NCR RealPOS 62

Release 2.0

Hardware User's Guide

200

B005-0000-1481
Issue C

Preface

Audience

This book is written for hardware installer/service personnel, system integrators, and field engineers.

Safety Warnings

Servicing
Caution: This product does not contain user serviceable parts. Servicing should only be performed by a qualified service technician.

Fuse Replacement
Caution: For continued protection against risk of fire, replace only with the same type and ratings of fuse.

Attention: Pour prévenir et vous protéger contre un risque de feu, remplacer la fusible avec une autre fusible de même type, seulement.

Power Supply Cord Used as Disconnect Means
Caution: The power supply cord is used as the main disconnect device. Ensure that the socket outlet is located/installed near the equipment and is easily accessible.

Attention: Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité du matériel et être facile d'accés.

Lithium Battery Warning

Caution: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. The battery is battery is recyclable. At the end of its useful life, under various state and local laws it may be illegal to dispose of this battery into the municipal waste. Contact officials for recycling options or proper disposal.

Attention: Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagées conformément aux instructions du fabricant.

Battery Disposal (Switzerland)

Refer to Annex 4.10 of SR814.013 for battery disposal.

IT Power System

This product is suitable for connection to an IT power system with a phase-to-phase voltage not exceeding 240 V.

Peripheral Usage

This terminal should only be used with peripheral devices that are certified by the appropriate safety agency for the country of installation (UL, CSA, TUV, VDE) or those which are recommended by NCR Corporation.

Caution: DO NOT connect or disconnect a printer, keyboard, or any other terminal-powered peripheral while the terminal is powered on. Doing so may result in peripheral or system damage.

Environmental Consciousness

NCR is demonstrating its concern for the environment by designing an intelligent power management system into this terminal that operates efficiently whether the system is in a stand-alone or network environment.

Grounding Instructions

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances. Do not modify the plug provided – if it will not fit the outlet, have the proper outlet installed by a qualified electrician. Improper connection of the equipment-grounding conductor can result in a risk of electric shock.

The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor.

If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal. Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if you are in doubt as to whether the product is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the product's plug. **Repair or replace damaged or worn cords immediately.**

References

- *NCR RealPOS 62 Site Preparation Guide*
  (B005-0000-1480)

- *NCR RealPOS 62 Hardware Service Guide*
  (B005-0000-1482)

- *NCR RealPOS 62 Parts Identification Manual*
  (B005-0000-1483)

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Revision Record

Issue	Date	Remarks
A	Sept 02	First issue
B	Mar 03	Added Compact Flash
C	Apr 03	Removed *Migration* Appendix and made it into a stand-alone document (B005-0000-1523).

Radio Frequency Interference Statements

Federal Communications Commission (FCC)

Information to User

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of 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 interference in which case the user will be required to correct the interference at his own expense.

NCR is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by NCR. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user. The user is cautioned that changes or modifications not expressly approved by NCR may void the user's authority to operate the equipment.

Canadian Department of Communications

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

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 radioélectriques édicté par le ministrère des Communications du Canada.

Voluntary Control Council for Interference (VCCI)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Declaration of Conformity

Manufacturer's Name	NCR Corporation
Manufacturer's Address	NCR Corporation Retail Solutions Division— Atlanta 2651 Satellite Boulevard Duluth, GA 30096-5810
Type of Equipment	Information Technology Equipment
Model Number	Class 7460
Electrical Ratings (Input)	100-120 V/200-240 V, 4.0 A/2.0 A, 50-60 Hz

NCR Corporation, 1700 South Patterson Boulevard, Dayton, OH 45479, USA, declares that the equipment specified above conforms to the referenced EU Directives and Harmonized Standards.

EU Directive	Harmonized Standard(s)
89/336/EEC (EMC)	EN 55022: 1987 (CISPR 22) EN 50082-1, Part 1: 1992 IEC 801-2: 1984 IEC 801-3: 1984 IEC 801-4: 1988
73/23/EEC (Low Voltage)	EN 60 950: +A1+A2: +A3 + A11

NCR Corporation
Retail Solutions Division— Atlanta
2651 Satellite Boulevard
Duluth, GA 30096-5810

European Contact:
International IP Counsel
206 Marylebone Road
London, NW1 6LY, England

Chapter 1: **Product Overview**
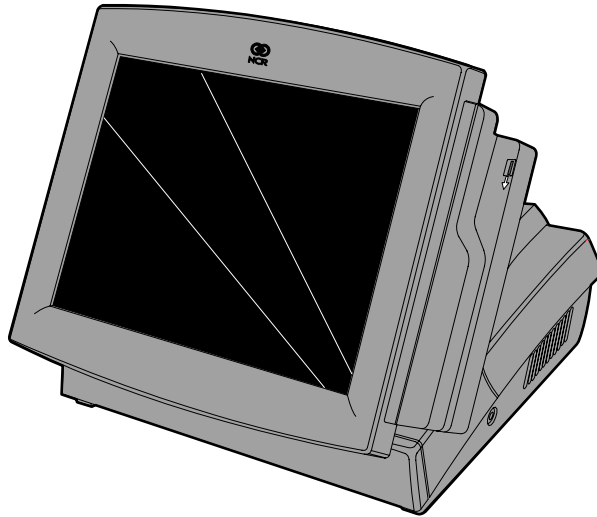
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Introduction

The NCR RealPOS 62 (also referred to as NCR 7460) is an interactive touch screen terminal designed specifically for the hospitality marketplace. Housed in an integrated, compact cabinet, the 7460 supports a complete set of peripherals.

The major hardware features of the 7460 are a flat panel display with touch screen input, LAN connectivity, and magnetic stripe reader.

The 7460 is Internet/Intranet ready. System loading can occur from a network server, and software and data content may be delivered from a server through standard internet protocols.

Serial Number Labels

NCR Corp. Model:7460-01   S/N 35012156

NCR Corporation
Duluth, Ga 30096-5810   Made in **USA**

Class:
Model: 7460
Serial No:

Date Manufactured:

100-120Vac   4.0A   50-60Hz
200-240Vac   2.0A   50-60Hz

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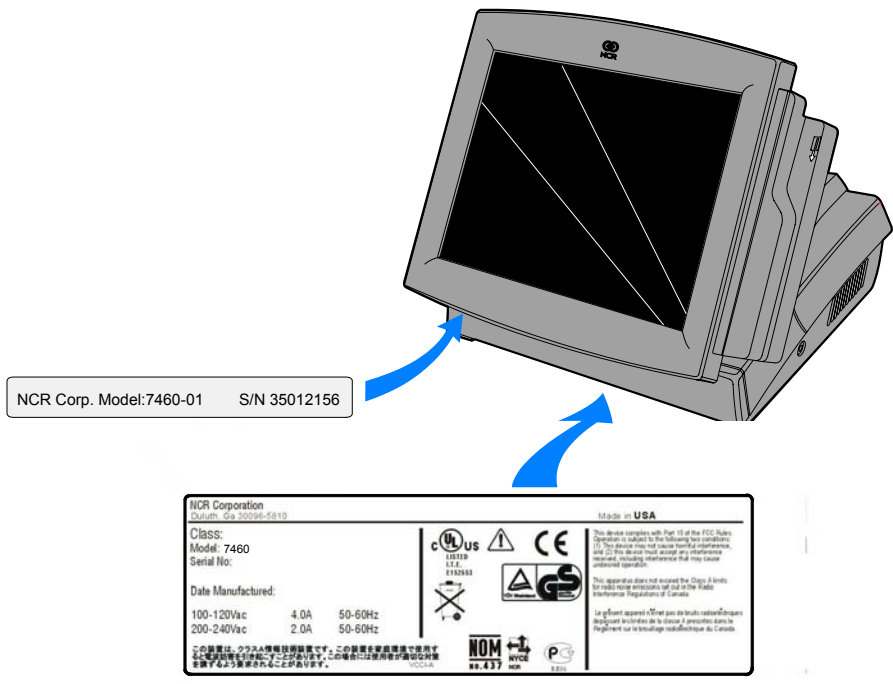
Hardware Modules

Base Unit

- Processor Board
    - Celeron-class processor
    - SVGA chipset
    - MPEGII chipset
    - 4 Mbps Flash BIOS (not CMOS)
    - Four RS-232 ports (three powered)
    - Parallel port
    - 10/100BaseT Ethernet LAN chipset, Wake-on-LAN support, and RJ-45 port
    - Two USB type A ports
    - PS/2 keyboard/mouse port
    - External VGA display port. (This does not allow different information on each display. If you use an external display, you get the same screen that you do on the operator display.)
    - Serial touch screen interface (dedicated COM3)
    - Two DIMM RAM socket
    - IDE support for a hard disk
    - Cash drawer port
- 12.1-Inch LCD Operator Display
- Resistive touch screen
- 3.5-Inch hard disk
- Integrated Power Supply
- 3-meter Ethernet cable
- U.S. power cord

Hardware Options

- Integrated 3-track ISO MSR
  - Side Mount (side of display)
  - Front Mount (front panel under the display)
- Customer displays
  - Integrated 2x20
  - Remote 2x20
- Cash drawers
  - 2189 Cash Drawer (modular)
  - 2113 Cash Drawer (modular)
  - 7454-K005 Mid-range Cash Drawer (modular)
- Printers:
  - 7167, 7197, 7196, TMU-200, TMU-230, 2214
- 256 MB Compact Flash (through IDE interface)
- PS/2 Workstation keyboard
- Telequip Coin Dispenser
- 7892 Hand-held Scanner
- 5945 Electronic Payment Terminal
- 5992 Signature Capture Device
- 5974 4x20 Remote Customer Display
- 5973 International Remote Customer Display

Terminal Components not Supported

It is important to note that the terminal does not support the following components.

Not supported	Alternative implementation
CMOS for hard totals, logs, and tallies	Hard disk, or server storage
Removable media, e.g., a flex disk	LAN communication to an NT server via standard protocols
SLP terminal loading	Local storage and TCP/IP networking; PXE terminal loading
Keylock for security (X, L, R, S)	Reset switch based security
ISA and PCI Expansion slots	USB and LAN based devices (future)
DVD ROM	
Internal UPS	External UPS
Manual Video and audio controls	Server
Windows 3.1, Windows NT 3.51, OS/2	Win2000, NT 4.0, Win98, DOS

System Configuration Diagram

Keyboard

5973 2 x 20
Customer Display

5974 4 x 20
Customer Display

2183

2189

PS/2
KBD

Parallel

Cash
Drawer

USB

Transaction Printers

7197

7167

7460-20xx

RS-232   LAN

Ethernet

7196

TELEQIP
Coin Dispenser
2336-K022

5945
Electronic
Payment
Terminal

7892
Presentation
Scanner

5992
Signature
Capture
Terminal

20128
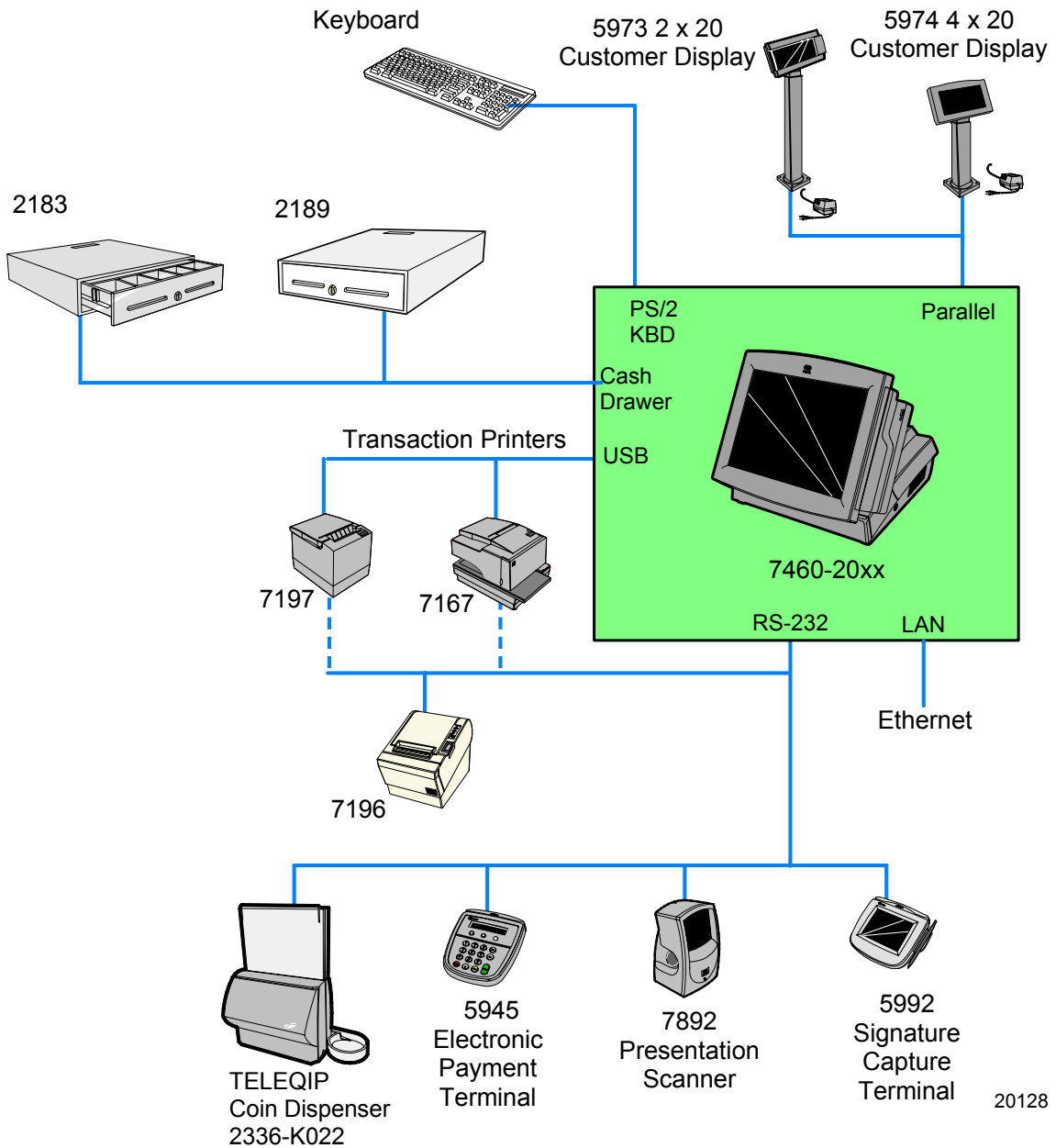
Hardware Module Descriptions

Processor Board

Processor/Chip Set

The terminal uses an Intel architecture processor, which permits it to leverage existing software drivers and applications, as well as provide the greatest flexibility in choosing an operating system. This provides several other advantages:

- Capable of MPEG-1 or MPEG-2 playback at 30 frames per second with 22 kHz stereo audio (may be limited by OS constraints).

- Java Benchmark performance > 1000 Caffeinemarks, JIT compiled

- OS support to run Java

- Expansion capabilities for optional features and future requirements (ISA/PCI bus and USB)

Video Subsystem

The video subsystem supports the following LCD types:

- 12.1-Inch active matrix (TFT) 800 x 600 with 64 k colors

Support for the LCD integrated display is provided internally. External support for SVGA monitors (800 x 600 [or better] resolution and 64 k [or better] colors) is provided by a CRT 15-Pin D-shell connector.

In addition to OFF and ON modes, a *dimmed* mode is supported in the hardware to allow increased tube life. If appropriate software drivers are loaded, full brightness is restored when touched, or an application requests it (e.g., to play promotional material on a preset schedule).

Ethernet 10/100Base-T LAN Communications

Each processor board contains a unique IEEE MAC address. This address is combined with other configuration parameters into a configuration data file, which is then used to program the LAN EEPROM. Intel's EEUPDATE.EXE utility can be used to program the EEPROM with the desired data file.

The terminal may be connected to either a 10 Mbps or 100 Mbps Ethernet connection. The hardware automatically selects the correct speed (if enabled by software to do so).

The LAN hardware supports wakeup packet capability as defined in the Device Class Power Management Specification, Network Device Class (available from Microsoft's web site).

When the platform is in the *Soft OFF* state (refer to the Power Management section), receipt of a Wakeup Packet on the LAN can return the system to the *ON* state, if this feature is enabled by software.

100Base-T is wired identically to 10Base-T, except that the twisted pair cable must be Category 5 and the hubs must permit 100 or 10/100 Mbps operation. Although 10Base-T will operate on Category 3 twisted pair, or NCR 747 cable, an upgrade to Category 5 is required for 100Base-T.

A customer desiring to use the terminal in an existing 10Base-T environment can do so and run at 10 Mbps. *In order to upgrade to 100Mbps, Category 5 cable and 100 or 10/100 hubs must be installed.* NCR strongly recommends the use of Category 5 for all new cabling, even if the customer initially intends to run only 10Base-T.

LED Indicators for Link Integrity (verifies cable and hub connection are good) and LAN speed is provided on the processor board next to the LAN connector. The LED is ON (yellow) when the speed is 100 Mbps.

Link Integrity is provided to the PC chipset to permit boot-up software to verify the presence of the LAN connection. Software must allow 2 seconds after power-up in order for the Link Integrity signal to become valid.

Universal Serial Bus

Two USB Type-A ports are provided on the terminal. Power to the connectors is fused using self-healing fuses. USB devices requiring more than 750mA @ 5V need an external power supply.

Note: USB peripherals require support from the operating system.

Serial Ports

In Setup, you can *Disable*, *Enable,* or *Auto Configure* each serial port. Under the *Enabled* option, the serial ports can be assigned to I/O addresses 3F8H, 2F8H, 3E8H or 2E8H and IRQs 3 or 4. Under the *Auto* option, the BIOS or Operating System chooses the I/O & IRQ configuration. This flexibility permits you to logically swap the operating system's COM ports.

Example: Serial port 1 can be configured to be COM2 and serial port 2 can be configured to be COM1.

Serial ports 2, 3, and 4 can be configured to provide +12V (0.5A each, up to 1.0 A total)* on pin 9 of the RS-232 connector (normally Ring Indicator (RI)).

There is an option in the BIOS for each of the three powered serial ports that determines how the BIOS controls the power pin. If the BIOS serial port power option is set **OFF**, the port has no power applied on pin 9; if it is set **ON**, the port always has power applied on pin 9, regardless of the presence of the modified NCR peripheral cable. If the serial port power option is set to **Auto**, power is applied on pin 9 if the modified cable is detected. If the cable is not detected, power is not applied to pin 9. The BIOS default for the three powered serial ports is *Auto*.

* If power requirements exceed 90 Watts for a total system configuration, then the current on the powered serial ports will be reduced or limited. Maximum powered serial peripheral configurations can be specified to limit the total power required through COM2 to COM4 in order to accommodate a 90-Watt power supply.

If an NCR device requiring power is attached to the port, it has the modified cable, which ties DCD, DTR, and DSR together. If the BIOS has been set to **Auto**, then DTR is automatically toggled at power up. If DCD and DSR both toggle with DTR, the BIOS provides power to the serial port.

The power to the serial ports is fused with self-healing type fuses.

Parallel Port

The processor board provides a standard 25-pin D-shell parallel port (LPT1) and an internal 16-pin (2 x 8) header to a second parallel port (LPT2). The 16-pin header has fused power and the standard parallel signals to drive the integrated customer display.

The parallel ports can be configured in Setup as output only, bi-directional mode, ECP, or EPP modes. Also, you can *Disable*, *Enable* or *Auto* configure the parallel port. Under the *Enabled* option, the parallel port can be assigned to I/O addresses 278H, 378H, or 3BCH and IRQs 5 or 7. Under the *Auto* option, the BIOS or Operating System chooses the I/O & IRQ configuration. The BIOS default for the parallel port is *Auto*.

PS/2 Keyboard and Mouse Interface

The processor board provides one standard PS/2 connector (6-pin mini din), which supports a PS/2 keyboard or PS/2 mouse. The 5V power to this connector is fuse protected.

Note: A Y-cable is required to operate a PS/2 mouse and keyboard simultaneously

Hardware Monitor

The hardware monitor generates an interrupt to the system whenever any of the internal voltages used by the system processor goes above or below the acceptable operating range. An interrupt is also generated when the temperature of the processor exceeds safe levels. Software can use this indication to slow or stop the system and/or force a reset.

Mini PCI Expansion Header

A single Mini PCI expansion header is provided.

IDE Header

A standard IDE header is provided to support the 3.5-inch hard disk drive.

Processor Board Connectors

All connectors are either keyed or impossible to plug incorrectly due to mechanical design of the product.

MSR

There are two MSR options for the 7460.

- *Side Mount MSR* – mounted vertically to the side of the operator display

- *Front Mount MSR* – mounted horizontally to the front of the terminal base

The MSR (ISO and JIS formats) interface supports a maximum of 3 tracks of magnetic stripe information.

Side Mount MSR

The Side Mount MSR uses the NCR *Wedge* interface, which controls input devices such as the MSR and keyboard data, and merges the data from each of them into the data stream of the PC keyboard.

The MSR signals are routed through the display head and connected to the PS/2 keyboard connector on the terminal.

Note: The MS-DOS Diagnostic Support Tools, starting with version 5.00.04, has been modified with an option to re-program the Wedge Side Mounted MSR for either Wedge Sentinels or OPOS/TAPS Sentinels.

Front Mount MSR

The MSR interface controller is a memory-mapped device, which can reside at system memory addresses DE000-DFFF or DA00-DBFF. Activate the MSR interface by enabling it in *BIOS Setup* under IO Configuration. If MSR capability is not desired, it may be disabled through BIOS Setup.

The MSR cable connects to the MSR connector on the processor board.

Graphics Subsystem

The Celeron processor board is equipped with integrated AGP graphics using the Intel 810 Chipset.

Resolutions Supported

Resolution	Colors	Max Vfreq
800 x 600 x 16 bpp	64 k	85 Hz

Colors Supported

Resolution	256 Colors (8-Bit)	65,000 Colors (16-Bit)	16.7 M Colors (24-Bit)
800 x 600	512 k	1 Mbps	2 Mbps

Board BIOS

The processor board uses a Phoenix BIOS, which is stored in Flash ROM. The Flash BIOS also contains the Setup utility, Power-On Self Tests (POST), and APM 1.2. The board also supports system BIOS shadowing, allowing the BIOS to execute from onboard write-protected DRAM.

The BIOS displays a sign-on message during POST identifying the type of BIOS and a five-digit revision number.

FLASH memory Implementation

The Intel 82801AB Firmware Hub (Flash ROM) is organized as a 512KBx8 device (4Mb total). It is divided into eight blocks, each of 64KB size. The physical ROM occupies FFF80000h through FFFFFFFFh in high memory and the run-time BIOS occupies E4000h through FFFFFh in lower memory.

BIOS Upgrades

Flash memory makes distributing BIOS upgrades easy. A new version of the BIOS can be installed from the hard disk, network, or through a serial port.

The disk-based flash upgrade utility, PHLASH.EXE, ensures the upgrade BIOS extension matches the target system to prevent accidentally installing a BIOS for a different type of system.

Setup Utility

The ROM-based Setup utility allows the system configuration to be modified without opening the system for most basic changes. The Setup utility is accessible only during the Power-On Self Test (POST) by pressing the <F2> key after the POST memory test has begun and before boot begins. A prompt may be enabled that informs users to press the <F2> key to access Setup.

Note: Since the Setup Utility supports touch input, an external alphanumeric keyboard is not required. However, it is recommended for ease of use.

Plug and Play

The Processor BIOS also has a setup option to support the Windows runtime plug and play utilities. When this option is selected, only devices critical to boot are assigned resources by the BIOS. Device Node information is available for all devices to ensure compatibility with plug and play operating systems. System configuration information is stored in ESCD format. The ESCD data will be cleared upon loss of the battery voltage.

Operator Display
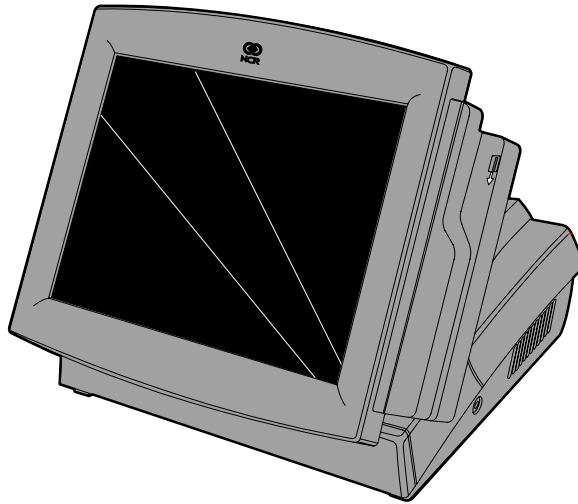
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The 7460 is available with a 12.1-Inch TFT (active matrix) 12.1-Inch
LCD.

LCD Adapter Board

The signals from the LCD header on the processor board are brought to
the LCD on a harness. Since there are multiple pin configurations and
connector types being used on the LCD, a small adapter board is used
to receive the LCD harness and map the signals into the correct pin-out
for the LCD panel. This board has a connector that plugs directly into
the LCD panel.

LCD Backlight Inverter Module

The backlight for the 7460 is contained on the LCD Adapter Board.

Operator Touch Screen

The touch screen completely covers the LCD and is mounted directly in front of the LCD, and is held in place by the front plastic bezel of the terminal. The touch controller on the processor board supports resistive touch glass.

The touch glass has an integrated harness that is routed into the LCD board enclosure and is connected to a header on the LCD board. The touch glass has a glare-reducing texture that also helps hide fingerprints.

NCR 7460 Integrated Customer Display

The NCR 7460 Integrated Customer Display supports two lines of twenty 5x7 characters.

Integrated Customer Display
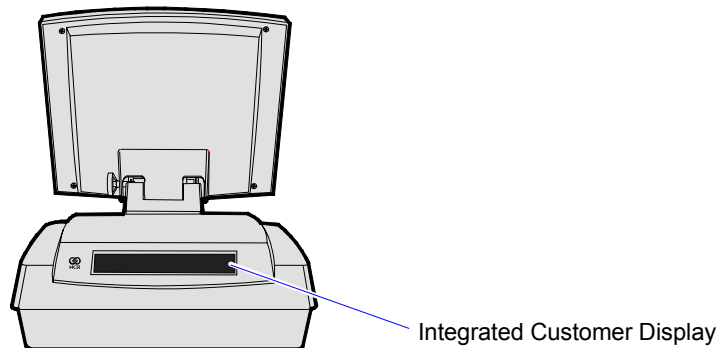
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The 7460 also supports the following remote customer displays.

- NCR 5954 4x20 Remote Customer Display
- NCR 5973 2x20 International Customer Display

Hardware Features

Magnetic Stripe Reader

A single 3-track analog Magnetic Stripe Reader (MSR) is available as a feature, supporting ISO format cards. There are two versions available:

- Side Mounted MSR

- Front Mounted MSR

When the MSR is not desired filler pieces are included as substitutes.

Side Mounted MSR

Front Mounted MSR

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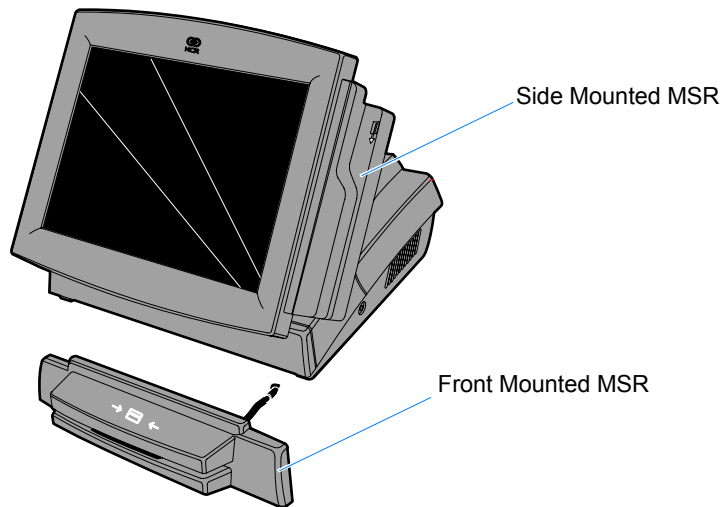
Printer Options

NCR 7167 Printer

The NCR 7167 Printer is a fast, quiet, relatively small, and very reliable multi-function printer. It prints receipts, validates and prints checks, and prints on a variety of single or multiple part forms. There is no journal. The printer features a dual interface, so it can connect to the host terminal either through a USB or RS-232 interface. It receives its power from an external power supply. It also has a connector for cash drawers.

Power Supply

AC Adapter Cable
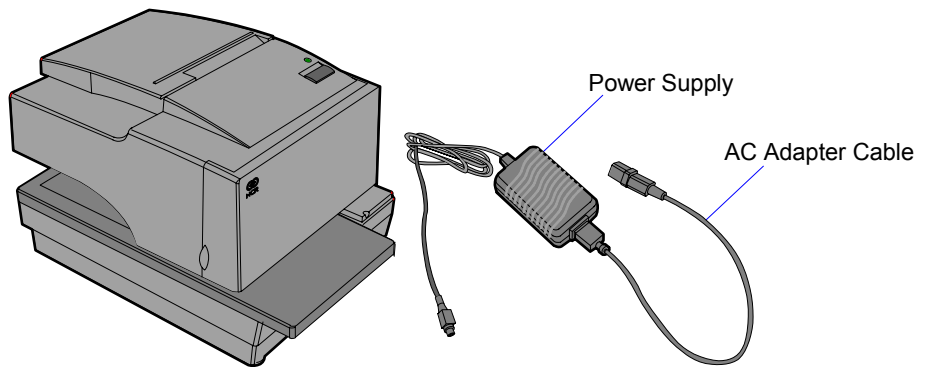
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NCR 7197 Printer

The NCR 7197 Printer is a fast, quiet, relatively small and very reliable multi-function printer. It prints receipts and two-color printing. The printer features a dual interface, so it can connect to the host terminal either through a USB interface or RS-232. It receives its power from an external power supply. It also has a connector for cash drawers.

Power Supply

AC Adapter Cable
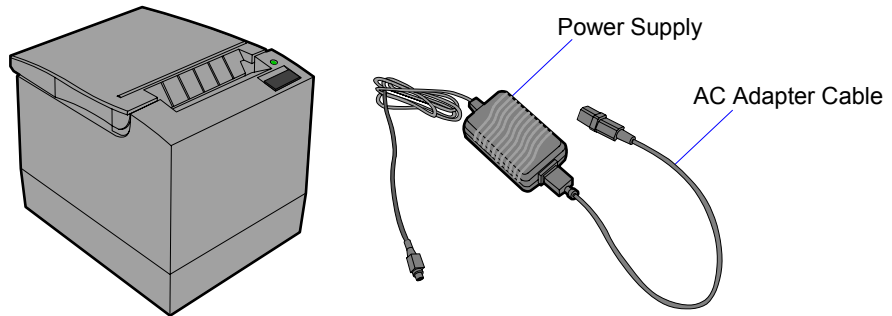
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7196 Printer

The 7196 Printer is a high speed, high-resolution printer, capable of both text and graphics printing. It receives its power from an external power supply, has a serial interface and a connector for cash drawers.

Power Supply

AC Adapter Cable
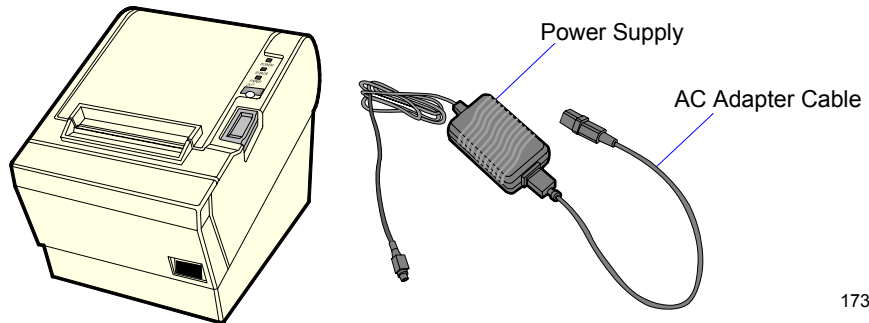
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Customer Displays

NCR 5974 Remote 4x20 Customer Display

The NCR 5954 Customer Display supports four lines of twenty
5 x 7 characters. It receives its power from an external power supply,
uses the parallel interface, and has an eight-inch post mount.

Power Supply

AC Adapter Cable

20119
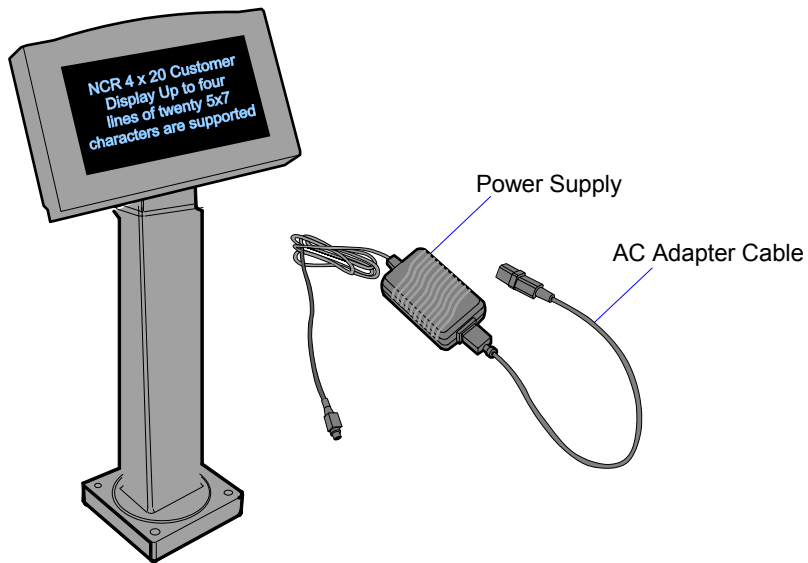
NCR 5973 International VFD Customer Display

The NCR 5973 VFD (Vacuum Fluorescent Display) is a 256 x 64 graphic display for international character sets. It receives its power from an external power supply, uses the parallel interface, and is available with a Remote Desktop Mount or a 16-inch High-Post Mount.

Power Supply

AC Adapter Cable

20286
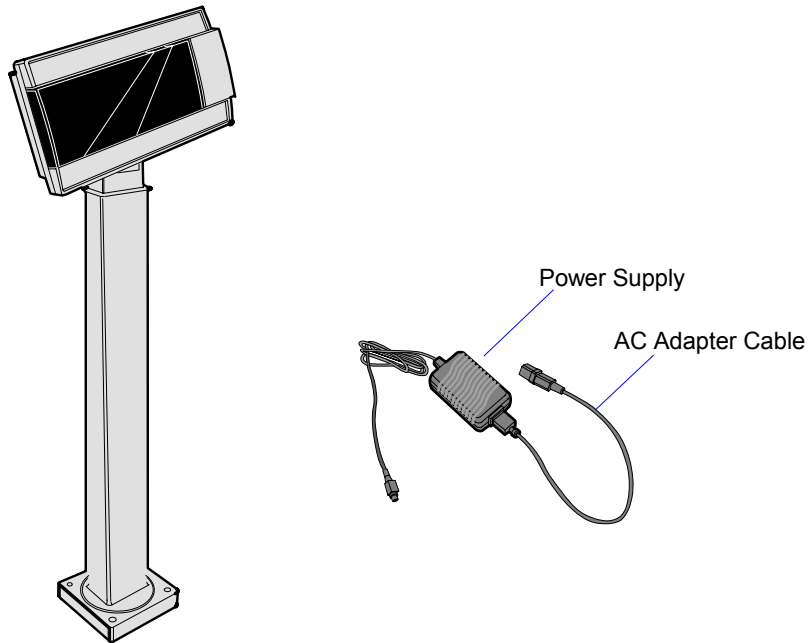
Cash Drawers

All cash drawers offered with the RealPOS 80 include a cable with a RJ-11 connector for connection to the cash drawer port on any retail printer featuring a RJ-11 cash drawer kick out (CDKO) port.

2189 Cash Drawer

The 2189 Cash Drawer is a full-size cash drawer designed for medium to high transaction environments.

Other Cash Drawers

While the 2189 Cash Drawer is the advocated solution, the following alternate drawers are available for remote configurations where smaller form factor is required.

- 2183 Mid Range Cash Drawer
- 2113 Compact Cash Drawer

Third-Party Cash Drawers

For compatibility with NCR POS terminals and printers, cash drawers must meet the following requirements:

- The cash drawer interface must match the NCR CDKO interface with RJ45 connector.
- The cash drawer kick-out solenoid must be designed for a 24V, 1A pulse of duration 100msec.
- The cash drawer must include a back-emf protection diode (1A, 200PIV) across the solenoid, to prevent damage to the printer or motherboard circuitry.

Other Integrated Devices and Indicators

Hard Disk Drive

A 3.5-inch IDE hard disk is a standard type that is used by notebook PCs.

Power Status LED

The LED power indicator indicates whether power is present at the processor board or not. The LED is green when the processor and BIOS are operating properly. The LED is located on the right side of the chassis as illustrated.

To power down the terminal, press the Power button on the side of the terminal. If the *Instant Power Off* setting in BIOS Setup is set to *Disabled* you must press and hold the power off button for 4-5 seconds.

Power Status LED

20282

LAN Status LEDs

LAN Integrity   LAN Speed:
  (Green)   Yellow=100MB
                   OFF=10MB
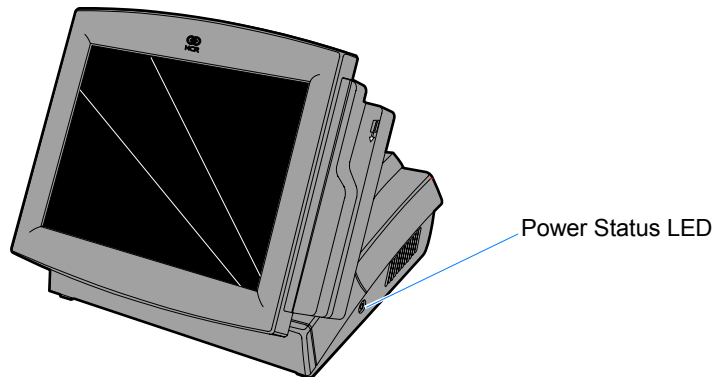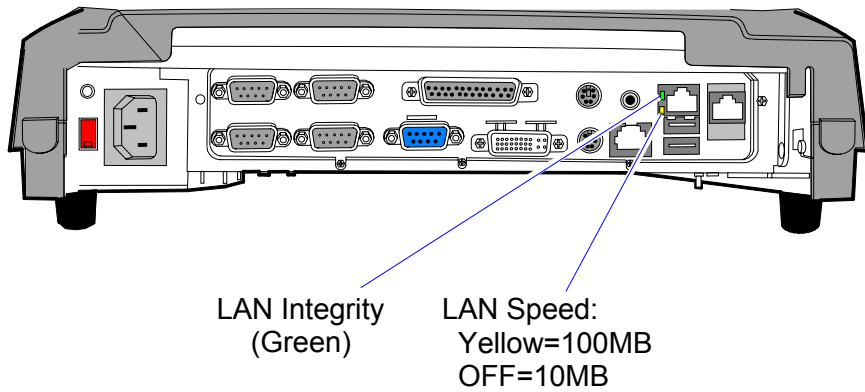
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Power Supply

Note: The power supply **DOES NOT** automatically sense the proper AC voltage; therefore, the switch on the back must be set prior to installation.

All power required to operate the base unit and bus-powered USB peripherals is provided by the power supply.

The Processor board serves as the hub to distribute power to all terminal functions. The Cash Drawer, integrated VFD Customer Display, PS/2 Keyboard, Mini PCI slot, Scanner (through RS-232 port), USB, hard disk, and the LCD all receive power through their respective processor board connectors.

NCR Power Management

APM is disabled in BIOS by default, therefore, the user must enable this feature and the system must be configured with an APM driver (such as Power.exe for DOS or vpowerd.386 for Windows 3.x) in order for the system power saving features to take effect.

The processor board is designed with different software-controlled power states. This permits different parts of the system to be powered down by the power management software in the BIOS.

Note: APM is only supported under Windows 2000

Definitions of the Power States

1. **OFF:** AC power is not present. All RAM contents are lost.

2. **ON:** Power is on and fully supplied to all 7460 components. The display and touch panel are active. The CPU may be fully on or be in chip standby mode. This is transparent to the user and the application. Standby mode reduces power requirements and is controlled by the chip set and is entered/exited depending on the CPU's utilization level. Transitioning between fully on and stand by causes no delay.

3. **CONSERVE:** Power is on, but throttling back or completely stopping the system clock reduces consumption. Throttling is fully programmable. This is the primary means of reducing system power consumption and is used to help correct a high temperature warning level detected by the temperature monitor. Temperature is also be reduced by dimming the LCD. There is no user or application action required for this mode. When a *Safe Temperature* is detected, the system will switch back to the **ON** state. Transitioning between **ON** and **CONSERVE** takes less than 10 milliseconds.

4. **SOFT OFF:** *Temperature* has reached a critically high level, a *LAN-based Powerdown* was received, or a system Shutdown occurred. Power consumption is reduced to its lowest level. All voltages are still present, but BIOS places each peripheral and chip into its lowest available power state. The chip set enters the Suspend-to-RAM mode. The LCD back light is turned off, blanking the display. RAM contents are preserved upon return to **ON** state unless software issues a reset. If this state was entered because of a *LAN-based Powerdown* or system Shutdown, transitioning to the **ON** state can occur via LAN-based reset or wakeup, Timer wake-up, Touch activity, or keyboard. If **SOFT OFF** was entered because of a Critical Temperature, the ON state can be automatically transitioned to when a Safe Temperature is reached.

   Note: Support for wake-on-ring from **SOFT OFF** state has been removed as a feature.

Operating System Support

The following table shows what is expected during a system shutdown for each type of operating system.

Windows 2000				
Power Savings Enabled	**Power Savings Disabled**	**OS APM Enabled**	**OS APM Disabled**	**Result**
√		√		Shutdown in **SOFTOFF** Mode
√			√	Shutdown to *Safe to Shutdown* screen
	√	√		On Shutdown machine restarts (*)
	√		√	Shutdown to *Safe to Shutdown* screen

(*) This is a BIOS restriction

Windows NT (**)				
Power Savings Enabled	**Power Savings Disabled**	**NCRSYSM Installed**	**NCRSYSM Not Installed**	**Result**
√		√		Shutdown to *Safe to Shutdown* screen, then goes into **SOFTOFF**
√			√	Shutdown to *Safe to Shutdown* screen
	√	√		Shutdown to *Safe to Shutdown* screen, then goes into **SOFTOFF**
	√		√	Shutdown to *Safe to Shutdown* screen

Note: APM is only supported under Windows 2000

Windows 98 (**)				
Power Savings Enabled	**Power Savings Disabled**	**OS APM Enabled**	**OS APM Disabled**	**Result**
√				Shutdown in **SOFTOFF** Mode
	√			Shutdown completely, did not enter **SOFTOFF**

Note: APM is only supported under Windows 2000

Wake on Touch Restriction

If a shutdown is performed with APM **Disabled**, , the message *Press the power button to turn the system off* is display. The system is turned off by pressing the power switch.

If a shutdown is performed with APM **Enabled**, you must still press the power switch to reboot the Operating System. Touching the screen does not reboot the system.

Note: The NCR *Gold* images are built with APM **Disabled** in the Operating System.

Chapter 2: **Hardware Installation**

Introduction

The terminal is fully assembled at the factory. This chapter explains the mounting options and how to connect optional hardware components to the terminal.

Installation Summary

The terminal should be removed from the shipping packaging and visual checks made to verify the correct hardware configuration. The system is then configured and any communication cables are connected.

Caution: The power supply in this unit must be set to match the proper voltage requirements (115V or 230V). The AC Selector switch is located behind the Front Panel. The switch must be set before plugging the power cord into an AC outlet. Refer to the *Accessing the Cable Connectors and Routing Cables* section for instructions how to remove the Front Cover.

AC Voltage Selector
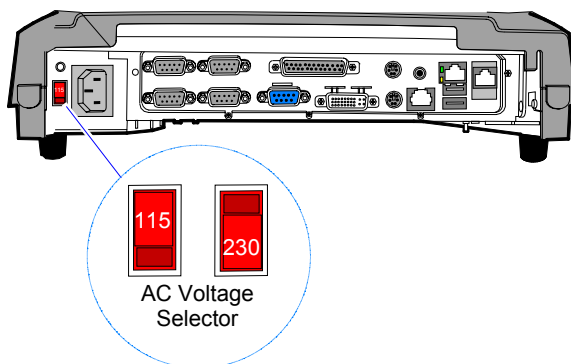
20623

ROM-based setup should be used to configure network options. Full configuration depends upon the system server and the management web site.

Installation Restrictions

- Before installing the terminal, read and follow the guidelines in the *NCR 7460 Retail Terminal Site Preparation Guide* (B005-0000-1281) and the *NCR Workstation and Peripheral AC Wiring Guide* (BST0-2115-53).

- Install the terminal near an electrical outlet that is easily accessible. Use the power cord as a power-disconnect device.

- Do not permit any object to rest on the power cord. Do not locate the terminal where the power cord can be walked on.

- Use a grounding strap or touch a grounded metal object to discharge any static electricity from your body before servicing the terminal.

- If the power cord is replaced, it must be replaced with the same type of cord with the protective shroud.

- Do not route the power cord through openings with sharp edges.

Caution: This unit contains hazardous voltages and should only be serviced by qualified service personnel.

Caution: DO NOT connect or disconnect the transaction printer while the terminal is connected to AC power. This can result in system or printer damage.

Warning: If wall mounted, the NCR 7460 must be mounted securely to prevent a hazard. It must be installed in accordance with local building codes. The wall on which the unit is mounted should be able to withstand four times the weight of the unit, which is approximately 16 lbs. 2oz. (7.3 kg) for the complete unit and 6 lbs. (2.7kg) for the operator display .

Connecting the Cables

Cable connectors are located on the chassis behind the Front Cover.

Accessing the Cable Connectors and Routing Cables

1. Remove the Front Cover

   a. Elevate the front of the unit and rotate the Latch Plates as shown below. The Latch Plates are used to hold the Front Cover in position.

   b. Slide the Front Cover down to disengage it from the chassis.

      Note: Some models are configured with a Front Mounted MSR. In that case you also have an MSR cable to disconnect.

Latch Plates

Front Cover

20142
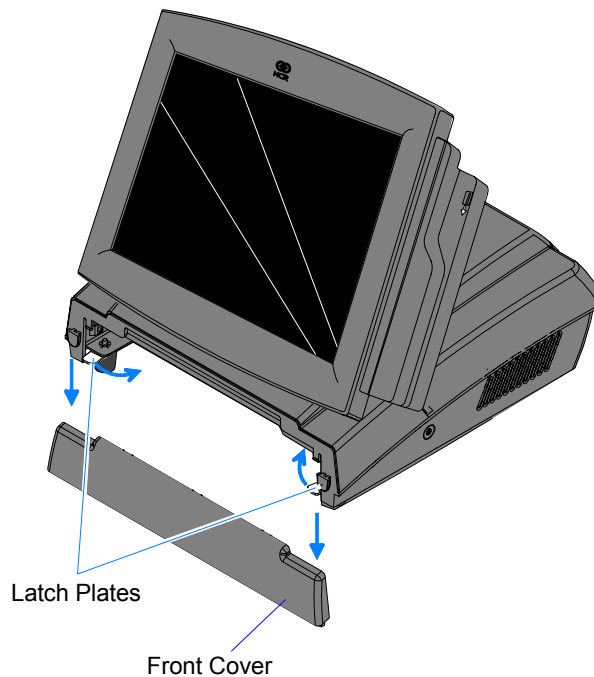
Cable Connectors

Terminal Cable Connectors

The following illustration identifies each of the cable connectors. Refer to the sections following the illustration for specific instructions on installing each peripheral.
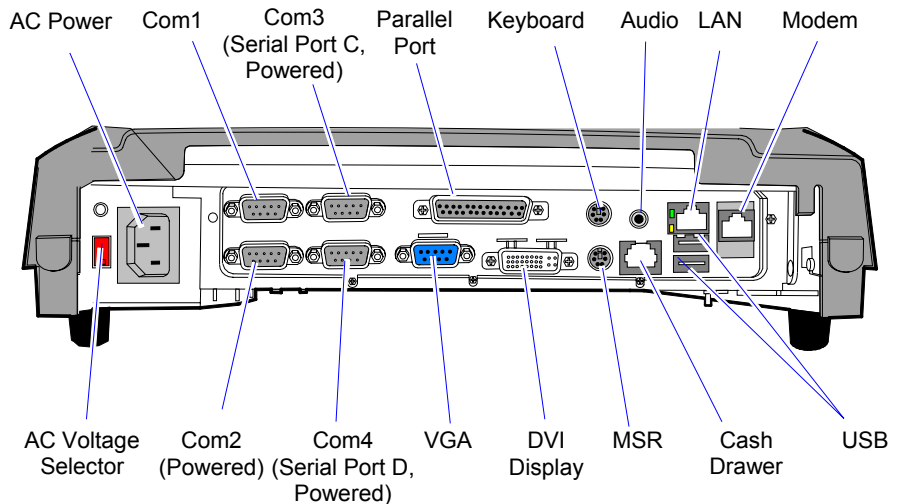
20117

MSR Connections

The MSR connection varies, depending on which MSR is present.

Front Mounted MSR – connects to the MSR connector behind the Front Panel (shown above).

Side Mounted MSR – uses the Wedge interface through the display head to the PS/2 keyboard connector. The MSR connector is not used.

Operator Display Cable Connectors

DVI

RS-232

PS/2
Keyboard

Wedge
Scanner
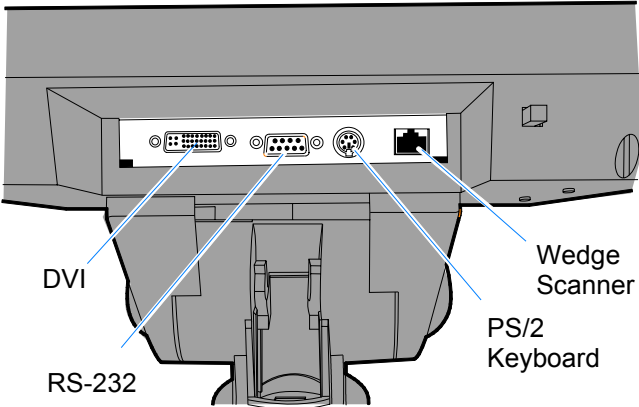
19454a

Installing Peripherals

Installing a Transaction Printer

The printer can connect through a USB connector or an RS-232 connector. It receives power from an external power supply.

Interfaces Supported

Printer	USB	RS-232
7167	√	√
7196		√
7197	√	√

In order to use the USB interface the I/O Networks USB to RS-232 drivers must be used. These drivers are found in the `C:\install` directory of the OS Recover image or on the NCR Drivers and Patches web site.

http://www.ncr.com/support/support_drivers_patches.asp?Class=retail.

Under Windows 98, if the I/O Networks drivers are installed after the NCR Retail Platform for Windows OPOS Drivers, the system will hang on restart. If a shutdown is done there is no problem. This only occurs after installation. All subsequent restarts and shutdowns perform as expected. If OPOS is installed after the I/O Networks drivers, this does not occur.

Note: `edgeser.sys` (V 2.17 or later) is required for support of the 7197/7167 printers. Otherwise a *General Protection Fault* will occur.

USB Printer Installation

1. Connect the USB Printer Interface Cable to the *USB Connector* on the printer and the terminal.

2. Connect the Power Supply to the *Power* connector on the Printer and to a standard AC outlet.

USB

Power

USB

AC Power Supply

497-0415949 - 1 m
(1416-C528-0010)

497-0415950 - 4 m
(1416-C528-0040)

20118
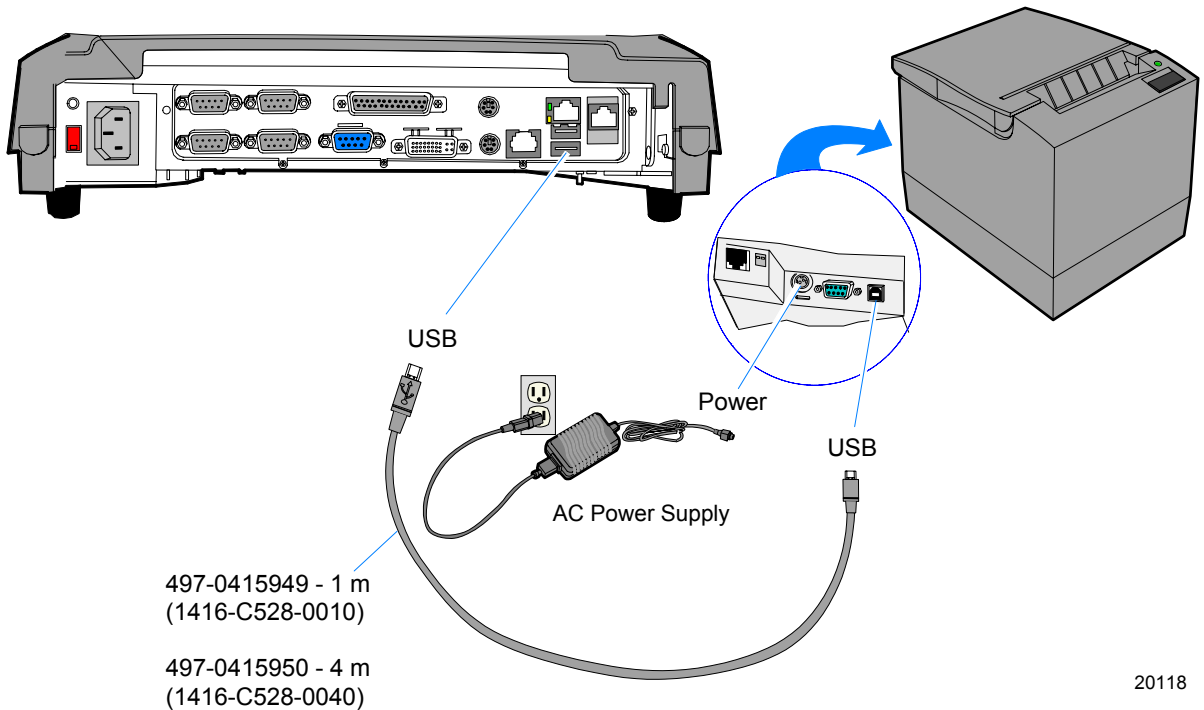
RS-232 Printer Installation

1.   Connect the RS-232 Printer Interface Cable to the *RS-232 Connector* on the printer and to an *RS-232 Connector* on the terminal.

2.   Connect the Power Supply to the *Power* connector on the Printer and to a standard AC outlet.

RS-232

COM1   COM3

COM2   COM4

Power   RS-232

Power Supply
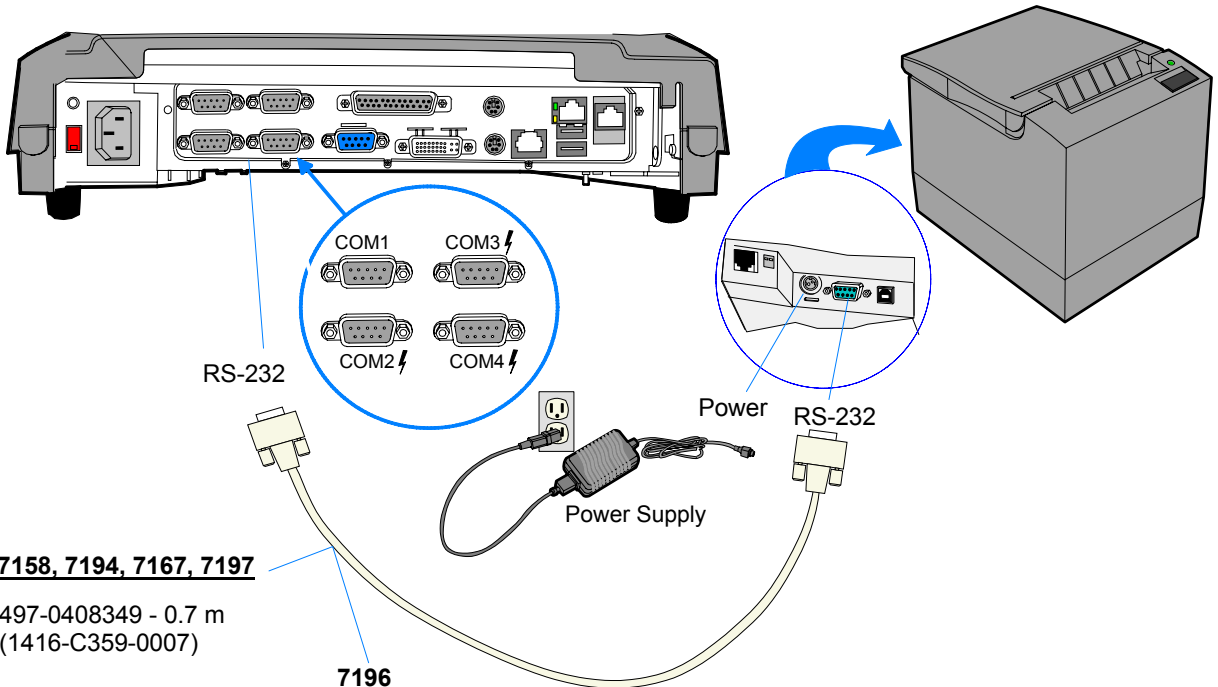
7158, 7194, 7167, 7197

497-0408349 - 0.7 m
(1416-C359-0007)

497-0407943 - 4 m
(1416-C266-0040)

497-0409379 - 15 m
(1416-C266-0150)

7196
497-0407427 - 1.0 m
(1416-C337-0010)

497-0407429 - 4 m
(1416-C337-0040)

497-0407430 - 15.2 m
(1416-C337-0152)

20121

Installing a Remote Customer Display

There are two Remote Customer Displays supported. The installation procedures are identical.

NCR 4 x 20 Customer
Display Up to four
lines of twenty 5x7
characters are supported

5974 Remote Customer Display
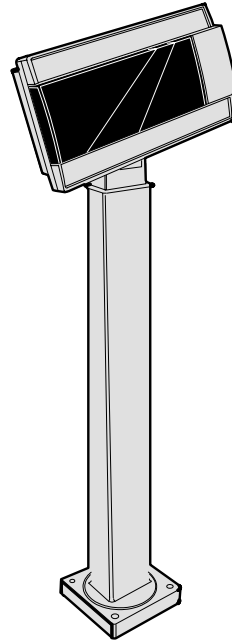
5973 International Customer Display

20285

1. Locate the Display Mount within 4 meters (13 ft.) of the host terminal.

2. Determine if the cable should be routed down through the mounting surface or if it should be run on top of the surface. Drill a hole if necessary.

3. Secure the Mounting Plate with the provided screws (4).

Mounting Plate

4 Holes
4.06 mm
(0.160 in.)
Diameter

76 mm
(3 in.)
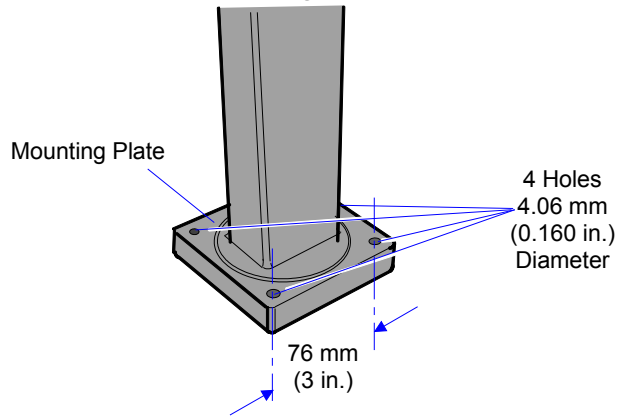
16258a

4. Connect the 5974 Display Cable to the *Parallel* port on the terminal.

NCR 4 x 20 Customer
Display Up to four
lines of twenty 5x7
characters are supported

Parallel Port
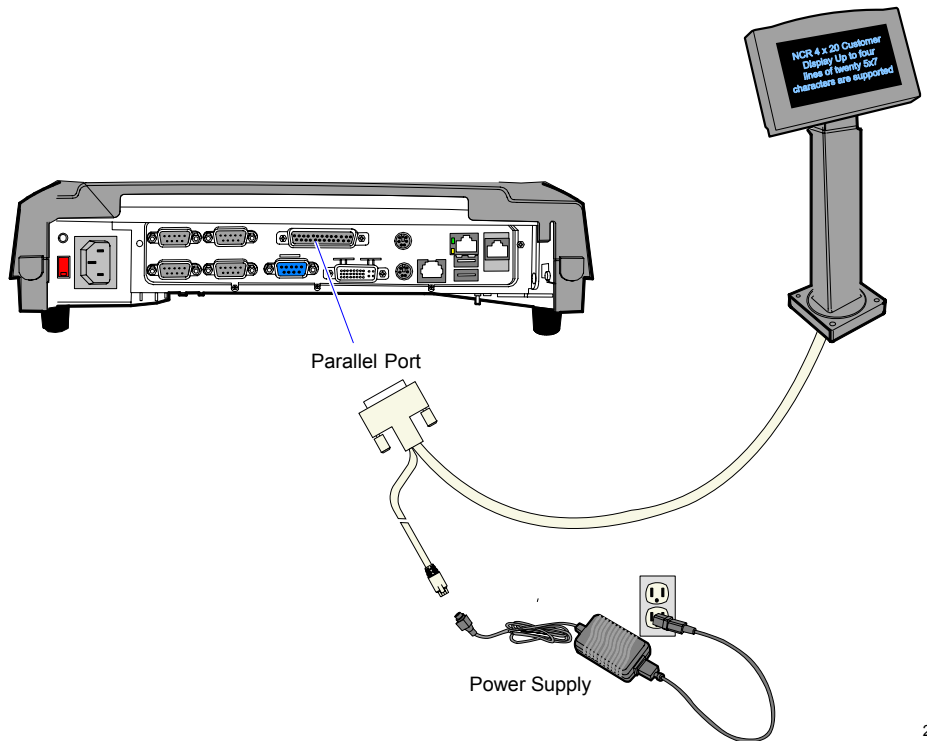
Power Supply

20284

5. Connect the Power Supply to the *Power* pigtail on the cable and to a standard AC outlet.

Installing a Cash Drawer

1. Place the cash drawer in the desired location, within cable length of the terminal.

2. Connect the cash drawer cable to the terminal cash drawer connector.

Cash Drawer

Optional
Connection
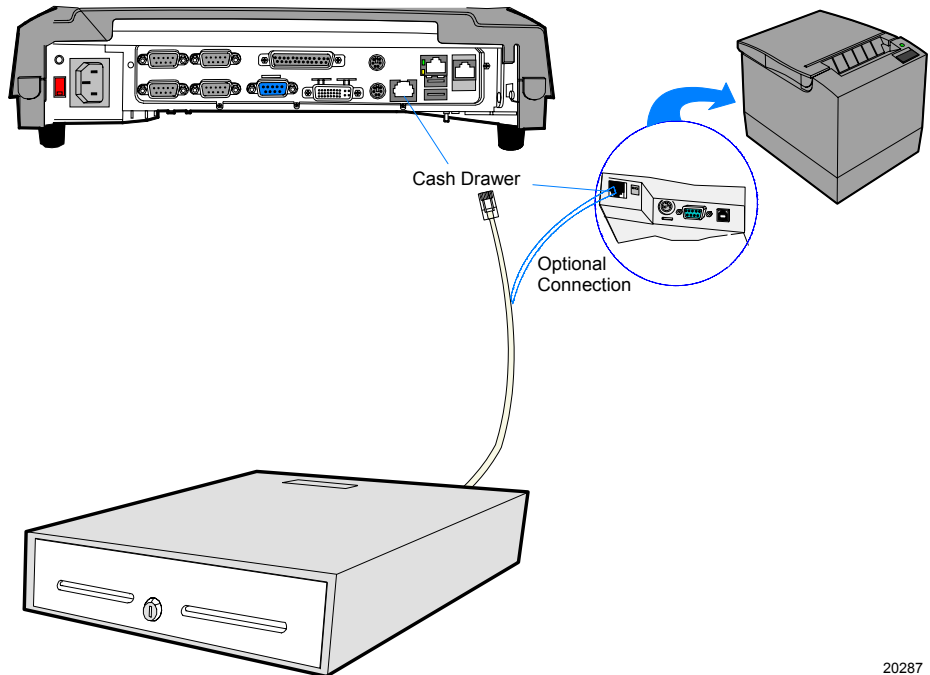
20287

Note: The Cash Drawer can optionally be connected to the printer.

Installing a Keyboard and Mouse

The 7460 supports a PS/2 keyboard connected to the PS/2 connector in the Operator Display assembly. The PS/2 mouse requires a Y-cable to be installed at the terminal PS/2 connector as shown below.

Operator Display

RS-232

PS/2

497-0425664
(1416-C800-0004)

RS-232   PS/2

PS/2

497-0406056
(1416-C281-0018)

20296
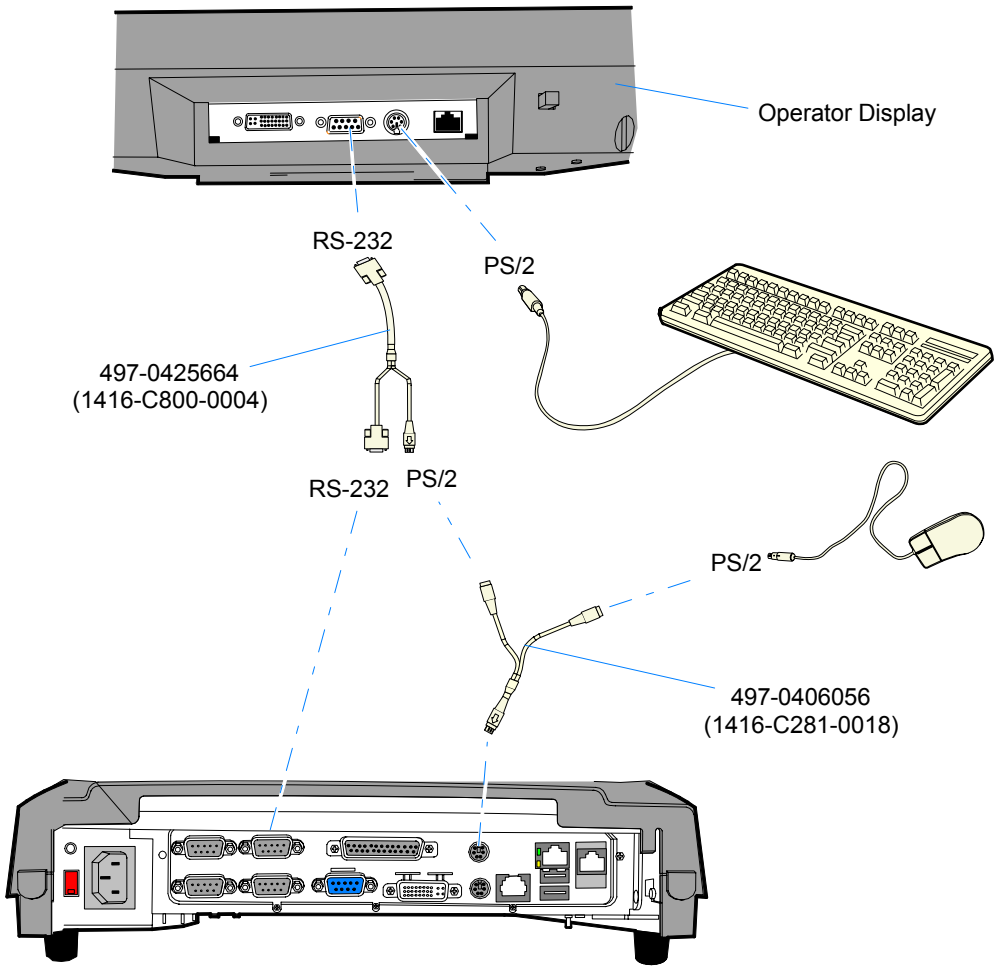
Installing a Serial Mouse

Follow these steps to install a Serial Mouse on the terminal.

Edit the `boot.ini` file, which is located in the root of the C drive.

Note: The procedures below vary slightly, depending on which Operating System is being used.

1. Open Windows Explorer
2. Go to the **Tools** menu and select **Folder Options**.
3. Select the **View** tab.
4. Scroll down until you see a folder that is labeled **Hidden Files**. Make sure the button labeled **Show hidden files and folders** is selected and then select OK.
5. Select the C drive root directory. Scroll down until you find the file named `boot.ini` and select it.
6. Open the **File** menu and then select **Properties**.
7. Uncheck the box labeled **Read Only** and then select **OK**.
8. Open the `boot.ini` file with Notepad. It should have the following entry:

```
[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINNT="Windows NT
Workstation Version 4.00" /NoSerialMice
```

9. Delete the text `/NoSerialMice`.
10. Save the file and then restart the terminal with the serial mouse connected.

After the machine restarts it sees the mouse and installs the supporting drivers. The drivers are located on the hard drive at `C:\install\i386`. If for some reason they are not on the hard drive, connect the terminal to a network and share a CD-ROM drive with the NT Operating System disk installed, or copy the files needed to the network.

Touch Screen

Touch Interface BIOS Setting

The touch screen for has a dedicated serial interface (COM3), which means that any serial peripheral device using COM3 must be changed to use a different port. The Powered Port option for COM3 (*Serial Port C* in the BIOS Setup, see Chapter 3: *BIOS Setup*), **MUST** be set to **Auto** for the Touch Interface to function.

Calibrating the Touch Screen

Be sure to observe for the following touch screen calibration guidelines:

- Calibrate the touch screen as part of the installation process.

- Recalibrate the touch screen when the system is installed at its final location.

- Recalibrate whenever the terminal is moved to a new location.

- Recalibrate the touch screen anytime the system has been disassembled for servicing.

- Recalibrate the touch screen if the screen resolution is changed.

The touch screen can be calibrated using MicroTouch (Windows) or Microcal (DOS).

Calibration Using TouchWare (Windows)

1. From the Windows Start button, select **Settings→Control Panel→TouchWare**.

2. From the *TouchWare Properties* screen, select **Calibrate** to begin calibration.
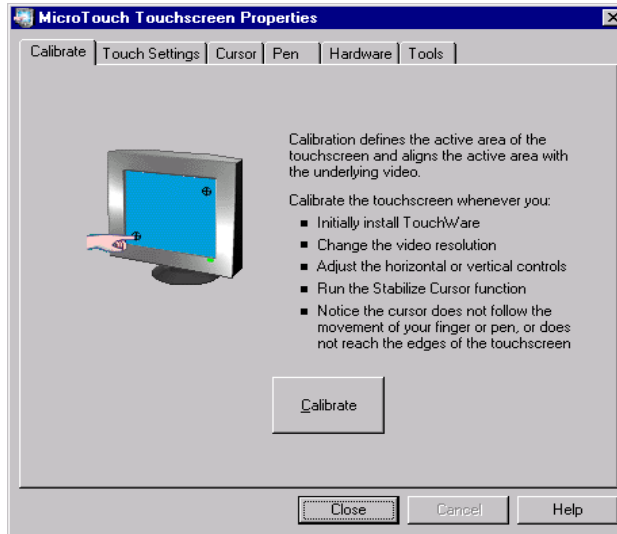
3. A screen is displayed with five targets. Place your finger on the target that has a finger icon pointing towards it and hold it until the statement *Touch Enable* is displayed over the finger icon.

    Note: For best results, press the screen near the circle and then slide your finger onto the circle without raising your finger from the screen.
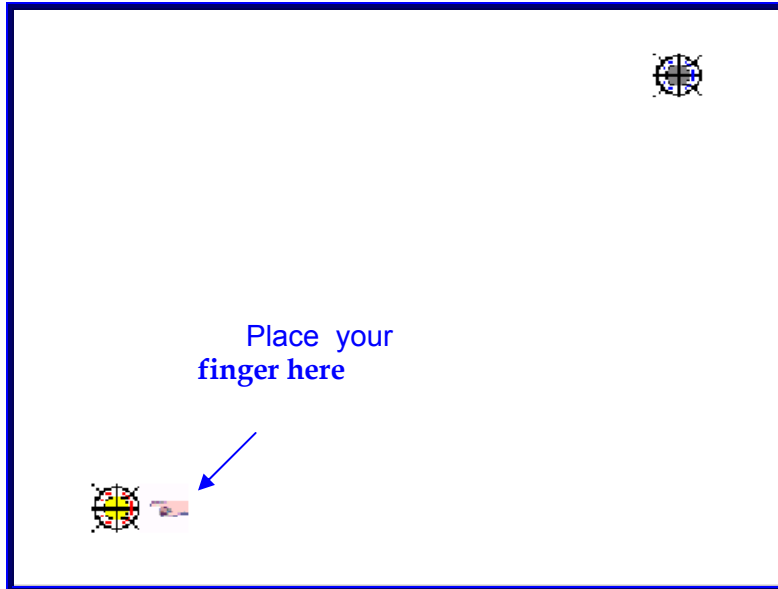
4. Repeat the touch procedure for the remaining icons.

5. When the *MicroTouch Calibration* dialog box reappears, do not touch the screen until this dialog box is no longer displayed.

MicroTouch Calibration

❌ Do NOT touch the screen while calibration data is being saved.
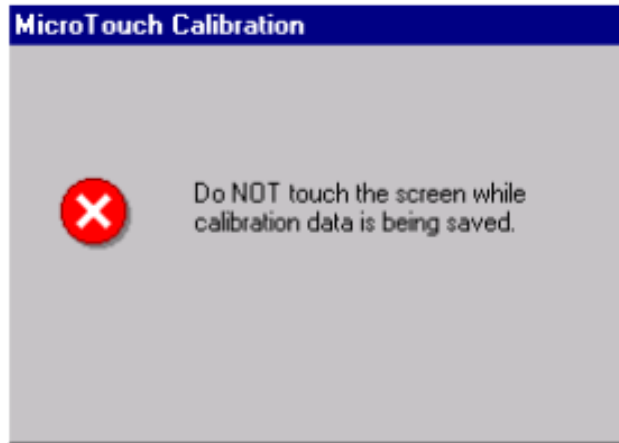
6. From the *Calibration Complete* screen, select **Done**.

7. Select **Close** to exit the TouchWare program.

8. From the Control Panel, select **File→Close** to exit the Control Panel.

Note: For more information on the MicroTouch TouchWare software, please refer to the User's Guides that are on the *NCR 74xx Base System and Client Third Party Drivers* CD (LPIN: D370-1111-0100), or on the NCR Drivers and Patches web site.

http://www.ncr.com/support/support_drivers_patches.asp?Class=retail.

Calibration Using Microcal (DOS)

The calibration program looks at where your finger is when you lift it off the screen, not where you touch it. Therefore, calibrate the screen as follows:

1. Touch the screen near the calibration target.

2. Keep your finger on the screen and slide it to the center of the target.

3. Hold your finger firmly on the target for two seconds, then lift it off quickly.

4. Verify that the calibration was set accurately before making a service call. Perform the calibration again if necessary.

Noise Check Utilty

If cursor is not stable, or false touches are suspected, run the Noise Check Utility from the Microcal program (found on the *NCR 74xx Base System and Client Third Party Drivers* CD (LPIN: D370-1111-0100). Choose the recommended frequency (the one with the lowest noise level). This should also be done if the touch screen is still not calibrated after one attempt to recalibrate it.

1. Set the video resolution by going to the **Tools** menu, Video and selecting **800 x 600 256 colors**.

2. Go to the **Tools** menu, select **Noise Check**.

3. Follow the instruction prompts. Choose the frequency with the lowest noise level.

Application software can possibly generate a dialog box from the Touch Driver, with the message that the touch screen needs to be recalibrated. If the screen appears to be working normally, then this message can be ignored. There is a check box labeled `Do not show this message again`. Make sure this box is checked.

Summary

If there is a touch screen calibration issue during or after installation, take the following actions in the order listed:

1. Recalibrate.

2. If recalibration is unsuccessful after two attempts, then run the Noise check to change the frequency.

3. If you are still unable to calibrate, change the touch screen glass.

4. The final step is to replace the Touch Controller Board. If this corrects the problem, then the old glass is probably OK to reuse.

Double-Touch Condition

There are instances where Touchscreen settings can permit duplicate touches from operators. If you experience this condition make the following changes.

1. From the Windows Start button, select **Settings→Control Panel→TouchWare**.

2. From the *TouchWare Properties* screen, select **Touch Settings**.

3. In the *Touch Mode* section select **Button** (Green Light should illuminate).

   Note: If **Button** is not one of the selections available but there is a **Custom** button available, go to the *Tools* tab, select **Options→Button** **mode (default),** and **Close**.

4. In the *Double-click* section set the **Double-click** to the slowest setting.

5. Test the Touchscreen by selecting the *Draw* option under the *Tools* tab.

6. Exit the TouchWare Utility.

MSR Cleaning Cards

Part	Part Number
MSR Cleaning Card, Dry	998-0052929
MSR Cleaning Card, Wet	603-9004998

Out-of-Box Failures

The RSG-Atlanta Customer Satisfaction Hotline will replace out-of-box failed hard disks with identical, preloaded drives. Once a system is successfully installed, all disk contents are the responsibility of the customer. The customer is responsible for restoring operating system software and/or customer-specific data onto replacement disks sent to repair a failed or damaged disk in the field. NCR provides recovery tools for the operating system and platform software.

Powering Down the Terminal

To power down the terminal, press the Power button on the side of the terminal. If the *Instant Power Off* setting in BIOS Setup is set to *Disabled* you must press and hold the power off button for 4-5 seconds.

Note: If the unit is powered on and you pull the plug from the power source and then plug it back in, the unit comes back on. If the unit is powered off and you unplug it from its power source, then plug it back in, the unit is still powered off. To disable this feature change the BIOS setting *After Power Failure* in the *Advanced* menu.

Chapter 3: **BIOS Setup**

Introduction

Since the Setup Utility supports touch input, an external alphanumeric keyboard is not required. However, it is recommended for ease of use.

Note: The BIOS version required is Version 2.0.0.0.

Entering Setup Using a Keyboard

1. Apply power to the terminal.

2. Press the F2 key when the message at the bottom of the screen prompts you to do so.

   Note: Setup can also be entered from the Boot Menu that is displayed when you press **ESC** during POST.

Entering Setup Using the Touch Screen

1. Apply power to the terminal.

2. Calibrate the touch screen.

   a. When the screen prompt that says *Touch the screen two times to enter Setup* appears, touch the screen **three** times. This causes the system to bypass the *BIOS Setup* and go directly to the Touch Screen Calibration Setup. You will not see this prompt if the *Boot-Time Diagnostics Screen* is disabled, but you can still enter setup by touching the screen **three** times.

   b. As instructed on the screen, touch the circle near the lower-left corner of the screen. For best results, press the screen near the circle and then slide your finger onto the circle without raising your finger from the screen.

   c. Using the same method as above, touch the circle near the upper-right corner of the screen.

3. You should receive a *Successful Calibration* message and then the *PhoenixBIOS Setup Utility* should come up.

4. Select the setup parameters by touching the controls at the bottom of the screen.

How to Select Menu Options

The following keyboard controls are used to select the various menu options and to make changes to their values.

- Use the arrow keys to select (highlight) options and menu screens.

- Use the + and - (or F5 and F6) keys to change field values.

- To view help information on the possible selections for the highlighted item, press F1.

- To save the changes, move the cursor to the *Exit Menu*, select either *Save Changes & Exit* or *Save Changes*, and press Enter.

Note: If you are not using an external keyboard, you can touch the menu controls at the bottom of the screen. If you encounter difficulty doing this, recalibrate the screen.

Restoring Factory Settings

To reset all values to their default settings for the *current screen*, press F9. The terminal will automatically load BIOS default CMOS values for boot up.

To reset *all* BIOS settings to their default settings go to the *Exit* menu, press F9, select either *Save Changes & Exit* or *Save Changes*, and press Enter.

See the BIOS Default Settings section later in this chapter for the pre-installed Setup defaults.

BIOS Default CMOS Values

The following are the BIOS default CMOS values for the terminal.

Main Values

System Time	(variable)
System Date	(variable)
Legacy Diskette A:	[Disabled]
Primary Master	[Auto]
Total Sectors:	(variable)
Maximum Capacity:	(variable)
Multi-Sector Transfers:	(variable)
LBA Mode Control:	[Enabled]
32 Bit I/O:	[Disabled]
Transfer Mode:	Fast PIO 4
Ultra DMA Mode:	[Mode 2]
Primary Slave	[Auto]
Type:	[Auto]
Multi-Sector Transfers:	[Disabled]
LBA Mode Control:	[Disabled]
32 Bit I/O:	[Disabled]
Transfer Mode:	[Standard]
Ultra DMA Mode:	[Disabled]
Smart Monitoring:	Ensabled
System Memory	640 KB
Extended Memory	(variable)

Advanced Menu

Installed O/S:	[Other]
Reset Configuration	[No]
Memory Cache	[Enabled]
Cache System BIOS area	[Write Protect]
Cache Video BIOS area	[Write Protect]
Cache Base (0-512k)	[Write Back]
Cache Base (512-640k)	[Write Back]
Cache Extended Memory area	[Write Back]
Cache A000 – AFFF:	[Disabled]
Cache B000 – BFFF:	[Disabled]
Cache C800 – CBFF:	[Disabled]
Cache CC00 – CFFF:	[Disabled]
Cache D000 – D3FF:	[Write Protect]
Cache D400 – D7FF:	[Write Protect]
Cache D800 – DBFF:	[Write Protect]
Cache DC00 – DFFF:	[Write Protect]
Cache E000 – E3FF:	[Write Protect]
Cache E400 – EBFF:	[Write Protect]
Cache EC00 – EFFF:	[Write Protect]
PS/2 Mouse	[Auto Detect]
I/O Device Configuration	
Serial port A:	[Enabled]
Base I/O address:	[3F8]
Interrupt:	[IRQ 4]

Serial port B:	[Enabled]
Base I/O address:	[2F8]
Interrupt:	[IRQ 3]
Powered Port:	[Auto]
LPT 1:	[Enabled]
Mode	[ECP]
Base I/O address:	[378]
Interrupt:	[IRQ 7]
DMA channel:	[DMA 1]
Fdc On Lpt:	[Auto]
Floppy disk controller:	[Disabled]
Serial port C:	[Enabled]
Base I/O address:	[3E8]
Interrupt:	[IRQ 10]
Powered Port:	[Auto]
Serial port D:	[Enabled]
Base I/O address:	[2E8]
Interrupt:	[IRQ 11]
Powered Port:	[Auto]
LPT 2:	[Enabled]
Mode	[ECP]
Base I/O address:	[278]
Interrupt:	[IRQ 5]
DMA channel:	[DMA 3]
Disk-On-Chip:	[Disabled]

MSR Address:	[DE00-DFFF]
Large Disk Access:	[DOS]
Local Bus IDE adapter:	[Primary]
Advanced Chipset Control	
Video boot type	[Enabled]
Extended memory gap	[Disabled]
PCI Configuration	
PCI/PNP ISA UMB Region Exclusion	
Cache C800 – CBFF:	[Available]
Cache CC00 – CFFF:	[Available]
Cache D000 – D3FF:	[Available]
Cache D400 – D7FF:	[Available]
Cache D800 – DBFF:	[Available]
Cache DC00 – DFFF:	[Available]
PCI/PNP ISA IRQ Resource Exclusion	
IRQ 3:	[Available]
IRQ 4:	[Available]
IRQ 5:	[Available]
IRQ 7:	[Available]
IRQ 9:	[Available]
IRQ 11:	[Available]
IRQ 15:	[Available]
PCI IRQ Line 1	[Auto Select]
PCI IRQ Line 2	[Auto Select]
PCI IRQ Line 3	[Auto Select]

PCI IRQ Line 4	[Auto Select]
System Monitors	
+12V Status	Current value of the indicated measurement (continuously updated)
+2.5V Status	Current value of the indicated measurement (continuously updated)
+5V Status	Current value of the indicated measurement (continuously updated)
CPU Temperature	Current value of the indicated measurement (continuously updated)
System Temperature	Current value of the indicated measurement (continuously updated)
Vcc Status	Current value of the indicated measurement (continuously updated)
Vcore Status	Current value of the indicated measurement (continuously updated)
1.8V Status	Current value of the indicated measurement (continuously updated)
Vtt Status	Current value of the indicated measurement (continuously updated)
+3.3V Status	Current value of the indicated measurement (continuously updated)
Multiple ROM	
Parallel CD-ROM Boot	[Disabled]
On-board Intel PXE	[Enabled]
On-board Intel LAN	[Enabled]
Etherboot	[Disabled]
Selectable ROM 5	[Disabled]

Selectable ROM 6	[Disabled]
Selectable ROM 7	[Disabled]
Selectable ROM 8	[Disabled]
Selectable ROM 9	[Disabled]
Selectable ROM 10	[Disabled]
Selectable ROM 11	[Disabled]
Selectable ROM 12	[Disabled]
Selectable ROM 13	[Disabled]
Selectable ROM 10	[Disabled]
Selectable ROM 15	[Disabled]
Quickboot Mode:	[Enabled]
After Power Failure	[Enabled]
Continuous POST:	[Disabled]
Boot menu retry:	[Keyboard]
Instant Power Off	[Enabled]
LCD Contrast:	[25]
LCD Brightness:	[3]
Beep Error Codes:	[Off]

Security Menu

Supervisor Password Is:	Clear
User Password Is:	Clear
Set Supervisor Password:	[Enter]
Set User Password:	[Enter]
Password on boot:	[Disabled]

Power Menu

Power Savings:	[Disabled]
Standby Timeout:	[Off]
Auto Suspend Timeout:	[Off]
Hard Disk Timeout:	[Disabled]
Resume On Time:	[Off]
Resume Time:	[00:00:00]
Resume On Modem Ring:	[Off]

Boot Menu

Intel® Boot Agent Version 4.0.17:

+Hard Drive

CD-ROM Drive

Removable Devices

Chapter 4: **Operating System Recovery**

Introduction

This chapter discusses procedures how to recover the Operating System by using the parallel CD-ROM drive. The software is distributed on bootable CD-ROM media. The drivers that are necessary to run the CD-ROM are temporarily installed during boot.

Prerequisites

The following are required on the 7460 in order to perform a OS Recovery using a CD.

- Bootable CD-ROM drive (2336-K024)

- Keyboard

Caution: When performing an OS recovery from a larger source image (larger disk) to a smaller destination disk you must use a special procedure. See the section titled *OS Recovery from a Larger Disk Image*.

Updating Procedures

1. Connect the external CD-ROM (**2336-K024)** drive to the parallel port on the terminal.

2. Connect the opposite end of the CD-ROM cable power connector to the CD-ROM drive parallel connector.

    Note: The parallel port on the 7460 is the Remote Customer Display port. Therefore, if your terminal is configured with a Customer Display, you must temporarily disconnect it in order to use the CD-ROM drive.

Parallel Port

Power Connector

Parallel Connector

18532
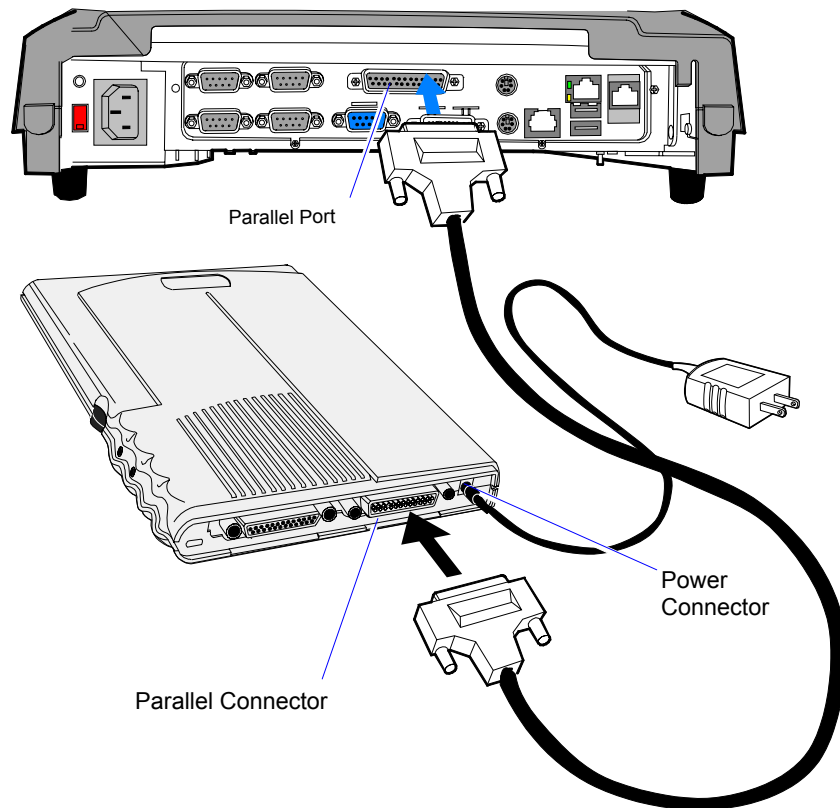
3. Connect the DC Power Cable to the CD-ROM power connector and an AC outlet.

4. Insert the CD that contains the operating system image in the CD-ROM drive.

Software CD LPINs			
Win2000	**WinNT**	**Win98**	**DOS**
D370-0562-0100	D370-0561-0000	D370-0559-0100	D370-0499-0100

5. Apply power to the terminal.

6. Press **F2** at the screen prompt to enter the Setup Utility.

7. In the **Advanced** menu, select **Multiple ROM Menu**.

8. Set the **Parallel CD-ROM Boot** to **Enabled**.

9. In the **Advanced** menu, select **I/O Device Configuration**.

10. Verify the **LPT1:** is set to **ECP**.

11. Exit Setup and Save Changes.

As the terminal reboots, you should see a message during boot indicating that the CD-ROM has been recognized:

```
Micro Solutions BACKPACK CD-ROM v0.3
. . .
Booting from BACKPACK CD
Starting MS-DOS
```

12. Follow the DOS screen prompts. After each entry, you are asked to confirm your input. You can use *1* or *y* for **Yes**, *2* or *n* for **No**.

13. Enter whether or not you want to perform **Disk Verification**. (Answering **Yes** takes twice as long, but is recommended.)

If **Yes** is selected:

- The Ghost software verifies write operations and handles bad FAT clusters.

- The Ghost error file (GHOST.ERR) is displayed before rebooting

If **No** is selected:

- The Ghost error file is displayed before rebooting only if Ghost aborts.

    Caution: If the error file is displayed, the batch file pauses for user input before rebooting. You may use Ctrl-C to cancel out of the batch file if you want to see the error file again, but **<u>nothing</u>** should be done that writes to the hard disk before rebooting. GHOST.ERR is on the RAM disk and is lost on reboot.

14. Select which type of recovery you want to perform from the next menu (normally option #1).

    ```
    1. Redo entire disk with the first partition the same size.
    2. Redo the first OS partition.
    3. Redo the second OS partition.
    ```

The Ghost software then begins the disk recovery from the CD. It displays a progress bar and gives you an estimate how long the process should take.

> **Note:** Some Operating Systems occupy more than one CD. You are asked to insert the next CD at the proper time.

When the recovery process is completed, the client hard disk is restored to its preinstalled condition, as originally received from the factory.

15. Remove the CD from the drive.

16. Enter Setup when the terminal reboots and reset the **Parallel CD-ROM Boot** to **Disabled**.

17. Exit Setup and Save Changes.

Completing the OS Installation (Win2000)

The system automatically reboots when the image recovery is complete and starts the software installation. This installation also installs most of the additional software and drivers that are included in the disk image. Complete the installation as follows.

1. After the terminal reboots, it will perform a disk check and then continue with the Windows 2000 installation.

2. Enter the *User Name* and *Organization*.

3. Enter the *Computer Name* for the client.

4. Enter the *Administrator's Account Password* (optional)

5. Login when prompted.

6. Run the TouchWare calibration from the Desktop icon.

Completing the OS Installation (WinNT)

The system automatically reboots when the image recovery is complete and starts the software installation. This installation also installs most of the additional software and drivers that are included in the disk image. Complete the installation as follows.

1. After the terminal reboots, it will perform a disk check and then continue with the Windows NT installation.

2. Enter the User Name and Organization.

3. Enter the Computer Name for the client.

4. Enter the Administrator's Account Password (optional)

5. Log in when prompted.

6. Press Next at the Found New Hardware wizard.

7. Run the TouchWare calibration from the Desktop icon.

Completing the OS Installation (Win98)

The system automatically reboots when the image recovery is complete and starts the software installation. This installation also installs most of the additional software and drivers that are included in the disk image. Complete the installation as follows.

1. When the terminal boots it enters the Windows setup routine.

2. At the **User Information** screen, enter the *User* information. This can be done using a keyboard or you can use the touch screen.

3. Go into the Control Panel and set the terminal Date and Time.

4. Run the TouchWare calibration from the Desktop icon.

Completing the OS Installation (DOS)

The system automatically reboots when the image recovery is complete and opens at the DOS C: prompt.

Gold Disk Contents

This section describes the contents of each of the Gold Disk Images, including all the additions and changes that was made on top of the generic operating system.

Important: For each operating system, NCR **strongly** recommends that the drivers placed in the `c:\install` directory be left there for the purposes of servicing and maintaining the system. If you are using the information in this section to build your own operating system image and not using NCR's provided OS Recovery image as a base image, then we recommend that all installed drivers be placed in a similar `c:\install` directory for support.

Microsoft Operating System License Agreements

When purchasing a workstation preloaded with a Microsoft operating system, the application provider must follow certain license agreement guidelines. Listed below are some of the major points of Microsoft's *Embedded Software* agreement, which currently covers DOS, Win 3.11, Windows 98, Windows NT, and Windows 2000.

- The end user application should not allow the user (typically a cashier) to exit the application so that they may be able to browse the operating system desktop, explorer, or other Microsoft operating system user interface elements. This does not apply to servicing, upgrading, or diagnosing problems for the workstation by services or field engineers. This restriction is meant to ensure that the end user is only allowed to navigate within the confines of the end user's application under normal operating conditions.

- The NCR OS Recovery image can only be used to recover or update systems with licenses procured from NCR.

Migrating Operating System Images from 7460 1.x Terminals

In the sections that follow are listed the items that NCR has installed for the images for Release 2.0. Those items that are marked in **Bold** are required changes that **MUST** be done to the 1.x image in order for the new hardware to function properly. All other changes to the image are optional.

NCR 7460 Win 2000 Operating System Recovery Software (LPIN: D370-0562-0100)

Installed Software

- Microsoft Windows 2000 Professional with SP2

- Microsoft Windows 2000 SRP1

- Microsoft Internet Explorer 6.0 (6.0.2600.0000)

- Intel AC'97 Audio (5.0.2184.1)

- Intel(R) 82810 Video (5.12.1.2772)

- Intel(R) 82559 Fast Ethernet LAN (5.0.67.0)

- Intel 810 Ultra ATA Storage (6.03.008)

- **MicroTouch TouchWare (5.63 SR3) for serial interface (*)**

- Windows Installer (2.0)

- NCRSYSM (3.0.1.9)

- Backpack CD-Rom available (3.02)

- Edgeport USB available (1.16.9)

(*) All previous versions of MicroTouch must be uninstalled before reinstalling support for the serial touch interface.

Uninstalled Drivers

The following drivers are not installed automatically, but can be installed from their respective locations (Readme files exist in these locations):

- Backpack CD-ROM   `C:\Install\Drivers\CDRom`

- Edgeport USB   `C:\Install\Drivers\USB`

Settings and Revisions

- 1. Preinstalled W2K to include the Product ID Number (PID)

- 2. Placed the Gold Drive Part Number, Date Created, LPIN, and Release in Registry under:
  `HKey-Local_Machine\Software\NCR\Gold Drive`

- 3. Ran Sysprep, using sysprep.inf and sysprep.bat, so that the mini installation will run on initial boot with the following parameters:

Automatically include PID

- Established a single FAT32 primary system partition to fill the entire drive

- Included necessary OS cab files in C:\Install

- Installed Intel Proset utility

- Enabled PME set to 'Hardware Default'

- Disabled APM

- Used noguiboot to hide OS splash

- Removed Secondary Controller from IRQ 15 (ATA)After installing Windows 2000 the Backpack CD-ROM is not recognized as a boot device. It is recognized as a device on the system, but not a bootable device. When bootable media is inserted, errors such as *Operating System Not Found* are reported. To correct this condition set the BIOS to the Default Parameters. See the *Setup* chapter, *Exit Menu Options* section.

Note: This product should only be used on 7460-2XXX terminals with a Microsoft Windows 2000 license.

NCR 7460-NT Operating System Recovery Software (LPIN: D370-0561-0100)

Installed Software

- Microsoft Windows NT Workstation 4.0 with SP6a

- Microsoft Internet Explorer 6.0 (6.0.2600.0000)

- Microsoft Internet Explorer Security Update (Q323759.exe)

- Intel(R) 82810-DC100 Video (4.03.1381.2772)

- Intel(R) 82559 Fast Ethernet LAN (5.00.66.0000)

- **MicroTouch TouchWare (5.63 SR3) for serial interface (*)**

- Windows Installer (2.0)

- NCRSYSM (3.0.1.9)

- SoundMax Audio (4.02.00.0053)

- Intel 810 Ultra ATA Storage (6.10.011)

- Backpack CD-Rom available (2.04)

- Edgeport USB available (2.13)

(*) All previous versions of MicroTouch must be uninstalled before reinstalling support for the serial touch interface.

Uninstalled Drivers

The following drivers are not installed automatically, but can be installed from their respective locations (Readme files exist in these locations):

- Backpack CD-ROM   `C:\Install\Drivers\CDRom`

- Edgeport USB   `C:\Install\Drivers\USB`

Settings and Revisions

- Preinstalled NT to include the Product ID Number (PID)

- Placed the Gold Drive Part Number, Date Created, LPIN, and Release in Registry under:

  `HKey-Local_Machine\Software\NCR\Gold Drive`

- Ran Sysprep (so that the mini installation will run oninitial boot) with the following parameters: Automatically include PID

- Host.cmd set in RunOnce to update the registry

- Established a 2gb FAT16 primary system partition

- Established a secondary NTFS partition that fills the remainder of the drive

- Included necessary OS cab files in C:\Install

- Made SP6a folder available in C:\Install (installed)

- Exposed to both Intel 82810 and 82810-DC100 video chipsets

- Installed SMI Control Panel

- Installed Intel Proset utility

- Enabled DMA

- Refresh rate set to 60Hz

- Set **Enable PME** to **Hardware Default**

Note: This product should only be used on 7460-2XXX terminals with a Microsoft Windows NT 4.0 license.

NCR 7460-Win98 Operating System Recovery Software (LPIN: D370-0559-0100)

Installed Software

- Microsoft Windows 98SE

- Microsoft Internet Explorer 6.0 (6.0.2600.0000)

- Microsoft Internet Explorer Security Update (Q323759.exe)

- Analog Devices SoundMax Audio (5.12.01.2502)

- Intel(R) 82810 Video (4.12.01.2772)

- Intel 82559 Ethernet LAN (5.00.67.0000)

- **MicroTouch TouchWare (5.63 SR3) for serial interface (*)**

- Windows Installer (2.0)

- NCRSYSM (3.0.1.8)

- Intel 810 Ultra ATA Storage (6.10.011)

- Backpack CD-Rom available (2.04)

- Edgeport USB available (1.16.9)

(*) All previous versions of MicroTouch must be uninstalled before reinstalling support for the serial touch interface.

Uninstalled Drivers

The following drivers are not installed automatically, but can be installed from their respective locations (Readme files exist in these locations):

- Backpack CD-ROM   `C:\Install\Drivers\CDRom`

- Edgeport USB   `C:\Install\Drivers\USB`

Settings and Revisions

- Preinstalled Win98 to include the Product ID Number (PID)

- Placed the Gold Drive Part Number, Date Created, LPIN, and Release in Registry under:

  `HKey-Local_Machine\Software\NCR\Gold Drive`

- Added Userinfo.exe to Start Menu to capture User Name, User Organization, Computer Name, and Workgroup (once the user has entered this information, Userinfo removes itself from the Start Menu)

- Established a FAT32 primary system partition that fills the entire drive

- Included necessary OS cab files in C:\Install

- Exposed to both Intel 82810 and 82810-DC100 video chipsets

- Installed Intel Proset Utility

- Applied a Microsoft hotfix to replace usbhub.sys version 4.10.2222 with 4.10.2223; this executable has been placed in

  `C:\Install\Drivers\USB\Hotfix`

- Set to High Color

- **Enable PME** (in Intel Proset utility) set to **Hardware Default**

- Muted the Volume Line-In

- Set refresh rate to 60 Hz

Note: This product should only be used on 7460-2XXX terminals with a Microsoft Windows 98 license.

NCR 7460 DOS Operating System Recovery Software (LPIN: D370-0499-0100)

The following software is installed on the image:

- Microsoft DOS installed

OS Recovery from a Larger Disk Image

The following procedure should be used to restore an Operating System when the destination disk is smaller than the source image (i.e. OS Recovery was made on a 10 GB source disk, but is being recovered on a 4.3 GB drive).

1. Boot the system.

You should see a message during boot indicating that the CD-ROM has been recognized:

```
Micro Solutions BACKPACK CD-ROM v0.3
. . .
Booting from BACKPACK CD
Starting MS-DOS
```

2. Follow the DOS screen prompts. After each entry, you are asked to confirm your input. You can use *1* or *y* for **Yes**, *2* or *n* for **No**.

3. Enter **No** at the **Disk Verification** question.

4. Select which type of recovery you want to perform from the next menu (normally option #1).

```
Redo entire disk with the first partition the same size.
Redo the first OS partition.
Redo the second OS partition.
```

5. At the *Press any key to continue* dialog box, press **[CTRL-C]** to abort the process. When asked `Terminate batch job?` Answer **Y**.

6. From the command prompt, change to drive Z, which is the location of the Ghost software (CD-ROM drive).

7. Run the Ghost command.

```
Ghost.exe
```

8. Press **Enter**.

9. Select **Local** → **Disk** → **From Image** and press **Enter**.

10. The directory that Ghost is now looking in should be Z: (if not, switch to Z). Select the **File name to load image from** file (*nnnnnnn*.gho) and press **Enter**.

11. Select the **Local destination drive** and press **Enter**.

12. Set the size (2gb) of the 1st partition (which is FAT16). In order to do this you may need to clear the amount from the 2nd partition.

13. Set the size of the 2nd partition.

O/S	2nd Partition Format	2nd Partition Size
Win2000	NTFS	Fill the remaining drive space
NT	NTFS	Fill the remaining drive space
Win98	FAT32	Fill the remaining drive space
DOS	FAT16	2gb

14. Press **Enter**.

15. If you are recovering from Win9x, it is likely that the 2nd partition will be too small for FAT32. If so, a dialog is displayed
    ```
    Converting partition from FAT32 to FAT, proceed?
    ```
    Choose **Yes**.

16. At the next dialog box,
    ```
    Proceed with disk load? Destination drive will be
    permanently overwritten,
    ```
    Choose **Yes** to start the recovery process.

Chapter 5: **BIOS Updating Procedures**

Introduction

This chapter discusses procedures how to update the terminal BIOS by using the parallel CD-ROM drive. The software is distributed on bootable CD-ROM media. The drivers that are necessary to run the CD-ROM are temporarily installed during boot.

It is also possible to perform a BIOS update using a network connection. Refer to the *NCR FitClient Software User's Guide* for information about that procedure.

Crisis Recovery

In the event the BIOS becomes corrupt, such as the result of a power failure during the BIOS Update procedure, you can use the method discussed later in this chapter in the *BIOS Crisis Recovery* section to recover the BIOS.

Prerequisites

The following are required on the 7460 in order to perform a BIOS update using a CD.

- Bootable CD-ROM drive (2336-K024)

- Keyboard

- Keyboard *NCR BIOS and BIOS Update Software* (LPIN: A370-0022-0100) (Version 2.0.0.0 or later)

Updating Procedures

1. Connect the External CD-ROM Drive (**2336-K024)** to the parallel port on the terminal.

Parallel Port

Power Connector

Parallel Connector
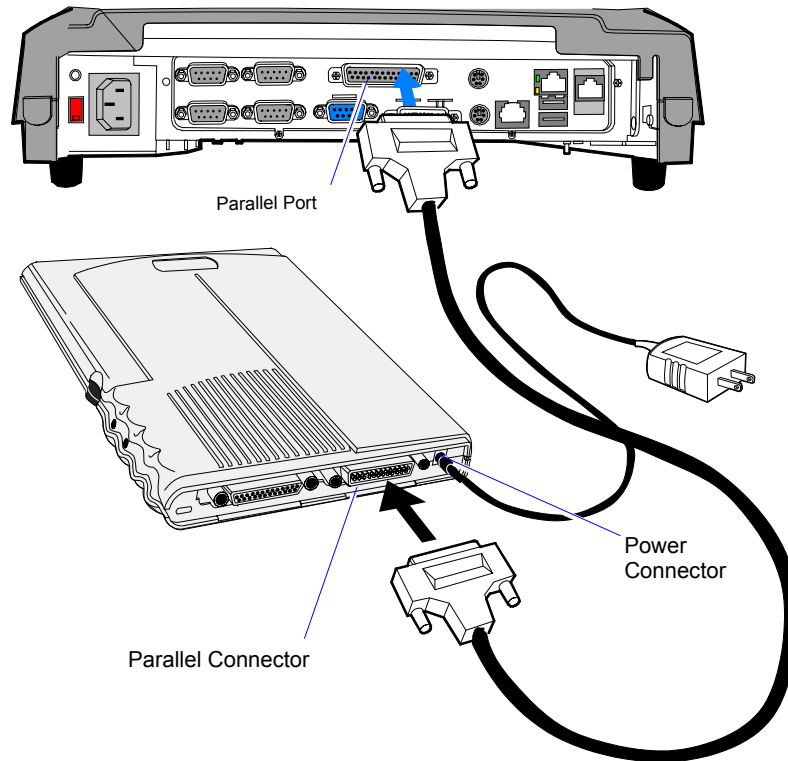
18532

2. Connect the Power Cable to the CD-ROM power connector and an AC outlet.

3. Insert the BIOS CD in the CD-ROM drive.

4. *NCR BIOS and BIOS Update Software*
    LPIN: A370-0022-0100 (Version 2.0.0.0 or later)

5. Apply power to the terminal.

6. Press **F2** at the screen prompt to enter Setup.

7. In the **Advanced** menu, select **Multiple ROM Menu**.

8. Set the Parallel CD-ROM Boot to Enabled.

9. In the Advanced menu, select I/O Device Configuration.

10. Verify the **LPT1:** is set to **ECP**.

11. Exit Setup and Save Changes.

As the terminal reboots, you should see a message during boot indicating that the CD-ROM has been recognized:

```
Micro Solutions BACKPACK CD-ROM v0.3
. . .
Booting from BACKPACK CD
Starting MS-DOS
```

12. Follow the screen prompts on the client to update the BIOS. You can select two methods to run the update program.

    • Automatic BIOS Update – update process runs unattended

      Note: You can see a prompt for terminal model and serial number information. If the program detects invalid information in the current BIOS, or if you are replacing the processor board, there is not model/serial number information in the BIOS. Model/Serial Number is mandatory for FitClient operation.

    • Interactive BIOS Update – permits you to input/replace the model/serial number information that is stored in the BIOS.

13. You should see a green window, indicating a successful update.

14. Press any key to reboot.

15. When the system reboots, press **F2** at the screen prompt to enter Setup.

16. In the **Exit** menu, select **Load Setup Defaults**.

17. Go to the **Advanced** menu and set **Reset Configuration Data** to [**Yes**]

18. Exit Setup and Save Changes.

Note: Model/Serial number data that is currently stored in the BIOS is displayed during power up.

BIOS Crisis Recovery

The procedures below provide a way to restore the BIOS resulting from a non-recoverable condition.

Note: Use this BIOS crisis recovery procedure only for a **<u>NON-RECOVERABLE</u>** BIOS failure. A non-recoverable BIOS state typically results from power loss during a flash BIOS update process. This is a rare occurrence and should not be confused with other hardware errors that cause a *no video* state. **This procedure is not intended to be used for changing or upgrading an operational BIOS**.

Required Hardware

Part Number	Part Name	Use
	PC with at serial port	Download BIOS
497-0408349	Cable, 9-Pin Female to 9-Pin Female RS-232	PC to terminal connection
497-0413418	Parallel Dongle	Forces BIOS recovery

Required Software

Acquire the following software from NCR.

NCR 74xx BIOS and BIOS Update Software
LPIN: A370-0022-0100, (Version 2.0.0.0 or later)
P/N: 497-0424310

Recovery Procedures

1. Connect the Parallel Dongle to the parallel connector on the terminal.

Com1   Parallel Port
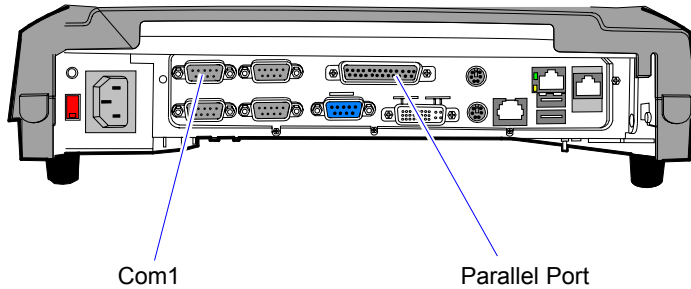
19507

2. Connect the two machines with the RS-232 cable. Use COM Port 1 on both machines.

NCR 7460

RS-232 Cable

PC
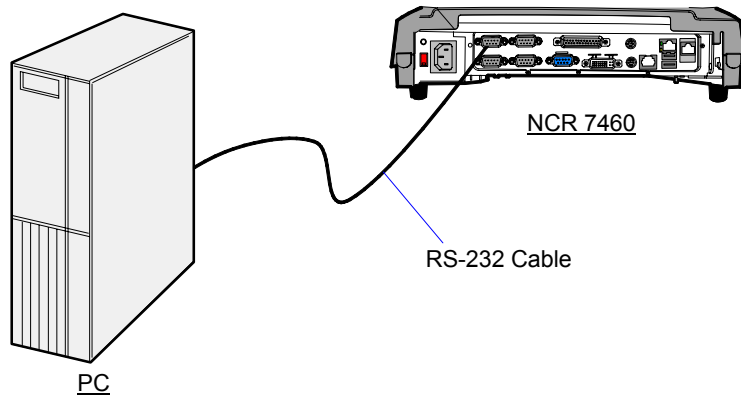
19508

3. Boot the PC in the DOS mode with CD-ROM support enabled.

   Note: The PC must be running in the DOS mode (not in a Windows DOS box) for the software to operate correctly.

4. Insert the BIOS update CD into the PC.

   NCR BIOS and BIOS Update Software
   LPIN: A370-0022-0100

5. Apply power to the terminal.

6. On the PC, change directory to the CD-ROM drive.

    ```
    E: [Enter]
    ```

7. Enter the update command:

    ```
    EMBflash [Enter]
    ```

8. Select the number for the 7460 terminal from the menu list:

    ```
    1) 7454
    2) 7401
    3) 7452
    4) 7453
    5) 7455
    6) 7460
    7) 7451
    8) 7456

    6 [Enter]
    ```

A blue screen displays as the program runs, showing the program progress, followed by a green screen, indicating a successful load.

PhoenixPhlash Status

Flash memory has been successfully programmed

PRESS ANY KEY TO EXIT
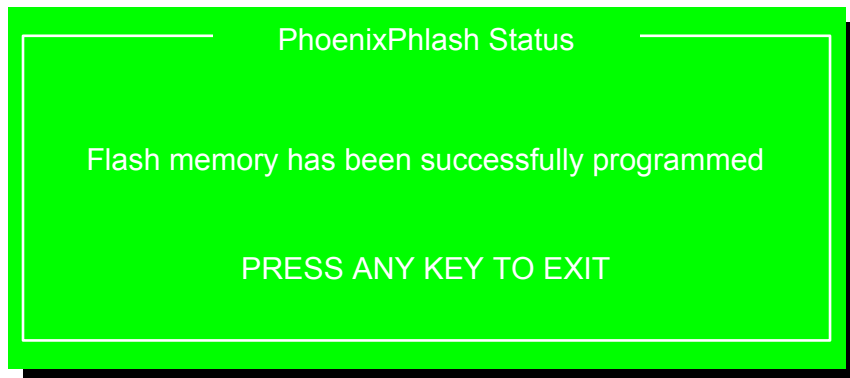
19502

The Class/Model/Serial # information is deleted using the Crisis Recovery procedure. Use the normal BIOS update procedures, as discussed earlier in this chapter, to restore the information.

Cable/Connector Pin-Out Information

Parallel Dongle

25-Pin D-shell Receptacle
(Viewed from wiring side)

19513

RS-232 Cable
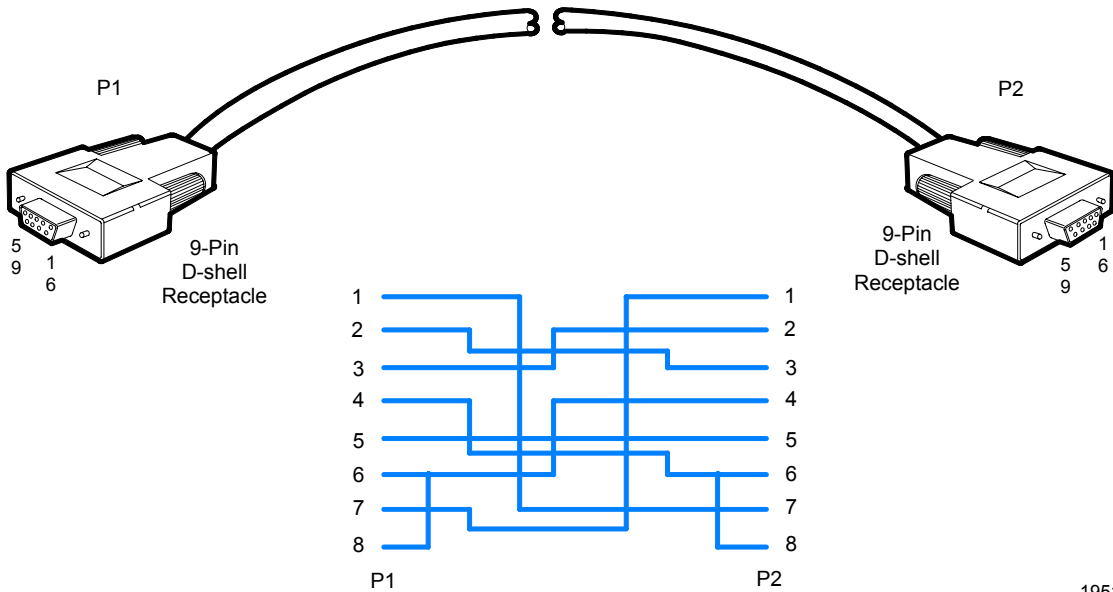
19512

Chapter 6: **Integrated 2x20 Customer Display**

Introduction

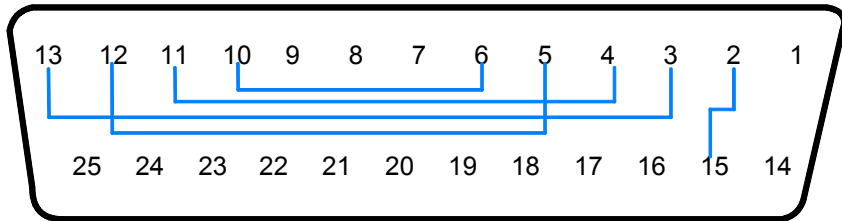This chapter defines the character set and the supported commands. The NCR 7460 2x20 Customer Display is an integrated line display attached to the LPT2 parallel port of the terminal motherboard.

Viewing Area

The characters are arranged in 2 rows of 20 characters. Each character is a 5x7 dot matrix.
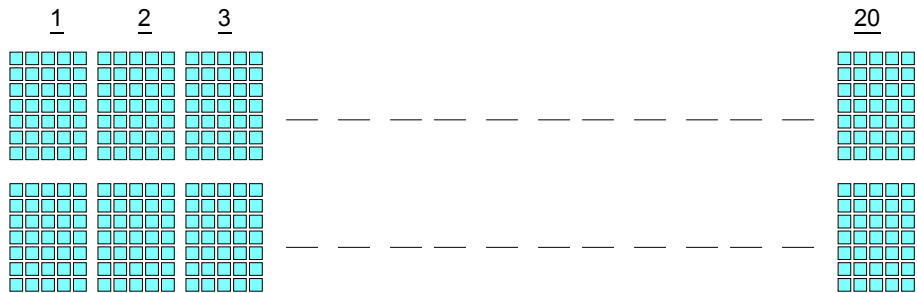
16674a

Diagnostics

Power-Up Diagnostics occur soon after the hardware reset circuitry is released, or when a Reset Display command is received from the host software. When the hardware is powered down, all registers and memory are lost. The display is not capable of any kind of power recovery back to a previous state. As a part of the Power-Up Diagnostics, the working registers and variables are initialized (set to zero).

Command Descriptions

Structure/Logic Description

The 7460 integrated line display consists of a character generator controller and display drivers. The CG Controller maps the character value to a bitmap stored in memory. The controller outputs the bitmap to the appropriate segment drivers for display. The display is 2 lines by 20 characters where each character is displayed lighting a 5 by 7 segment.

The display is controlled by a 7460 terminal motherboard through a parallel interface.

Integrated Display Interface

The 7460 integrated line display connects internally to the terminal motherboard. The display hardware interface is similar to a standard parallel port interface. The display is logically connected to LPT2. Standard parallel port drivers cannot be used since the standard hardware connection is controlled in a non-standard way when interfacing to the display. The display is controlled by writing either Command or Data bytes through the parallel port to the display. To display a character the character value is written as Data to the display. The Character Generator controller writes the character bitmap to the segment drivers of the display. The cursor position is updated by either incrementing or decrementing to the next display data RAM position.

Display Data RAM address 0 is the first character of the first line. The last character address of the first line is 19. CGRAM address 64 is the first character of the second line.

The following Table describes the 7460 Integrated Display commands supported

Instructions	Instruction Guide										Description	Execution Time (fosc=270KHZ
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM. And set DDRAM address to "00H" from AC.	1.52ms
Return Home	0	0	0	0	0	0	0	0	1	X	Set DDRAM address to "00H" from AC and return cursor to it's original position if shifted. The contents of DDRAM are not changed.	1.52ms
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	SH	Assign cursor moving direction and make shift of entry display enable	37µs
Display ON/OFF Control	0	0	0	0	0	0	1	D	C	B	Set Display (D), cursor (C), and blinking of cursor (B) on/off control bit.	37µs
Cursor or Display Shift	0	0	0	0	0	1	S/C	R/L	X	X	Set interface data length (DL:4-bit/8-bit), numbers of display line (N:1-line/2-line), display font type (F:5*8 dots/5*11dots)	37µs
Set GGRAM Address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set GGRAM address in address counter.	37µs
Set DDRAM Address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter.	37µs
Read Busy Flag and Address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.	0µs
Write Data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write Data into international RAM (DDRAM/CGRAM)	43µs
Read Data to RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read Data into international RAM (DDRAM/CGRAM)	43µs

Instructions

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
Clear Display	0	0	0	0	0	0	0	0	0	1
Cursor Home	0	0	0	0	0	0	0	0	1	x
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S
Display On/Off Control	0	0	0	0	0	0	1	D	C	B
Cursor Display Shift	0	0	0	0	0	1	S/C	R/L	x	x
Function Set	0	0	0	0	1	DL	N	x	BR1	BR0
CGRAM Address Set	0	0	0	1	CGRAM Address					
DDRAM Address Set	0	0	1	DDRAM Address						
Address Counter Read	0	1	BF=0	AC Contents						
DDRAM or CGRAM Write	1	0	Write Data							
DDRAM or CGRAM Read	1	1	Read Data							

Clear Display

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	0	0	0	1

This instruction clears the display (without affecting the contents of CGRAM) by performing the following:

1. Fills all DDRAM locations with character code 20H (character code for a space).

2. Sets the AC to DDRAM address 00H (i.e. sets cursor position to 00H).

3. Returns the display to the non-shifted position.

4. Sets the I/D bit to 1.

Cursor Home

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	0	0	1	x

x = don't care

This instruction returns the cursor to the home position (without affecting the contents of DDRAM or CGRAM) by performing the following:

1. Sets the AC to DDRAM address 00H (i.e. sets cursor position to 00H).

2. Returns the display to the non-shifted position.

Entry Mode Set

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	0	1	I/D	S

This instruction selects whether the AC (cursor position) increments or decrements after each DDRAM or CGRAM access and determines the direction the information on the display shifts after each DDRAM write. The instruction also enables or disables display shifts after each DDRAM write (information on the display does not shift after a DDRAM read or CGRAM access). DDRAM, CGRAM, and AC contents are not affected by this instruction.

I/D = 0: The AC decrements after each DDRAM or CGRAM access. If S = 1, the information on the display shifts to the right by one character position after each DDRAM write.

I/D = 1: The AC increments after each DDRAM or CGRAM access. If S = 1, the information on the display shifts to the left by one character position after each DDRAM write.

S = 0:   The display shift function is disabled.

S = 1:   The display shift function is enabled.

Display On/Off Control

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	0	1	D	C	B

This instruction selects whether the display and cursor are on or off and selects whether or not the character at the current cursor position blinks. DDRAM, CGRAM, and AC contents are not affected by this instruction.

D = 0: The display is off (display blank).

D = 1: The display is on (contents of DDRAM displayed).

C = 0: The cursor is off.

C = 1: The cursor is on (8th row of pixels).

B = 0: The blinking character function is disabled.

B = 1: The blinking character function is enabled (a character with all pixels on will alternate with the character displayed at the current cursor position at about a 1Hz rate with a 50% duty cycle).

Cursor/Display Shift

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	0	1	S/C	R/L	x	x

x = don't care

This instruction increments or decrements the AC (cursor position) and shifts the information on the display one character position to the left or right without accessing DDRAM or CGRAM. DDRAM and CGRAM contents are not affected by this instruction. If the AC was addressing CGRAM prior to this instruction, the AC will be addressing DDRAM after this instruction. However, if the AC was addressing DDRAM prior to this instruction, the AC will still be addressing DDRAM after this instruction.

S/C	R/L	AC contents (cursor position)	Information on the display
0	0	Decrements by one	No change
0	1	Increments by one	No change
1	0	Decrements by one	Shifts one character position to the left
1	1	Increments by one	Shifts one character position to the right

Function Set

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	1	DL	N	x	BR1	BR0

x = don't care

This instruction sets the width of the data bus for the parallel interface modes, the number of display lines, and the luminance level (brightness) of the VFD. It must be the first command sent after any reset. DDRAM, CGRAM, and AC contents are not affected by this instruction.

DL =0:   Sets the data bus width for the parallel interface modes to 4-bit (DB7-DB4).

DL = 1:   Sets the data bus width for the parallel interface modes to 8-bit (DB7-DB0).

N = 0:   Sets the number of display lines to 1 (this setting is not recommended for multiple line displays).

N = 1:   Sets the number of display lines to 2 (this setting is not recommended for single line displays).

BR1,BR0 = 0,0: Sets the luminance level to 100%.

0,1:   Sets the luminance level to 75%.

1,0:   Sets the luminance level to 50%.

1,1:   Sets the luminance level to 25%.

CGRAM Address Set

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	CGRAM	address				

This instruction places the 6-bit CGRAM address specified by DB5-DB0 into the AC (cursor position). Subsequent data writes (reads) will be to (from) CGRAM. DDRAM and CGRAM contents are not affected by this instruction.

DDRAM Address Set

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	DDRAM	address					

This instruction places the 7-bit DDRAM address specified by DB6-DB0 into the AC (cursor position). Subsequent data writes (reads) will be to (from) DDRAM. DDRAM and CGRAM contents are not affected by this instruction.

Address Counter Read

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	1	BF=0	AC	contents					

This instruction reads the current 7-bit address from the AC on DB6-DB0 and the busy flag (BF) bit (always 0) on DB7. DDRAM, CGRAM, and AC contents are not affected by this instruction.

Because the BF is always 0, the host never has to read the BF bit to determine if the modules are busy before sending data or instructions. Therefore, data and instructions can be sent to the modules continuously according to the E, WR/, and SCK cycle times specified in section 3.7 AC Timing Specifications. Due to this feature, the execution times for each instruction are not specified.

DDRAM or CGRAM Write

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	0	Write	data						

This instruction writes the 8-bit data byte on DB7-DB0 into the DDRAM or CGRAM location addressed by the AC. The most recent DDRAM or CGRAM Address Set instruction determines whether the write is to DDRAM or CGRAM. This instruction also increments or decrements the AC and shifts the display according to the I/D and S bits set by the Entry Mode Set instruction.

DDRAM or CGRAM Read

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	1	Read	data						

This instruction reads the 8-bit data byte from the DDRAM or CGRAM location addressed by the AC on DB7-DB0. The most recent DDRAM or CGRAM Address Set instruction determines whether the read is from DDRAM or CGRAM. This instruction also increments or decrements the AC and shifts the display according to the I/D and S bits set by the Entry Mode Set instruction. Before sending this instruction, a DDRAM or CGRAM Address Set instruction should be executed to set the AC to the desired DDRAM or CGRAM address to be read.

Reset Conditions

After either a power-up reset or an external reset, the modules initialize to the following conditions:

1. All DDRAM locations are set to 20H (character code for a space).

2. The AC is set to DDRAM address 00H (i.e. sets cursor position to 00H).

3. The relationship between DDRAM addresses and character positions on the VFD is set to the non-shifted position.

4. Entry Mode Set instruction bits:

   I/D = 1:   The AC increments after each DDRAM or CGRAM access.
   S = 0:   The display shift function is disabled.

5. Display On/Off Control instruction bits:

   D = 0:   The display is off (display blank).
   C = 0:   The cursor is off.
   B = 0:   The blinking character function is disabled.

6. Function Set instruction bits:

DL = 1:   Sets the data bus width for the parallel interface modes to 8-bit (DB7-DB0).

N = 1(0):   Number of display lines set to 2 for multiple line displays (number of display lines set to 1 for single line displays).

BR1,BR0 = 0,0:   Sets the luminance level to 100%.

Note: The function set command must be the first instruction sent to the module after any reset.

Initialization

The modules can be initialized by using instructions if the modules are not reset according to the reset timing detailed in Section 3.7.1 (Reset Timing). After any reset, the function set command must be the first instruction sent to the module.

Character Map (VFD)

Upper 4 Bits	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Lower 4 Bits 0000	CG RAM (1)															
0001	(2)															
0010	(3)															
0011	(4)															
0100	(5)															
0101	(6)															
0110	(7)															
0111	(8)															
1000	(1)															
1001	(2)															
1010	(3)															
1011	(4)															
1100	(5)															
1101	(6)															
1110	(7)															
1111	(8)															

20299

Character Map (LCD)

20068

Restriction: The last two rows of characters stored in the PC2002-L and PC2002-M ROM require 5 x 10 dots. The PC2002-L and PC2002-M only have 5 x 8 dots so the last two rows of characters beginning at 11100000 cannot be displayed correctly. These last two rows consist of symbols that are not typically used. If one of these characters is required, then the recommended method is to use CGRAM (Character Generator RAM) to generate them. CGRAM can also be used to generate up to 8 custom 5 x 8 characters.

The CGRAM stores the pixel information (1 = pixel on, 0 = pixel off) for the eight user-definable 5x8 characters. Valid CGRAM addresses are 00H to 3FH. CGRAM not being used to define characters can be used as general purpose RAM (lower 5 bits only). Character codes 00H to 07H (or 08H to 0FH) are assigned to the user-definable characters (see Character Map). The graphic below shows the relationship between the character codes, CGRAM addresses, and CGRAM data for each user-definable character.

20300

Appendix A: **Cables**

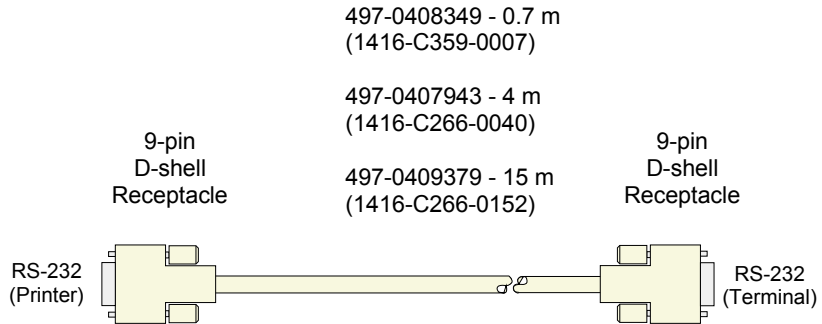| Corporate ID	Part Number	Where Used	Description
1416-C359-0007	497-0408349	7167, 7197	RS-232, 9-pin female to 9-pin female
1416-C266-0040	497-0407943	7167, 7197	RS-232, 9-pin female to 9-pin female
1416-C266-0152	497-0409379	7167, 7197	RS-232, 9-pin female to 9-pin female
1416-C528-0010	497-0415949	7167, 7197	USB, 1 meter
1416-C528-0040	497-0415950	7167, 7197	USB, 4 meter
1416-C337-0010	497-0407427	7196	RS-232, integrated
1416-C337-0040	497-0407429	7196	RS-232, remote
1416-C337-0152	497-0407430	7196	RS-232, interface 50'
1416-C372-0006	497-0409394	Cash Drawer	Dual Cash Drawer (Y cable)
1416-C112-0006	497-0409394	Cash Drawer	Cash Drawer (Ext. cable)
1416-C542-0002	497-0414489	Keyboard	PS/2, Y-Cable
1416-C338-0005	497-0407490	Keyboard	Wedge, Y-Cable
1416-C278-0040	497-0405676	5972	Parallel, Remote Customer Display
1416-C279-0010	497-0405678	5972	RS-232, Remote Customer Display
1416-C279-0040	497-0405679	5972	RS-232, Remote Customer Display
1416-C473-0040	497-0413365	5973/5974	Parallel, Remote Customer Display
1416-C792-0004	497-0425405	DVI to DVI	Operator Display
1416-C634-0040	497-0418406	5945, 5992	RS-232, 9-pin female to 5945/5992
1416-C059-0030	497-0008905	LAN	Ethernet, 10/100BaseT
1416-C321-0030	006-8601012	7460	Power Cord – UK

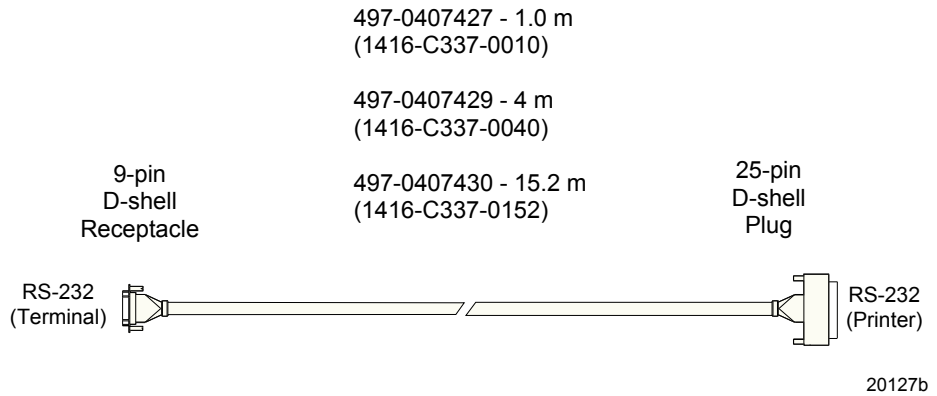| Corporate ID	Part Number	Where Used	Description
1416-C323-0030	006-8601010	7460	Power Cord – International
1416-C393-0030	006-8601001	7460	Power Cord – Japan
1416-C408-0030	006-8601011	7460	Power Cord – SEV
1416-C410-0030	006-8601019	7460	Power Cord – Australia
1416-C419-0030	006-8601020	7460	Power Cord – U.S. Twist-lock

Printers

7167, 7197 Printer (RS-232)

497-0408349 - 0.7 m
(1416-C359-0007)

497-0407943 - 4 m
(1416-C266-0040)

9-pin
D-shell
Receptacle

497-0409379 - 15 m
(1416-C266-0152)

9-pin
D-shell
Receptacle

RS-232
(Printer)

RS-232
(Terminal)

19722a

7167, 7197 Printer (USB)

497-0415949 (1 meter)
1416-C528-0010

498-0415950 (4 meter)
1416-C528-0040

Type A
USB

Type B
USB

1 2 3 4

P1
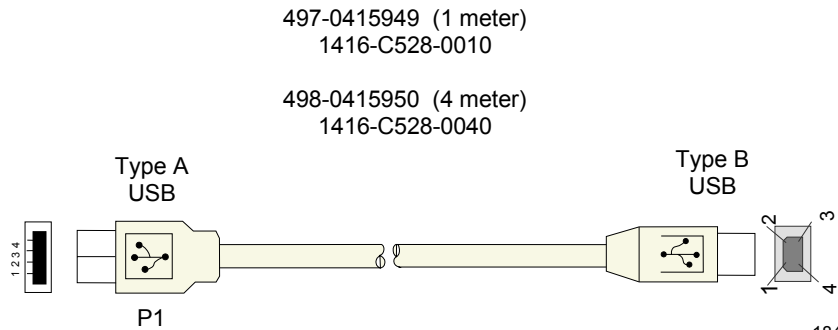
18433a

7196 Printer (RS-232)

497-0407427 - 1.0 m
(1416-C337-0010)

497-0407429 - 4 m
(1416-C337-0040)

9-pin
D-shell
Receptacle

497-0407430 - 15.2 m
(1416-C337-0152)

25-pin
D-shell
Plug

RS-232
(Terminal)

RS-232
(Printer)

20127b

Cash Drawers

Cash Drawer, Extension Cable

230-0145735 - 3.0 m
(1424-C112-0030)

Modular
6-Pin Plug

Modular
6-Pin Jack

Cash Drawer
(Terminal/Printer)

Cash Drawer
(Cable)

19730a

Keyboard PS/2 Y-Cable

497-0414489 - 0.2 m
1416-C542-0002)

6-pin
Mini-DIN
Plug

6-pin
Mini-DIN
Receptacle

PS/2
(Terminal)

51 mm
(2 in.)

PS/2
(Mouse)

5-pin
Mini-DIN
Receptacle

PS/2
(Keyboard)
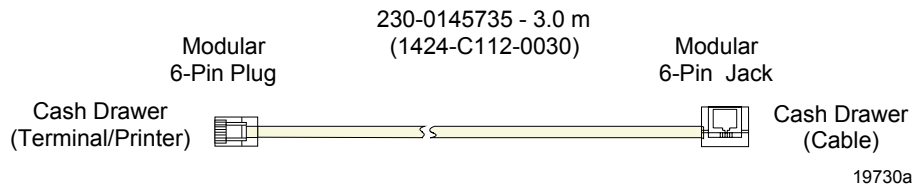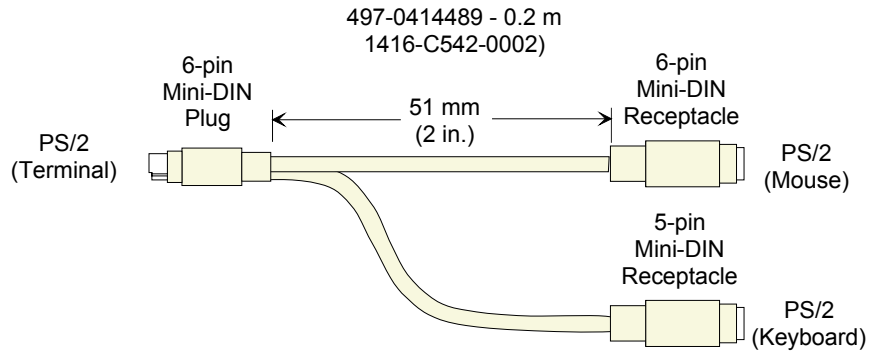
17894a

5964 to 7460 (RS-232/PS2/Power)

497-0425664
(1416-C800-0004)

RS-232
(Terminal)

PS/2
(Terminal)

12 V COM
(Display)
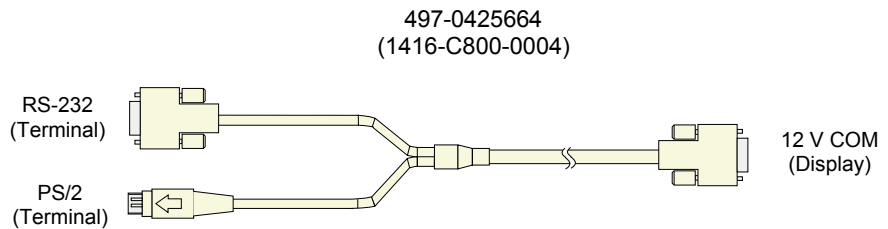
20310a

Remote Customer Display

5972 VFD (Parallel)

497-0405676 - 4m
1416-C278-0040

25-pin
D-Shell
Receptacle

24-pin
Microfit
Receptacle

Terminal
Parallel Port

Customer
Display

8-pin
Microfit
Receptacle

Power

20277

5972 VFD (RS-232)

9-pin
D-shell
Receptacle

497-0405678 - 1.0 m
(1416-C279-0010)

24-pin
Microfit
Receptacle

497-0405679 - 4.0 m
(1416-C279-0040)

Terminal
RS-232
Port

Customer
Display

Power

8-pin
Microfit
Receptacle
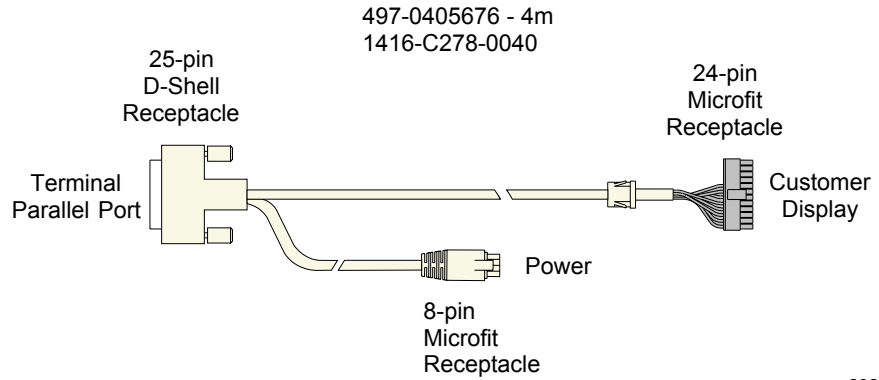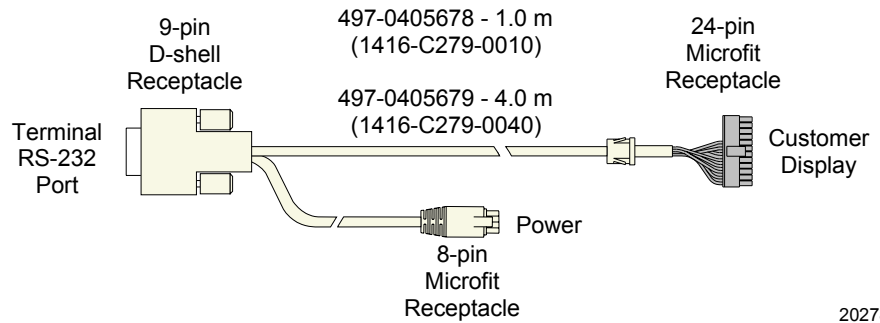
20278

5973/5974 International VFD (Parallel)

497-0413365 - 4m
1416-C473-0040

25-pin
D-Shell
Receptacle

30-Position
Microfit
Receptacle

Terminal
Parallel Port

Customer
Display

Power

8-pin
Microfit
Receptacle

20280
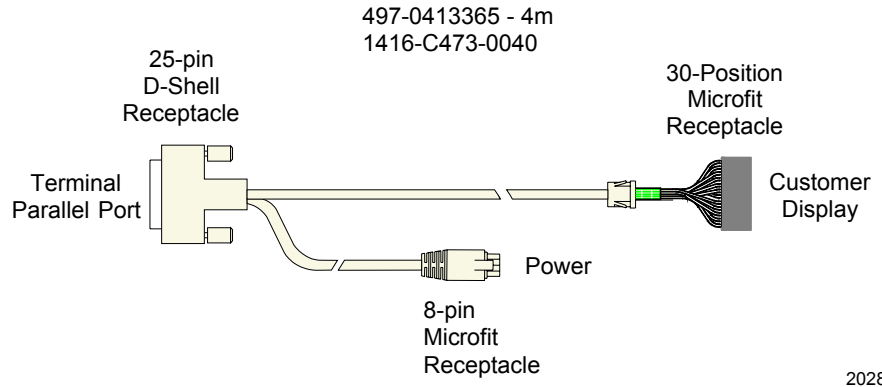
Operator Display Cable (DVI to DVI)

497-0422831 - 400 mm
(1416-C792-0004)

24-Pin
DVI-D Plug

24-Pin
DVI-D Plug

DVI
(Operator
Display)

DVI
(Terminal)

20303

5945/5992 Cable (RS-232)

Sub Miniature D-Shell
9-Pin
Receptacle

497-0418406 - 4 m
1416-C634-0040
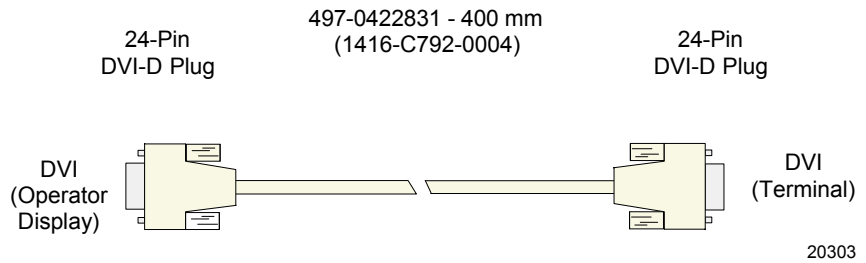
RS-232
(Terminal)

RS-232
(5945/5992)
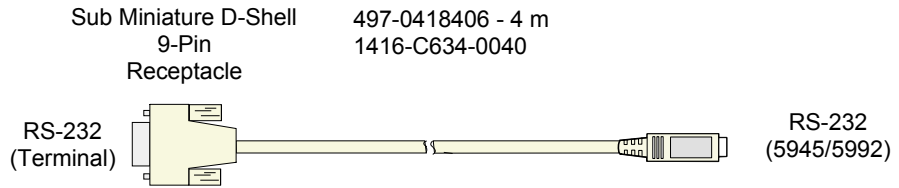
20149

Ethernet 10/100BaseT Cable

Modular
8-Pin
Plug

497-0008905 - 3.0 m
(1416-C059-0030)

Modular
8-Pin
Plug
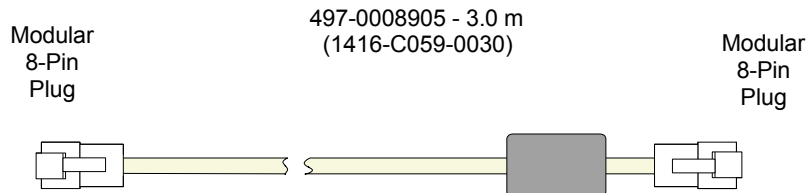
16298a

Power Cables

AC Power

006-1009037 - U.S.

Terminal
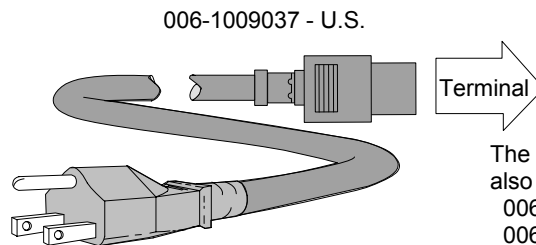
The following power cables (not shown)
also have an IEC connection of 45 mm:
  006-8601001 - Japan Twist-Lock
  006-8601010 - International
  006-8601011 - SEV
  006-8601012 - U.K.
  006-8601019 - Australia

15405a

Appendix A: **Kits**

This section contains a comprehensive list of the available hardware Feature Kits that can be installed in the customer environment. Kit installation instructions (for those requiring instruction) are available on the Information Products web sites.

- Internet*: http://www.info.ncr.com*

- NCR Intranet*: http://inforetail.atlantaga.ncr.com*

To locate the installation guides on these sites:

1. Select **General Search**.

2. Select the **Kits** icon.

3. In the **Title** field, enter the *Kit Title*.

   Example: *Memory*

or

In the **Product ID** field, enter the Kit Number.

   Example: *7460-K800*

1. Select **Search**.

The file can be viewed online by left-mouse clicking on the pub title, or if you prefer to download the entire file you can right-mouse click on the title and then a *Save target as*.

If you aren't sure of the title or number you can display all kits associated with a terminal product class by:

1. In the **Class** drop-down list, enter the *Class* of the terminal.

   Example: *7460*

2. Select **Search**.

Kit Number	Description
7460-K022	128MB memory
7460-K023	256MB memory
7460-K102	Display Mount
7460-K104	Front Mount MSR
7460-K451	Integrated Customer Display (LCD)
7460-K452	Integrated Customer Display (VFD)
7460-K800	1.44 Mbps External Flex Disk Drive
7460-K900	256MB Compact Flash Memory

Appendix C: **Technical Specifications**

Interrupt Defaults

IRQ	System Resource
0	System Timer
1	Keyboard
2	Cascade
3	Serial Port (COM 2)
4	Serial Port (COM 1)
5	LPT 2
6	Floppy (if present)
7	LPT 1
8	Real Time Clock
9	Video/Audio/LAN (shared); USB if IRQ 12 is used
10	Serial Port (COM 3) for Serial Touch
11	Serial Port (COM 4)
12	USB; PS/2 Touch/Mouse if present
13	Math coprocessor
14	IDE Hard Disk
15	MSR

DMA Channel Defaults

DMA	Data Width	System Resource
0	8- or 16-bits	Open
1	8- or 16-bits	Open
2	8- or 16-bits	Floppy
3	8- or 16-bits	Parallel Port (for ECP/EPP Config.)
4		Reserved - Cascade channel
5	16-bits	LAN
6	16-bits	Open
7	16-bits	Open

Memory Map

Address Range	Size	Description
FFFFFFFF-FFF80000	512KB	BIOS ROM
FFF80000-FFF81FFF	8KB	BIOS ESCD
100000-FFFFFFF	255MB	Extended Memory (1MB to 255MB)
E8000-FFFFF	96KB	BIOS run-time
E4000-E7FFF	16KB	BIOS DMI
E0000-E3FFF	16KB	LAN PXE ROM (if MSR and/or DOC enabled)
DC000-DFFFF	16KB	MSR and/or DOC if either is enabled (DOC at DC000 or MSR at DE000)
D8000-DBFFF	16KB	MSR and/or DOC if either is enabled (DOC at D8000 or MSR at DA000)
D4000-E0000	48KB	LAN PXE ROM (uses D8000-DFFFF only if no MSR/DOC)
D2000-D3FFF	8KB	Available HI DOS memory
D0000-D1FFF	8KB	Micro-Solutions Backpack CD ROM (if enabled)
CC000-CFFFF	16KB	Available HI DOS memory
C0000-CBFFF	48KB	Video BIOS
A0000-BFFFF	128KB	Video frame buffering
9FC00-9FFFF	1KB	Extended BIOS data
80000-9FBFF	127KB	Extended memory
00000-7FFFF	512KB	Conventional memory
DA000-DBFFF or DE000-DFFFF	8KB	NCR Trigantor MSR (optional)
D8000-D9FFF or DC000-DDFFF	8KB	Flash Disk (optional)

Note: If you are using the side mounted MSR, the MSR address range can be disabled.

I/O Map

Address (hex)	Size	Description (Default/Primary Resource)	Description (Alternate Configurable Resource)
0	16	DMA Controller	
20	8	Interrupt Controller	
40	4	System Timer	
60	8	Keyboard Controller	
70	8	Real Time Clock	
80	16	DMA Page Controller	
90	8	System Control Port	
98	8	Reserved	
A0	8	Slave Interrupt Controller	
A8	24	Reserved	
C0	32	Slave DMA Controller	
F0	16	Math Co-Processor	
1F0	8	IDE Controller, Channel 1	
220	8		COM C or COM D
228	8		COM C or COM D
278	8	LPT2	LPT1
2E8	8	COM D	COM A or COM B or COM C
2F8	8	COM B	COM A or COM B or LPT2
378	8	LPT1	LPT2
3BC	8		LPT1
3C0	8	Video	
3E8	8	COM C (Serial Touch)	COM A or COM B or COM B
3F0	8	Floppy Drive	
3F8	8	COM A	
1800	8	IDE	
1810	8	SM Bus	
1820	8	USB	
1840	8	Audio	
1C00	8	Audio	
2000	4096	PCI-to-PCI Bridge	

Index