

# 2320 Operator's Guide

2320A138OPGD  
February 1996  
E-EQ-2320OG-B-ARC

## IMPORTANT NOTICE

The LXE 2320 is obsolete.

This electronic manual has been made available as a courtesy to LXE's 2320 customers. Please contact your LXE customer support representative for assistance.

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**Language: English**  
**Regulatory Notices**

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**Notice:**

The long term characteristics or the possible physiological effects of radio frequency electromagnetic fields have not been investigated by UL.

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**FCC Information:**

This device complies with FCC Rules, part 15. Operation is subject to the following conditions:

1. This device may not cause harmful interference  
and
2. This device must accept any interference that may be received, including interference that may cause undesired operation.

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

Warning: Changes or modifications to this device not expressly approved by LXE, Inc., could void the user's authority to operate this equipment.

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**EMC Directive Requirements:**

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

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**Industry Canada:**

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. 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.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouiller du Canada. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique édictés par le ministère des Communications du Canada.

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**RF Safety Notice:**

Caution:



*This device is intended to transmit RF energy. For protection against RF exposure to humans and in accordance with FCC rules and Industry Canada rules, this transmitter should be installed such that a minimum separation distance of at least 20 cm (7.8 in.) is maintained between the antenna and the general population.*

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**R&TTE Directive Requirements - (Applies only to Equipment operated within the EU/EFTA)**



**Information to User**

A label on the exterior of the device should resemble one of the labels shown below (the label contains the LXE part number of the installed radio card). The labels shown below and affixed to the device, identify where the device may be used and where its use is restricted. Use of a device is prohibited in countries not listed below or otherwise identified by the label. (May or may not include the 0560 Notified Body No.)



*Permitted for use in: Austria, Belgium, Denmark, Finland, Germany, Greece, Iceland, Italy, Ireland, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom*



*Permitted for use in France.*

**Revision Notice  
November 2001**

Update regulatory notices based on LXE Safety Department changes.

Revise manual formatting for CD and Web delivery.

**Remove Contacting LXE section. Information is available on the LXE website at [www.lxe.com](http://www.lxe.com).**



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## Introduction

This operator's guide describes the LXE OmniNet 2320 Scout Hand Held Terminal.

### Features

The 2320 is a powerful and multi-featured portable hand held computer. Its modular design opens a wide range of data collection possibilities.

A selection of integrated modules is available for the 2320:

- laser bar code scanner module
- touch module to communicate with Touch Memory buttons
- serial port module to connect to a PC, modem or printer
- serial port module with an InfraRed transmitter
- D-9 connector<sup>1</sup> for external non-decoding bar code scanners.

Two integrated modules can be attached to the 2320 at the same time. The integrated modules can be removed and replaced with other integrated modules. Data can be transferred between the 2320 and a computer by using a PC card, an RS232 (RJ-11) serial port module, or a radio via radio frequency communications.

The 2320 also features

- a supertwist graphics display
- a multi-functional alphanumeric keyboard
- a PC card slot
- an internal memory of 1Mb RAM and 256Kb flash ROM.

The 2320 is DOS compatible with ROM-DOS 5.0 installed in the flash ROM.

Durably constructed and maintaining the LXE commitment to lightweight portability, the 2320 is constructed with a cast-metal case and weighs less than 15 ounces.

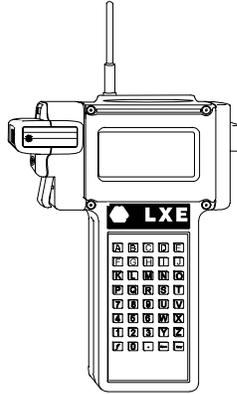
*Note: See Appendix E "Accessories" for reference material noted throughout this guide.*

The *LXE OmniNet 2320 Developer's Kit* is an LXE supported method for developing applications that access the special features of the 2320. In order to use the scanner, serial ports, etc., you need to use the developer's kit to write programs for the 2320 on a development PC, load the compiled program on the 2320 and then run the program on the 2320. The Developer's Kit includes the LXE OmniNet 2320 C Developer's Guide.

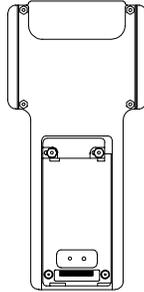
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<sup>1</sup> Future Enhancement

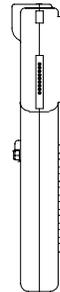
## LXE OmniNet 2320 Hand Held Terminal



**Figure I - 1 - Front View**



**Figure I - 2 - Back View**



**Figure I - 3 - Side View**

See Appendix C for Technical Specifications of the unit and modules.

---

## Bar Code Symbolgies

The trigger-activated laser can read and decode

- Code 39
- Interleaved 2 of 5
- UPC-A and E
- EAN-8 and 13
- Codabar
- Code 128 bar codes

## Getting Started

### Installation

You need the following equipment to set up your LXE OmniNet 2320 Scout hand held terminal:

- PC card and PC card drive or 2320 RS232 (RJ-11) serial port module and cable for communication between a 2320 and a computer
- Two (2) hex wrenches : 5/64" and 3/32" to use when installing cards and/or modules.
- The 2320 Software disk.
- The 2320 Scout hand held terminal and Nicad battery (or *customer-provided* AC adapter).
- A computer on which to edit files that will be transferred to the 2320.

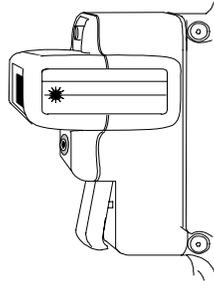


**WARNING:**

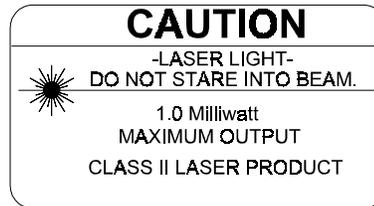
*Before performing any of the functions in this section disconnect and/or remove all power sources from the 2320.*

## Laser Bar Code Module

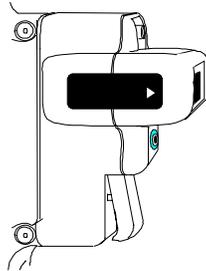
The integrated laser bar code module consists of a trigger-activated visible light laser diode cushioned inside a metal casing.



**Figure 1 - 2320 Laser Module**



**Figure 2 - Caution Label on Laser Module**



**Figure 3 - Opposite View of Laser Module**



**Figure 4 - Aperture Label on Laser Module**

## Laser Module Warnings

This product incorporates a Class II laser. The visible laser diode has a maximum output of one milliwatt. Laser light can be dangerous to you or others nearby if it is improperly used.

	<b>Warning:</b> Do not look directly into the window area or at a reflection of the laser beam while the laser is scanning. Exposure to the laser beam can damage your vision.
	<b>Caution:</b> Users concerned with the risk of RF exposure may wish to limit the duration of use of this equipment and position the antenna (or device) as far away from the body as practical.
	<b>Caution:</b> This product uses laser light. Please read the caution labels.
	<b>Caution:</b> Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

---

## Regulatory Approvals

<u>Terminal</u>	<u>Scanner</u>
UL1950	CDRH
EN60950	IEC825-1
EN55022	
EN50082-1	

### Remember:

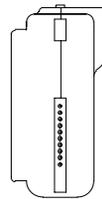
- Do not look into the laser's magnifying lens.
- Do not stare directly into the laser beam.
- Do not remove the laser caution labels from the 2320.
- Do not connect the laser bar code module to any other device. The laser bar code module is certified for use with the 2320 only.

## Remove A Module

All modules may be removed and replaced with other modules. **Do not tamper with the laser scan module.** The laser is factory installed because of the sensitivity of the scan head and the hazards of improper laser operation if the module is not properly installed and tested.

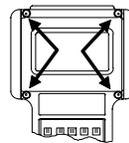
Module connections on the left and right sides of the unit will accept any 2320 module connection. Units can be configured for right or left-handed use or for specific tasks. Both ports do not require an installed module before the 2320 will function. The right port (with LCD screen facing you) is the COM 1 port and the left port is the COM 2 port. The default COM port is COM 1.

*Note: When the 2320 is configured for one module, the module connector cap on the unused port must be firmly attached to the unused port.*



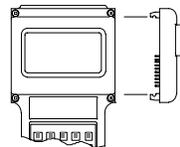
**Figure 5 - Module Connector**

1. Using the **3/32" hex wrench**, remove two screws on the front of the 2320 next to the module port you want to remove. Before completely removing each screw, hold your finger over the small hex nut on the back of the unit that secures the hex screw. When they are removed carefully place them in a safe place.



**Figure 6 - Module Anchor Location**

2. Pull the module straight off, being careful not to bend the pins. If the pins do bend, gently straighten them using mild force. Make sure the module gasket is covering the module board.

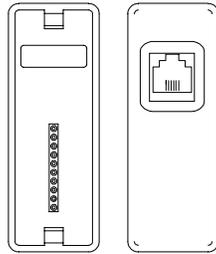


**Figure 7 - Remove Module**

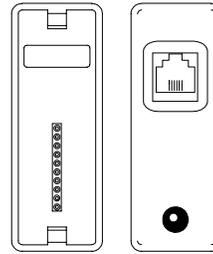
Place the module in it's shipping container or a well-marked, shock absorbent container for storage.

## Install an RS232 Serial Port Module

The RS232 (RJ-11) serial port module provides a serial connection to the 2320. This allows the 2320 to connect directly to a computer's serial port with a standard LXE serial port cable. The RS232 (RJ-11) serial port module can also be used to communicate with a variety of external devices such as modems and printers.

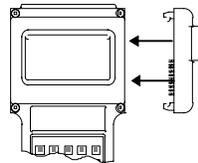


**Figure 8 - RS232 Serial Port Module**



**Figure 9 - IR Transmitter RS232 Serial Port Module**

1. Using the **3/32" hex wrench**, remove two screws on the front of the 2320 next to the module port you want to use. Before completely removing each screw, hold your finger over the small hex nut on the back of the unit that secures the hex screw. When they are removed carefully place them in a safe place.
2. Check the RS232 module pins for straightness and adjust if necessary. Ensure the module gasket is in place.



**Figure 10 - Install RS232 Module**

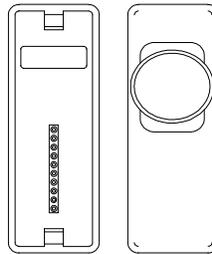
3. Insert the RS232 module into the 2320 module port socket ensuring that the module pins are aligned with the socket pin receivers. Press the module securely in place.
4. Replace the two screws on the front of the 2320 and secure them with the hex nuts on the back of the unit.
5. Connect the RJ-11 cable to the module.

## Install a Touch Memory Module

The Touch Memory Button module reads Touch Memory buttons. Touch Memory buttons are small electronic chips, housed in stainless steel canisters, that contain a unique serial number. The weather-resistant buttons are glued or attached to a structure or movable object.

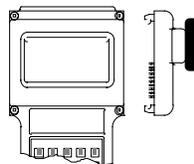
### Button Contact

You can begin to collect data with a simple touch of a Touch Memory button after programming the 2320. To communicate with a button, place the touch module's contact over a Touch Memory button—the round rim of the button helps guide the touch module for easy alignment. The touch module communicates with the button and data is transferred to the 2320's memory. The 2320 emits an audible beep with each successful read.



**Figure 11 - Touch Memory Module**

1. Using the **3/32" hex wrench**, remove two screws on the front of the 2320 next to the module port you want to use. Before completely removing each screw, hold your finger over the small hex nut on the back of the unit that secures the hex screw. When they are removed carefully place them in a safe place.
2. Check the touch memory module pins for straightness and adjust if necessary. Ensure the module board gasket is in place.



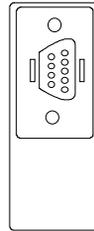
**Figure 12 - Install Touch Memory Module**

3. Insert the touch memory module into the 2320 module port socket ensuring that the module pins are aligned with the socket pin receivers. Press the module securely in place.
4. Replace the two screws on the front of the 2320 and secure them with the hex nuts on the back of the unit.

## Install a D-9 Connector Module

The D-9 Connector Module<sup>2</sup> is used to allow external non-decoding bar code scanners or wands to communicate with the 2320.

1. Using the **3/32" hex wrench**, remove two screws on the front of the 2320 next to the module port you want to use. Before completely removing each screw, hold your finger over the small hex nut on the back of the unit that secures the hex screw. When they are removed carefully place them in a safe place.
2. Check the D-9 connector module pins for straightness and adjust if necessary. Ensure the module board gasket is in place.



**Figure 13 - D-9 Connector Module**

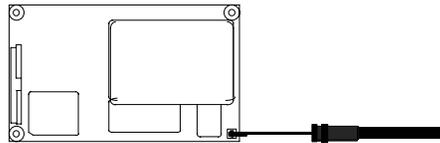
3. Insert the D-9 module into the 2320 module port socket ensuring that the module pins are aligned with the socket pin receivers. Press the module securely in place.
4. Replace the two screws on the front of the 2320 and secure them with the hex nuts on the back of the unit.
5. Connect the D-9 cable to the module by squeezing the side of the cable connector and pressing it firmly into place over the D-9 pin socket face.

---

<sup>2</sup> Future Enhancement

## Install Radio Card

When you order a 2320 you will receive an SRAM card or diskette containing the utilities directory, commands directory, and OmniNet/ISA radio driver. You will also receive the FTP kernel if you order the FTP stack.

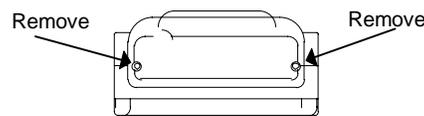


**Figure 14 - 2320 OmniNet/ISA Radio Card with Antenna**

There are certain files you need to edit when configuring your radio and FTP kernel stack to match your radio network system configuration. Instructions are contained in section "Change Files to Meet 2320 Requirements".

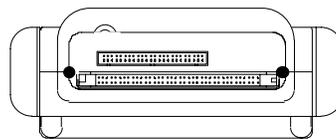
*Note: The radio card, if already installed, can be removed from the unit by pinching the top of the card and pulling the card straight up and out of the radio card socket.*

1. Using the **5/64" hex wrench**, remove two screws on the top of the 2320. Place the screws and cover plate in a safe place.



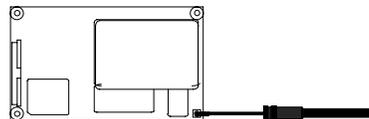
**Figure 15 - Top Coverplate Connection**

The following diagram illustrates the top view of the 2320 after the coverplate is removed. There are two slots inside the 2320. One slot is for the radio card and the other slot is for the PC card. The radio card fits right behind the back cover of the 2320.



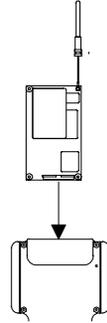
**Figure 16 - Radio Card and PC Card Connections**

2. Snap the antenna into the antenna connector on the bottom right side of the radio card.



**Figure 17 - Radio Card and Antenna**

3. Insert the radio card into the 2320 as shown in the following diagram. Seat the card over the pin receivers and gently snap into place. When seated properly, the top of the radio card is just below the level of the coverplate.



**Figure 18 - Insert Radio Card**

- When the 2320 software programs need to be set up or the PC Card needs to be programmed, put the unit, coverplate and screws aside in a safe place and proceed to the section titled "Set Up and Load the Software Programs". After the software is loaded on the 2320 and/or the PC Card, the card is then installed and the coverplate placed back on the 2320.
  - When the software is already loaded on the installed PC Card or the 2320 drives, replace the top coverplate and proceed to the section titled "Power Up and Test the Unit".
4. Replace the coverplate by sliding it sideways, seating the antenna in the coverplate by the lower groove in the antenna against the antenna cutout in the lid. Do not twist or crimp the antenna cable that connects it to the card. Replace the coverplate screws, securing firmly.

## Install the PC Card

The 2320 has a PC card slot that accommodates Type I and Type II PC cards, Release 1.0. PC cards are about the size of a credit card and have a 68-pin connector. The cards come in different “types,” which refer to the thickness of the card. Type I cards are 3.3 mm and Type II cards are 5.0 mm thick.

The 2320 is designed to operate with PC cards as designated by Release 1.0 of the PCMCIA standard. PCMCIA is an acronym for the Personal Computer Memory Card International Association. Release 1.0 PC cards are file-formatted cards that can be used in much the same way as diskettes and hard disks.

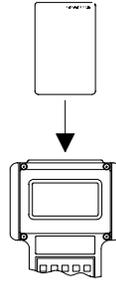
A variety of Release 1.0 PC cards are commercially available and can be used with the 2320:

- Random Access Memory (RAM)
- Flash Read-Only Memory (Flash ROM)
- Static Random Access Memory (SRAM)
- One-Time Programmable (OTP)
- Erasable Programmable Read-Only Memory (EPROM)

SRAM PC cards use a lithium battery for data retention. Refer to the instruction manual that accompanies the PC card for instructions on installing the battery and operating the write protect switch.

To use a PC card with the 2320, your development computer should have the ability to communicate with the card. Many computers already have internal PC card slots. External PC card drives are also available.

- Do not install the PC Card at this time if software on the card needs to be set up using an external PC Card drive. Instead, proceed to the section titled "Set Up and Load the Software Programs". After the software is installed on the PC Card, return to this section.
  - The PC Card may be installed first and programmed afterwards *IF* you have installed an RS232 (RJ-11) serial port module with the cable for communication between the 2320 and a computer *AND* you have a communication program available (e.g. ProComm).
1. Using the **5/64" hex wrench**, remove two screws on the top of the 2320. Place the screws and cover plate in a safe place.
  2. Attach the Pull-Out Tab (a small piece of heat resistant plastic connected to double-sided sticky tape) to the top front of the PC Card before insertion. Use the tab to manipulate the PC Card in the narrow installation area. The card is keyed so it will only go in one way -- looking at the back of the PC card the write protect switch is on the top right.
  3. Insert the PC Card (text side toward the front of the 2320) as shown in the following diagram. Seat the card over the pin receivers and gently push into place. When seated properly, the top of the PC card is just below the level of the coverplate.



**Figure 19 - Insert PC Card**

4. If you have not already done so, install the Radio Card.
5. Replace the coverplate by sliding it sideways, seating the radio antenna in the coverplate by the lower groove in the antenna against the antenna cutout in the lid. Do not twist or crimp the antenna cable that connects it to the card. Replace the coverplate screws, securing firmly.

## Optional Hand Strap

The hand strap is attached to each side of the 2320 below the LCD screen.

1. Using the **3/32" hex wrench**, remove two screws below the LCD.
2. Do not remove the modules on either side of the 2320. Before completely removing each screw, hold your finger over the small hex nut on the back of the unit that secures the hex screw. When they are removed carefully place them in a safe place.
3. Place the hand strap loops on the front of the unit over the screw openings. Thread the hex screw through the loop, replace the hex screw and nut in the 2320 and fasten securely.

## Install Battery

The 2320 is designed to use a camcorder-style battery. This gives significant power to the unit and allows you flexibility in choosing the exact size of battery you want to use with the 2320. The 2320 uses a 1200 mAh, 6-volt nickel-cadmium (Nicad) battery.

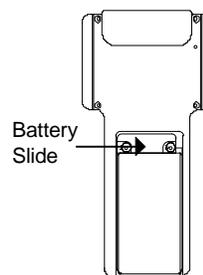
The 2320's rate of power consumption depends upon which modules are being used. Roughly, a fully charged 1200 milliampere-hour nickel-cadmium battery will power a 2320 with a laser scan module for approximately six to eight hours. Other modules consume less power and give correspondingly longer usage times. The combination of two modules can also affect power consumption. A fully charged battery will power a 2320 for eight hours for most applications.

The battery charger is designed to provide optimum battery performance. Refer to the *Getting the Most from Your Batteries* manual included with the battery charger for information on the use and operation of the battery charger.

Always use a fully charged battery or the *customer-provided* AC Adapter.

*Note: New Nicad batteries must be fully discharged then recharged. Nicad batteries run for the amount of time they were on the charger.*

1. Press and hold the battery slide to the right to release a used battery, if any. Tip the battery out of the battery compartment.



**Figure 20 - 2320 Battery Compartment**

2. Orient the charged battery so that the positive and negative contacts on the battery are aligned with the metal contacts in the lower portion of the 2320 battery compartment.
3. Hold the battery slide to the right. Fit the battery into the battery compartment using the tab cutouts in the top and bottom of the compartment.
4. Release the battery slide to secure the battery.

Your 2320 is now ready to use.

Turn on the 2320 terminal by pressing the <f> and <Ent> keys on the keyboard at the same time or, if you have a laser module, press the trigger.

## Set Up and Load the Software Programs

If possible, use the *customer-provided* AC Adapter as the 2320 power source for this section's activities. Install a fully charged Nicad battery prior to 2320 wireless roaming activities.

---

### Software Configuration

---

#### DOS

DOS is an acronym for Disk Operating System.

DOS runs programs, manages files, controls information processing, directs input and output, and performs many other related functions.

---

#### ROM-DOS

ROM-DOS is an operating system which can be embedded in ROM (Read-Only Memory) and can run entirely from within ROM. ROM-DOS is functionally equivalent to other brands of DOS, and can run programs that are executable in standard (RAM) DOS. With ROM-DOS, the executable program may reside in RAM or may be placed in ROM along with ROM-DOS.

ROM-DOS is installed in the 2320's 256Kb flash ROM.

---

#### Computer Memory: RAM, ROM, PC Card

The 2320 has internal memory of 256Kb of flash ROM and 1Mb of RAM. The combination of ROM and RAM memory allows the unit to run DOS. In fact, several DOS 5.0 files are installed in the flash ROM. With DOS 5.0 installed in ROM, the 2320 is a small computer.

Additional memory is available for the 2320 by using PC cards. The ROM is configured as Drive A and the PC card is configured as Drive B. The 1Mb of internal RAM has 256Kb of memory partitioned off to be used as Drive C. The remaining memory is used to run DOS and application software.

LXE strongly recommends using a PC card with your 2320 because the card will protect your data when the terminal is powered off.

If you do not use a PC card you will need an RS232 (RJ-11) serial port module for communication between the 2320 and the computer. The data is stored in the 2320 in Drive C. Drive C consists of a 256Kb portion of the 1Mb internal RAM. Drive C is volatile memory, and the data in Drive C is cleared each time the 2320 is turned off or when the 2320's battery is removed.



**WARNING :** *You must transfer the data from the 2320's Drive C before turning it off or removing the battery. Data stored in Drive C will be lost.*



**WARNING :** *Static electricity can adversely affect the performance and integrity of file contents in the 2320.*

*Note: Date and time is not saved during the 2320 power down process.*

---

## Files Delivered With the 2320

When you order a 2320 you will receive an SRAM card or diskette containing the COMMANDS directory files, BIN directory files, and OmniNet/ISA radio driver in the DRIVERS directory. You will also receive the FTP kernel if you order the FTP stack.

If ordered, you receive the 2320 C Developer's Kit which is the LXE supported method for developing unique applications for the 2320 that access the special features of the 2320. The applications are developed on a desktop computer then transferred to the 2320.

---

## Flash ROM Contents

The 2320's Flash ROM (2320 BIOS) is non-volatile (retains data even when power is turned off) and is upgraded or changed by LXE. It has been configured as **Drive A** and contains the following files. Descriptions of these files are in section titled "Commands and Functions".

Drive A files are sorted by function. The files that set up the system are contained in the root directory, a few DOS commands are located in the BIN subdirectory and device driver files are stored in the DRIVERS subdirectory of Drive A.

Directory	Filename	Function
Root	COMMAND.COM	A ROM-DOS file that runs programs, manages files, controls information processing, directs input and output, among other functions.
	COMMAND.HLP	ROM-DOS help
	CONFIG.SYS	Contains system configuration commands
	AUTOEXEC.BAT	Batch file consulted when system is started
BIN	CHKDSK.COM	Checks disk directories
	CLICK.EXE	Toggles the keyboard click on or off
	FMT.EXE	Formats PC card
	IFEXIST.COM	Reports existence of a file
	ISCARD.EXE	Checks to see if a PC card is present
	MEM.COM	Reports free memory
	MODE.COM	Modifies serial port settings
	MP.EXE	Allows modifying the PATH environment variable
	RECALL.COM	Recalls previously entered command lines, equivalent to DOSKEY
	SLEEP.EXE	Sets the idle time prior to sleep mode
	WRAPOFF.COM	Turns screen wraparound off
	WRAPON.COM	Turns screen wraparound on
	XFER.EXE	Performs file transfer functions and supports COM1 and COM2
DRIVERS	PSRAM.SYS	Supports accessing Drive C

*Note: The contents of the flash ROM may vary in future versions of 2320 BIOS.*

---

## COMMANDS Directory

The COMMANDS directory contains a number of functions for the 2320. It has been configured as **Drive B** and may contain the following files. Refer to section "Files and Commands".

Command	Filename	Function
ATTRIB	ATTRIB.EXE	Displays or modifies file attributes
BLINK	BLINK.EXE	Toggles the cursor blink on or off
CALIB	CALIB.EXE	Reports computer and clock speeds
CDS	CDS.COM	Changes 'secret' directory

<b>Command</b>	<b>Filename</b>	<b>Function</b>
FIND	FIND.EXE	Displays lines that contain a specified string
GETFILE	GETFILE.EXE	Prompts for filename, outputs string
HOST	HOST.EXE	This file is copied to computer hard disk
KC	KC.COM	Hex & decimal value keycode reporting utility
LABEL	LABEL.COM	Sets or deletes a disk volume label
LX	LX.EXE	Demonstrates scanning with the laser scanner and entering information at the keyboard
MAPLOW	MAPLOW.COM	Converts all keystrokes to lower case
MDS	MDS.COM	Makes 'secret' directory
MORE	MORE.EXE	Displays text file, one screen at a time
PACK	PACK.EXE	File compressor and decompressor
PRINT	PRINT.EXE	Prints a list of files
PUTENV	PUTENV.EXE	Accepts tilde for carriage return in prompt string
RDS	RDS.COM	Removes 'secret' directory
REMAP	REMAP.ASM	Remaps keyboard
REPEAT	REPEAT.EXE	Toggles the keyboard repeat on or off
SCANCODE	SCANCODE.DOC	Keyboard mapping scan codes
SERVER	SERVER.BAT	This file is copied to same directory on your computer hard drive as HOST
SORT	SORT.COM	Sorts a text file and displays the output to the screen
STUFF	STUFF.COM	Places up to 15 characters into the keyboard buffer
TABLE	TABLE.INC	Translation template table used by REMAP
TL	TL.EXE	Used for touch module mounted on left side
TR	TR.EXE	Used for touch module mounted on right side
TREE	TREE.EXE	Displays subdirectory and enclosed files
XCOPY	XCOPY.COM	Copies files from one disk to another
XSET	XSET.COM	Similar to SET command; modifies master environment

If you purchased the FTP stack and the LXE OmniNet 2320 Scout Radio Card, the following files are contained in **Drive B** in the PCTCP subdirectory:

<b>Command</b>	<b>Filename</b>	<b>Function</b>
NET	NET.CFG	Configuration file
PCTCP	PCTCP.INI	PCTCP configuration file
ODIPKT	ODIPKT.COM	Network driver file
2320ODI	2320ODI.COM	Network driver file
LSL	LSL.COM	Network connect file

## Change Files to Meet 2320 Requirements

There are certain files you need to edit when configuring your radio and FTP kernel stack to match your system configuration.

---

### Radio

The NET.CFG file enables you to modify the ODI radio driver configuration. You need to edit these files off line ensuring that the domain value matches Access Point configuration. DO NOT change the INT or PORT configuration settings.

Refer to the following *example* of a typical NET.CFG file:

```
protocol tcpip
    bind LXEISA
link support
    buffers 5 1600
LINK DRIVER LXEISA
    INT 15
    PORT 600
    DOMAIN 0
    STATION_TYPE 0
    frame ethernet_ii
    protocol ip 800 ethernet_ii
    protocol arp 806 ethernet_ii
```

Refer to the *LXE OmniNet 2320 Reference Guide* for more information on the parameters used for configuring your radio operation.

---

### FTP Kernel Stack

The AUTOEXEC.BAT file executes the files necessary for the FTP kernel stack operation. The following *example* illustrates an AUTOEXEC.BAT file for use with the FTP kernel stack.

```
PATH = a:\;a:\bin;a:\drivers;b:\;b:\commands;b:\pctcp;
set 87 = no
b:\pctcp\lsl
b:\pctcp\lxeisa
b:\pctcp\odipkt.com
set pctcp=b:\pctcp\pctcp.ini
b:\pctcp\ethdrv.exe
```

Refer to the following *example* of a PCTCP.INI file which includes the configuration file for the FTP kernel stack:

```
[pctcp general]
time-zone = EST

host-name = your_hostname
[pctcp addresses]
domain-name-server = 128.123.54.122
[pctcp kernel]
interface = ifcust 0
serial-number = your_serial_number
authentication-key = your_authentication_key
kernel-does-kns=yes
[pctcp if cust 0]
router = 123.145.51.4
ip-addresses = 123.125.51.125
subnet-mask = 255.255.255.0
```

```
[pctcp screen]
video-card = CGA
```

Refer to the *FTP User's Guide* for more information on the FTP kernel stack configuration.

---

## Power Up Files

Refer to the following *example* of a CONFIG.SYS and AUTOEXEC.BAT file (need to be in Drive A):

CONFIG.SYS File

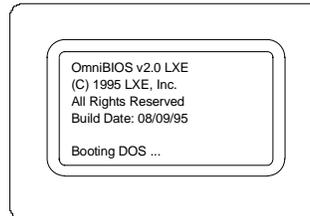
```
device=a:\drivers\psram.sys 256
newfile=b:\config.sys
break=on
files=50
shell=command.com /p /e:1024
AUTOEXEC.BAT File
```

```
@echo off
cls
\bin\recall
\bin\wrapon
set DIRSIZE=8 21
set DIRCMD=/p/c
prompt $p$g
path a:\;a:\bin;
iscard
if errorlevel 1 goto sram
echo No card inserted.
goto done
:sram
echo Card inserted.
mp -p b:\
b:
ifexist b:\autoexec.bat
if errorlevel 1 goto done
call b:\autoexec.bat
:done
```

## Power Up and Test the Unit

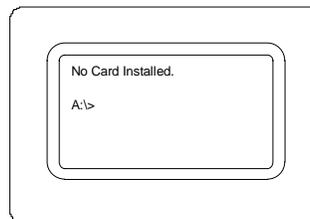
If you have not already done so, insert the battery. Turn on the 2320 terminal by pressing the  $\langle \text{>} \rangle$  and  $\langle \text{Ent} \rangle$  keys on the keyboard at the same time or, if you have a laser module, press the trigger.

The 2320 powers on, performs a self-test, and boots DOS:



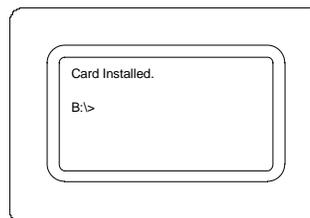
**Figure 21 - 2320 Power On**

If you are not using a PC card, the 2320 displays that there is not a card installed. The 2320 then goes to Drive A and displays the DOS prompt:



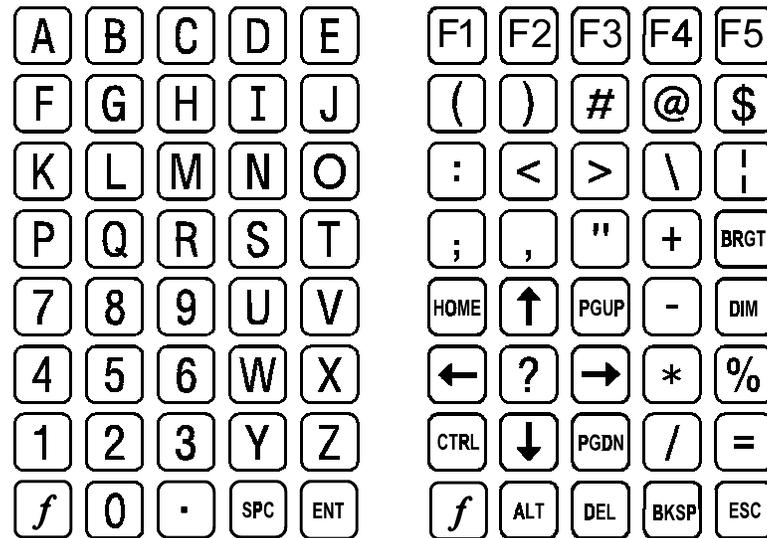
At this point you may transfer files to your 2320 by means of the serial port module.

If you are using a PC card, the 2320 locates the card, displays a message that the card is installed, and automatically goes to Drive B.



At this point the 2320 is powered up and ready to receive and/or send data.

## Key Combinations



**Figure 22 - Standard and Alternate Non-Buffered Keyboard**

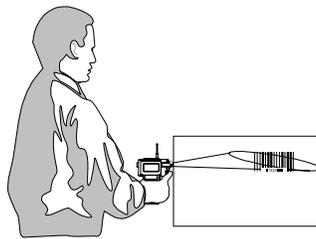
You can perform several functions on the 2320 using key combinations with the standard keyboard.

- Power On** Press the <f> key and the <Ent> key at the same time. If the barcode scanner module is installed, pressing the trigger will turn the 2320 on.
- Power Off** Press the <f>, <F>, and <J> keys at the same time.  
*Note: If the keys are held too long, the 2320 will turn back on.*
- Reset** Press the <f>, <A>, and <E> keys at the same time.
- Use <Ctrl> Character** Press and hold the <f> key and the <1> key until the 2320 emits a double beep. The double beep signifies that the next character entered will be entered as a <Ctrl> character.  
**Example:** To enter <Ctrl> C, press and hold the <f> key down, then press the <1> key until the 2320 emits a double beep. Release the <f> and <1> keys. Press the <C> key; ^C is displayed on the command line.  
*Cancel the <Ctrl> character option*  
Press the <f> key until you hear a single beep. The single beep signifies that <Ctrl> is canceled.

- Use <Alt> Character** Press and hold the <f> key and the <0> key until the 2320 emits a double beep. The double beep signifies that the next character entered will be entered as an <Alt> character.
- Cancel the <Alt> character option*
- Press the <f> key until you hear a single beep. The single beep signifies that <Alt> is canceled.
- Brighten Display** Hold down the <f> key and repeatedly press the <T> key. A tone will be emitted for each brighter setting. A higher, shorter tone will be emitted when the display is as bright as possible.
- Dim Display** Hold down the <f> key and repeatedly press the <V> key. A tone will be emitted for each dimmer setting. A higher, shorter tone will be emitted when the display is as dim as possible.

## Scanning

To scan with the laser bar code module, point the laser head towards a bar code and hold down the trigger button located under the laser.



**Figure 23 Scan A Bar Code**

You will see a red laser beam. Align the red beam so that the bar code is centered within the beam.

The laser beam must cross the entire bar code. Move the 2320 towards or away from the bar code so that the bar code takes up approximately two-thirds the width of the beam.

The front LED (Laser On Indicator) on the top of the laser bar code module will light, indicating laser emission when the laser beam is being emitted.

Following a good read, the back LED (Good Read Indicator) will flash to provide a visual indication of a successful scan. The 2320 will also beep to indicate a good read.

The laser automatically turns off after a successful read and is ready to scan again when the trigger is pressed.

*Note: The scan, beep, LED indicators, and automatic turn-off are controlled through programs written using the 2320 C Developer's Kit.*

## Commands and Functions

The 2320 operating system is compatible with DOS 5.0 commands and files. This section contains further description of the files delivered with the 2320.

---

### ATTRIB

The ATTRIB command either displays or modifies the attribute of a file.

#### Syntax

```
ATTRIB [+ | -] [option] [filespec]
```

The ATTRIB command modifies file attributes if modify commands are given to ATTRIB.

Option	Description
+/-	Add (+) or remove (-) attribute
A	Archive attribute
C	Clear all attributes
H	Hidden attribute
R	Read-only attribute
S	System attribute

If no modify commands are found by ATTRIB, then the files are displayed along with the file names.

---

### BLINK

BLINK toggles the cursor blink on or off.

#### Syntax

```
BLINK [ON|OFF]
```

---

### BREAK

The BREAK command stops certain batch and program operations when you press the <Ctrl> and <C> keys at the same time.

#### Syntax

```
BREAK [ON|OFF]
```

---

### BUFFERS

ROM-DOS has internal buffers to temporarily hold data read from the disk. Increasing the number of internal buffers speeds system performance.

#### Syntax

```
BUFFERS = number
```

## CALIB

CALIB reports computer and clock speeds.

### Syntax

```
CALIB
```

---

## CALL

The CALL subcommand invokes execution of a secondary batch file without exiting the primary batch file. Control is returned to the primary batch file when the secondary batch file is finished executing.

### Syntax

```
CALL batchfile [batchfile arguments]
```

Parameters for the secondary batch file may also be included, if appropriate.

---

## CDS

CDS is a utility that enables you to change a directory. This utility is closely related to two other utilities: MDS and RDS. These three utilities allow you to change, make, or remove 'secret' directories. They work like their 'non-secret' DOS counterparts: CD, MD, and RD except that they take no DOS arguments. DOS allows you to create files with hidden attributes, but not directories.

### Syntax

```
CDS
```

---

## CHKDSK

The CHKDSK command checks the disk directories and File Allocation Table and displays a disk and memory report.

### Syntax

```
CHKDSK [d:][/F][/V] [filespec]
```

### Options

**/F** fixes errors on the disk if any are found. The errors that can be found are directory or FAT errors. If the **/F** is not specified, then CHKDSK acts as if it is fixing the disk, but the corrections are not written out to the disk.

**/V** displays each path and file as it is processed.

---

## CLICK

CLICK toggles the keyboard click on or off.

### Syntax

```
CLICK [ON|OFF]
```

---

## CLS

The CLS command clears the monitor to display a blank screen.

### Syntax

```
CLS
```

---

## COMMAND

This command starts a new command processor.

### Syntax

```
COMMAND [/option][commandstring]
```

This command starts a new copy of the ROM-DOS command processor. The command processor is the program that has all the internal DOS commands in it. Starting a new command processor also produces a new environment. The size of the environment is 128 bytes by default.

### Options

**/C** causes COMMAND to execute a command in the string and then terminate. The string command can be any internal or external command.

**/P** causes COMMAND not to exit. The **/P** switch is used when COMMAND is used in a CONFIG.SYS SHELL statement.

---

## CONFIG.SYS

Certain standard settings for your system's operation can be stored in a file called CONFIG.SYS. The CONFIG.SYS file must be placed in the root directory of the drive that is used for system boot-up. Items in the file may be listed in any order.

*Note: If a CONFIG.SYS file is found on either Drive B or Drive C, it is executed using the newfile command. Control is not returned to Drive A's CONFIG.SYS file; therefore, the remaining command lines are ignored. You must provide for the lines in your own CONFIG.SYS file.*

DOS commands that you can include in the CONFIG.SYS file: BREAK, BUFFERS, DEVICE, FCBS, FILES, INSTALL, LASTDRIVE, REM, SHELL.

## FIND

The FIND command is a filter to display only lines that contain a specified *string*. The input to FIND may come from a file, or it may be piped in from another filter or a DOS command.

### Syntax

```
FIND [/option] string [filename] [/option]
```

### Options

/C causes FIND to display the count of lines found with the specified *string*.

/N causes FIND to display the line number of the line found containing the *string*.

/V causes FIND to display the lines that do not contain the *string*.

/I ignores the case of characters when searching for the *string*.

---

## FMT

FMT allows the 2320 to format a Release 1.0 PC card. You are given a choice of card memory sizes, followed by a warning that all data in the card will be destroyed. Enter a **Y** to format the card; enter any other key to return to the DOS prompt without formatting the card. Use FMT with caution as it will delete all of the files on the PC card.

### Syntax

```
FMT
```

---

## GETFILE

GETFILE prompts you (usually from within a batch file) for a file name and outputs the string "FNAME=[whatever you typed]". This string can be piped into the XSET command to place the whole thing in the environment.

---

## GOTO

The GOTO subcommand transfers control to another line of the batch file.

### Syntax

```
GOTO [:]label
```

The *label* is another line in the batch file consisting of a string up to eight characters long. The string may be preceded by a colon (:). The label may be an environment variable. If the specified *:label* is not found, then the batch file terminates with the error message: **Label not found**.

---

## IFEXIST

IFEXIST reports the existence of a file. It is used in the 2320's AUTOEXEC.BAT file.

### Syntax

```
IFEXIST
```

---

---

## ISCARD

ISCARD checks to see if a PC card is present. It is used in the 2320's AUTOEXEC.BAT file.

### Syntax

```
ISCARD
```

---

## KC

KC is a hex & decimal value keycode reporting utility.

### Syntax

```
KC
```

---

## LABEL

The LABEL command sets or deletes a disk volume label.

### Syntax

```
LABEL [d:]
```

The volume label may be up to 11 characters in length. LABEL only uses the first 11 characters of a volume label that is more than 11 characters long. The characters that are usable in a volume label are the same as used for a file name.

---

## LX

The LX program demonstrates scanning with the laser scanner and entry of information on the keyboard.

### Syntax

```
LX
```

The entries from either source are stored in the DATA file. The DATA file is cleared every time the program starts. The DATA file closes after every entry ensuring that the data is saved even if you exit the program without pressing the <ESC> key. The DATA file can be sent out the serial port to a printer with the DOS copy command. Keyboard entries cannot be made until F3 is entered.

---

## MDS

MDS is a utility that enables you to make a directory. This utility is closely related to two other utilities: CDS and RDS. These three utilities allow you to change, make, or remove 'secret' directories. They work like their 'non-secret' DOS counterparts: CD, MD, and RD except that they take no DOS arguments. DOS allows you to create files with hidden attributes, but not directories.

### Syntax

```
MDS
```

## MEM

MEM reports free memory in bytes.

### Syntax

```
MEM
```

## MODE

The MODE command modifies the operation of the printer and serial port.

### Syntax

```
MODE LPT#[ : ]=COM#[ : ]
```

or

```
MODE COM#:baud[ ,parity[ ,databits[ ,stopbits[ ,P]]]
```

The first format above causes the output sent to the specified line printer (P - printer port) to be redirected to the serial port.

The second format above changes the operation of the specified communications port. The following options can be modified:

MODE for the 2320<sup>3</sup> supports the following:

COM port	1, 2 Default=1
Baud rate	1200, 2400, 4800, 9600
Parity	N (none), E (even), O (odd) Default=E
Data Bits	7, 8 Default=7
Stop Bits	1

*Note: The right module connector on the 2320 is COM1 and the left module connector is COM2.*

Invalid values for any of the options are flagged with an error message. Using the “P” option as the last argument causes output to be sent repeatedly to the printer port until it is successfully received. Without the “P,” output is sent only once, causing a critical error if unsuccessful.

*Note: A serial port should be initialized before an LPT device is redirected to it.*

## O'Neil Printer

The 2320 communicates with the O'Neil Printer through the IR (infra-red) module. Use the O'Neil configuration software diskette to configure the printer. Setup the necessary parameters according to your needs. Refer to the O'Neil *User and Technical Guide* for more information. If you have any questions, call your O'Neil representative.

*Note: You must place the IR receiving printer within three feet (line of sight) of the 2320's IR module.*

<sup>3</sup> The 2320 MODE command accepts only N,8,1; O,7,1; or E,7,1.

---

## MORE

The MORE command displays a text file one screen at a time.

### Syntax

```
MORE [filename]
```

```
<command> | MORE
```

Option	Description
B	Display the last full page shown
<Enter>	Display just one more line
T	Display starting at the top of the file
Spacebar	Display the next full page of text
Q	Quit MORE

---

## MP

MP allows modifying the PATH environment variable. It is used in the 2320's AUTOEXEC.BAT file.

### Syntax

```
MP [-{p|a} newpathnode | -r oldpathnode [newpathnode] ]*
```

MP modifies the working path for MS DOS environments by prepending (“-p”) or appending (“-a”) a new path node to an existing path environment or by replacing (“-r”) an old path node (“oldpathnode”) with a new path node (“newpathnode”) within the existing path.

For the -r switch, the field specifying “newpathnode” can be empty, thus deleting “oldpathnode” from the search path entirely. Since switches are processed in the order entered, a -r followed by a -p or -a can be used to move a node from the interior of a PATH list to the beginning or end of that list.

The path node names are case sensitive!

This program operates on the parent process environment, thus eliminating the requirement to use a batch file or enter a complete new path specification to make minor modifications to the working path.

---

## PACK

PACK is a small and fast LZW file compressor and decompressor. It reduces the size of most files by 50% or more and is useful for greatly reducing file transfer times over the serial port. The larger the file the better the compression.

### Syntax

```
>PACK infile outfile [/p] [/u] [/q]
```

### Options

/p = pack infile to outfile

/u = unpack infile to outfile

/q = quiet mode (no sign-on banner)

## PRINT

The PRINT command prints a list of files.

### Syntax

```
PRINT [/d:] [filename] [/options]
```

PRINT allows you to enter between 1 and 32 files for spooling to the printer. The files are output to the device in a spooled manner while the user performs other operations. If PRINT is entered without any parameters it displays all the files that are in the queue.

### Options

**/B** allows the user to set the buffer size. The default buffer size is 512 bytes. A larger buffer size causes PRINT to operate faster. The maximum buffer size is 32Kb and the minimum size is 256 bytes. This option is only allowed the first time PRINT is run.

**/C** cancels the file names listed after the **/C** command.

**/F** allows the user to set the maximum number of files to be queued up at one time. The default number of files is 10. The minimum is 2 and the maximum is 32.

Support for more files is often useful when using wild cards in file names. This option is only allowed the first time PRINT is run.

**/P** causes all files listed after this option to be submitted for printing. This is the default for filenames encountered on the PRINT command line.

**/T** cancels all the files from the print queue (list). Think of this as a terminator.

The **/H** option displays the help screen.

---

## PSRAM

The PSRAM device driver provides support for accessing Drive C in upper memory.

### Syntax

```
device = [d:] [path] PSRAM.SYS
```

"Device = PSRAM.SYS" installs the PSRAM device driver. Once this driver is installed, calls for the PSRAM are legal. The PSRAM driver will fail to load if the machine does not have enough memory for PSRAM or if the machine does not provide support for it.

---

## PUTENV

PUTENV is for use with the external XSET command. It accepts a prompt string and the name of an environment variable, then waits for user input. Once the user presses <Enter>, it builds the argument list for the XSET command and must have its output piped to XSET.

### Syntax

```
PUTENV [stdout] [stdin]
```

Arguments to the PUTENV command or any DOS command that accepts strings must be enclosed in double quotes if it contains the space character. The above command prints the prompt “This prompt has spaces.” (minus the quotes), waits for input, then sends the string “So does this ENV variable Name.=[whatever was typed]” (again without quotes) to the XSET command, which places it in the master environment.

You can embed a tilde character (~) in the prompt string to represent <CRLF>, which enables you to create multi-line prompts.

---

## RDS

RDS is a utility that enables you to remove a directory. This utility is closely related to two other utilities: CDS and RDS. These three utilities allow you to change, make, or remove ‘secret’ directories. They work like their ‘non-secret’ DOS counterparts: CD, MD, and RD except that they take no DOS arguments. DOS allows you to create files with hidden attributes, but not directories.

### Syntax

```
RDS
```

---

## RECALL

RECALL is a program equivalent of DOSKEY. RECALL is automatically installed during startup of the 2320.

RECALL takes two optional arguments on the command line:

- the number of bytes (256 - 32767) to use for history storage for COMMAND
- the number of bytes (256 - 32767) to use for other programs

If only one argument is given, it is taken as the number of bytes for COMMAND. If an argument is missing, the minimum, 256, is used. If a number less than 256 is given, it is treated as 256. If a number larger than 32767 is given, it is treated as 32767.

The history buffer is circular; i.e., when space is exhausted, the oldest commands are deleted. The sum of the two arguments should not be greater than about 55000 (usually a much smaller sum is appropriate).

A value of 1000-2000 is generally appropriate for the first argument. A much smaller value is usually adequate for the second argument. The default of 256 bytes is generally adequate.

*Note: Use the CLS command frequently to move the prompt to row 1, column 1 on the 2320 LCD screen. When using WRAPON, pressing the up arrow retrieves the entire string. When using WRAPOFF, pressing the up arrow retrieves 20 characters.*

Entering commands with RECALL is similar to doing so in the standard command processor but there are numerous additional editing options:

Key	Description
-----	-------------

Key	Description
<Up Arrow>	Recall previous command line Repeated application gets successively earlier command arrowlines. If there is no previous command line (or it has not been kept in the history), the bell will sound. The <Ctrl> <U>, <Ctrl> <X>, and <Esc> editing commands reset the internal pointer to the end so the next up arrow gets the last command line executed again.
<Down Arrow>	Recall the next command (assuming a previous command has been recalled with up arrow and is being edited); if there is no next command, sound bell
<Left Arrow>	Go back one character
<Right Arrow>	Go forward one character
<Home>	Go to start of line
<Del>	Delete current character
<Backspace>	Delete previous character
<Ctrl> <T>	Delete to beginning of next word
<Ctrl> <W>	Delete back to beginning of word

---

## REMAP

REMAP is used to compile a terminate-and-stay-resident (TSR) program that hooks into the back end of the keyboard interrupt and remaps the scan codes received from the PIC processor according to the translation tables in TABLE.

The following two tables are provided:

**normkeytbl:** for all 'normal' key presses

**extkeytbl:** for keys pressed while the 'f' key is held down.

In order to translate a key, find its scan code in the correct table, change the value to the desired scan code, and reassemble. You can refer to any DOS or BIOS reference for a list of scan codes. SCANCODE lists the default 2320 scan codes. When indexing into the tables, only the significant byte is used; i.e., scan code 00 40 and scan code 40 00 both refer to the 40th (hex) entry in the associated table.

---

## REPEAT

REPEAT toggles the keyboard repeat on or off.

### Syntax

```
REPEAT [ON|OFF]
```

---

## SCANCODE

SCANCODE.DOC is a text file that lists the default 2320 keyboard scan codes. Refer to "REMAP" in this section for additional information.

---

## SET

The SET command sets and modifies environment variables.

### Syntax

```
SET [variable = [string]]
```

A current list of environment variables is displayed if only SET is entered.

Using SET variable = with no argument string clears the current environment string for the named variable.

---

## SLEEP

SLEEP sets the amount of idle time the 2320 waits before going into sleep mode. The BIOS default is five minutes. You can set it anywhere from one second to one hour. Setting it to zero disables sleep mode entirely.

### Syntax

```
SLEEP [# of seconds]
```

---

## SORT

The SORT filter sorts a text file and displays the output to the standard device.

### Syntax

```
SORT [/options] [filename]
```

### Options

*/+n* causes SORT to begin its alphabetical sorting starting at the n<sup>th</sup> position in the string.

*/r* causes SORT to sort in reverse alphabetical order.

---

## STUFF

STUFF stuffs up to 15 characters into the keyboard buffer. It is useful for running programs that take keyboard input when you know in advance what input to give. When used in a batch file, it can reduce the amount of typing necessary to run a program while retaining the program's input flexibility.

*Note:* STUFF does not enter the space separating the program name from the parameters. To use a carriage return as part of the string, enter a tilde (~) which will be interpreted as a carriage return (0dh).

*Note:* The 2320 has a non-buffered keyboard.

---

## TABLE

This file is a table of key assignments that is used with the REMAP.ASM file. Refer to "REMAP.ASM" in this section for more information.

## TL

TL is a simple demo program that allows a 2320, with a touch module mounted on the left, to read a Touch Memory button and report its serial number to the screen. Press <ESC> to exit the program.

### Syntax

```
TL
```

---

## TR

TR is a simple demo program that allows a 2320, with a touch module mounted on the right, to read a Touch Memory button and report its serial number to the screen. Press <ESC> to exit the program.

### Syntax

```
TR
```

---

## TREE

The TREE command displays each subdirectory and the files within them for a specified drive.

### Syntax

```
TREE [d:] [/options]
```

The [d:] specifies the drive that TREE displays the subdirectories from; this argument must be specified.

### Option

The /F switch causes TREE to display the files in each subdirectory.

---

## WRAPOFF

WRAPOFF turns screen wrap off. The screen would normally wrap at 21 characters. Use the arrow keys to view the end of lines.

### Syntax

```
WRAPOFF
```

---

## WRAPON

WRAPON turns screen wrap on. The screen wraps text to the next line at 21 characters.

### Syntax

```
WRAPON
```

---

---

## XCOPY

The XCOPY command copies multiple files and subdirectories from one directory to another.

### Syntax

```
XCOPY [source] [target] [/options]
```

The **source** and the **target** parameters are complete drive path and file specification descriptions. XCOPY assumes the default path if you do not specify a path. Wildcard “\*.\*” is assumed if a file name is not specified.

The ATTRIB command may be used to modify the archive bit for the various XCOPY options that check the archive.

### Options

**/A** copies only source files that have the archive bit set in them; the archive is not reset.

**/D<mm-dd-yy>** copies only those files with a date later than the date specified in the /D option.

**/E** creates subdirectories on the target even if they are empty.

**/M** copies only those source files that have the archive bit set. Once the source file is copied, the archive bit is reset.

**/P** prompts before each file is copied.

**/S** copies files in the subdirectories of the source directory.

**/V** verifies each write to the disk.

**/W** waits before starting to copy files.

---

## XFER

XFER performs file transfer functions and supports COM1 and COM2. COM1 is on the right side of the 2320 when you are looking at the LCD screen. COM2 is on the left side.

### Syntax

```
XFER -B<num> -C<num> -P<char> -F<string> [-R|-S]
```

Parameter	Description
-B<num>	Baud rate. Values: 1200, 2400, 4800, 9600, 19200, 38400, 57600 115200. Default: 9600
-C<num>	COM Port. Values: 1, 2. Default: 1
-P<char>	Protocol. Values: X,K,Y,G. Default: X
-F<string>	Filename. Value: maximum of 11 characters
[-R -S]	Receive (-R) or send (-S) a file

The default values are used if you do not indicate a value.

## **XSET**

The XSET command can be used in either of two forms.

### **XSET (AUTOEXEC.BAT File)**

XSET is similar to the SET command, except it modifies the master environment instead of the current copy. This means that XSET works while shelled out from other programs, where the built-in SET command fails. It may be used with GETFILE.

### **XSET (DOS Command)**

XSET, all by itself, accepts standard input and interprets it line-by-line as if you had typed each line on the XSET command line.

## Appendix B RS232 Module Cable Pinouts

*Note: The RS232 Serial Port with InfraRed Transmitter is a TRANSMIT only function. The following Module Cable Pinouts do not apply to the IR module.*

To Computer - RJ-11 to DB-9 Female Cable

RJ-11 (DCE)	Signal Name	Direction	Signal Name	DB-9 (DTE)
Pin 1	CTS	→	CTS	Pin 8
Pin 2	GND		GND	Pin 5
Pin 3	TXD	←	TXD	Pin 3
Pin 4	DTR	←	DTR	Pin 4
Pin 5	RXD	→	RXD	Pin 2

To Modem - RJ-11 to DB-25 Male Cable

RJ-11 (DCE)	Signal Name	Direction	Signal Name	DB25 (DCE)
Pin 1	CTS	→	DTR	Pin 20
Pin 2	GND		GND	Pin 7
Pin 3	TXD	←	RXD	Pin 3
Pin 4	DTR	←	CTS	Pin 5
Pin 5	RXD	→	TXD	Pin 2

To Printer - RJ-11 to DB-25 Male Cable

RJ-11 (DCE)	Signal Name	Direction	Signal Name	DB25(DTE)
Pin 1	CTS	→	CTS	Pin 5
Pin 2	GND		GND	Pin 7
Pin 3	TXD	←	RXD	Pin 2
Pin 4	DTR	←	DTR	Pin 20
Pin 5	RXD	→	TXD	Pin 3

To Computer - RJ-11 to DB-25 Female Cable

RJ-11 (DCE)	Signal Name	Direction	Signal Name	DB25 (DCE)
Pin 1	CTS	→	DTR	Pin 8
Pin 2	GND		GND	Pin 5
Pin 3	TXD	←	RXD	Pin 3
Pin 4	DTR	←	CTS	Pin 4
Pin 5	RXD	→	TXD	Pin 2

## Appendix C

### Technical Specifications

---

#### 2320 Data Terminal

<b>Physical:</b>	Rugged cast-metal case
<b>Dimensions:</b>	
<b>Length:</b>	7.9" (200 mm)
<b>Width:</b>	2.4" (61 mm) (hand grip) 3.6" (91.4 mm) (display)
<b>Depth:</b>	1.2" (30.5 mm) (maximum)
<b>Weight:</b>	19 oz
<b>Memory:</b>	Internal 1 Mb RAM and 256Kb flash ROM
<b>Storage Temperature:</b>	-4° to 122° F (-20° to 50° C)
<b>Operating Temperature:</b>	32° to 122° F (0° to 50° C)
<b>Humidity:</b>	20% - 85% non-condensing
<b>Display:</b>	Graphics supertwist LCD; 64 x 128 dot matrix; 8 lines x 21 characters
<b>Keypad:</b>	40 keys; alphanumeric
<b>PC Card Slot:</b>	Slot accommodates Type I and Type II cards (Release 1.0); supports up to 64 Mb SRAM card

---

#### PC Card

<b>Card Type:</b>	Type I and Type II (Release 1.0) compatible
<b>Dimensions:</b>	Type I: 3.4 x 2.1 x 0.1" (86 x 54 x 3.3 mm) Type II: 3.4 x 2.1 x 0.2" (86 x 54 x 5.0 mm)
<b>Weight:</b>	1.1 oz (31.2 g)
<b>Battery:</b>	Lithium
<b>Battery Life:</b>	Approximately one year
<b>Memory:</b>	SRAM: 256Kb; 1 Mb

---

#### Battery

<b>Physical:</b>	Sony-style camcorder nickel-cadmium battery with internal overload switch
<b>Nominal Voltage Rating:</b>	6 volt; 1200 mAh
<b>Operating Voltage Range:</b>	5.5 to 7 volt
<b>Storage Temperature:</b>	-4° to 122° F (-20° to 50°; C)
<b>Operating Temperature:</b>	32° to 122° F (0°; to 50° C)
<b>Battery Life:</b>	Battery rated for 1,000 charge/discharge cycles

- Sleep mode uses 2MHz.
- Unit will power off when battery is less than 5.5V.
- NiCad batteries must be fully discharged then recharged. NiCad then runs for amount of time it was on the charger.

---

## Integrated Laser Bar Code Module

<b>Physical:</b>	Cast-metal case; laser internally cushioned
<b>Dimensions:</b>	2.8 x 1.73 x 1.58" (72 x 44 x 40 mm)
<b>Weight:</b>	3.9 oz (110.6 g)
<b>Light Source:</b>	Visible laser diode operating at 670 nm $\pm$ 10 nm
<b>Scan Rate:</b>	36 ( $\pm$ 3) scans per second
<b>Optical Resolution:</b>	Element Width: min., 0.0055" (0.14 mm); max., 0.2" (5.08 mm)
<b>Bar Code Symbolologies:</b>	Code 39, Interleaved 2 of 5, Codabar, UPC, EAN, Code 128
<b>Minimum Print Contrast:</b>	25% absolute dark/light reflectance differential as measured at 675 nm
<b>Orientation Tolerance:</b>	Pitch - $\pm$ 55 $\mu$ ; min., Skew - $\pm$ 65 $\mu$ ; min., Specular Dead Zone - $\pm$ 4 $\mu$
<b>Power:</b>	5 V; 90 mA typical
<b>Scanning Range:</b>	4 to 12" optimum
<b>Storage Temperature:</b>	-40° to 140° F (-40° to 60° C)
<b>Operating Temperature:</b>	32° to 104° F (0° to 40° C)

*Note: Protection circuitry shuts down the laser when the case temperature reaches 122° F (50° C)*

---

## RS232 (RJ-11) Serial Port Module

<b>Physical:</b>	Cast-metal case; RJ-11 connector
<b>Dimensions:</b>	2.8 x 1.02 x 0.79" (72 x 26 x 20 mm)
<b>Weight:</b>	1.01 oz (28.6 g)
<b>Connection:</b>	RJ-11 telephone style (6 wire)
<b>Serial Communications:</b>	User select; up to 115.2K baud, five-wire interface

---

## IR Transmitter RS232 (RJ-11) Serial Port Module

<b>Physical:</b>	Cast-metal case; RJ-11 connector; IR transmitter
<b>Dimensions:</b>	2.8 x 1.02 x 0.79" (72 x 26 x 20 mm)
<b>Weight:</b>	1.15 oz (32.6 g)
<b>Serial Communications:</b>	User select; up to 115.2K baud, three-wire interface
<b>IR Transmitter:</b>	One-way communication; 500KHz carrier
<b>Compatible Device:</b>	O'Neil microFlash Printer
<b>Distance:</b>	Within 3 ft

---

## D-9 Module<sup>4</sup>

<b>Physical:</b>	Cast-metal case
<b>Dimensions:</b>	2.8" x 1.02" x 0.79" (72 x 26 x 20 mm)
<b>Weight:</b>	1.01 oz (28.6 g)
<b>Pin Connection:</b>	9-pin male connector

---

## Touch Memory Button Module

<b>Physical:</b>	Cast-metal case; read and write capability (requires Dallas Semiconductor's Development software)
<b>Dimensions:</b>	2.8 x 1.02 x 0.98" (72 x 26 x 20 mm)
<b>Weight:</b>	1.17 oz (33.1 g)
<b>Read Speed Tolerance:</b>	Minimum 1/20 second

---

## Touch Memory Button, Read-Only

<b>Button Type:</b>	DS1990
---------------------	--------

---

<sup>4</sup> Future Enhancement

<b>Physical:</b>	Memory chip stored inside button-shaped, water-resistant, stainless steel case
<b>Dimensions:</b>	
<b>3 mil button:</b>	0.642" diameter x 0.126" height (16.3 x 3.2 mm) 0.682" diameter mounting flange (17.3 mm) Weight: 0.057 ounces (1.6 g)
<b>5 mil button:</b>	0.642" diameter x 0.23" height (16.3 x 5.9 mm) 0.682" diameter mounting flange (17.3 mm) Weight: 0.08 ounces (2.3 g)
<b>Operating Temperature:</b>	40° to 185° F (-40° to 85° C)
<b>Battery:</b>	None
<b>Data Storage:</b>	Unique 12-character serial number (read-only)

---

### Touch Memory Button, Read/Write

<b>Button Types:</b>	DS1991, DS1992, DS1993, DS1994
<b>Physical:</b>	Nonvolatile memory chip stored inside button-shaped, water-resistant, stainless steel case
<b>Dimensions:</b>	0.642" diameter x 0.23" height (16.3 x 5.9 mm) 0.682" diameter mounting flange (17.3 mm)
<b>Weight:</b>	0.12 ounces (3.4 g)
<b>Operating Temperature:</b>	-4° to 158° F (-20° to 70° C)
<b>Battery:</b>	Lithium
<b>Data Storage:</b>	Up to 4Kb read/write memory plus unique 12-character serial number (read-only)
<b>Clock:</b>	Real-time
<b>Life Span:</b>	10 years of data retention

## Appendix D

### File Transfer Methods

#### File Transfer Methods



Instructions for installing, removing and the use of modules and PC Cards are contained in the 2320 Operator's Guide and the 2320 Reference Guide.



Also contained in the guides are names and descriptions of valid DOS commands for the 2320 operating system.

---

#### PCMCIA Card

One method of file transfer is the use of a PCMCIA Card, or PC Card. A requirement for using a PC Card with a 2320 is that the C development computer must have the ability to communicate with the card. Many computers have internal PC card drives already installed; if not, an external PC card drive connected to the computer can be used.

How to transfer files between the 2320 and a computer:

1. After removing the power source from the 2320, remove the PC Card from the 2320.
2. Insert the PC Card into the PC card drive connected to the computer (refer to the card drive manual for insertion instructions).
3. Use standard DOS commands (e.g. copy, rename, delete) to transfer files from the C development computer to the 2320 and transfer files from the 2320 to the C development computer.
4. Remove the PC Card from the computer and plug into the 2320.

---

#### Serial Port

The second method of file transfer requires the use of serial ports. To use this method, both the 2320 and the C development computer must have an available serial port. File transfer via serial port requires connecting the 2320's RS-232 (RJ-11) serial port module to the computer's serial port using an LXE RS-232 (RJ-11) serial port cable.

---

#### XFER.EXE

The file XFER.EXE is a transfer utility that is capable of using several protocols and baud rates up to 115,200. It is resident to Drive A of the 2320. This file may be used with other communications programs such as Terminal or ProComm.

The following steps describe how to use XFER:

1. Connect the serial port cable to the selected COM port on the computer and the 2320's RS-232 (RJ-11) serial port module.

2. Execute a File Transfer program such as Procomm Plus on the computer. Configure the program to select the appropriate COM port, baud rate, parity, protocol, etc.
3. Delays of several seconds after requesting a directory listing is normal. The program must calculate the free space of each directory and this takes a few seconds.
4. Enter the DOS MODE command on the 2320's keyboard:

```
MODE COM1:9600,N,8,1
```

MODE for the 2320<sup>5</sup> supports the following:

```
COM port      1, 2 Default=1
Baud rate     1200, 2400, 4800, 9600
Parity        N (none), E (even), O (odd) Default=E
Data Bits     7, 8 Default=7
Stop Bits     1
```

*Note:* The MODE command is used to establish parity, data bits and stop bits prior to running XFER.

5. Enter the XFER command on the 2320's keyboard:

```
XFER -B9600 -C1 -PX -FMYFILE.TMP -R
```

### Parameters

Parameter	Description	Default
-B<num>	Baud rate. Values: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 115200.	9600
C<num>	COM port. Values: 1, 2.	1
-P<char>	Protocol. Values: X, K, Y, G.	X
-F<string>	Filename. Value: Maximum 11 characters.	
[-R -S]	Receive (-R) or send (-S) a file.	

The XFER command requires an abbreviated notation for the larger baud specifications:

Baud Rate	Use Abbreviation
38400	-B38
57600	-B57
115200	-B115

*Suggestion:* Consider putting the XFER command line in a batch file so that the command can be run again without having to enter the parameters at the keyboard.

6. A typical message as it appears on the 2320's display during XFER:

```
Receiving: MYFILE.TMP
Length: 0
1024 bytes received
Transfer successful
```

*Note:* The value in the Length: field varies depending on the protocol that is used.

<sup>5</sup> The 2320 MODE command accepts only N,8,1; O,7,1; or E,7,1.

## Appendix E Accessories

### Manuals:

2320 Operator's Guide  
2320 C Developer's Kit  
2320 C Developer's Guide  
2320 Reference Guide  
Getting The Most From Your Batteries  
FTP Users Guide

### Equipment:

2320 RF Upgrade Kit  
2320 PCMCIA SRAM - 1MB  
2320 Module, Laser, Bar Code Reader  
2320 Module, D-9<sup>6</sup>  
2320 Module, RS232 (RJ-11) Serial Port  
2320 Module, RS232 (RJ-11) IR Serial Port  
2320 Module, Touch Memory  
2320 Module Cable, D25, Modem  
2320 Module Cable, D25, Printer  
2320 Module Cable, D25, PC  
2320 Module Cable, D9, PC  
Battery, NPSS  
Battery Charger, NPSS Single Unit  
Battery Charger, NPSS Single Unit, 240VAC  
Battery Charger, NPSS Six Unit  
Battery Analyzer  
Carrying Case  
Hand Strap  
Holster with Belt

---

<sup>6</sup> Future Enhancement



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