Tandy 3000 NL

Installation and
Operation Manual

TANDY®

SERVICE POLICY

Radio Shack's nationwide network of service facilities provides quick, convenient, and reliable repair services for all of its computer products, in most instances. Warranty service will be performed in accordance with Radio Shack's Limited Warranty. Non-warranty service will be provided at reasonable parts and labor costs.

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The FCC Wants You to Know

This equipment generates and uses radio frequency energy. If not installed and used properly, that is in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception.

It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

Warning

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

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Package Contents

Carefully unpack your Tandy® 3000NL, and be sure you have the following items:
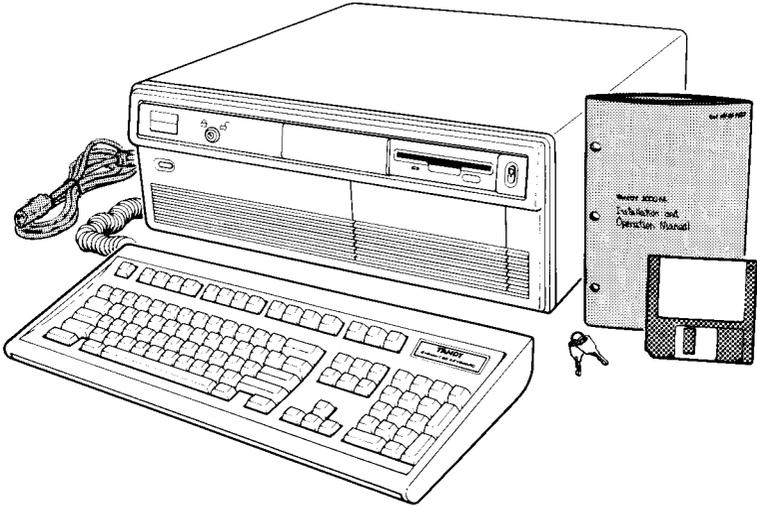
- System unit
- Keyboard
- Power cord
- Keylock keys
- Utilities Diskette (in this *Installation and Operation Manual*)
- Drive installation screw kit

Contents

Introduction

The Tandy 3000NL is one of the most versatile microcomputers available today, a high-performance PC/AT-compatible that offers the latest advances in computer technology at significantly lower prices than comparable machines. With the Tandy 3000NL, you get more power for less money.

The following lists a few of the many advanced features that are standard on the Tandy 3000NL. In addition, some of the options available for the 3000NL are noted.

Standard Features

Features	Advantages
10MHz, 16-bit 80286 Processor	Processes data 20-25% faster than the 8MHz IBM/AT
IBM PC/AT Compatible	Ensures compatibility with most software available
512K Memory	Allows quicker access to data by processing bytes of information at 10MHz
Local Memory Expansion Bus	Allows expansion of up to 8M of "high speed" 16-bit memory without using any expansion slots
3 1/2", 1.44M, Double-sided, Slim-line Diskette Drive	Provides more storage than the standard 5 1/4" floppy diskette
Built-in Parallel Port	Gives you factory-installed printer support
Built-in Serial Port	Gives you factory-installed support for serial devices

Features	Advantages
Three 8-bit Slots	For installation of AT-compatible 8-bit adapter boards
Four 16-bit Slots	Permits maximum memory and standard 16-bit adapter board installation
Real-time Clock with CMOS RAM and Battery Backup	Automatically gives current date and time each time you start up the computer
A 101-Key, Enhanced, Sculpted Keyboard	Provides industry-standard key arrangement on a smaller, desktop-saving keyboard
Keylock	Secures your system from unauthorized use

Options

Features	Advantages
128K RAM Upgrade Kit	Increases the system memory to a fully configured 640K on the main logic board
Local Memory Expansion Board (for use with the optional memory upgrade kits)	Allows high-speed memory upgrade up to 8M using 256K or 1M SIMM modules without using an expansion slot
Memory Upgrade Kits (512K and 2M)	Expands the memory capacity up to 8M using 256K or 1M SIMM modules and a local memory expansion board
2M Memory Board	Installed on the memory expansion bus for a memory upgrade up to 16M (limited by the number of available expansion slots)
Up to Two Additional 5 1/4" Internal Drives and One Additional 3 1/2" Internal Drive	Provides internal data storage flexibility for increased information processing. These drives can include: A 3 1/2", 720K diskette drive A 5 1/4", 360K diskette drive A 5 1/4", 1.2M diskette drive A 3 1/2", 1.44M diskette drive Several internal hard disk drives
One or Two External hard drives	Increases data storage using external storage devices
A Math Coprocessor	Processes numeric data faster using a 33% duty-cycle oscillator

Hardware Setup

Follow the sequence in this chapter to set up your computer for the first time.

5¼" Drive Device
3½" Drive Device
Adapter Board

AC Power Connector
Printer
Serial/RS232 Port
Keyboard
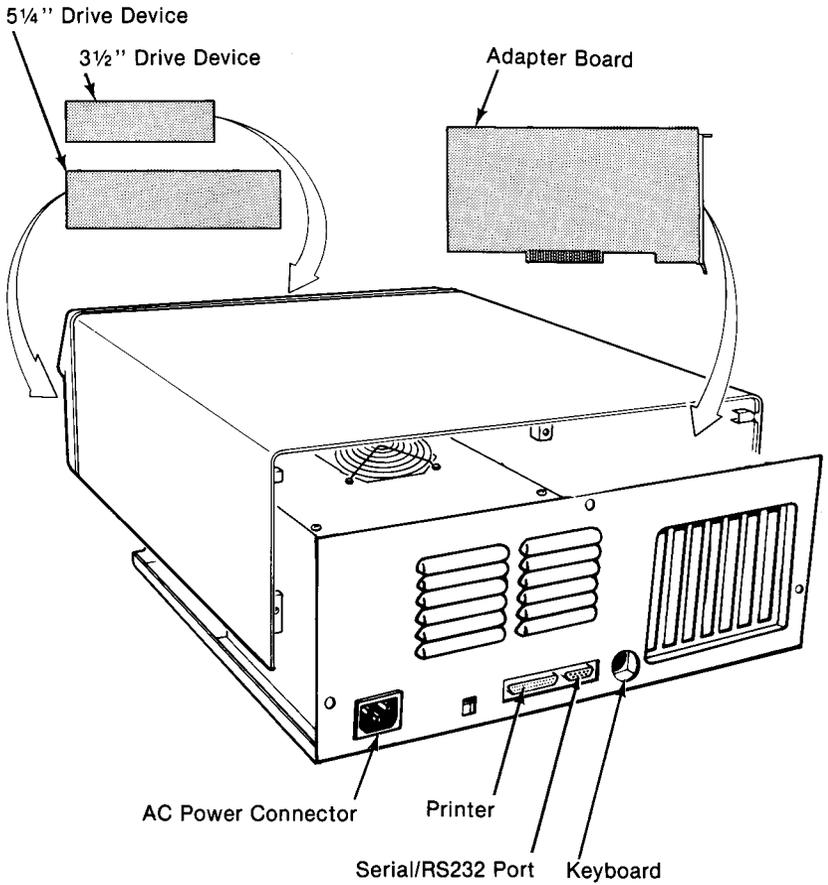
Set up your computer hardware in the following order:

1. Remove the computer cover.

2. Install optional math coprocessor and memory upgrades.

3. Install additional drives (if any).

4. Install any optional adapter cards.

5. Install the video display card.

6. Connect the battery.

7. Replace the computer cover.

8. Connect the cables.

9. Run the Setup program on your Utilities diskette.

Always consult the documentation provided with any option kit. If applicable, refer to the following illustrations of the Main Logic Board for the location of the sockets, slots, switches, and jumpers. When installing adapter cards, be sure that: (1) the card's metal slot cover is seated correctly in the rear panel slot, (2) the front end of the card fits into the corresponding plastic card slot (long cards only), and (3) the card is securely mounted in the slot connector.

Clock Speed Settings

The Tandy 3000NL has three clock speed settings for the CPU and BUS. The factory sets the CPU clock speed at 10 (fast) and the BUS clock speed at 10 (fast). Some software packages and adapter boards cannot run at the faster speeds. Use the Setup program on your Utilities diskette to change the speed of communication with the CPU and BUS. **We do not recommend that you change the CPU and BUS speeds of your Tandy 3000 NL by using the MS-DOS Mode Fast and Mode Slow commands.** See the following chart for a handy reference:

Speed Settings	CPU	BUS
Factory Setting	10	10
Fast	10	10
Medium	10	8
Slow	8	8

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Main Logic Board Illustration

Floppy Disk Connector
Parallel Printer Port
512K SIMM Connectors
Serial/RS232 Port
Keyboard Connector
16-Bit Local Memory Expansion Connectors
16-Bit Expansion Slots
8-Bit Expansion Slots

Power LED
Connector

Real-Time
Clock Adjust
Reset Switch
128K RAM Upgrade
Color Burst Adjust
Keyboard Inhibit Switch
80287 Math Coprocessor

Speaker Connector
Battery Connector
Main Power Connector
Math Coprocessor Oscillator

Jumpers Illustration

Video Monitor Type
Dip Switches
On-Board Serial Port
On-Board Parallel Port
Bios ROM Type

DRAM Bank Select

Math Coprocessor Clock Selection

Removing the Computer Cover

Cover Mounting Screws

Note: Turn off all external peripheral equipment (printer, monitor, modem, and so on).

Adding an Optional Math Coprocessor

1. Locate the coprocessor socket on the Main Logic Board illustration.

2. Snap the coprocessor chip into the socket, taking care not to bend the pins. Be sure that Pin 1 on the math coprocessor chip aligns with Pin 1 on the socket.

3. Install the 10MHz oscillator (available with Tandy 10MHz math coprocessor kit) in the oscillator socket. Be sure that Pin 1 on the oscillator aligns with Pin 1 on the socket.
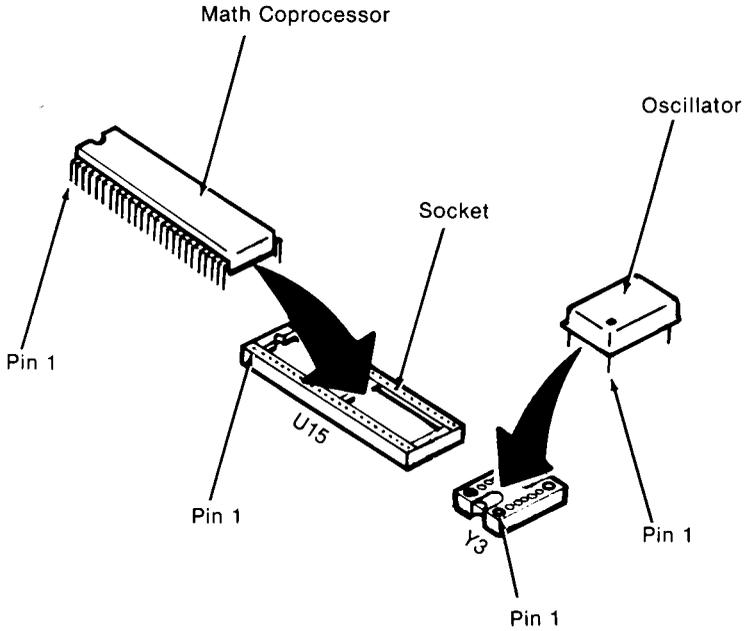
4. Make the appropriate jumper settings according to the following chart. The jumper settings for the math coprocessor clock depend on the type of coprocessor you install.

Configuration	Jumper Settings
Optional 10 MHz 80287 with 33% duty-cycle 10MHz oscillator (Effective operational clock of 10 MHz)	E2-E3 E4-E6
Optional 8 MHz 80287 with on-board clock (Effective operation-al clock of 6.7 MHz)	E1-E2 E6-E7

Installing Additional Memory

The Tandy 3000NL has a standard 512K memory (two 256K single-in-line memory modules (SIMMs)) on the Main Logic Board. There are several ways to upgrade your memory. You can add a 128K RAM kit in the RAM sockets on the Main Logic Board for a total of 640K.

In addition to adding memory to your Main Logic Board, you can add memory with a conventional memory expansion board or a special Tandy Memory Expansion Board. Please note that the conventional board will run at 8 megahertz, while the special Tandy board is designed to work with the local memory bus at 10 megahertz. Refer to the "Clock Speed Settings" and "System Configuration (Setup)" sections for CPU and BUS speeds when installing additional memory.

In addition, the special Tandy board has its own slot on the Main Logic Board and does not take up an expansion slot that could be used for other optional adapter boards.

The following illustration shows how to install RAM chips. If you are adding memory with the Tandy Expansion Board, be sure to see the next section and "Jumpers Illustration" for required jumper settings.

To install the RAM chips:
1. Note that four RAM chips fit the 18-pin sockets, and two fit the 16-pin sockets. Also, note the notch or dot at one end of each RAM chip. Align all pins in the pin sockets before inserting each chip.
2. Now, install the chips in their sockets with the notch or dot on the chip toward the front of the system unit. Be careful not to bend the pins of the RAM chips.

RAM Chips

Notch   RAM Sockets
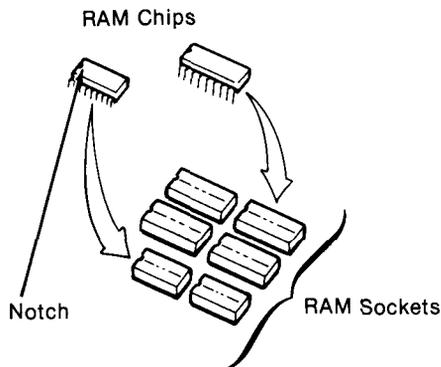
Memory Configurations

The standard 512K RAM on the Main Logic Board is designated as Bank 0. The memory expansion sockets on the Main Logic Board are designated as Bank 1. There is also a Bank 0 and Bank 1 on the optional Tandy Memory Expansion Board. Your computer can access only one Bank 0 and only one Bank 1. When you add memory with the expansion board, you must move the SIMMs from Bank 0 on the Main Logic Board to Bank 0 on the Memory Expansion Board.

The following illustration shows the location of the Banks 0-3 on the Tandy Memory Expansion Board. The chart shows all the possible memory configurations, where to add the memory (what bank), and the jumper settings necessary to tell the computer which Bank 0 and Bank 1 to use. See "Jumpers Illustration" for the location of the Jumpers on the Main Logic Board.
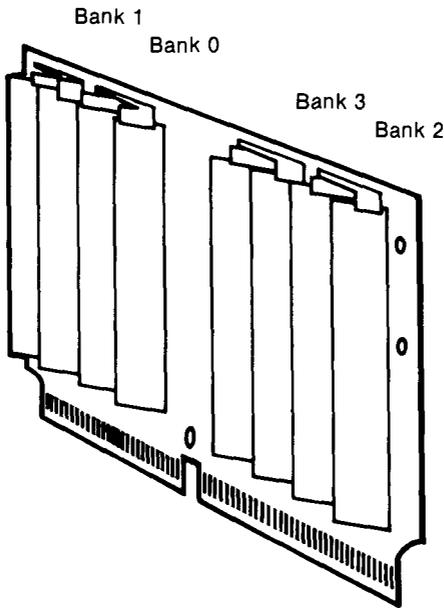
MBd = Main Logic Board
ExBd = Expansion Board

Total Memory	Bank 0 MBd ExBd	Bank 1 MBd ExBd	Bank 2 MBd ExBd	Bank 3 MBd ExBd	Jumper Settings
512K	512K —	— —	— —	— —	E23-E24 E21-E22
640K	— 512K	128K —	— —	— —	E23-E24 E21-E22
1MB	— 512K	— 512K	— —	— —	E24-E25 E20-E21
1.64MB	— 512K	128K —	— 512K	— 512K	E24-E25 E21-E22
2MB	— 512K	— 512K	— 512K	— 512K	E24-E25 E20-E21
4.64MB	— 512K	128K —	— 2MB	— 2MB	E24-E25 E21-E22
5MB	— 512K	— 512K	— 2MB	— 2MB	E24-E25 E20-E21
8MB	— 2MB	— 2MB	— 2MB	— 2MB	E24-E25 E20-E21

Installing Additional Drives

Note to hard disk owners: Note the drive type number, the number of heads and cylinders, and the hard disk media error map on the top of the drive chassis before installing the drive. Record this information on the System Worksheet (last section in this manual) before you install the drive. You will need to use the drive type number and the head and cylinder counts when you start up your system. You will need to use the head and cylinder error numbers when you format your hard disk.

If you are adding a 3 1/2-inch diskette drive or hard drive:

1. Remove the appropriate plastic panel from the front of the computer cover.
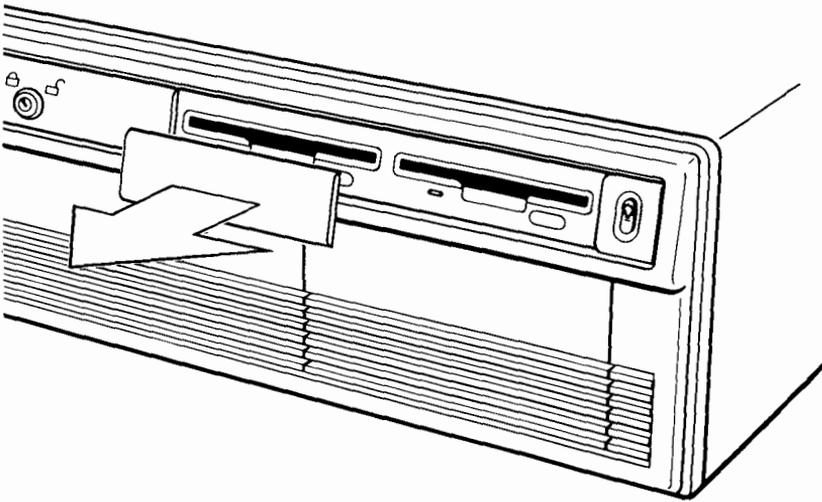
2. Consult the documentation provided with your drive to determine which set of mounting holes in the drive platform to use.

3. Locate the data cable in your computer, and attach it to the power connector of your drive.

4. Using the corresponding mounting holes selected in Step 2, mount the drive in the computer.
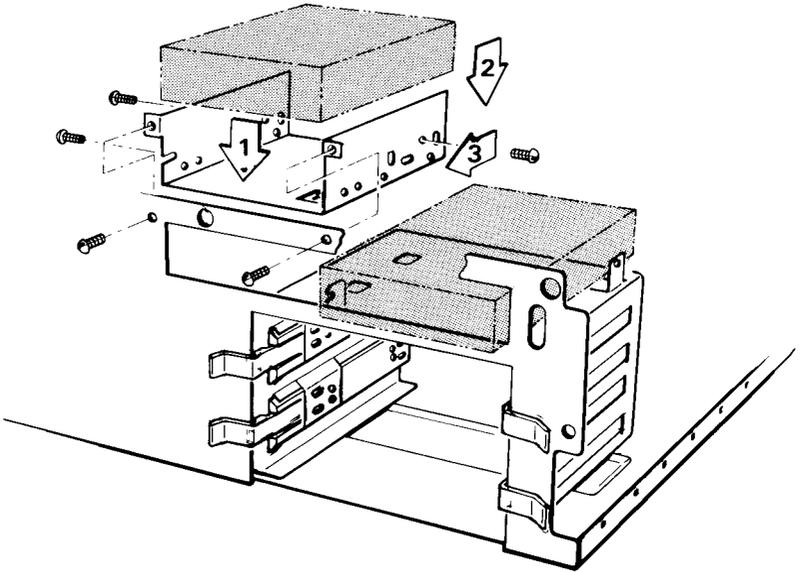
If you are adding a 5 1/4-inch diskette drive or hard drive:

1. Remove the appropriate plastic panel from the front of the computer cover.
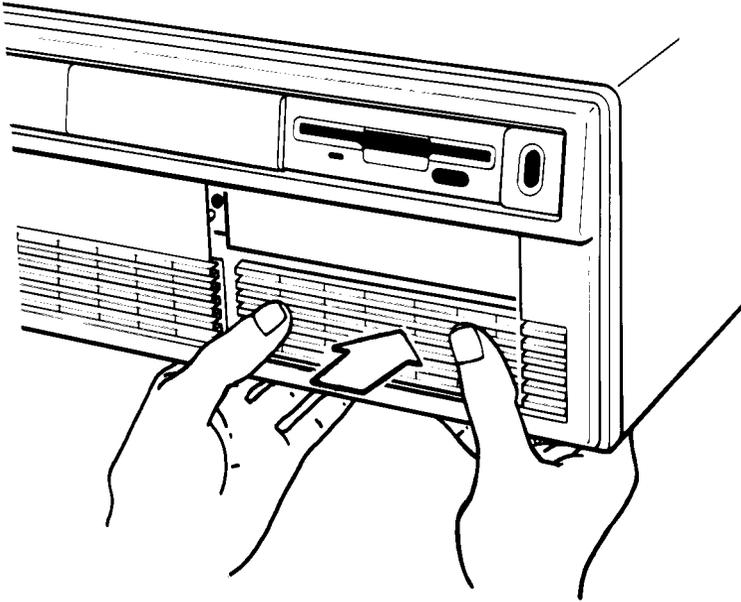
2. Remove both pairs of drive mounting rails from the inside of the drive tower by pressing them toward each other and sliding them forward out of the tower.

3. Unscrew the grounding clip from each mounting rail. Discard the screws.

4. Consult the documentation provided with your drive to determine which set of rail holes to use to mount the rails on the drive.

5. Replace the grounding clips, and attach the appropriate pair of mounting rails to your drive using screws in the drive installation screw kit (provided).

6. Locate the power connector wire in the computer, and attach it to the power connector of your drive.

Grounding Clip
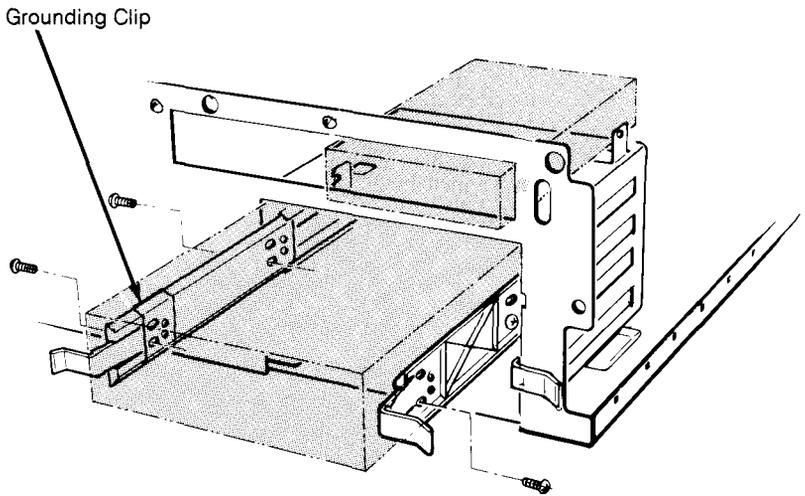
7. Locate the data cable in your computer, and attach it to the data connector of your drive.

8. Using the corresponding mounting slots located inside the drive tower, slide the drive into the computer.

Installing an Optional Adapter Board

1. Depending on the size of the adapter board you install, unscrew and remove the appropriate slot cover. Save the screw.
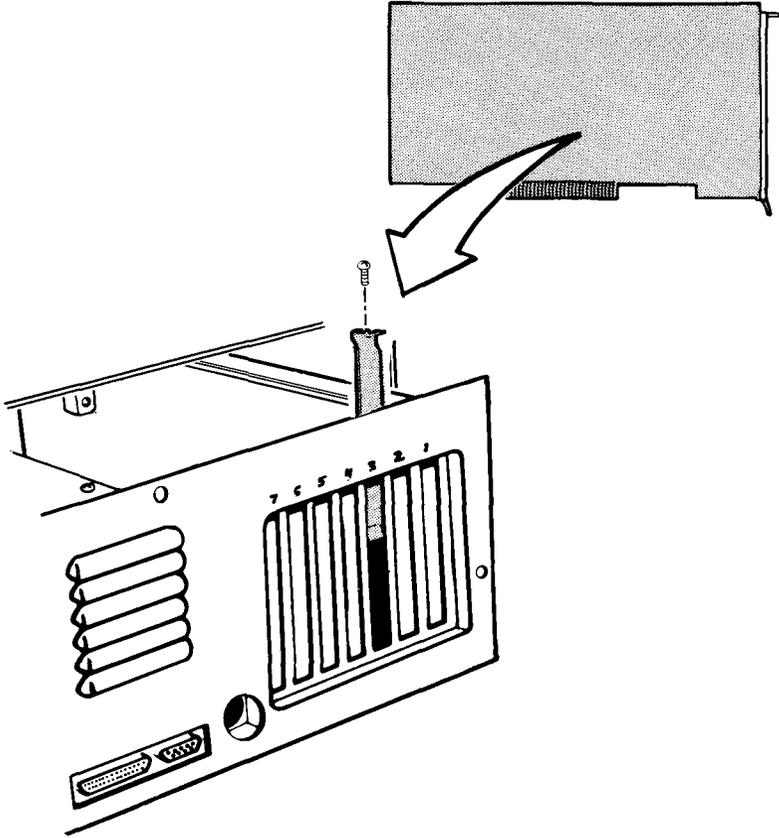
2. Hold the board by its top corners and slide it into the system unit. Be sure that the board is fully seated in the expansion slot.

3. Secure the adapter board with the retaining screw you removed in Step 1.

   Note: Refer to the "Clock Speed Settings" and "System Configuration (Setup)" sections for CPU and BUS speeds when installing additional adapter boards.

Installing the Video Display Card

Install your video display card in Slot 1, 2, or 3.
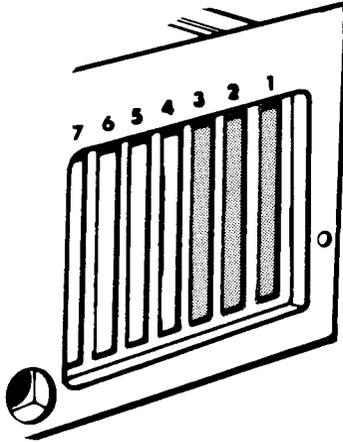
The Tandy 3000NL is set at the factory for a monochrome video display card and monitor. If you are going to install a color video display card, you must reposition a wire jumper on the computer's Main Logic Board. Refer to the Main Logic Board illustrations.
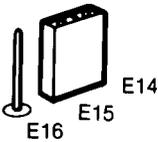
Monochrome

Jumper plugged onto
Pins E14 and E15.
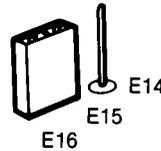
Color display

Reposition jumper onto
Pins E15 and E16.

Note: Composite color monitor/color TV users might need to adjust the color burst capacitor (C135) on the Main Logic Board. See the Main Logic Board illustration for the location of the capacitor.

Insulated Non-metallic Screwdriver

Color Burst Clock Screw
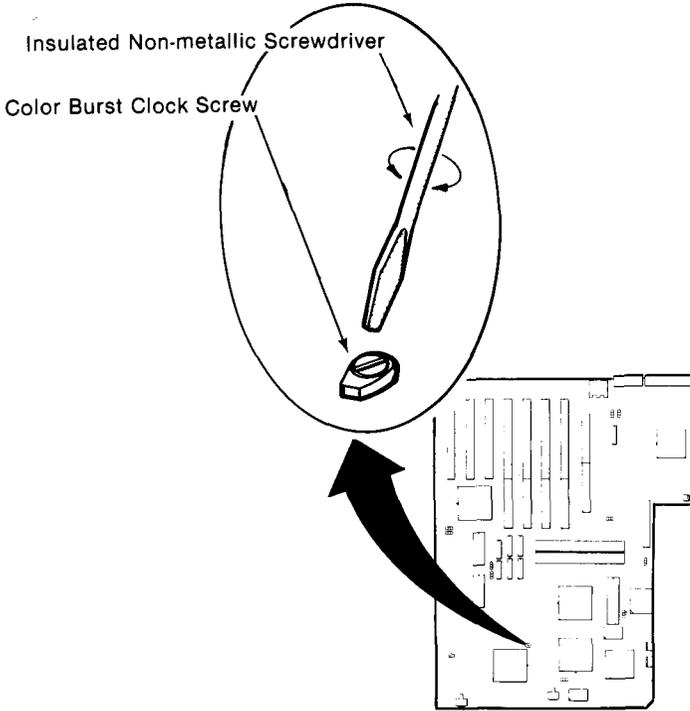
Replacing the Cover

Before you replace the cover, be sure the CMOS battery is connected properly. (Some units may have their battery disconnected to preserve their life during shipment.) See the "CMOS RAM Battery Replacement" chapter for details.

Replace the system unit cover. Connect the peripheral and power cables. Be sure the AC power outlet is grounded. Do not use an outlet that powers heavy machinery, copiers, office machines, and so on. If you must use an extension, use a grounded power strip, such as Radio Shack's Power Center (Cat. No. 26-1396).

Note: Voltage requirements vary in different countries. Be sure to read the voltage label, then set your system accordingly.

System Unit Operation

The front panel of the Tandy 3000NL has two lights, a reset button, and a keylock.
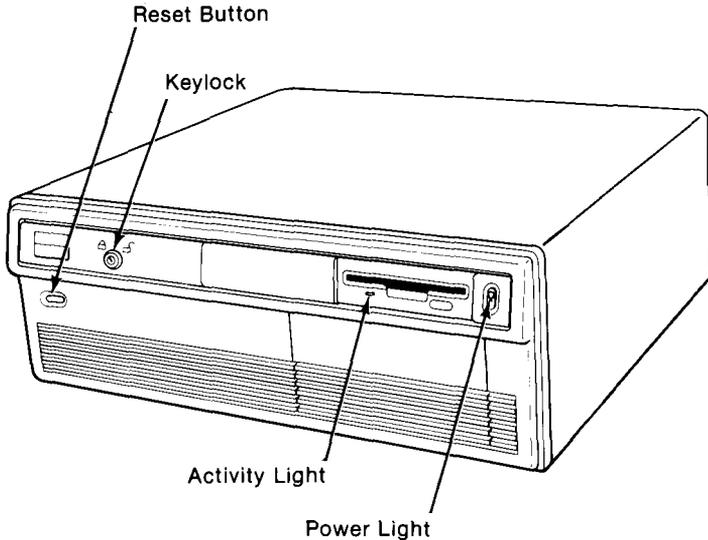
- **Power light** - Comes on whenever the system's power is on. Never move the unit when this light is on.

- **Diskette drive activity light** - Comes on whenever the diskette drive is reading from or writing to a diskette. Never remove a diskette when this light is on.

- **Reset button** - Performs a *cold-start* reset. When you press the reset button, it is as if you turned the computer off and then turned it on again.

- **Keylock** - "Locks out" keyboard entry and disables the reset button.

Note the number inscribed on the keylock key. **It is important that you take a moment to record this number on the System Worksheet.** If you ever lose your key, you will need this number to obtain a duplicate.

The Diskette Drive

1. To insert a diskette into an empty diskette drive, slide the diskette, label side up, into the drive until the diskette clicks into place.

3½" Diskette (Label up)
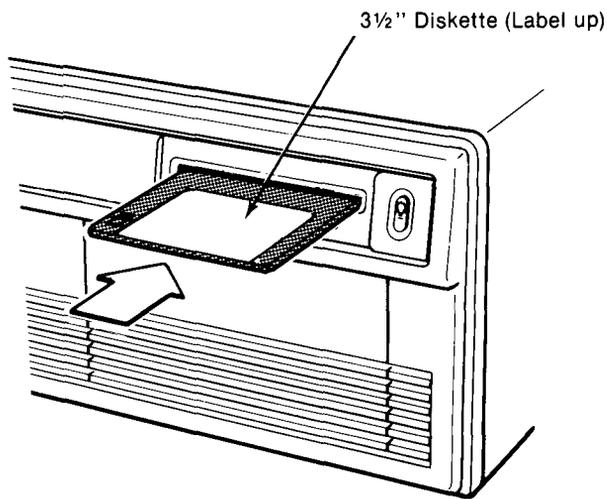
2. To remove a diskette from the drive, press the button on the front of the drive. When the diskette is partially ejected, pull it out.

    Note: If your Tandy 3000NL has an optional second diskette drive, it will be designated as your secondary drive. Your original drive is your primary drive. MS-DOS and MS-OS/2 operating systems refer to the primary drive as Drive A and the secondary drive as Drive B.

Power Switch

1. Be sure to unlock your keylock. To turn on your system, press the power switch on the right side of the computer.

    The first time you turn on the computer, a warning signal (a long beep or a series of short beeps) prompts you to run Setup. The Setup program is on your Utilities diskette. After you run Setup, the computer should sound one short beep each time you turn it on. See "System Configuration (Setup)" in the "Utilities Diskette" section of this manual.

2. To turn off the system, simply press the power switch. If you wish to lock the unit, turn the keylock to the locked position.

The Keyboard

The low-profile, enhanced, sculpted keyboard is designed for optimum ease of use. The typewriter-style keyboard has 101 keys and features auto-repeat character keys.
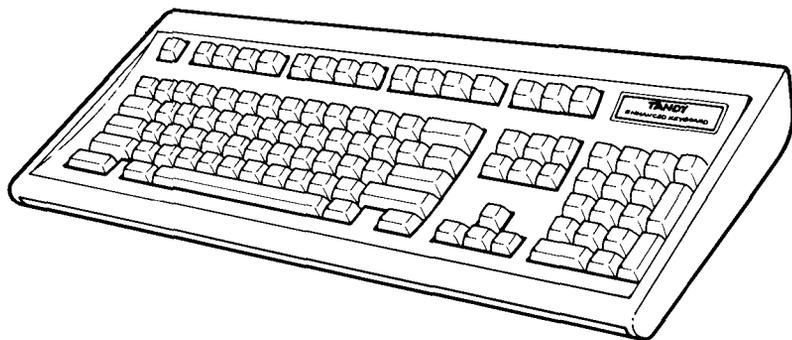
Function Keys
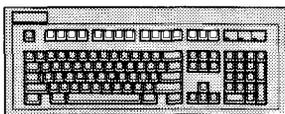
The 12 function keys are program-specific. Their functions depend on the program you are running.

Typewriter Keys
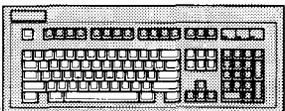
The typewriter keys are similar to a standard typewriter. Note that when you hold down a character or number key, the keystroke repeats automatically until you release the key.

Cursor Keys
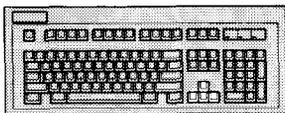
Many programs use the cursor keys to control the movement of the cursor (or highlight) on the screen.

Numeric Keys
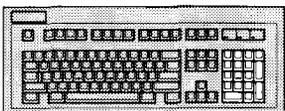
The numeric keypad is arranged the same as a calculator keypad. Number keys are normally shifted characters on the numeric keypad. (You hold down **SHIFT** and press a number.) Press **NUMLOCK** to use the keypad for extensive number entry.

Diskette Types

The type of diskette you use in a diskette drive depends on the size of the drive (3 1/2-inch or 5 1/4-inch), type of drive (high-capacity or standard), and whether or not you are writing information to the diskette. See the following chart for handy reference:

Media		Standard Drive		High-Capacity Drive	
Size	Type	Read	Write	Read	Write
3 1/2"	1.44M High-Density	No	No	Yes	Yes
3 1/2"	720K Standard	Yes	Yes	Yes	Yes
5 1/4"	1.2M High-Density	No	No	Yes	Yes
5 1/4"	360K Standard	Yes	Yes	Yes	Yes*

* This situation requires a special format on the diskette. See your *MS-DOS Handbook* for details.

A Standard 5 1/4-inch diskette that has been written to in a high-capacity drive might not be able to be read by a standard drive.

The Utilities Diskette

The Utilities diskette contains the following programs:

```
1  FORMAT DISKETTE
2  COPY DISKETTE
3  PREPARE SYSTEM FOR MOVING
4  SETUP
5  FORMAT HARD DISK
9  END UTILITIES
```

System Configuration (Setup)

The Tandy 3000NL contains a battery-powered, real-time clock CMOS RAM chip that stores drive and memory information about your system. You must set the memory of this RAM chip to your individual hardware configuration for the computer to function properly.

To record your hardware configuration into memory, use the Setup program on the Utilities diskette. You must run the Setup program each time you install or remove:

- A video display card

- An optional diskette drive

- An optional internal or external hard disk drive

- Additional memory

You also must run Setup if you want to change the system date and time or the CPU and BUS speeds.

The computer retains the hardware configuration in memory until the battery gets weak (time lapses) or you change the information with the Setup program.

To run Setup, follow these steps:

1. Turn on the computer. The following prompt appears on the screen:

>   BIOS ROM version xx.xx.xx
>   Compatibility Software (C) 198x
>   Phoenix Technologies Ltd.
>   All Rights Reserved
>   Licensed to Tandy Corp.
>   00512k Base Memory, 00000k Expansion
>   Invalid configuration information - please run
>   Setup program
>   Strike the F1 key to continue

2. Insert the Utilities diskette into Drive A.

3. Press the **F1** function key. This message appears:

>   Phoenix Technologies Ltd
>   Configuration Setup Program Ver x.x
>   (C) Copyright 198x
>   This program is used to store system configura-
>   tion information into battery backed memory in
>   your computer. It is necessary to run this
>   program when any memory, disk drives, or monitors
>   are added to or removed from your system, or to
>   set the battery maintained time or date.
>   ERRORS FOUND -
>   INCORRECT CONFIGURATION INFO
>   MEMORY SIZE MISCOMPARE
>   Press ENTER to continue...

4. Press **ENTER**. The next series of screens displays the system date and time and describes how to change them. Follow the instructions on the screen.

5. Verify the new date and time. Setup displays a screen listing the current settings for your hardware options. When asked if all the options are correct, type N and press **ENTER**.

6. Setup now displays a series of screens showing the current setting for each option. If the setting is correct, type Y and press **ENTER**. If the setting is not correct, type N, press **ENTER**, and change the setting by following the prompts.

You need to know the following information to complete the configuration:

- The type of diskette drive for Drive A and optional Drive B

- The number of optional hard disk drives

- The type of hard disk drive for optional Drives C and D

- The amount of system base memory

- The amount of expansion memory

- The primary video card

- The CPU and BUS clock speeds

Keep a current list of this hardware information on the System Worksheet at the back of the manual.

7. After you answer all prompts, Setup displays the new settings on a hardware configuration screen. At the bottom of the screen is the question:

```
Are these options correct
(Reply Y or N then <ENTER>)
?
```

If you made an incorrect selection, type N and press **ENTER** to repeat the Setup procedure. If your selections are correct, type Y. Then, press **ENTER** to record the date, time, CPU and BUS speeds, and hardware information in the CMOS memory.

8. Reboot (reset) the computer. To do this, either press the reset button, or press the **CTRL-ALT-DEL** keys simultaneously.

The copyright page appears on the screen, followed by the main menu of the Utilities diskette.

Note: If your computer has an internal or external hard disk and you have not yet formatted the hard disk, a hard disk failure error message might appear on the copyright page. Press **F1** to display the main menu.

You are now finished with the Setup procedure.

We recommend that you use the Copy Diskette utility to make a backup copy of your Utilities diskette.

If you have a standard Tandy 3000NL (one drive only), press **9** to exit the Utilities diskette. See your operating system manual(s) for instructions on how to load and use the operating system.

If you have a Tandy 3000NL with an internal or external hard disk that is factory-formatted, press **9.** Read the documentation on how to install and use the operating system. If the hard disk is not factory-formatted, read the next section for instructions on how to format the hard disk.

> **Note:** If, after you run Setup, the computer still sounds a warning signal (long beep or a series of three short beeps), and prompts you to run Setup, see the "Troubleshooting" section of this manual.

Formatting a Hard Disk

To format a hard disk, follow these steps:

1. At the Utilities diskette menu, type 5 and press **ENTER.** The following prompt appears:

   ```
   Which hard drive do you
   want to format (C/D)
   ?
   ```

2. To format the first internal hard disk drive, type C and press **ENTER.** To format a second internal or an external hard disk drive, type D and press **ENTER.**

   After you make your selection, the following warning message is displayed on the screen:

   ```
   All data on drive X will be DESTROYED!!
   Do you want to continue (Y/N)
   ?
   ```

   This warning exists to prevent you from accidentally erasing any information on your hard disk. You can proceed safely.

3. Type Y and press **ENTER**. The screen displays the following information about the disk you want to format:

```
Hard drive x is type x
Number of heads = x
Number of cylinders = x
Is this correct (Y/N)
?
```

4. If the displayed information matches your hard disk drive, type Y and press **ENTER**.

If you made an error in the Setup program, or if you have a non-standard type of hard disk, the information will not match your disk. Type N and press **ENTER**. Then, answer the prompts that follow with the correct number of heads and cylinders and the interleave factor for your hard disk drive. To correct any errors made in the Setup program, simply run Setup again to enter the correct data.

Also type N and press **ENTER** if you want to change the interleave factor from the default of 3.

After you verify or change the hard disk information, the following prompt appears:

```
Do you want to flag defective tracks (Y/N)
?
```

5. Refer to the hard disk media error map you found with the disk drive.

If the map shows no defective tracks, type N and press **ENTER**. If the map shows one or more defective tracks, type Y and press **ENTER**. The following prompt appears on the screen:

```
Enter next head, cylinder pair or press ENTER
to quit.
?
```

As an example, if your media error map lists Head 4, Cylinder 100 and Head 5, Cylinder 100 as defective, type:

```
4,100 ENTER
5,100 ENTER
```

After you enter all the defective heads and tracks noted on the media error map, press **ENTER** to begin the formatting procedure.

Do not interrupt the program while it is formatting the drive. When the format is complete, the program returns to the main menu.

You are now ready to install one or more operating systems on your hard disk drive. See your Operating System manual(s) for instructions.

Format Diskette

The Format Diskette utility divides a diskette into tracks and sectors, but does not install an operating system on the diskette.

Follow these steps to use the Format Diskette utility program:

1. To choose the Format Diskette utility, type 1. Then, press **ENTER**.
2. Answer the prompt that asks in which drive you are formatting.
3. Insert the diskette you wish to format into the drive you specified, and press **ENTER**.

   Note: Diskettes formatted with the above procedure are not necessarily usable with your operating system. It is preferable to use the Format command present in your operating system to format your diskettes. (See your operating system documentation.)

Copy Diskette

The Copy Diskette utility formats a target diskette and copies a source diskette exactly — including the operating system. The source is the diskette containing the information to copy. The target is the diskette to receive the copy.

Follow these steps to use the Copy Diskette utility program:

1. To choose the Copy Diskette utility, type 2. Then, press **ENTER**.
2. Answer the prompts to select the source and target diskette drives you wish to use.

   Note: If you have only one diskette drive, select Drive A as both the source drive and the target drive.

3. After you select the drive(s) you wish to use, insert the source and target diskettes at the appropriate prompts.

Always use the same type of diskette for both the source and target. See the following chart:

Copy Diskette Utility
Drive/Diskette Compatibility

Source Drive	Target Drive	Diskette Type
Standard	Standard	Standard
High-Capacity	Standard	Standard
High-Capacity	High-Capacity	High-Density

Use your operating system instead of the Utilities diskette if you want to make backups from one type of diskette to another. For example, use your operating system to make backups from a 5 1/4-inch diskette to a 3 1/2-inch diskette or from a high-density diskette to a standard diskette. See your operating system manuals for details.

Prepare System for Moving

Use the Prepare System For Moving utility if your system includes a hard disk drive (internal, external, or both). Normally, the hard disk drive heads are positioned over the data area of the disk media. This utility parks the hard disk drive heads away from the data area. This reduces the chance of disk damage or data loss while moving the computer.

Follow these steps to use the Prepare System For Moving utility program:

1. Type 3 at the SELECT THE ACTION DESIRED prompt. Press **ENTER.**
2. Wait for the TURN SYSTEM OFF prompt. Then, turn off the computer.

When you turn on the system again, the heads automatically return to an active position, and the hard disk drive is operational.

End Utilities

Press **9** at the Utilities diskette menu to exit the Utilities diskette. The system then prompts:

```
PREPARE SYSTEM FOR DESIRED OPERATION
AND PRESS "ENTER"
?
```

Remove the Utilities diskette from the disk drive. Press **ENTER** to boot the system to use the operating system. Check your operating system documentation for the procedures required to install your operating system.

MS-DOS User Notes

For your convenience, you can copy the hardware configuration program, Setupnl, and a speed setting program, Speednl, from the Utilities diskette to your operating system diskette or hard disk. This feature enables you to change the hardware configuration information and the speed settings of the CPU and BUS without restarting the computer and inserting the Utilities diskette.

Use the MS-DOS Copy command to copy these programs. For example, to copy Setupnl to a hard disk, type:

copy a:setupnl.com c:. Then, press **ENTER**.

Using Setupnl

Simply type **setupnl**, and then press **ENTER**. After you enter the hardware information, be sure to *reboot* (reset) the computer. The new configuration is recorded into memory until you run the program again.

Using Speednl

To change speeds, exit any application program and return to the MS-DOS system prompt. Type **speednl x, y** where x is the speed you want for your CPU and y is the speed you want for the BUS. For example, to change your speed settings to the medium speed, type;

speednl 10,8. Then, press **ENTER**.

The speeds of the CPU and BUS change immediately. Once you reset or turn your system off, then turn it on again, the speed settings will default to the current settings designated in Setup. For further information, refer to the "Clock Speed Settings" in the "Hardware Setup" section of this manual.

CMOS RAM Battery Removal and Replacement

With normal system use, the battery that powers the Tandy 3000NL CMOS chip should last at least three years before you need to replace it.

> **Note:** If you are storing the computer for long periods of time, you can extend the life of the battery by unplugging it from the main board until you are ready to use the computer again.

If the battery ever fails and the CMOS memory is erased, the following prompt is displayed when you turn on the computer:

```
Invalid configuration information - please run
Setup program
Strike the F1 key to continue
```

Insert the Utilities diskette, and follow the instructions in "System Configuration (Setup)" in the "Utilities Diskette" section of this manual.

> **Note:** If you have a battery problem that cannot be immediately corrected, you can still use the computer by running the Setup program each time you turn on the computer.

To remove and replace the battery:

1. Remove the system unit cover.
2. Locate the battery.
3. Follow the wires from the battery to the connector on the Main Logic Board. (The connector location is J3. It is labeled BATT.)

4. Remove the lock-type connector from the Main Logic Board by pushing the lock-lip away from the internal drive and, at the same time, lifting the connector.

Velcro Strip

Battery

Lock-type Connector
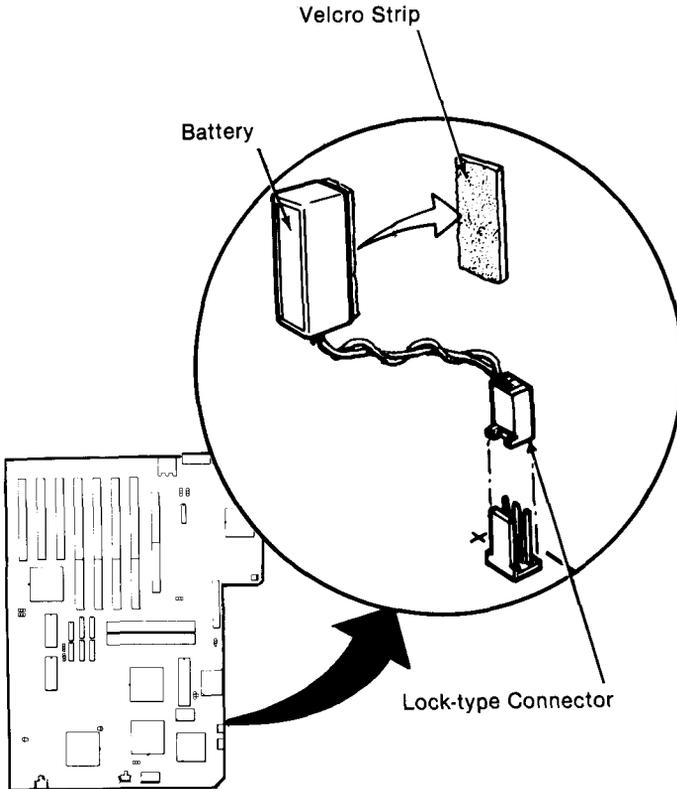
5. Be careful when disposing of this battery!

   Warning: Improper handling of this special lithium battery can cause a fire, explosion, or severe burns. Never recharge, disassemble, or heat the battery above 100°C (212°F). Never solder directly to the battery, or expose the contents of the battery to water.

6. Insert the new battery's connector at the J3 location on the Main Logic Board.

7. Attach the new battery to the Velcro strip on the side of the drive tower.

8. Replace the system unit cover.

Troubleshooting

Problem...	Check That...
Blank Screen	• System cords are solidly plugged in.
	• Monitor is turned on.
	• Monitor brightness and/or color is adjusted.
	• Power switch is turned on.
	• All jumpers or switches are set correctly.
No Keyboard Action	• Keyboard cord is solidly plugged in.
	• Power switch is turned on.
	• Keylock is unlocked.
Setup (Computer still sounds a warning and prompts you to run Setup when you turn it on.)	• System cords are solidly plugged in.
	• Peripheral cards are properly seated.
	• All jumpers or switches are set correctly.
	• Hardware information when running the Setup program is correct.

Problem...	Check That...
Option Not Working	• Option card is properly seated. • System cords are solidly plugged in. • All jumpers or switches are set correctly. • Setup program is executed after installation. • Hardware information when running the Setup program is correct. • CPU and BUS clock speeds are set correctly.

Specifications

System Unit

Processor   Intel 80286, 10 megahertz

Size

    Length: 15 11/16" (39.78 cm)

    Width: 17" (43.18 cm)

    Height: 6 1/4" (15.88 cm)

Weight

    38 lbs. Total   system unit, keyboard, power cord, manual, and packing material

    32.7 lbs. System unit only   one 1.44 megabyte, 3 1/2" diskette drive

Power Requirements   105 - 130 VAC, 60 Hz (U.S.) [220 VAC, 50 Hz (International)] 2.1 amps maximum current drain

Heat Output   363 Btu/hr

Environment

    Air Temperature

        Operating   13°C - 29°C (55°F - 85°F)

        Storage   − 40°C - 65°C (−40°F - 149°F)

    Humidity

        Operating   20% to 80% (non-condensing)

        Storage   10% to 80% (non-condensing)

Peripheral Interfaces

RS-232C serial port (DB-9 connector)

Pin assignments:

1 - Carrier Detect
2 - Receive Data
3 - Transmit Data
4 - Data Terminal Ready
5 - Signal Ground
6 - Data Set Ready
7 - Request To Send
8 - Clear To Send
9 - Ring Indicator

Parallel I/O printer port (25-pin connector)

Pin Assignments:

1   - Strobe
2   - Data Bit 0
3   - Data Bit 1
4   - Data Bit 2
5   - Data Bit 3
6   - Data Bit 4
7   - Data Bit 5
8   - Data Bit 6
9   - Data Bit 7
10   - ACKNOWLEDGE
11   - BUSY
12   - PAPER END
13   - SELECT
14   - AUTO FEED
15   - ERROR
16   - INITIALIZE
17   - SELECT IN
18-25   - Ground

Disk drive controller (for a maximum of two internal diskette drives)

1.44M Diskette Drive

Unformatted Capacity   2 megabytes

Formatted Capacity   1.44 megabytes

Number of Heads   2

Number of Cylinders   80 per side

Average Access Time   95 ms

Track to Track   3 ms

Motor Starting Time   500 ms (700 ms max.)

Rotation Speed   300 RPM

Media   3 1/2" High-Density

Tandy 3000NL Configurations

Configuration	Jumper Setting	Dip Switch
Monochrome Monitor	*E14-E15	
Color Monitor	E15-E16	
Bios ROM Type		
128K (16K x 8)	*E26-E27 E29-E31	
256K (32K x 8)	E26-E27 E28-E29	
512K (64K x 8)	E27-E30 E28-E29	
DRAM Bank Select		
Bank 0 On-board (512K)	*E23-E24	
Bank 0 on Local Memory ExBd (512K/2M)	E24-E25	
Bank 1 On-board (128K)	*E21-E22	
Bank 1 on Local Memory ExBd (512K/2M)	E20-E21	
On-board Parallel Port		
Port One Enabled		*SW1 = ON *SW2 = ON
Parallel Port Interrupt = IRQ7	*E12-E13	
Port Two Enabled		SW1 = ON SW2 = OFF
Parallel Port Interrupt = IRQ5	E11-E12	
On-board Parrallel Port Disabled		SW1 = OFF
On-board Serial Port		
Port One Enabled		*SW3 = ON *SW4 = ON
Serial Port Interruypt = IRQ4	*E8-E9	
Port Two Enabled		SW3 = ON SW4 = OFF
Serial Port Interrupt = IRQ3	E9-E10	
On-board Serial Port Disabled		SW3 = OFF
On-board Floppy		
Primary Port		*SW5 = ON
Secondary Port		SW5 = OFF
Math Coprocessor		
10MHz Option Kit	*E2-E3 E4-E6	
8MHz Option Kit	E1-E2 E6-E7	

* Standard Factory Settings

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System Worksheet

This System Worksheet provides a convenient space in which you can keep up-to-date information about your Tandy 3000NL system. Record all the hardware information you need to run the Setup configuration. Update this list every time you add memory, hard or diskette drives, or a new video display card to your system.

The Worksheet also contains a section for you to record the flawed cylinders and heads for one or two hard disks and a space for your keylock key number.

Diskette Drives

Type of primary diskette drive:_____

Type of secondary diskette drive:_____

Hard Disk Drives

Primary hard disk drive_____

Head Count:_____

Cylinder Count:_____

Drive type number:_____

Secondary hard disk drive_____

Head Count:_____

Cylinder Count:_____

Drive type number:_____

Base Memory

Total on-board memory:_____

Expansion Memory

Total expansion memory:_____

Video Adapter Card

Type of primary video adapter card:_____

Secondary video adapter card:_____

Clock Speed

CPU:_____

BUS:_____

Media Error Map

Primary disk drive		**Secondary disk drive**	
Flawed Heads	**Cyclinder**	**Flawed Heads**	**Cylinders**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Keylock Number_____

Addendum to Tandy 3000 NL Owner's Manual
Cat. No. 25-4072

The following information is necessary for the installation of a printer (or other parallel device).

If You Are Installing a Parallel Device

The parallel port on your computer allows either one-way or two-way data transfer:

- **Unidirectional (one-way).** The computer uses the port only to send output to the parallel device. It does not receive input through the port.

- **Bidirectional (two-way).** The computer uses the port both to send output to the parallel device and to receive input from the device.

MS-DOS uses unidirectional or bidirectional transfer. IBM OS/2 and SCO XENIX use unidirectional transfer only. Tandy OS/2 (Version 1.1 or greater) is an exception. It permits bidirectional transfer.

On the Tandy 3000 NL, DIP Switch SW6 has been modified to let you control the data transfer of the parallel port.

- For unidirectional transfer, set SW6=ON (default).

- For bidirectional transfer, set SW6=OFF.

SW6 should always be set to ON, unless:

- Your system is running under MS-DOS and you want to use the bidirectional mode

- Your system is running under a Tandy version of OS/2 (Version 1.1 or greater) and you want to use the bidirectional mode

Clock Speed Upgrade

This Tandy 3000NL has a 12 MHz, 16-bit 80286 Central Processor Unit (CPU) instead of a 10 MHz CPU.

This results in approximately 20% speed improvement on programs and applications that require a significant amount of computing time (especially mathematical and graphics processing).

Because of this upgrade, the CPU and the bus clock speed settings are different from the information stated in the *Installation and Operation Manual*. When using Setup or Speednl to change clock speed, you will have to use the new speed settings.

Speed Settings	CPU	BUS
Factory Setting	12	6
Fast	12	8
Medium	12	6
Slow	8	8

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