 uses the DR DOS™ operating system, which is compatible with and extends the industry-standard IBM PC-DOS™. Using DR DOS provides access to a number of commercially available programming tools. Additional programming tools, available from Symbol, make programming the system easier and provide access to special features.

Power saving features of the Series 3300 include auto-off and a power save mode which reduce power consumption while waiting for an operator to provide input. These features conserve battery power, lengthening the time between charges.

This high-performance computer supports many options, including a one-way acoustic coupler, expansion memory, scanners, and an internal modem. The modular design provides flexibility in combining options to suit an application's needs.

Two models are currently available: the PDT 3300 and the PRC 3310. The primary difference between the models is that the PRC 3310 has an internal radio transmitter/receiver.

Parts of the Series 3300

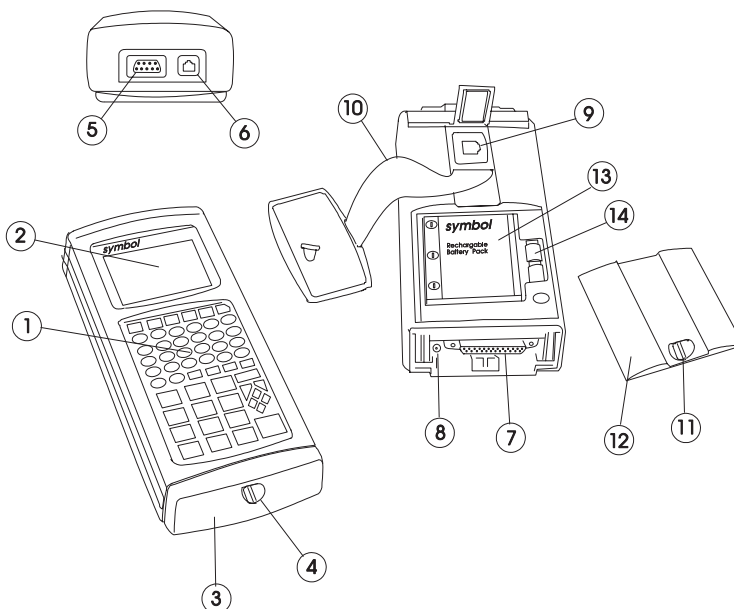


Figure 1 - 1 Parts of the PDT 3300 (Standard end cap)

1. Keyboard (56 or 35 keys)
2. LCD display screen
3. Standard end cap (optical end cap not shown)
4. End cap latch
5. Scanner port (DB-9)
6. COM2 serial port (RJ-41)
7. COM1 serial port (DB-25)
8. Battery charger port
9. Internal modem port (optional)
10. Hand strap
11. Battery compartment latch
12. Battery compartment cover
13. Battery pack
14. Lithium backup batteries

Accessories

There are a variety of optional accessories available for the Series 3300.

Battery Chargers

The Series 3300 can use rechargeable NiCad battery packs. Two types of battery chargers are available from Symbol:

- The 12-Volt adapter charges the battery pack while the pack is in the 3300. The adapter plugs into a 115V AC wall outlet and into the system (see Chapter 2).
- The Universal Battery Charger (UBC) charges up to four battery packs. The packs must be placed in an adapter cartridge.

The batteries are also charged while the 3300 is placed in a cradle.

Table 1 - 1 Battery Charging Accessories

12Volt adapter	3042-06M (US version)
Universal Battery Charger	3004-110 (US version) 3004-220 (Int'l version)
UBC Adapter Cartridge	3004-003

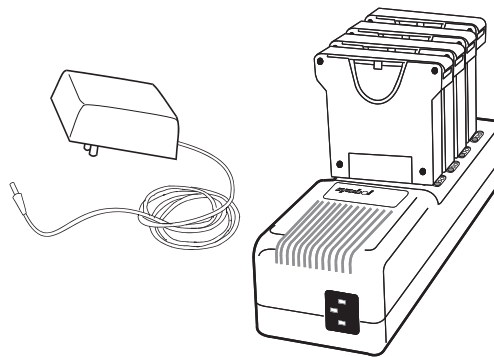


Figure 1 - 2 Battery Chargers

Cradles

A cradle is a communications device and battery charger combined. Cradles are available with one or four slots.

When in a cradle, the terminal can communicate with the host computer over serial or modem communication line. At the same time, the NiCad battery pack is recharged. This simplifies many routine administrative tasks by eliminating the need to connect cables to the terminal.

Communications between the terminal and the cradle are conducted via optical signals. The terminal must have the optical interface installed, which includes a special, non-removable end cap (optical end cap).

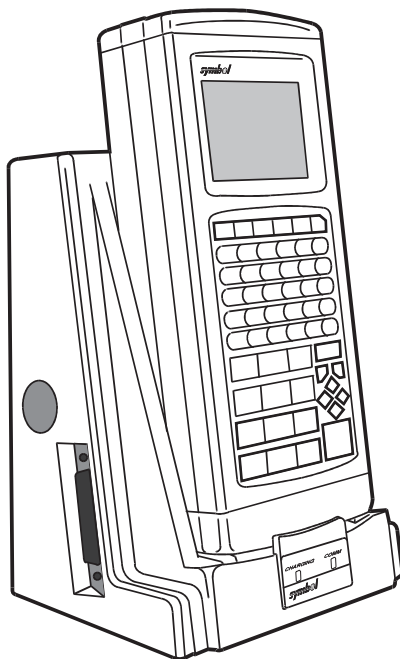


Figure 1 - 3 PDT 3300 in cradle

Scanners

A variety of scanning devices are available for use with the Series 3300, including wand scanners and laser scanners.

Also available is an integrated scanner module which permanently attaches to the terminal.

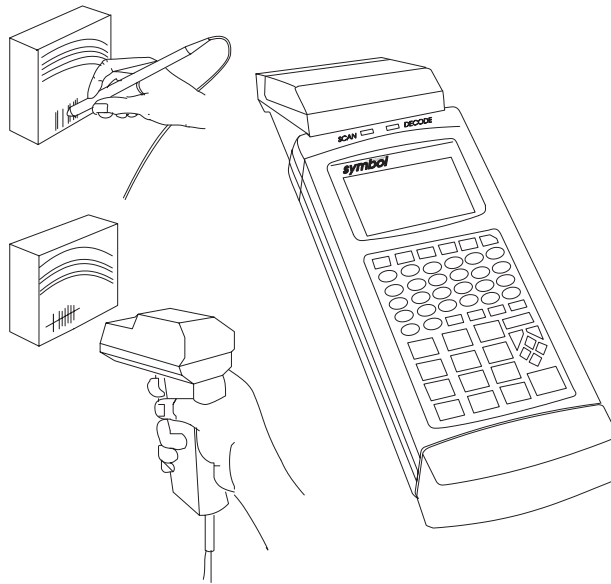


Figure 1 - 4 Scanners

Radio

The PRC 3310 includes an internal radio frequency transmitter/receiver, allowing these systems to be used as part of a Spectrum One[®] network.

Environment

The Series 3300 is intended to be used in an industrial environment. Table 1-2 summarizes the conditions under which the terminal is intended to operate.

Table 1 - 2 Environmental Specifications

Condition	Range
Temperature range	32° to 122° F (0° to 50° Celsius)
Humidity	0 to 90% (non-condensing)
Max Static discharge	15 kilovolts
Altitude	up to 10,000 feet.

Note that (1) batteries lose power faster at extremely high and low temperatures, and (2) below 10°C, the LCD operates slowly.

Intrinsically Safe Configurations

Certain configurations of Series 3300 systems are certified for use in potentially hazardous environments. These systems are specially ordered and configured for such use.

Some procedures described in this manual should not be performed in potentially hazardous environments. These procedures are noted with the following Warning:

Warning

This procedure is not approved for and should not be performed in potentially hazardous environments.

Storage

If the 3300 will not be used for longer than a week, it should be stored in a cool, dry place, away from dust. It is best to remove the battery pack and pack the terminal in its original shipping container.

If you are storing the terminal for a shorter period of time (a few days), you may leave the batteries in the terminal.

Maintaining the Series 3300

This chapter describes the basic procedures required to prepare and maintain a Series 3300 terminal in operating condition. These procedures include:

- Cleaning the terminal
- Replacing and charging batteries
- Initializing the terminal by loading a program into memory.

Cleaning

The 3300 requires a minimum amount of maintenance. Proper use and care of the system will increase its life.

To clean the 3300, use a clean, soft cloth dampened with a mild cleaner, such as soap and water.

Caution

Do not pour, spray, or spill any liquid onto any part of the 3300 or its peripheral devices.

Maintaining Batteries

Primary power for the Series 3300 is provided either by two 9-Volt alkaline batteries in a carrier tray or by a rechargeable, nickel cadmium (NiCad) battery pack.

To prevent loss of data while replacing batteries, Series 3300 systems have two lithium backup batteries. The backup batteries do not provide enough power to operate the system.

Battery Life

The life of the primary battery pack is affected by many factors, including temperature, the age of the batteries, and the data collection method. Battery life is shortened by use in very high or very low temperatures, and by use of a scanning device.

The approximate battery life between charges (NiCad) or replacement (Alkaline), which reflects the data collection method, is summarized in Table 2-1. Note that these values will vary with the application, and in particular, applications involving modem and radio communications will shorten these times.

The lithium backup batteries provide sufficient power to preserve the contents of memory for approximately approximately 300-400 hours.

Table 2 - 1 Battery Life

Battery Type	Input Method	Apx. Operating Time*
Alkaline	Keyboard	95 hours
	Laser Scanner	21 hours
	Wand Scanner	32 hours
NiCad	Keyboard	80 hours
	Laser Scanner	19 hours
	Wand Scanner	28 hours
*~ Actual operating time varies, depending on the application complexity.		

Note

Alkaline batteries are NOT recommended for use with the PRC 3310 except in case of emergency, due to the increased power consumption of the radio.

When to Replace or Recharge Batteries

The Series 3300 provides two types of indicators to notify you when battery power is running low: warning messages and modified cursors (see Table 2-2). These indicators may be changed or disabled by an application program.

- **LOW POWER** - When the battery is low, the cursor changes, as shown in Table 2-2. Depending on the configuration (if ERR3000 is loaded), the message LOW BATTERY is also displayed. At this level, the 3300 continues to operate, but there is probably less than one hour of usable power left.
- **VERY LOW** - When the power becomes very low, the REPLACE CELLS message is displayed briefly and the system powers off. You must replace or recharge the batteries before continuing to use the 3300.
- **DEAD LITHIUM** - The lithium batteries are too low to provide backup power. These should be replaced as soon as possible to prevent loss of data when the primary pack requires replacement.

Table 2 - 2 Normal and Low Power Cursors

Keyboard State	Cursor Character	Low Battery
Unshifted	∨	▼
Shifted	∧	▲
Momentary Shifted	↑	⬆
Momentary Unshifted	↓	⬇
Control	⌘	⌘
Alt	⌥	⌥
Function	⌘	⌘

Replacement Batteries

NiCad battery packs are available from Symbol Technologies:

- Standard systems: product numbers 3045-005 and 3045-010
- Intrinsically safe systems: product number 3045-006

9-Volt alkaline batteries vary slightly in size, so some may not make good electrical contact. The following batteries are known to be the proper size, and so are assured to work:

- Eveready #522
- Duracell #MN1604 and #MN1604-AS
- Panasonic 6LR61 (6AM6).

Caution

Alkaline batteries are not approved for use in Intrinsically Safe systems.

Replacing the Battery Pack

To remove and replace the primary battery pack, do the following (refer to Figure 2-1):

Warning

This procedure is not approved for and should not be performed in potentially hazardous environments.

1. Turn the terminal OFF.

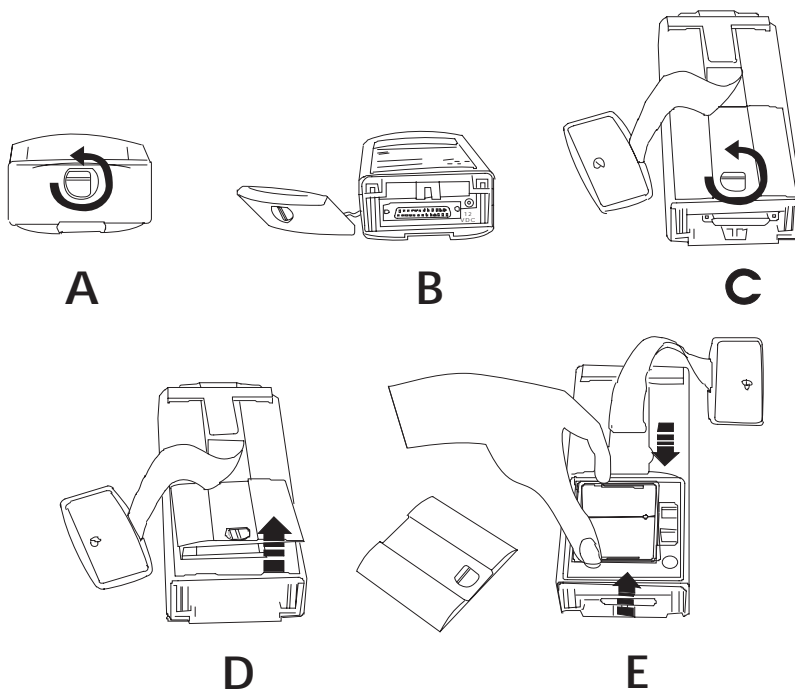


Figure 2 - 1 Removing Battery Pack

2. Unlock the end cap latch and remove the end cap to release the hand strap (Figure 2-1A and B). If the system has an optical end cap, the strap unhooks at the top.
3. Unlock the battery cover latch and remove the battery compartment cover (Figure 2-1C and D).
4. Tip out the NiCad battery pack. If the system is using 9-Volt alkaline batteries, squeeze the top and bottom of the battery carrier tray to release the catches and lift out the tray (Figure 2-1E).

Caution

Dispose of dead batteries in accordance with local hazardous material laws.

5. Install a fully charged battery pack or the battery tray with new alkaline batteries in the battery compartment and replace the battery compartment cover.

Replacing Alkaline Batteries

Alkaline batteries must be held in the carrier tray. To replace the batteries, do the following:

1. Remove the old batteries from the holder one at a time.
2. Install each new battery with the + and - signs in the correct direction, as indicated on the battery tray.
3. Install the batteries and tray in the battery compartment and replace the battery compartment cover.

Caution

Use only Eveready #522, Duracell #MN1604 or #MN1604-AS, or Panasonic 6LR61 (6AM6) alkaline batteries. Others may be slightly smaller, and not make good electrical contact.

Charging the NiCad Battery Pack

The NiCad battery pack can be recharged while it is in or out of the system.

To charge the battery pack external to the system, use the Symbol Universal Battery Charger. Up to four NiCad packs can be charged at one time using this charger.

If the system is equipped with the optical end cap, recharging begins when the 3300 is placed in a properly set up cradle. Refer to the cradle documentation for additional information.

To charge the NiCad batteries in the 3300 using the 12V adapter, do the following (refer to Figure 2-2):

Warning

This procedure is not approved for and should not be performed in potentially hazardous environments.

1. Turn the system off.
2. Unlock and remove the end cap and locate the battery charger port.
3. Plug the charger end of the adapter into a wall socket.
4. Plug the cable end into the 3300's battery charger port.
5. After 12 to 16 hours, disconnect the charger cable from the system and the wall outlet.

The 3300 may be used while the battery is being charged.

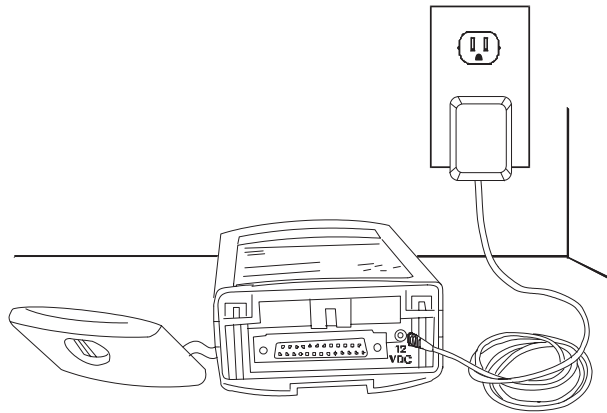


Figure 2 - 2 Charging NiCad Pack Using Adapter

Battery Charging Tips

For maximum capacity and battery life, follow these helpful hints:

- Charge at temperatures between 0°C and 45°C (32°F to 113°F).
- Recharge as soon as you see the "Low Battery" message.
- Recharge primary batteries after storage.
- If you find that your battery pack begins to need recharging more often, let it discharge as completely as possible, then recharge it for at least 16 but not more than 24 hours. Undercharging and overcharging can shorten the life of your battery pack.

Lithium Backup Batteries

The Series 3300 use two CR1/3N cylindrical lithium batteries (product number 3027-160) as backup power. The backup batteries provide enough power to maintain the contents of memory (RAM, including the RAM disk) for approximately 300 to 400 hours.

Depending on the system configuration, the "Dead lithium" message may display when the backup battery power is low.

Replacing Backup Batteries

It is recommended that you upload any data in memory to the host computer before replacing the backup batteries.

To retain programs and data in RAM while replacing the backup batteries, it is necessary to have main power applied. If the 3300 has the standard end cap (non-optical), you can plug in the 12 volt adapter to provide power. Otherwise, it is necessary to have charged main batteries in place.

Caution

When both main and backup power are removed at the same time, RAM contents are lost.

To replace the lithium batteries, do the following:

Warning

This procedure is not approved for and should not be performed in potentially hazardous environments.

1. Unload any data, using methods provided by the application program.
2. Turn the system off.
3. Remove the primary battery pack, as described earlier in this chapter.

4. Locate the lithium backup batteries next to the battery pack compartment (Figure 2-3). Remove the backup batteries by pulling the ribbon handles.

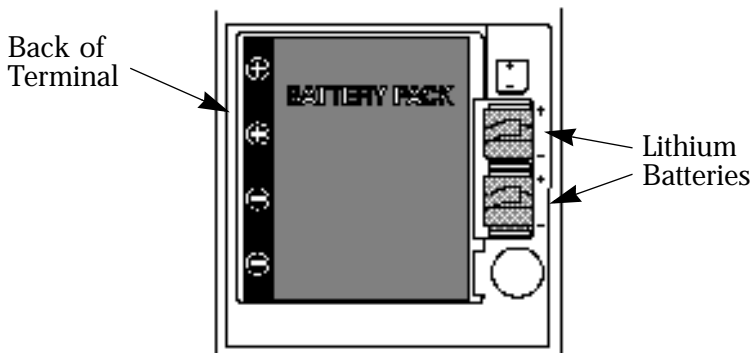


Figure 2 - 3 Location of Lithium Batteries

Caution

Dispose of dead batteries in accordance with local hazardous material laws.

5. Insert the new lithium backup batteries into the placement socket with the ribbon handle on the top.
6. The lithium batteries must be installed with the + and - signs on the battery on the same side as the + and - signs inside the backup battery compartment. The batteries must be installed with correct polarity for the system to operate.
7. Reinsert the primary battery pack and close the battery compartment.

If necessary, you can now download a new copy of the program.

Initializing the 3300

Before the 3300 is ready to use, it must be initialized by loading the application program. The program is stored in the terminal in non-volatile memory (NVM, also called the application EEPROM). The program is transferred from a host computer to the terminal over a communications line provided by either a null modem cable or a cradle.

The procedure described here uses the `sendhex` command on the PC and the Program Loader function on the terminal. For details on the `sendhex` command, refer to the Series 3000 Application Programmer's Manual. Other software may be used in place of `sendhex`.

Cancelling Communication

At any time during the communication session, you can cancel communications by pressing **Clear** on the 3300. The session stops immediately.

Communication Parameters

The communication parameters specified on the host and the 3300 must match. Typical parameters are:

- 38400 bps
- 7 bit data
- Odd parity
- Xon/Xoff flow control

Loading the Program

A direct connection between the Series 3300 and the host PC is made with a null modem cable (Symbol product number 3057-F03). The cable has a male DB-25 connector at one end and a female DE-9 connector at the other end.

To download the program, do the following:

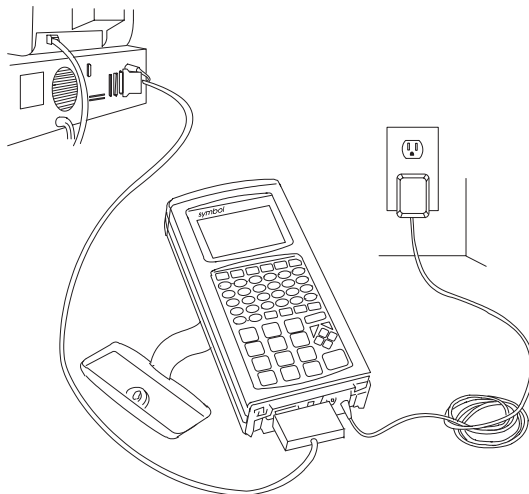


Figure 2 - 4 Communication and Charger Connections

Warning

This procedure is not approved for and should not be performed in potentially hazardous environments.

1. Power OFF the 3300 and host PC.
2. Attach the male connector end to the 3300 and the female end to the host's serial port (Figure 2-4).
3. Power up the PC and start the communication program. If you use the sendhex command with the null modem connected to COM2, enter:

```
cd \  
sendhex pgmname 38400 com2
```

Do *not* include the .hex extension on the program name.

Once correctly started, sendhex displays a prompt to press **Enter** to begin communications. You will start communications later (step 11).

Only the baud rate and comm port can be set by sendhex (defaults are 9600 bps and com1). Change these parameters as shown in the example. Other parameters are set to 7 data bits, odd parity, and Xon/Xoff flow control (version 3.0).

Note

Versions of sendhex earlier than 3.0 do not support flow control. If you use an earlier version and encounter communication errors, use a lower baud rate.

4. Boot the 3300 to command mode (refer to Chapter 3):

56-key: **On/Off** and **A+D**

35-key: **On/Off** and **BkSp+Shift**

After booting, the terminal displays the function selector screen:

```
COMMAND MODE
```

```
Select function
```

```
Self Test
```

5. Use the up or down cursor keys to scroll through the command mode options until "Program loader" is displayed, and press **Enter**.
6. The original contents of NVM (an EEPROM) must be erased before loading the new program. The terminal displays:

```
Program loader
```

```
WARNING: EEPROM
```

```
WILL BE ERASED
```

```
CONTINUE? <ENT>
```

Note

*To cancel this operation, press **Clear**.*

Press **Enter** to erase the EEPROM. Wait while the EEPROM is erased.

Once erasing the EEPROM is completed, the program prompts for the communications parameters.

7. Baud Rate. The baud rate screen is displayed:

```
Comm Parameters
```

```
Baud
4    9600
```

Use the up or down cursor key to scroll through the list of baud rates. When the correct rate is displayed (38400 is recommended), press **Enter**.

8. Data Bits. The data bits screen is displayed:

```
Comm Parameters
```

```
Data Bits
7
```

Press **7** (recommended) or **8** to specify the data bits, or use the up and down arrows. When the correct value is displayed, press **Enter**.

Note

If you select 8 data bits, the program selects "No parity" and skips the next step.

9. Parity. If you selected 7 data bits, the parity screen is displayed:

```
Comm Parameters
```

```
Parity
Odd
```

Press the first letter of a parity option (**E**ven, **O**dd, **N**one, **S**pace, or **M**ark), or use the up and down arrows to display a parity option, and press **Enter**.

10. Flow Control. The flow control screen is displayed:

Comm Parameters

Flow Control

None

Press the first letter of a flow control option (**N**one, **X**on/Xoff, or **R**TS/CRS), or use the up and down arrows to display a flow control option, and press **Enter**.

Starting Communications

The 3300 is now ready to receive the program from the host PC. The 3300 displays:

Comm Parameters

Start? <ENT>

11. Press **Enter** on the 3300. The terminal waits a few seconds for the host PC to initiate communications. While waiting, the 3300 displays:

Awaiting DSR

12. Press **Enter** on the host computer. Sendhex will begin transmitting the program image.

When communications are established, the 3300 displays the following:

Program loader

Receiving: XXXX

While the program is loading, the display shows the segment address currently being transferred (XXXX).

13. When the transmission is complete, the 3300 displays a transmission status screen:

Program loader

Status 0000

A Status of 0000 (all zeros) indicates that the transfer was successful. Other status values are described Appendix C.

Ending Communications

To return to the Command Mode main menu, press **Clear** on the 3300.

Turn the terminal off and detach the communications cable.

To start the software running, reboot the terminal using the cold boot sequence (refer to Chapter 3):

56-key: **On/Off** and **Enter+F1+F4**

35-key: **On/Off** and **Space+Func+UpArrow**

Operating the Series 3300

This chapter describes the basic operations involved in using the Series 3300, including:

- Powering the 3300 on and off
- Booting the terminal
- Adjusting the display
- Scanning
- Using the keyboard

Powering the 3300 On and Off

Since the Series 3300 is a battery powered system, it is important to save as much power as possible. The period of time that the 3300 can be used before its batteries must be recharged or replaced can be increased by turning it off when data is not being entered.

When powered off, the 3300 saves power by not performing any processing or display functions. However, any programs or data in the system's memory are retained. When the 3300 is powered up again, the display is restored and processing continues at the point where it was when the terminal was powered down.

Powering the 3300 on does not reset the system or its program. When you turn the system back on, it's program will normally resume in the same place where it was when it was powered off. The data stored in memory also remains intact.

Before the 3300 powers up, it checks the batteries for enough power to ensure reliable operation and data storage.

Normal Power On/Off

To turn the 3300 on or off, press **On/Off**.

Automatic Power-On/Off

A number of other events may turn the 3300 on or off, depending on the application program. Some of these are:

- The system may power on when a key other than **On/Off** is pressed.
- The system may power on when the scanner trigger is pressed.
- The program may power on the system at a preset time to perform unattended operations such as an overnight communications session.
- The program may power on the system to respond to a modem ring or an RS-232 device connecting to the DB-25 connector.
- The system may power off automatically if it is not used for some period of time, as determined by the program.

Forcing Power Off

If the 3300 hangs, simply pressing the **On/Off** will not power it off. In this case, the system can be forced to power off in order to reduce the drain on the batteries until the data can be downloaded to the host system.

To force the system to power off, press and hold the **On/Off** key for 15 seconds.

Since the 3300 is still hung at this time, turning the power back on will not solve the problem. To recover the data held in memory, you must perform a Warm Boot (refer to the next section).

Restarting After A Forced Power Off

If an operator is forced to power down the 3300 because of defective software, the System Administrator should restart the system following the warm or cold boot procedures given below.

Note

*Do not simply use the power key to restart if the 3300 was forced off due to defective system or application program software in NVM; pressing **On/Off** will only cause the program to resume where it left off, trying to perform the same unsuccessful operation.*

If the failure is due to an application program, use the warm boot procedure. If this does not restart the system, follow the cold start procedure.

If the failure is due to system software in NVM, you will need to load a corrected version of the program. Refer to Chapter 2 for loading instructions.

Booting the 3300

Powering on the Series 3300 does not boot the system, and so does not initialize either the program or data. When it is necessary to initialize the 3300, either a warm boot or a cold boot must be performed.

Warm Boot

A warm boot resets the operating system while preserving the program and data on the RAM disk. This process is similar to pressing the Ctrl+Alt+Del keys on a PC, except that it does not clear the system's memory. To perform a warm boot, power off the system, and then follow these steps.

On the 56-key keyboard:

1. Press and hold down **On/Off**.
2. Press and hold **L** and **Shift**.
3. Release **On/Off**, and then release **L** and **Shift**.

On the 35-key keyboard:

1. Press and hold down **On/Off**.
2. Press and hold / and +.
3. Release **On/Off**, and then release / and +.

The 3300 then displays copyright, RAM size, expanded memory RAM size, and so on, depending on the system's configuration.

Cold Boot

A cold boot fully resets the system and clears memory, including clearing the RAM disk. Any programs and data that have been stored in memory or on RAM Disk are deleted. The NVM (Application EEPROM), however, is not affected.

Caution

This procedure erases all data and programs residing in dynamic memory and RAM Disk. All contents of the RAM disk will be lost.

To perform a cold boot, power off the system and then follow these steps.

On the 56-key keyboard:

1. Press and hold **On/Off**.
2. Press and hold **Enter**, **F4**, and **F1**.
3. Release **On/Off**, and then release **Enter**, **F4**, and **F1**.

On the 35-key keyboard:

1. Press and hold **On/Off**.
2. Press and hold **Space**, **Func**, and **UpArrow**.
3. Release **On/Off** and then release **Space**, **Func**, and **UpArrow**.

The 3300 will display a copyright message, amount of RAM and expanded memory. Other messages will be displayed as well, depending on the system configuration.

Booting to Command Mode

Command Mode provides functions for:

- Running the Self-Test program to verify that the hardware is operating properly (refer to Chapter 4)
- Performing a Memory Transfer to upload data from the 3300 to the host system (refer to Chapter 4)
- Performing a Program Download to transfer an application program from the host system to the 3300 (refer to Chapter 2).

To boot to Command Mode, power the system off, then perform the following steps.

On the 56-key keyboard:

1. Press and hold **On/Off**.
2. Press and hold **A** and **D**.
3. Release **On/Off**, and then release **A** and **D**.

On the 35-key keyboard:

1. Press and hold **On/Off**.
2. Press and hold **BackSpace** and **Shift**.
3. Release **On/Off**, and then release **BackSpace** and **Shift**.

The 3300 displays the following:

```
COMMAND MODE
```

```
Select function  
Self test
```

Adjusting the Display

Backlighting

The 3300's display has a light to illuminate the display in dimly lit areas.

To turn the backlight on or off, press:

56-key: **Func** and **L**

35-key: **Func** and ' (apostrophe)

The light also turns off when the 3300 is powered off.

Display Contrast

The contrast of the LCD display can be adjusted, making the display more readable in different lighting conditions and at different viewing angles. Lightening and darkening the display (decreasing and increasing contrast) is changed in steps.

To increase contrast (darken) one step:

56-key: **Func** then **Space**

35-key: **Func** then **.**

To decrease contrast one step:

56-key: **Func** then **Bksp**

35-key: **Func** then **_**

Scanning

In addition to keyboard data entry, the Series 3300 supports the use of barcode scanning devices as an alternate input device. The application program must implement routines for barcode scanning before scanning can actually be performed.

Scanners supported by the 3300 include wand scanners and laser scanners. An option on the 3300 is an integrated laser scanner, which is a permanently installed option.

Caution

Only scanners designated as Intrinsically Safe with the PDT 3300 may be used in potentially hazardous environments.

Scanning Tips

Bar code labels that do not meet established industry specifications may not scan successfully. These labels may include:

- Smudged labels
- Very dark or very light labels
- Highly reflective surfaces or coatings
- Poor color contrast.

The following may also cause unsuccessful scans:

- Moving the contact wand scanner too quickly
- Moving the contact wand scanner too slowly
- Moving the contact wand scanner at an uneven speed
- Moving the scanner diagonally across the bar code.

Attaching a Scanner

To attach a wand or laser scanner to a Series 3300, do the following:

Warning

This attachment procedure is not approved for and should not be performed in potentially hazardous environments.

1. Turn the system off.
2. Find the rubber boot (provided with the 3300) with two connector access holes. Slip the larger hole of the rubber boot over the scanner's DE-9 connector (Figure 3-1).
3. Remove the rubber cover from the top of the 3300 and attach the DE-9 plug. Slide the rubber boot down over the connector plug and ensure it is firmly seated to create a watertight seal (Figure 3-2).

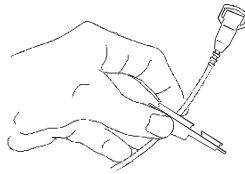


Figure 3 - 1 Installing the Rubber Boot

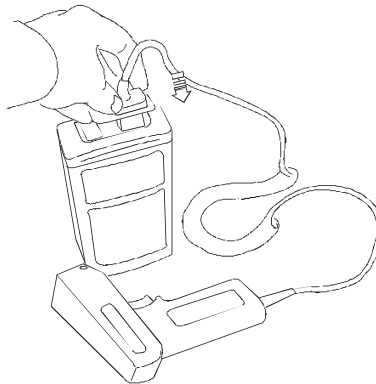


Figure 3 - 2 Connecting Scanner

Using a Laser Scanner

Laser scanners can be either detachable units, like the LS2000, or the Integrated Laser Scan Module which is permanently attached to the terminal.

Scanning is activated by pulling the scanner trigger when the program prompts for scanned data. Instead of using a trigger, a scanner may use a "soft trigger," with one or more keyboard keys defined to serve as the trigger. The Integrated Scanner Module requires the soft trigger since it does not have a trigger switch. The **Enter** key is the default soft trigger key.

To enable the soft trigger, the STG3000.EXE program must be loaded with the terminal software. Up to twenty keys can be defined as soft triggers. Refer to the Series 3000 Application Programmer's Manual for more information on this program.

To use a laser scanner, do the following (refer to Figures 3-3 and 3-4):

Warning

Do not look directly into the laser beam or point it at another person. Lasers can cause eye damage.

1. Power on the system and scanner by pressing **On/Off** or pulling the scanner trigger.
2. Point the scanner at the bar code and pull the trigger or press the soft trigger key (**Enter**).
3. Adjust the aim so that the thin, red laser beam covers the entire length of the bar code.

When the bar code is successfully decoded, the code is displayed on the 3300 screen. A beep may also indicate a successful scan.

The optimal scanning distance (focal length) for the Integrated Scanner Module is .75 to 25 inches. For the optimal scanning distance of a detachable scanner, consult the scanner operator's manual.

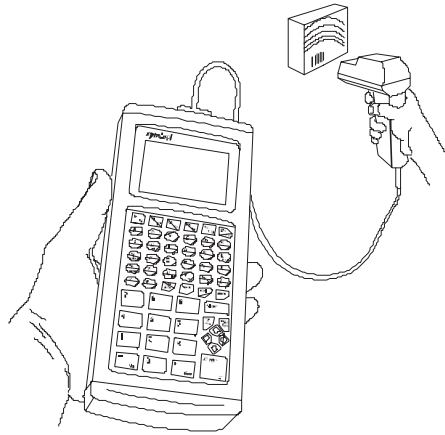


Figure 3 - 3 Using a Laser Scanner

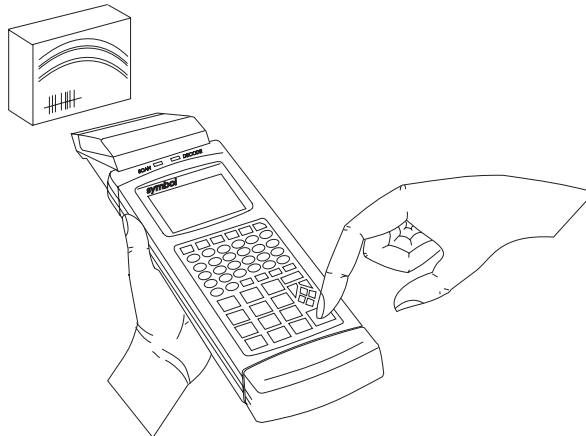


Figure 3 - 4 Using the Integrated Scanner Module

Using a Contact Wand Scanner

To use a contact wand scanner, do the following:

1. Turn the system on.
2. Lightly touch the bar code with the tip of the wand, holding it at a 0- to 45-degree angle above or below the line of the bar code (see Figure 3-5). The best angle depends on the bar code.
3. Draw the scanner smoothly and at a moderate speed from right to left or from left to right across the entire bar code.

When the bar code is successfully decoded, the code is displayed on the screen. Depending on the program, a tone indicates a successful scan.

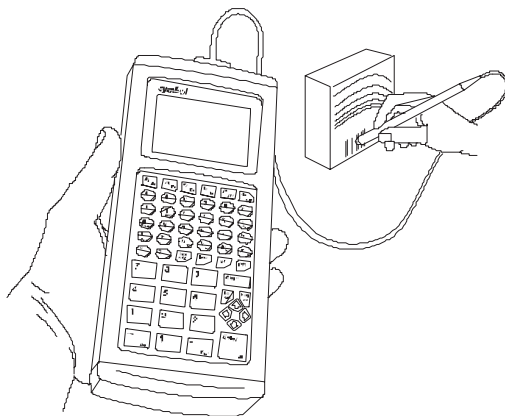


Figure 3 - 5 Using a Wand Scanner

The Series 3300 Keyboard

The keyboard is the primary means for entering data and issuing commands on the Series 3300. The standard 56-key and 35-key keyboards are illustrated in Figures 3-6 and 3-7, respectively.

The keys on the keyboard are distinguished as modifier keys and character keys. Because the 3300 keyboards have fewer keys than PC keyboards, each character key can produce more than the usual one or two characters. The four modifier keys, **Shift**, **CapsLock** (**Alpha** on the 35-key keyboard), **Ctrl** and **Func**, used individually or in combinations, determine which character or special function is produced by the character keys.

Using the Keyboard

Except for boot operations, the Series 3300 expects keys to be pressed one at a time. Depending on the configuration (whether ERR3000 is loaded), the system may indicate a Double Key error if two or more keys are pressed simultaneously. Accordingly, all key sequences must be entered by pressing and releasing one key before pressing the next.

The keyboard also has an optionally configurable auto-repeat function. If set, when the operator presses a character key and holds it, the character is repeated as long as the key is held. If the key is pressed immediately following a modifier keys, the modifier sequence affects only the first occurrence of the character key. For example, **Shift** followed by pressing and holding **A** generates: Aaaaaa...

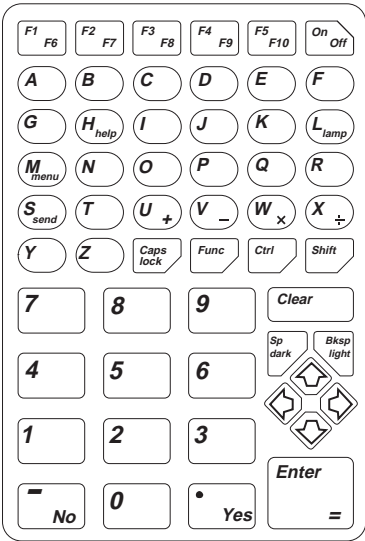


Figure 3 - 6 56-key Keyboard Legend

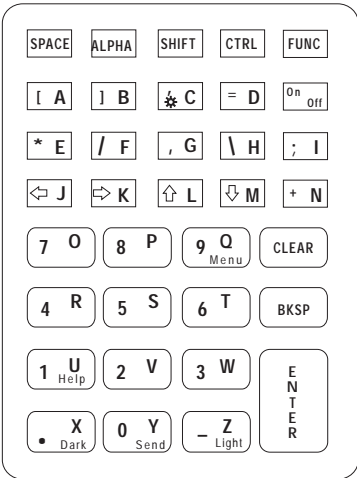


Figure 3 - 7 35-key Keyboard Legend

Modifier Keys

The **Shift**, **CapsLock** (56-key keyboard), **Alpha** (35-key keyboard), **Func**, and **Ctrl** keys are modifier keys. When pressed individually or in certain combinations, these keys change the keyboard state and possibly the character produced by the following character key.

For example, on the 56-key keyboard, the **Shift** key causes the letter keys to generate upper-case letters. On the 35-key keyboard, **Alpha** causes the character keys to produce letters. (**Alpha**, like **CapsLock**, shifts the keyboard so only upper-case letters are produced. Lower case letters are not available on the 35-key keyboard.)

Pressing **Func** followed by **Ctrl** produces Alt characters, just like the Alt key on a PC.

Appendix B shows the characters and operations produced by sequences of modifier keys on the standard 3300 keyboards. These key assignments may be changed by an application program. Refer to the application program documentation for any special key assignments.

The **CapsLock** and **Alpha** keys affect all succeeding character keys until **CapsLock** or **Alpha** is pressed again. The other modifier keys affect only the next character key.

The current keyboard state is indicated by the cursor shape, unless changed by the application. The standard cursor shapes are shown in Table 2-2.

To cancel the effect of a modifier key, press it again.

Key Descriptions

Most of the keys are self-explanatory; letter keys produce letters, number keys produce numbers. Table 3-1 describes the special functions performed by the 35-key and 56-key keyboards.

Table 3 - 1 Special Keys

Key Name	Description
Shift	Changes letter keys to uppercase, and number keys to punctuation marks and symbols.
Caps Lock	(56-key keyboard) Shifts the keyboard between uppercase and lowercase letters.
Alpha	(35-key keyboard) Shifts the keyboard to produce alphabetic characters. Uppercase only.
Func	Function key. Invokes special keyboard functions.
Ctrl	Control key. Generates control characters.
F1-F5 F6-F10	Function keys. The use of these keys is determined by the application program.
Enter	Usually pressed after typing data or a command.
Help	Displays a help message.
Lamp	Turns on the backlight.
Menu	Displays a menu.
Send	Sends data to the host.
Clear (Escape)	Depending on the application, completely or partially escapes from an application level or screen, or clears data entered in a field.
Dark	Following Func , darkens the display (increases contrast).
Light	Following Func , lightens the display (reduces contrast).
No	Answers NO to a question.
Yes	Answers YES to a question.

Error Recovery and Troubleshooting

This chapter provides information to assist in basic trouble analysis and correction, including:

- Error messages
- Troubleshooting startup failures
- Running the Self Test function
- Scanning problems
- Running Memory Transfer

Error Messages

Depending on the system configuration (if ERR3000 is loaded), the messages listed in Table 4-1 may be displayed indicating that an error condition exists which will affect the system's performance. A message is usually accompanied by one or more beeps, after which the system returns to its previous status.

The actual wording of the messages may be changed by the application program, so regard the messages here as representative. Some or all of these messages may also be disabled by the application. Refer to the application documentation for further information.

Table 4 - 1 Error Messages

Message	Explanation
Double Key Error	Two or more keys were pressed at the same time. This does not include boot sequences (see Chapter 3).
Low Battery	The battery pack should be recharged or replaced as soon as possible.
Replace Cells	Replace or recharge the battery pack immediately. After this message is displayed, the system shuts off. You will not be able to power it on again until the battery pack is charged.
Power Fault	The last power off was caused by a power failure. This occurs, for example, if the battery pack is removed while the 3300 is on or the batteries fail suddenly.

Troubleshooting

Table 4 - 2 Troubleshooting Chart

Symptom	Possible Cause	Suggested Action
Display is blank	Battery pack is dead or missing.	Replace or recharge battery pack.
	Application program was not downloaded successfully.	Repeat downloading.
3300 does not respond when keys are pressed	Application Program was not downloaded successfully.	Repeat downloading.
Scanner will not operate	Scanner connection is loose or disconnected.	Reconnect scanner cable.
	Scanner is broken.	Replace scanner.
	Scanning head needs cleaning.	Clean scanner head.
	Bar codes do not meet industry standards.	Try scanning a different bar code.
Time and date are incorrect	Real-time clock needs to be reset.	See the application guide for instructions.

Startup Failures

If a cold boot does not successfully start the application, either the application, the system software, or the system is malfunctioning.

If you can boot the system to command mode, try the following:

- Use the Program Loader function to download a new version of the system software to NVM. This procedure is described in Chapter 2.
- Use the Self Test function to check if the system hardware is operating properly. This procedure is described later in this chapter. After downloading new system software, warm boot the 3300.

Boot Failure Messages

During a cold boot, the system briefly displays a status line for each driver as it loads in the format:

```
0: Driver      #.##
```

The line shows a status value, usually 0, followed by the name and version number of the driver. If the system halts at one of these lines and displays a status value other than 0, the displayed device driver failed to load properly.

If such a failure occurs, the driver may need to be reloaded. If this does not solve the problem, call your authorized Symbol representative or Technical Support Services.

Self Test Function

The 3300 includes a series of self tests which can be run to verify the operation of terminal hardware components. You should run the self test if you suspect a problem with the hardware.

Except for testing the keyboard, no operator input is necessary after a test screen is selected.

Running the Self Test

The Self Test function is selected from the command mode menu.

Boot to command mode:

- 56-key: **On/Off** and **A + D**
- 35-key: **On/Off** and **Bksp + Shift**

When the Command Mode screen is displayed, use the up or down arrow key to scroll through the options until Self Test is displayed, and press **Enter**.

Self Test Summaries

The Self Test is divided into five functions or screens:

- **Config Screen 1** - Reports the terminal type and version, time, date, main and backup battery condition, current power source, and status of the serial ports.
- **Config Screen 2** - Reports information on the keyboard and display. If a laser scanner is attached, the test reports if the trigger is pulled or not. If a wand scanner is attached, the test reports whether the wand is scanning black or white.
- **Memory Screen** - Tests ROM, RAM, and EMS (Expanded) memory, and reports the amount of RAM and EMS.
- **Fill Screen** - Fills the entire screen with a test pattern, so the operator can visually verify that the entire screen displays.
- **Set RTC Screen** - Allows the operator to set the time and date settings of the real-time clock.

Keyboard Test

While the Config Screen 1 results are displayed, you can test any keys except **Clear** and **On/Off**. When you press a key, the corresponding key code is displayed on the top row to the right of the test name.

Tables 4-3 and 4-4 list the codes for each key.

Table 4 - 3 56-key Keyboard Test Codes

Key	Scan Code	Key	Scan Code
F1/F6	00	W/(mult)	28
F2/F7	01	X/(divide)	29
F3/F8	02	Y	30
F4/F9	03	Z	31
F5/F10	04	CapsLock	32
A	06	Func	33
B	07	Ctrl	34
C	08	Shift	35
D	09	7	36
E	10	8	37
F	11	9	38
G	12	4	40
H/help	13	5	41
I	14	6	42
J	15	Space/dark	43
K	16	Up arrow	44
L/lamp	17	Backspace/light	45
M/menu	18	1	46
N	19	2	47
O	20	3	48
P	21	left arrow	49
Q	22	down arrow	50
R	23	right arrow	51
S/send	24	_/No	52
T	25	0	53
U/+	26	./Yes	54
V/-	27	Enter/=	55

Table 4 - 4 35-key Keyboard Test Codes

Key	Scan Code	Key	Scan Code
Space	00	down arrow/ M	18
Alpha	01	+ /N	19
Shift	02	7/O	20
Control	03	8/P	21
Func	04	9/Q	22
[/A	05	Clear	(clear)
] /B	06	4/R	24
' /C	07	5/S	25
= /D	08	6/T	26
* /E	10	Backspace	27
/ /F	11	1/U	28
, /G	12	2/V	29
\ /H	13	3/W	30
; /I	14	. /X	31
left arrow/J	15	0/Y	32
right arrow/K	16	_ /Z	33
up arrow/L	17	Enter	34

Exiting Self Test

The test loop continues, updating the time and battery status and processing key-strokes, until you press **Clear** to end the test. When you press **Clear**, the display returns to the command mode function menu.

Scanning Problems

Bar code labels that do not meet established industry specifications may not scan successfully. These labels may include:

- Smudged labels
- Very dark or very light labels
- Highly reflective surfaces or coatings
- Poor color contrast.

The following may also cause unsuccessful scans:

- Moving the contact wand scanner too quickly
- Moving the contact wand scanner too slowly
- Moving the contact wand scanner at an uneven speed
- Moving the scanner diagonally across the bar code.

Memory Transfer Program

The Series 3300 Command Mode functions include a memory transfer utility. Memory transfer is used primarily for program troubleshooting. This may be required, for example, if the application program hangs. Analysis of the program is performed by a programmer using tools described in the Series 3000 Application Programmer's Guide.

The memory transfer function transfers data from the Series 3300 to the host PC. You may select to transfer either all or a range of memory.

The following procedure describes the 3300 side of the transaction only. The PC side of the transaction is determined by the communication software used.

Running Memory Transfer

Memory transfer is conducted using communications over a direct connection between the 3300 and the host computer, using a null modem cable. The cable has a male DB-25 connector at one end and a female DE-9 connector at the other end.

Warning

This procedure is not approved for, and should not be performed in, potentially hazardous environments.

Caution

Always turn off the 3300 before attaching or removing cables or adapters.

1. Turn OFF both the 3300 and the host.
2. Attach the null modem cable. Attach the 25-pin connector to the 3300 and the 9-pin connector to the host computer.
3. Turn ON the host and start the communication program. Set up the communication parameters to match the 3300. Typical parameters are:
 - 38400 bps
 - 7 bit data
 - Odd parity
 - Xon/Xoff flow control

4. Boot the 3300 to command mode (refer to Chapter 3):
56-key: **On/Off** and **A+D**
35-key: **On/Off** and **Bksp + Shift**
5. Select the Memory Transfer function from the command mode menu. Use the Up or Down cursor keys to scroll through the command mode options until Memory Transfer is displayed, and press **Enter**.
6. Select the range of memory to transfer by pressing the first letter of the desired range (All, Range, or None), or use the up or down arrow key, and press **Enter**.

If you select All, the program skips to the summary screen (step 10).

7. If you select Range, the screen displays:

```
RAM
Use Arrow Keys
Start      End
00000     9FFFF
```

Specify a range of RAM by setting the Start and End addresses.

- Use the right and left arrow keys to move the cursor to the digit that you want to change.
- Use the up and down arrow keys to change the values.

When you have entered a range, press **Enter**.

8. Specify a range of NVM to transfer. Choose All or None.
9. If the system has EMS installed, it prompts for the range to transfer; otherwise, the program skips this screen:

```
EMS

Use arrow keys
Start      End
```

The range is specified in page numbers (16KB per page). Use the right and left arrow keys to move between the Start and End values. Use the up and down arrow keys to change the page number value.

When you have set the range, press **Enter**.

10. The terminal displays the selected ranges for verification, for example:

```
RAM 0000 3FFF
NVM C839 DFFF
EMS  None
Correct?
```

If the values are correct, press **Enter**. If the values are not correct, press **Clear** to clear the fields, and then select new values.

11. Specify the baud rate. Use the up and down arrows scroll through the list of baud rates until the correct rate is displayed, and press **Enter**. (Flow control may be necessary at 38400 bps and higher.)
12. Specify the data bits. Press **7** or **8**, or use the up and down arrows to display 7 or 8, and press **Enter**.
If you select 8 data bits, the program selects No parity and skips the next screen.
13. Specify parity type. If you selected 7 data bits, the 3300 prompts for the parity. Use the up and down arrows to display a parity option, or press the first letter of a parity option (**E**ven, **O**dd, **N**one, **S**pace, or **M**ark), and press **Enter**.
14. Set flow control. Use the up and down arrows to display the flow control options, or you may press the first letter of an option (**N**one, **X**on/Xoff, or **R**TS/**C**TS). Then press **Enter**.

15. The system is now ready to send the data to the host PC. The 3300 displays:

Comm Parameters

Start? <ENT>

Make sure the host is ready to received data, and press **Enter** on the 3300.

While data is being transferred, the 3300 displays a report of the 1 KB range being transferred:

Memory Transfer

Sending: XXXX

The display is updated for every 1024 bytes (1 KB) of memory.

16. When the transmission has completed or aborted, the transmission status screen is displayed:

Memory Transfer

Status 0000

A Status of 0000 (all zeros) indicates that the transfer was successful. Other status values are described in Appendix D.

Ending Communications

To return to the Command Mode main menu, press **Clear**. Then take whatever corrective action is necessary, and reboot the terminal.

Port Pin-Outs

This Appendix provides reference information for Series 3300 ports and mappings for a null modem cable.

Scanner Port (DE-9)

The scanner port is located at the top of the 3300, under a protective rubber boot. The pin descriptions are listed in Table A-1.

Table A - 1 Scanner Port Pin Descriptions

Pin	Name	Function	Direction
1	LASERDIR	Laser direction indicator*	input
2	BWD	Black/white data	input
3	WANDLED	Wand L.E.D. control	output
4	no connection		
5	LASERTRIGN	Laser trigger not	input
6	WANDEL	Wand electronics enable	output
7	GROUND	Logic/power ground	
8	GROUND	Logic/power ground	
9	WANDPWR	Wand Power (+5V)	output
* Must be grounded on contact wand scanners			

COM1 Serial Port (DB-25)

The COM1 serial port is located at the bottom of the 3300, under the end cap. The pin descriptions are listed in Table A-2.

Table A - 2 COM1 Serial Port Pin Descriptions

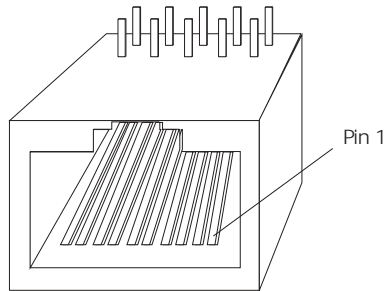
Pin	Name	Signal	Direction
1	GROUND	GND	IN*
2	TRANSMIT DATA	TXD	OUT*
3	RECEIVED DATA	RXD	IN*
4	REQUEST TO SEND	RTS	OUT*
5	CLEAR TO SEND	CTS	IN*
6	DATA SET READY	DSR	IN*
7	SIGNAL GROUND	GND	— *
8	CARRIER DETECT	DCD	IN*
9	CRADLE CONTROL	RXD	IN
10	CRADLE CONTROL	TXD	OUT
11	REV CH		OUT
12-19	Not used		
20	DATA TERMINAL READY	DTR	OUT*
21	Reserved**		
22	RING INDICATOR	RI	IN*
23	Reserved		
24	+12V IN	IN	
25	Reserved**		
*RS-232 signal			
**Symbol internal test signals			

COM2 Serial Port Connector (RJ-41)

The COM2 serial port is an optional port located at the top of the 3300, under a protective rubber boot. The pin descriptions are listed in Table A-3.

Table A - 3 COM2 Serial Port Pin Descriptions

Pin	Signal
1	Not Connected
2	+5 volts
3	RXD
4	RTS
5	TXD
6	Not Connected
7	Not Connected
8	GND
9	CTS
10	Not Connected



Null Modem

A null modem may be used on the COM1 serial port. It has a male DB-25 connector at one end and a female DB-25 connector at the other end. The pin-outs must be as shown in Figure A-1.

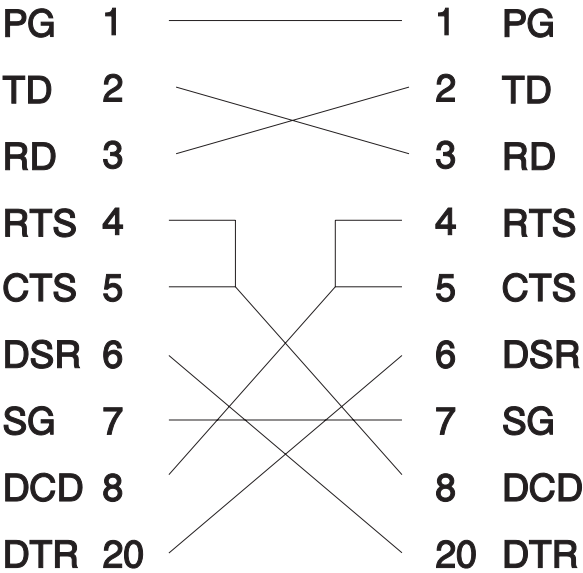


Figure A - 1 Null Modem Pin-outs

Keyboard Layouts

The following pages show the characters and character sequences produced by the 56- and 35-key keyboards using the default translation tables.

As explained in Chapter 4, these key definitions can be changed by the application program. Refer to the Series 3000 Application Programmer's Manual and the PDT 3300 System Software Manual for additional information on keyboard translation.

The captions indicate what sequence of modifier keys produce the keyboard.



Figure B - 1 Unmodified 56-key Keyboard

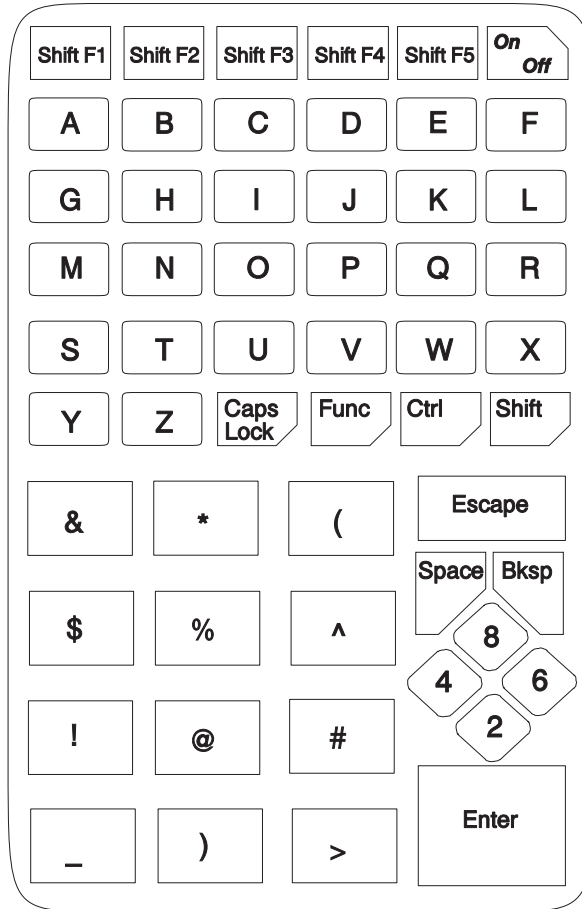


Figure B - 2 Shift Key Modified 56-key Keyboard

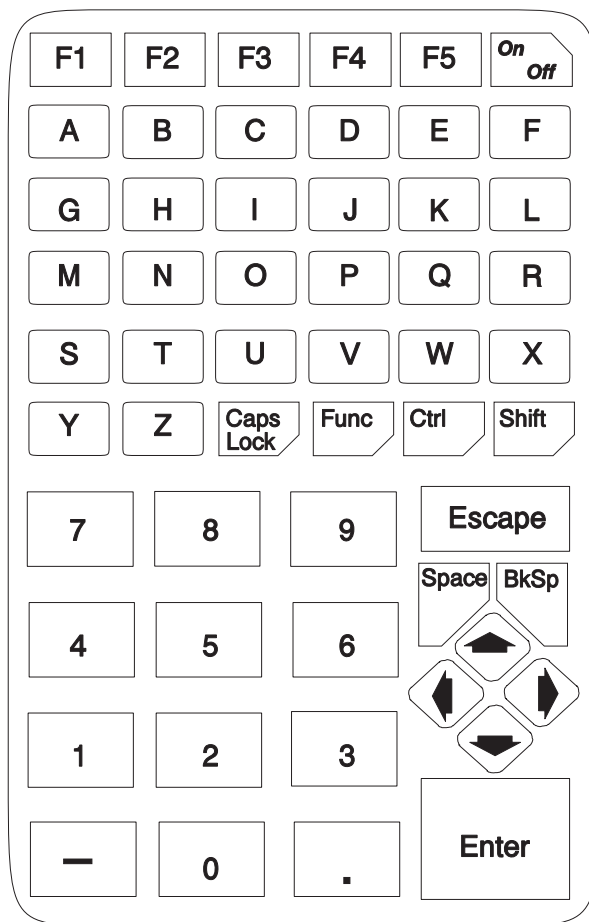


Figure B - 3 CapsLock Key Modified 56-key Keyboard

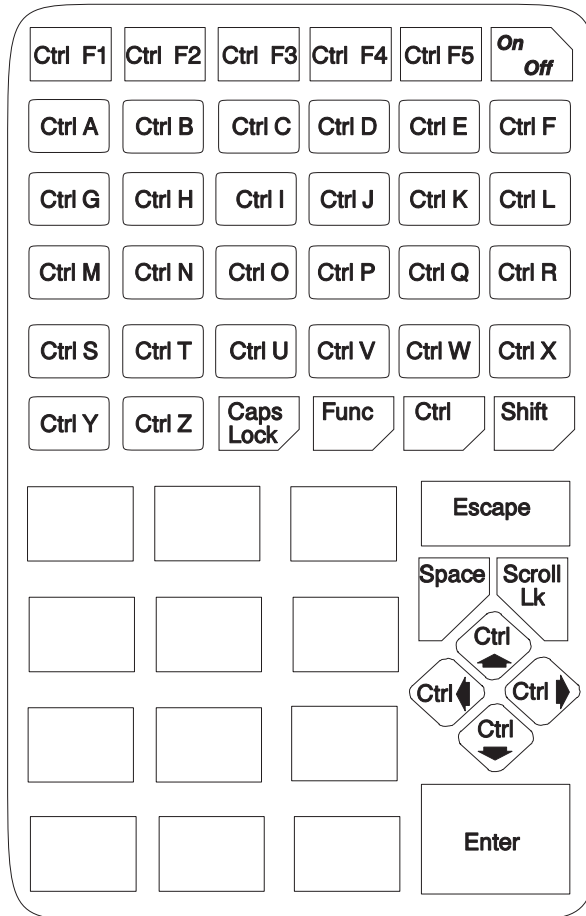


Figure B - 4 Control Key Modified 56-key Keyboard

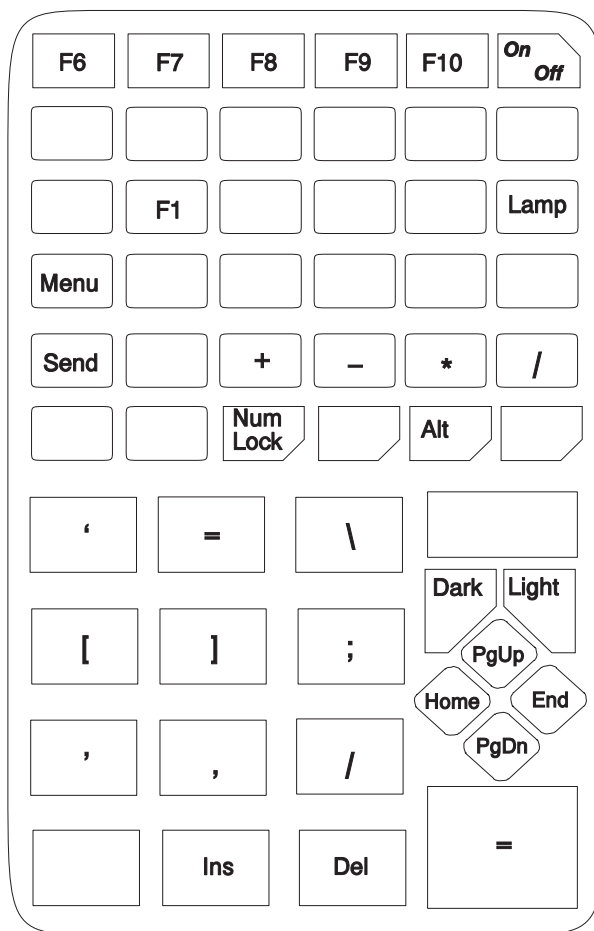


Figure B - 5 Function Key Modified 56-key Keyboard

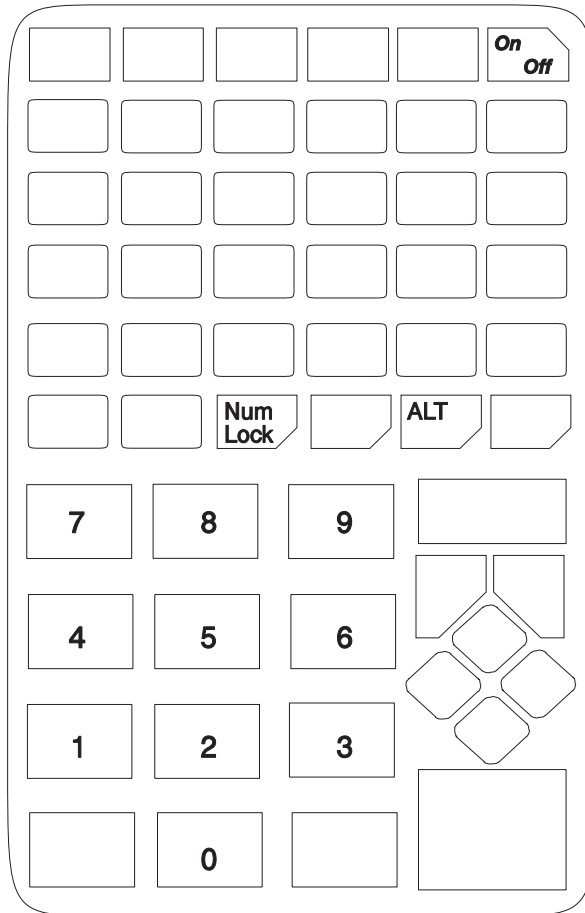


Figure B - 6 Func + CapsLock (NumLock) Modified 56-key Keyboard

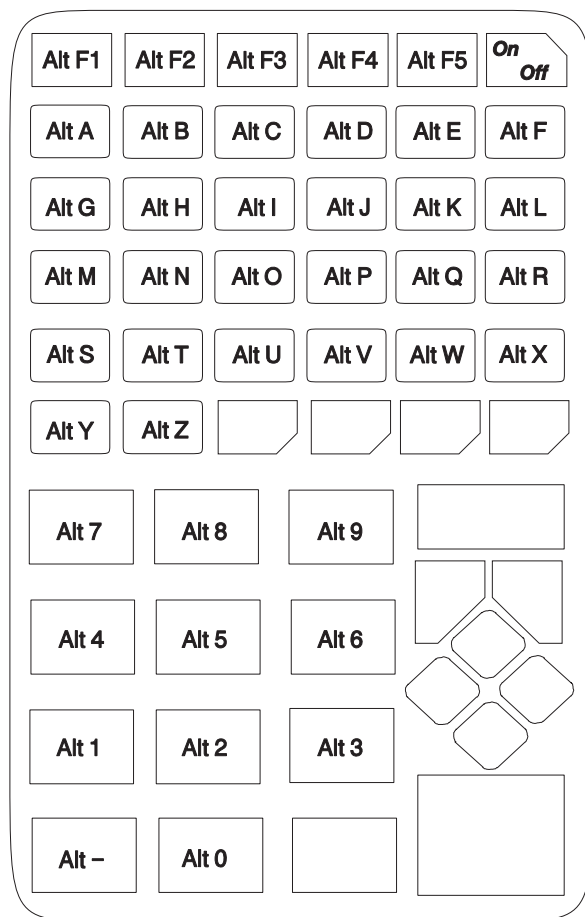


Figure B - 7 Func + Ctrl (Alternate) Modified 56-key Keyboard

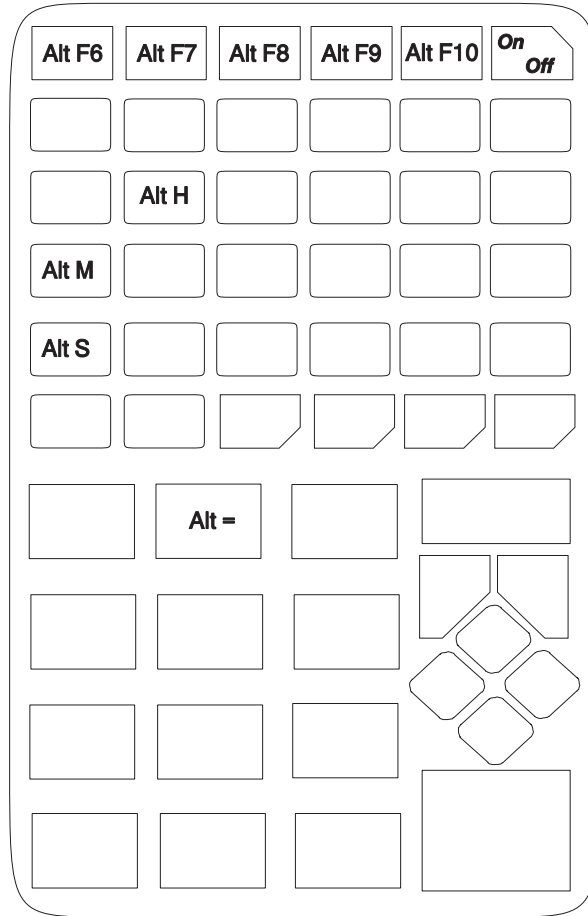


Figure B - 8 Func + Ctrl + Func Modified 56-key Keyboard

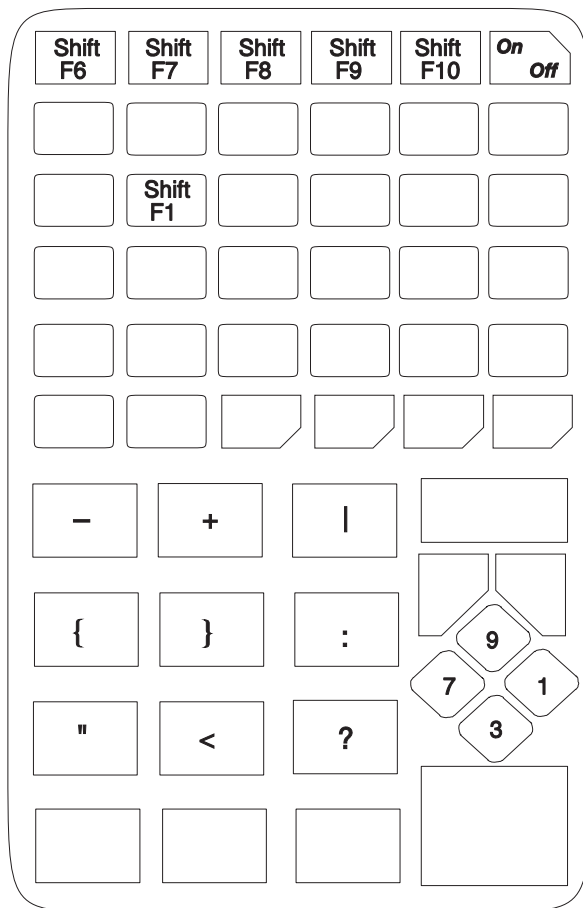


Figure B - 9 Shift + Func Modified 56-key Keyboard

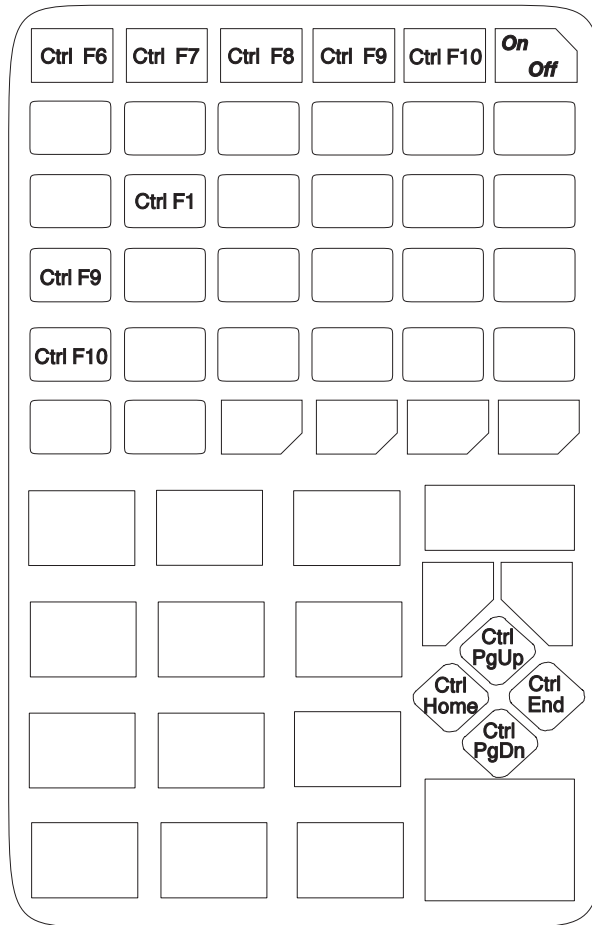


Figure B - 10 Ctrl + Func Modified 56-key Keyboard

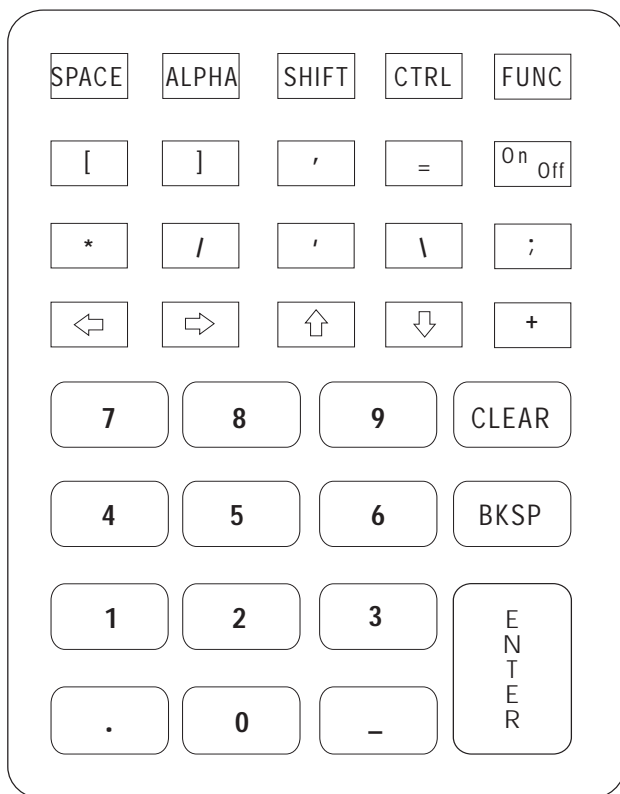


Figure B - 11 Unmodified 35-key Keyboard

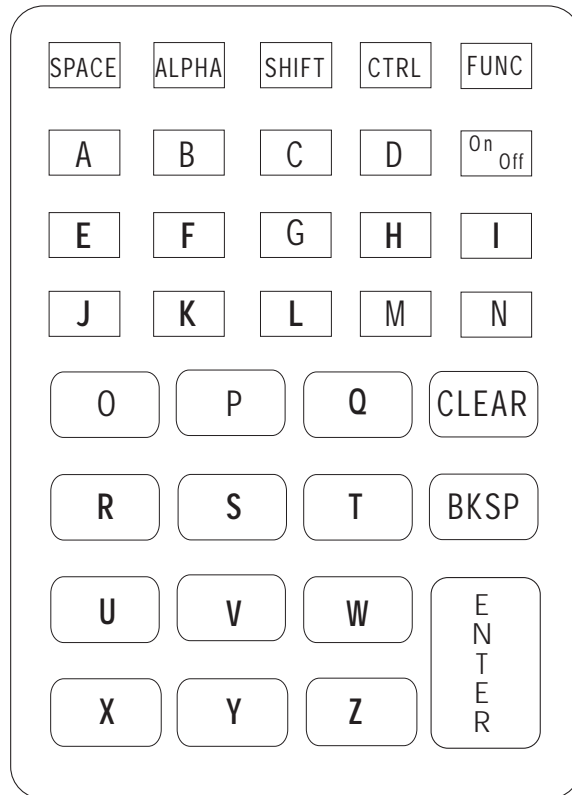


Figure B - 12 Alpha Key Modified 35-key Keyboard

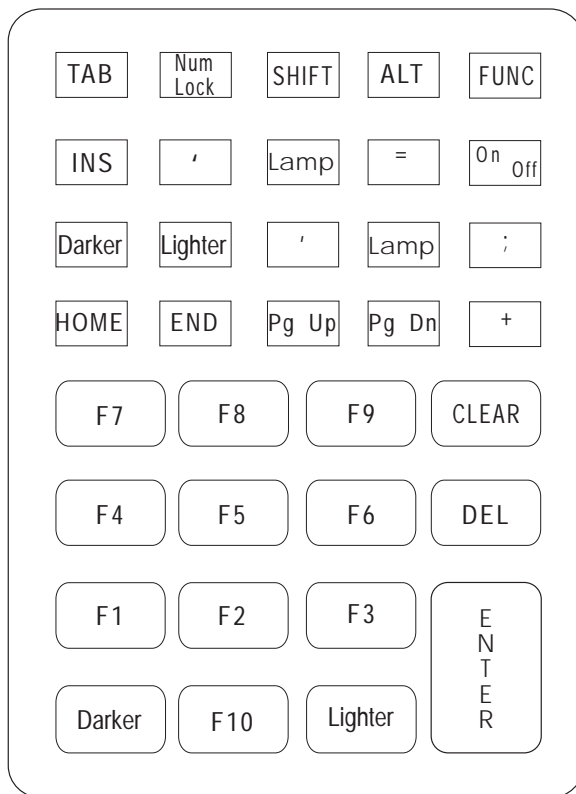


Figure B - 13 Shift Key Modified 35-key Keyboard

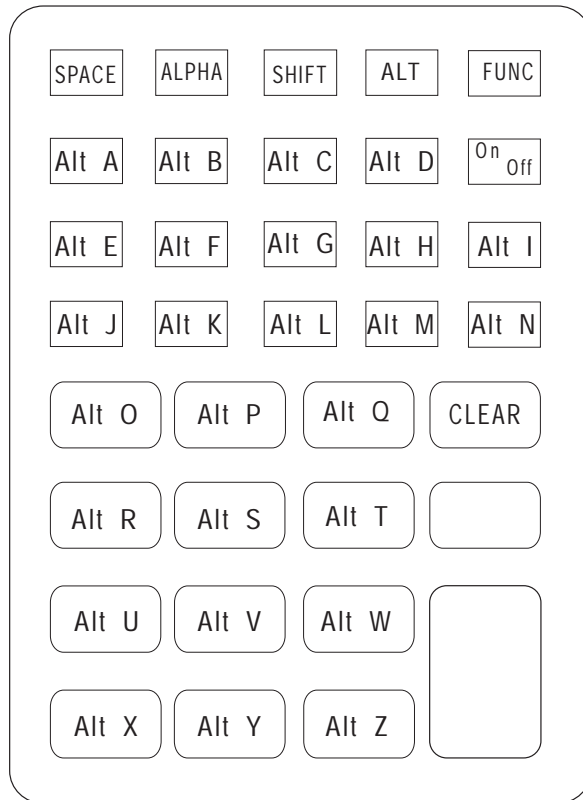


Figure B - 14 Control Key Modified 35-key Keyboard

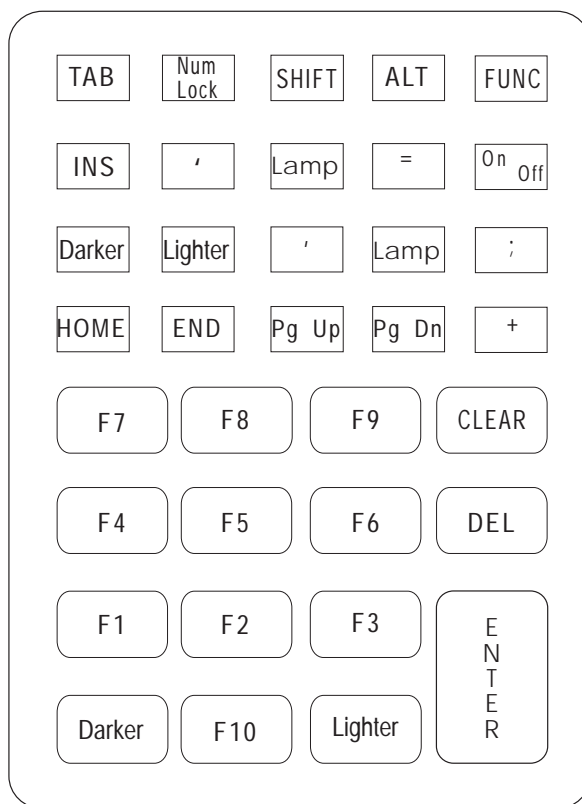


Figure B - 15 Function Key Modified 35-key Keyboard

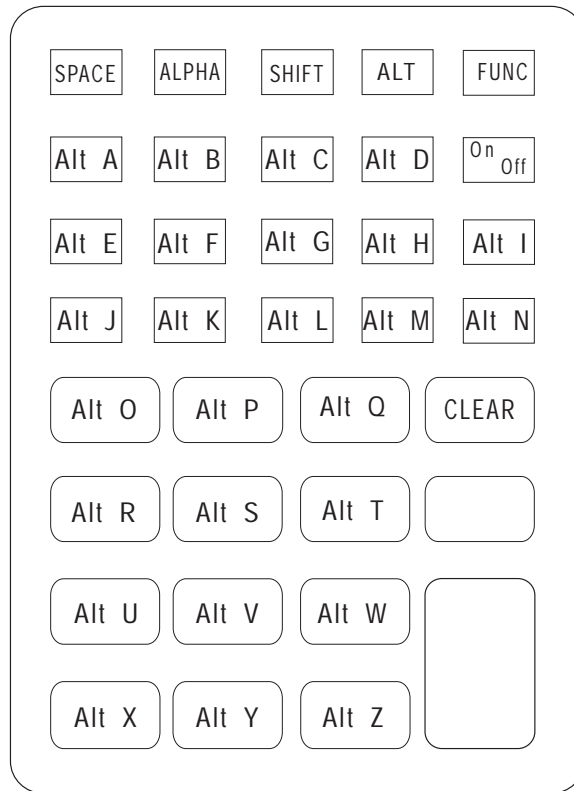


Figure B - 16 Func + Ctrl (Alternate) 35-key Keyboard

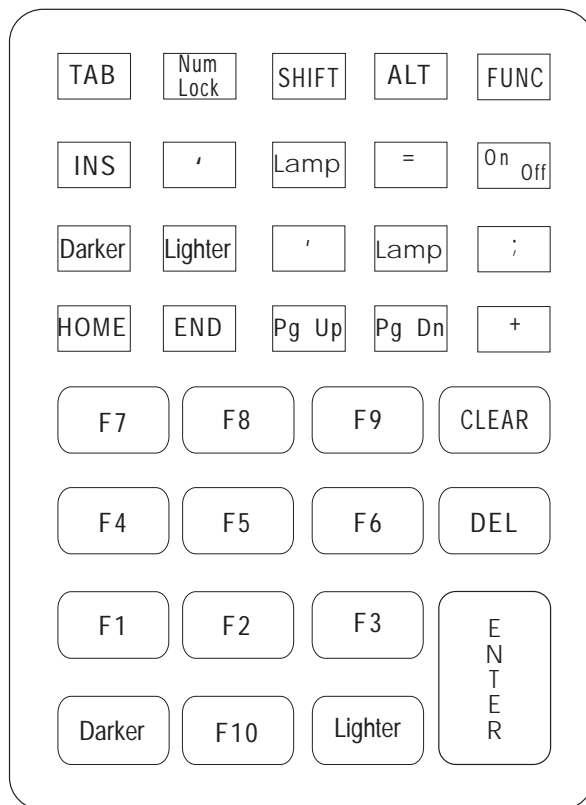


Figure B - 17 Shift + Func Modified 35-key Keyboard

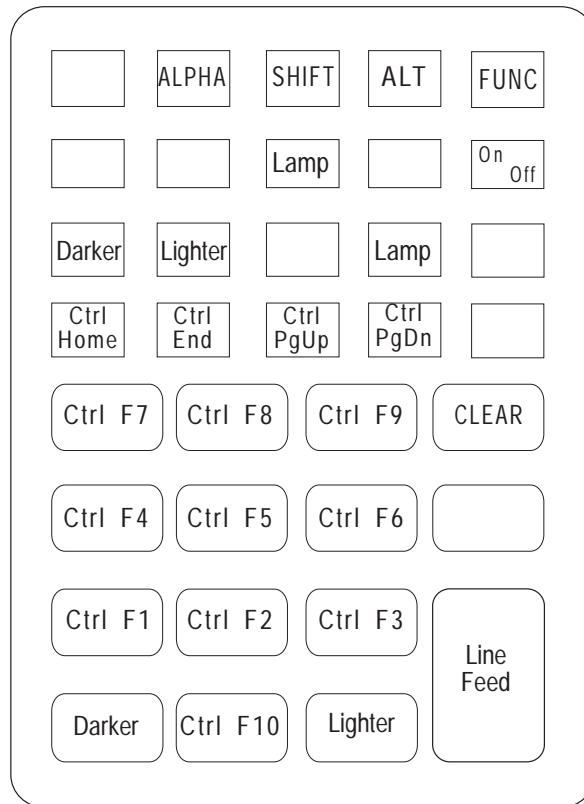


Figure B - 18 Ctrl + Func Modified 35-key Keyboard

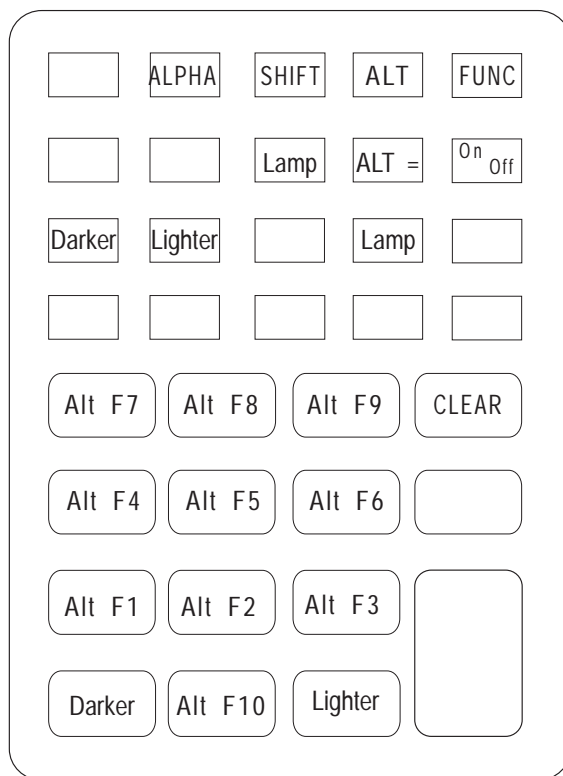


Figure B - 19 Func + Ctrl + Func Modified 35-key Keyboard

Communications Status Codes

The program loader status code consists of four hexadecimal digits which indicate whether or not the transfer was successful and if not, the source of the communications error. A status code of 0000 indicates success; any other code indicates failure.

Table C-1 lists the failures associated with the status codes. The values are additive.

Table C - 1 Communications Status Codes

Status Code	Meaning
0002	Receive overrun error
0004	Receive parity error
0008	Receive framing error
0010	Programming voltage not present
0020	Data Set Ready or Carrier Detect not detected on open
0080	ABORT key hit during comm
0100	CD lost during session
0200	Illegal Intel hexadecimal record
0400	Unsupported Intel record
0600	NVM EEPROM failed to erase
0800	Receive time-out error
1000	Control start character time-out
2000	Clear To Send inactive time-out error
4000	Receive buffer full

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