

NCR CX7 All-in-One POS

User Guide

7772



BCC5-0000-5363 Issue AF

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Audience

This book is written for store personnel, system integrators, and field engineers.



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Safety Requirements

The NCR CX7 All-in-One POS (7772) conforms to all applicable legal requirements. To view the compliance statements see the NCR POS Terminals Safety and Regulatory Information (B005-0000-1589).

▲ Caution

The on/off switch is a logic switch only. The AC line voltage primaries are live at all times when the AC power cord is connected to the AC outlet. Therefore, disconnect the AC power cord from the AC outlet and wait 30 seconds before opening the unit to install features or service this terminal.

Lithium Battery Warning

Warning

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Warning

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 Voyix Corporation.

Warning

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

DO NOT connect or disconnect any serial peripherals while the terminal is connected to AC power. This can result in system or serial peripheral damage.

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.**

Warranty

Warranty terms vary by region and country.

All parts of this product that are subject to normal wear and tear are not included in the warranty. In general, damages due to the following are not covered by the warranty.

- Improper or insufficient maintenance
- Improper use or unauthorized modifications of the product.
- Inadequate location or surroundings. Site installation must conform to guidelines listed in the NCR CX7 All-in-One POS (7772) Site Preparation Guide (BCC5-0000-5364) and the NCR Workstation and Peripheral AC Wiring Guide (BST0-2115-53).

For detailed warranty arrangements please consult your contract documents.

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Revision Record

| Issue | Date | Remarks | |
|-------|----------|---|--|
| А | Jul 2019 | First Issue | |
| В | Nov 2019 | Release 1.1 | |
| С | Dec 2019 | Added Administrator Login section | |
| D | Apr 2020 | Updated touchscreen and cabinet cleaning procedures | |
| E | Jun 2020 | Release 1.2 Added accessing serial number and class-model information | |
| F | Aug 2020 | Release 1.3 | |
| G | Oct 2020 | Updated cabinet cleaning procedures | |
| Н | Jan 2021 | Release 1.4 | |
| I | Mar 2021 | Updated Mounting Configurations section | |
| J | Apr 2021 | Updated the following: | |
| | | Caution statements in Preface and Connecting AC Power | |
| | | Illustration in Connecting AC Power | |
| | | Step 1 in Cleaning the Cabinet | |
| К | Jun 2021 | Release 1.5 and 1.7 | |
| L | Jun 2021 | Removed Appendix for Odometers | |
| М | Jul 2021 | Updated I/O Board Connector Pinouts | |
| Z | Sep 2021 | Release 1.6 – 5MP Camera Added F107 Taiwan Power Cord and F755 NCRLinuxU 1.0 Removed F256 SSD 480 GB NVMe 4-channel | |

| Issue | Date | Remarks |
|-------|----------|---|
| 0 | Dec 2021 | Release 1.8 and 1.9 Added Standard/Enhanced label to Serial Ports Updated Power Switch section |
| Р | Dec 2021 | Added F471 OSI APA Graphical Display |
| Q | Jan 2022 | Added: • Diagnostic LEDs • Warning for non-NCR Cash Drawers |
| R | Jan 2022 | Updated touchscreen cleaning procedures |
| S | May 2022 | Release 1.10 Added USBC Cables illustration Updated Windex note in touchscreen cleaning procedures Added Configuring Gen3 Cash Drawer Switch Polarity |
| Т | Nov 2022 | Added Power Consumption |
| U | Mar 2023 | Updated Configuring Cash Drawer Switch Polarity |
| ٧ | Apr 2023 | Added Cleaning the MSR |
| W | May 2023 | Added Flip Functionality |
| Х | May 2023 | Added NCRPSW/NCRPSL in Cash Drawer Switch Polarity section Added CX Display Touch Tool |
| Υ | Jul 2023 | Added Motherboard LAN Pinout and LAN Diagnostics LEDs |
| Z | Oct 2023 | Release 2.0 CX7ii |
| AA | Jan 2024 | Added Migration section Added OS Features: F702, F711, F757. F770, F791 |
| АВ | May 2024 | Added Updating DMI using Windows DMI Edit Tool Updated links from ncr.com to ncrvoyix.com |

| Issue | Date | Remarks | |
|-------|----------|--|--|
| AC | Aug 2024 | Added: | |
| | | Activating TPM | |
| | | Note in Linux Software RAID Setup introduction | |
| | | Linux Software RAID Setup for SLES 15 SP5 and NCRLinuxU2 | |
| | | Configuring a RAID System in BIOS and Deleting a RAID volume in BIOS | |
| AD | Oct 2024 | Added Caution admonition in "Table Top Stand" on page 53. | |
| AE | Dec 2024 | Removed OBF | |
| | | Release 2.1: | |
| | | • F022 21.5" Display | |
| | | F179 External Dual Speaker | |
| | | F550 No Port D Peripherals (21.5" Display) | |
| | | • F551 5MP Camera (21.5" Display) | |
| AF | Jan 2025 | Added links and RPSW version in "Migration" on page 50 | |
| | | Changed 10/100/Gb to 10/100/1000 | |

Product Overview



CCP-76587

The NCR CX7 All-in-One POS (7772), powered by an Intel chipset (option of 8th Generation Coffee Lake or 13th Generation Raptor Lake), features a sleek design, packed with superior performance. The new, stylish design provides a wide range of configuration versatility. The ability to configure with an I/O board that accommodates environments with more USB devices or an I/O board that accommodates environments with more serial devices gives customers the flexibility that prevents additional expansion boards or hubs.

The CX7 offers two I/O configurations:

- USB Centric I/O
- Serial Centric I/O

| I/O Board Connectors | USB Centric I/O (Retail) | Serial Centric I/O (Hospitality) |
|----------------------|-----------------------------|-------------------------------------|
| USB-C to Head | 1 | 1 |
| 12V Powered USB | 3 | 1 |
| 24V Powered USB | 1 | 1 |

| I/O Board Connectors | USB Centric I/O (Retail) | Serial Centric I/O (Hospitality) |
|-----------------------|-----------------------------|-------------------------------------|
| Serial | 1 x RJ50 1 x DB9 | 4 x RJ12 2 x RJ45 |
| USB 3.0 (5V) | 2 | 2 |
| DisplayPort | 1 | 1 |
| Cash Drawer (12/24 V) | 1 (dual port) | 2 |
| LAN | 1 | 1 |

Both I/O boards are connected to the CX7 core motherboard through a single USB Type-C connector. In addition to the integration of the board in the base, each I/O can be configured for a wall mount solution, pole mount solution, or ordered in a remote chassis to permit placement under the counter.

Base Models

CX7

| Model | Description | | | | | |
|--------------------------|--|--|--|--|--|--|
| 15" 4:3 Option | | | | | | |
| 7772-1215-8801 | 15" 4:3 Display w/ Intel Celeron, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-1315-8801 | 15" 4:3 Display w/ Intel i3, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-1515-8801 | 15" 4:3 Display w/ Intel i5, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-2515-8801 | 15" 4:3 Display w/ Intel i5-9500TE, No memory, No SSD, No Power Supply | | | | | |
| 7772-3315-8801 | 15" 4:3 Display w/ Intel i3, 8GB DDR4 memory, No SSD, No Power Supply, White | | | | | |
| 15.6" 16:9 (Wide Aspect) | Option | | | | | |
| 7772-1216-8801 | 15.6" PCAP RGB w/ Intel Celeron, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-1316-8801 | 15.6" PCAP RGB w/ Intel i3, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-1516-8801 | 15.6" PCAP RGB w/ Intel i5, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-2516-8801 | 15.6" PCAP RGB w/ Intel i5-9500TE, No memory, No SSD, No Power Supply | | | | | |
| 18.5" Option | | | | | | |
| 7772-1218-8801 | 18.5" PCAP RGB w/ Intel Celeron, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-1318-8801 | 18.5" PCAP RGB w/ Intel i3, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-1518-8801 | 18.5" PCAP RGB w/ Intel i5, 8GB DDR4 memory, No SSD, No Power Supply | | | | | |
| 7772-2518-8801 | 18.5" PCAP RGB w/ Intel i5-9500TE, No memory, No SSD, No Power Supply | | | | | |

CX7ii

| Model | Description | | | |
|---------------------------------|--|--|--|--|
| 15" 4:3 Option | | | | |
| 7772-5315-8801 | CX7ii, 15" 4:3 Display w/ Gen13 Intel i3, No Memory, No SSD, No Power Supply | | | |
| 7772-5515-8801 | CX7ii, 15" 4:3 Display w/ Gen13 Intel i5, No Memory, No SSD, No Power Supply | | | |
| 15.6" 16:9 (Wide Aspect) Option | on | | | |
| 7772-5316-8801 | CX7ii, 15.6" PCAP RGB w/ Gen13 Intel i3, No Memory, No SSD, No Power Supply | | | |
| 7772-5516-8801 | CX7ii, 15.6" PCAP RGB w/ Gen13 Intel i5, No Memory, No SSD, No Power Supply | | | |
| 18.5" Option | | | | |
| 7772-5318-8801 | CX7ii, 18.5" PCAP RGB w/ Gen13 Intel i3, No Memory, No SSD, No Power Supply | | | |
| 7772-5518-8801 | CX7ii, 18.5" PCAP RGB w/ Gen13 Intel i5, No Memory, No SSD, No Power Supply | | | |
| 21.5" Option | | | | |
| 7772-5321-8801 | CX7ii, 21.5" PCAP RGB w/ Gen13 Intel i3, No Memory, No SSD, No Power Supply | | | |
| 7772-5521-8801 | CX7ii, 21.5" PCAP RGB w/ Gen13 Intel i5, No Memory, No SSD, No Power Supply | | | |

Features

| Feature | | Description | СХ7 | CX7ii |
|--------------------------|------|---|----------|----------|
| Display F013 | | 15" 4:3 oTP LCD, PCAP, eDP, 1024x768, AG/AS, 400nit, 7772 EDID | √ | ✓ |
| | F016 | 15.6" oTP LCD, PCAP, eDP, 1920x1080, AG/AS, 50K BL | √ | √ |
| | F018 | 18.5" LCD, PCAP, eDP, 1920x1080, AG/AS, 50K BL | ✓ | √ |
| | F022 | 21.5" LCD, PCAP, eDP, 1920x1080, AG/AS, 50K BL, 300nit | × | √ |
| | F023 | 15" 4:3 oTP LCD, PCAP, eDP, 1024x768, AG/AS, 400nit, 7772 EDID, White | √ | × |
| Memory | F134 | 8GB, DDR4 2400MHz (Add On) | ✓ | √ |
| | F136 | 16GB, DDR4 2400MHz (Add On) | √ | √ |
| | F138 | 32GB, DDR4 (Two 16GB DDR4) | √ | √ |
| Storage Media F241 SSD | | SSD 120 GB, M.2 SATA | ✓ | √ |
| | F242 | DUAL SSD 120 GB, M.2 SATA | ✓ | √ |
| | F253 | SSD 240 GB, M.2 NVMe (PCIe) | √ | √ |
| | F255 | SSD 480 GB, M.2 NVMe (PCIe) | ✓ | √ |
| Port A (Right Side) F140 | | No Peripheral Filler Plate | √ | √ |
| Features | F141 | NCR Encrypted MSR | ✓ | √ |
| | F149 | External CX Keypad Module (15" 4:3 or 15.6" 16:9 or 18.5" Display) | 1 | √ |
| | F340 | No Peripheral Filler Plate, White (15" 4:3 Display) | √ | × |

| Feature | | Description | СХ7 | CX7ii |
|-----------------|------|---|----------|----------|
| Port B (Left | F150 | No Peripheral Filler Plate | ✓ | ✓ |
| Side) Features | F151 | Biometrics | ✓ | √ |
| | F156 | Imager | ✓ | √ |
| | F157 | Side Mount UV Bill Validator, CX7 | √ | √ |
| | F350 | No Peripheral Filler Plate, White (15" 4:3 Display) | ✓ | × |
| Port C (Bottom/ | F160 | No Peripheral Filler Plate | ✓ | √ |
| Chin) Features | F161 | 2-in-1 Sign-in (Dallas Key/Addimat) (15" 4:3 or 15.6" 16:9 or 18.5" Display) | √ | ✓ |
| | F166 | Imager | √ | √ |
| | F167 | WiFi 6 Wireless Card and Antenna (15" 4:3 or 15.6" 16:9 or 18.5" Display) | × | √ |
| | F168 | Wireless Card and Antenna (15" 4:3 or 15.6" 16:9 or 18.5" Display) | √ | × |
| | F169 | External Speaker Module (15" 4:3 or 15.6" 16:9 or 18.5" Display) | ✓ | ✓ |
| | F179 | External Dual Speaker Module (15" 4:3 or 15.6" 16:9 or 18.5" Display) | ✓ | ✓ |
| | F360 | No Peripheral Filler Plate, White (15" 4:3 Display) | √ | × |

| Feature | | Description | СХ7 | CX7ii |
|-----------------|------|---|----------|----------|
| Port D Features | F330 | No Customer Display - Logo Badge, White (15" 4:3 or 15.6" 16:9 or 18.5" Display) | | × |
| | F450 | No Customer Display - Logo Badge (15" 4:3 or 15.6" 16:9 or 18.5" Display) | 1 | √ |
| | F451 | APA (All Points Addressable) Graphical Display (15" 4:3 or 15.6" 16:9 or 18.5" Display) | 1 | √ |
| | F452 | 7" Non-Touch LCD (XL7) Customer Display (15" 4:3 or 15.6" 16:9 or 18.5" Display) | 1 | √ |
| | F453 | 7" Touch LCD (XL7) Customer Display (15" 4:3 or 15.6" 16:9 or 18.5" Display) | 1 | √ |
| | F460 | 5MP Camera (15" 4:3 or 15.6" 16:9 or 18.5" Display) | √ | √ |
| | F461 | 2x20 Customer Display (15" 4:3 or 15.6" 16:9 or 18.5" Display) | 1 | √ |
| | F462 | Double Byte Customer Display (15" 4:3 or 15.6" 16:9 or 18.5" Display) | √ | √ |
| | F471 | OSI APA (All Points Addressable) Graphical Display (15" 4:3 or 15.6" 16:9 or 18.5" Display) | 1 | √ |
| | F490 | No Customer Display - Logo Badge (18.5" Display) | √ | √ |
| | F491 | APA (All Points Addressable) Graphical Display (18.5" Display) | √ | √ |
| | F492 | 7" Non-Touch LCD (XL7) Customer Display (18.5" Display) | 1 | √ |
| | F493 | 7" Touch LCD (XL7) Customer Display (18.5" Display) | √ | √ |
| | F550 | No Port D Peripherals (21.5" Display) | × | √ |
| | F551 | 5MP Camera (21.5" Display) | × | √ |

| Feature | | Description | СХ7 | CX7ii |
|--------------|------|--|----------|----------|
| Base Display | F357 | No Base Display Option, White | √ | × |
| | F434 | 10" Touch (PCAP) LCD (TES) High Mount (USB-C) | 1 | × |
| | F435 | 10" Non-Touch LCD (XL10) Base Display (DP) | 1 | √ |
| | F436 | 10" Touch (PCAP) LCD (XL10) Base Display (DP) | 1 | √ |
| | F437 | 10" Non-Touch LCD (XL10) High Mount (DP) | 1 | √ |
| | F438 | 10" Touch (PCAP) LCD (XL10) High Mount (DP) | √ | √ |
| | F439 | 10" Non-Touch LCD (XL10) with Cube Imager (DP) | √ | √ |
| | F446 | 10" Touch (PCAP) LCD (TES) Base Display | √ | √ |
| | F455 | 10" Non-Touch LCD (XL10) Base Display | √ | √ |
| | F456 | 10" Touch (PCAP) LCD (XL10) Base Display | √ | √ |
| | F457 | No Base Display Option | √ | √ |
| | F465 | 10" Non-Touch LCD (XL10) with Cube Imager | √ | √ |
| | F466 | 10" Touch (PCAP) LCD (XL10) with Cube Imager | √ | √ |
| | F475 | 10" Non-Touch LCD (XL10) High Mount | √ | √ |
| | F476 | 10" Touch (PCAP) LCD (XL10) High Mount | 1 | √ |

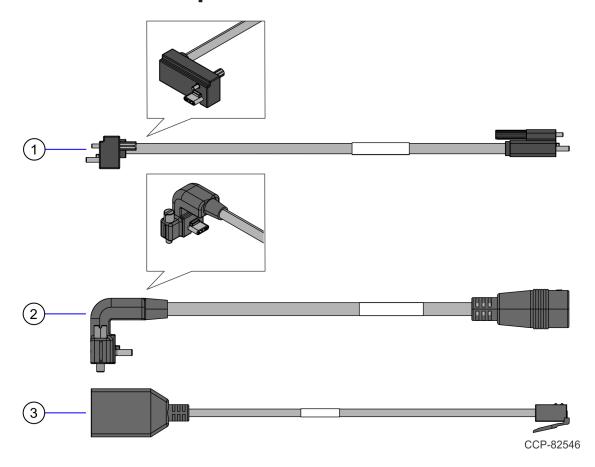
| Feature | | Description | СХ7 | CX7ii |
|--------------------------|------|--|----------|----------|
| Base and Power Supply | F032 | Base for USB Centric I/O (Retail), Integrated Power Supply (15.6" 16:9 or 18.5" Display) | | ✓ |
| | F033 | Base for USB Centric I/O (Retail), Remote Power Supply (15.6" 16:9 or 18.5" Display) | √ | √ |
| | F034 | Base for Serial Centric I/O (Hospitality), Integrated Power Supply (15.6" 16:9 or 18.5" Display) | √ | √ |
| | F035 | Base for Serial Centric I/O (Hospitality), Remote Power Supply (15.6" 16:9 or 18.5" Display) | √ | √ |
| | F036 | Integrated USB Centric I/O (Retail) Expansion (15.6" 16:9 or 18.5" or 21.5" Display) | ✓ | √ |
| | F037 | Integrated Serial Centric I/O (Hospitality) Expansion (15.6" 16:9 or 18.5"Display) | √ | √ |
| | F038 | Remote USB Centric I/O (Retail) Chassis (15.6" 16:9 or 18.5" or 21.5" Display) | √ | √ |
| | F039 | Remote Serial Centric I/O (Hospitality) Chassis (15.6" 16:9 or 18.5" Display) | √ | √ |
| | F042 | Base for USB Centric I/O (Retail), Integrated Power Supply (15" 4:3 Display) | √ | √ |
| | F043 | Base for USB Centric I/O (Retail), Remote Power Supply (15" 4:3 Display) | √ | √ |
| | F044 | Base for Serial Centric I/O (Hospitality), Integrated Power Supply (15" 4:3 Display) | √ | √ |
| | F045 | Base for Serial Centric I/O (Hospitality), Remote Power Supply (15" 4:3 Display) | √ | √ |
| | F046 | Integrated USB Centric I/O (Retail) (15" 4:3 Display) | √ | √ |
| | F047 | Integrated Serial Centric I/O (Hospitality) (15" 4:3 Display) | ✓ | ✓ |

| Feature | | Description | СХ7 | СХ7іі |
|------------|------|---|----------|----------|
| | F048 | Remote USB Centric I/O (Retail) Chassis (15" 4:3 Display) | ✓ | ✓ |
| | F049 | Remote Serial Centric I/O (Hospitality) Chassis (15" 4:3 Display) | ✓ | ✓ |
| | F342 | Base for USB Centric I/O (Retail), Integrated Power Supply (15" 4:3 Display), White | ✓ | × |
| Power Cord | F100 | US Power Cord | √ | √ |
| | F101 | International Power Cord | ✓ | ✓ |
| | F102 | UK Power Cord | ✓ | ✓ |
| | F103 | Australia Power Cord | √ | ✓ |
| | F104 | China Power Cord | √ | ✓ |
| | F105 | SEV Power Cord | √ | ✓ |
| | F106 | India Power Cord | √ | ✓ |
| | F107 | Taiwan Power Cord | √ | ✓ |
| | F108 | Argentina Power Cord | √ | √ |
| | F109 | Power Cord 120V Twist Lock | √ | √ |
| | F119 | No Power Cord | √ | √ |

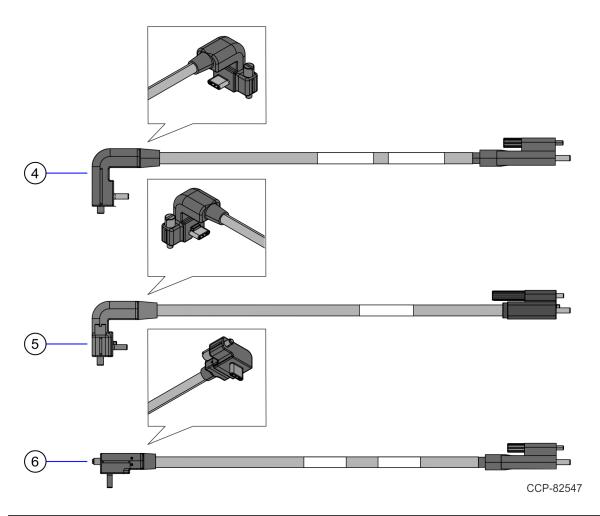
Optional Features

| Optional Feature | | Description | СХ7 | CX7ii |
|--|------|--|----------|----------|
| Optional Stand | F040 | Stand, CX7, Integrated I/O Mount, without Power Supply | ✓ | √ |
| | F041 | Stand, CX7, Integrated I/O Mount, with Power Supply | √ | √ |
| I/O Security Cover | F050 | CX I/O Security Cover | √ | √ |
| Ethernet Cable | F110 | 7772 10/100/1000 Ethernet Cable | √ | √ |
| Serial Converter Cable | F111 | Serial Converter Cable | √ | √ |
| Remote Base Cable (for use with F038, F039, F048, or F049) | F112 | USBC Cable, Remote, Keyed, Black, | √ | ✓ |
| | F113 | USBC Cable, Remote, Keyed, Black, 2.5m | ✓ | √ |
| | F115 | USBC Cable, Remote, Straight Offset, Black, 2.5m | ✓ | √ |
| ТРМ | F130 | Hardware TPM Security Module 2.0 | √ | √ |
| Firmware | F510 | CX7 I/O Cash Drawer Firmware | √ | √ |
| BIOS | F420 | UEFI BIOS - Coffee Lake -S (Windows) | √ | × |
| | F421 | UEFI BIOS - Raptor Lake (Windows and Linux) | × | √ |
| | F422 | UEFI BIOS - Coffee Lake - S (Linux) | √ | × |

USBC Cable Options



| Item | Cable | Description | Configuration Notes |
|------|-----------------------------|---|---|
| 1 | 1432-C847-0025 7772-F115 | USBC Cable, Remote, Straight Offset, Black, 2.5m | Use when connecting CX on third-party bracket to remote I/O |
| 2 | 1432-C851-0003 | USBC Cable, PSU Adapter for CX | Use with RJ45 Ethernet Plug (1432- C852-0003) |
| 3 | 1432-C852-0003 | Cable, RJ45 Ethernet Plug | Use with USBC Cable, PSU Adapter for CX (1432-C851-0003) |



| Item | Cable | Description | Configuration Notes |
|------|-----------------------------|--|---|
| 4 | 1432-C878-0013 | USBC Cable – XL7W/XL10W pole mount connected to CX5/CX7 stand model (1.3m) | Use when connecting XL7W/XL10W pole mounted to CX on table top stand |
| 5 | 1432-C880-0010 7772-F112 | USBC Cable, Remote, Keyed, Black, 1m | Use when connecting CX head to remote I/O |
| 5 | 1432-C880-0025 7772-F113 | USBC Cable, Remote, Keyed, Black, 2.5m | Use when connecting CX head to remote I/O |
| 6 | 1432-C883-0013 | XL7W/XL10W USBC Cable for CX5/CX7 remote or integrated I/O (1.3m) | Use when connecting XL7W/XL10W pole mounted to CX with remote I/O or integrated I/O |
| 6 | 1432-C883-0025 | XL7W/XL10W USBC Cable for CX5/CX7 remote or integrated I/O (2.5m) | Use when connecting XL7W/XL10W pole mounted to CX with remote I/O or integrated I/O |

Operating Systems

The OS image and base platform drivers will be pre-loaded on the solid state drive prior to shipment. The POS must be configured with a solid state drive.

| Product ID | Product ID Description | Configuration Notes | СХ7 | CX7ii |
|------------|---|------------------------------|----------|----------|
| 7772-F700 | No Operating System | Approval required | ✓ | √ |
| 7772-F701 | No Operating System for CX7 Linux Users | Approval required | ✓ | × |
| 7772-F702 | No Operating System for CX7ii Linux Users | Approval required | × | ✓ |
| 7772-F710 | Windows 10 Professional Non Embedded 64 bit OS | Pre-installed in the factory | ✓ | × |
| 7772-F711 | CX7ii Windows 11 Professional Non Embedded (64 bit) (UEFI BIOS) | Pre-installed in the factory | × | √ |
| 7772-F720 | Windows 10 IoT Enterprise 2019 LTSC Value 64 bit (UEFI) | Pre-installed in the factory | ✓ | × |
| 7772-F740 | Orderman Windows 10 IoT Enterprise 2019 LTSC Value 64 bit (UEFI) | Pre-installed in the factory | √ | × |
| 7772-F755 | NCRLinuxU 1.0 (Ubuntu 20.04.02 LTS based) | Pre-installed in the factory | ✓ | × |
| 7772-F756 | CX7 NCRLinuxU 2.0 Operating System (Ubuntu 22.04)— Coffee Lake Only | Pre-installed in the factory | ✓ | × |
| 7772-F757 | CX7ii NCRLinuxU 2.0 Operating System (Ubuntu 22.04)— Raptor Lake Only | Pre-installed in the factory | × | √ |
| 7772-F758 | Orderman Windows 10 IoT Enterprise 2021 LTSC Value (64 bit) (UEFI BIOS) | Pre-installed in the factory | ✓ | × |
| 7772-F760 | Windows 10 IoT Enterprise 2021 LTSC Value (64 bit) (UEFI BIOS) | Pre-installed in the factory | √ | × |

| Product ID | Product ID Description | Configuration Notes | СХ7 | CX7ii |
|------------|--|------------------------------|----------|----------|
| 7772-F762 | CX7ii Windows 10 IoT Enterprise 2021 LTSC Value (64 bit) (UEFI BIOS) | Pre-installed in the factory | × | ✓ |
| 7772-F770 | CX7ii Windows 11 IoT Enterprise LTSC Value (64 bit) (UEFI BIOS) | Pre-installed in the factory | × | ✓ |
| 7772-F780 | NCR Linux C (CentOS 8) | Pre-installed in the factory | √ | × |
| 7772-F781 | NCR Linux C 3.0 (CentOS 7.9) | Pre-installed in the factory | ✓ | × |
| 7772-F790 | CX7 SUSE Linux Enterprise Server 15 (SLES15) x86 64 bit Operating System—Coffee Lake Only | Pre-installed in the factory | ✓ | × |
| 7772-F791 | CX7ii SUSE Linux Enterprise Server 15 (SLES15) x86 64 bit Operating System—Raptor Lake Only | Pre-installed in the factory | × | √ |

Base client and third-party system software are also available on the public NCR Voyix Drivers and Patches support website: https://www5.ncr.com/support/support_drivers_
patches.asp?Class=External\display

Specifications

CX7

| Model Specs | Good | Better | Best | Best | |
|-------------------------------|---|---------------------------|---------------------------|----------------------------|--|
| Chipset | Intel Q370 "Coffee Lake" | | | | |
| Processor | Intel® Celeron® G4900T | Intel® Core™ i3- 8100T | Intel® Core™ i5- 8500T | Intel® Core™ i5- 9500TE | |
| Clock Speed | ock Speed 2.9 GHz 3.1 GHz 2.1 GHz | | 2.1 GHz | 2.2 GHz | |
| Turbo Boost for Peak Loads | N/A | N/A | Up to 3.5 GHz | Up to 3.6 GHz | |
| Cores | 2 | 4 | 6 | 6 | |
| Level 2 Cache | 2MB | 6МВ | 9MB | 9MB | |
| Thermal Design Power | 35 Watts | 35 Watts | 35 Watts | 35 Watts | |
| AMT | No | No | Yes | Yes | |
| Intel vPro | No | No | Yes | Yes | |
| Image Recovery Button | Yes | Yes | Yes | Yes | |
| Odometer Chip | Yes | Yes | Yes | Yes | |
| RAID Support | Yes | Yes | Yes | Yes | |
| ТРМ | Yes | Yes | Yes | Yes | |

| Model Specs | Good | Better | Best | Best | | |
|---|---------------------------------|---------------------------------|---------------------------------|------------------------------|--|--|
| Memory | | | | | | |
| Memory Type | DDR4-2400MHz | DDR4-2400MHz | DDR4-2400MHz | DDR4-2400MHz | | |
| Form Factor | SODIMM | SODIMM | SODIMM | SODIMM | | |
| Memory Slots | 2 | 2 | 2 | 2 | | |
| Standard Memory | 8GB (1 x 8GB) | 8GB (1 x 8GB) | 8GB (1 x 8GB) | 8GB (1 x 8GB) | | |
| Maximum Memory | 32GB (2 x 16GB) | 32GB (2 x 16GB) | 32GB (2 x 16GB) | 32GB (2 x 16GB) | | |
| M.2 Storage | M.2 Storage | | | | | |
| Solid State Drive (SATA) | 120GB SSD (128GB) | 120GB SSD (128GB) | 120GB SSD (128GB) | 120GB SSD (128GB) | | |
| Dual Solid State Drive (SATA) | Dual 120GB SSD (128GB) | Dual 120GB SSD (128GB) | Dual 120GB SSD (128GB) | Dual 120GB SSD (128GB) | | |
| Solid State Drive (PCIe) | 240GB SSD (256GB) | 240GB SSD (256GB) | 240GB SSD (256GB) | 240GB SSD (256GB) | | |
| Solid State Drive (PCIe) | 480GB SSD (512GB) | 480GB SSD (512GB) | 480GB SSD (512GB) | 480GB SSD (512GB) | | |
| Integrated Touch Display | | | | | | |
| 15.6" Projected Capacitive | | | | | | |
| 15.6" Projected Capacitive 1920 x 1080 10-point touch | Yes | Yes | Yes | Yes | | |
| Brightness | 400 nits | 400 nits | 400 nits | 400 nits | | |
| Screen Life | 50K Hours to half brightness | 50K Hours to half brightness | 50K Hours to half brightness | 50K Hours to half brightness | | |
| Anti-Glare | Yes | Yes | Yes | Yes | | |

| Model Specs | Good | Better | Best | Best | |
|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|--|
| 15" 4:3 Projected Capacitive | | | | | |
| 15" 4:3 Projected Capacitive 1024 x 768 10-point touch | Yes | Yes | Yes | Yes | |
| Brightness | 400 nits | 400 nits | 400 nits | 400 nits | |
| Screen Life | 50K Hours to half brightness | |
| Anti-Glare | Yes | Yes | Yes | Yes | |
| 18.5" Projected Capacitive | | | | | |
| 18.5" Projected Capacitive 1920 x 1080 10-point touch | Yes | Yes | Yes | Yes | |
| Brightness | 400 nits | 400 nits | 400 nits | 400 nits | |
| Screen Life | 50K Hours to half brightness | |
| Anti-Glare | Yes | Yes | Yes | Yes | |

| Model Specs | Good | Better | Best | Best |
|--|----------|----------|----------|----------|
| Peripherals | | | | |
| 3-track Encrypted MSR | Option | Option | Option | Option |
| Integrated Wireless 802.11 AC & Bluetooth | Option | Option | Option | Option |
| Integrated Biometric Reader | Option | Option | Option | Option |
| Integrated 2D Imager | Option | Option | Option | Option |
| Integrated 2-in-1 Sign-in Device | Option | Option | Option | Option |
| Integrated UV Bill Validator | Option | Option | Option | Option |
| Integrated Camera | Option | Option | Option | Option |
| Integrated External Speaker | Option | Option | Option | Option |
| Integrated Speaker | Standard | Standard | Standard | Standard |

| Model Specs | Good | Better | Best | Best | |
|--|-------------------|--------|--------|--------|--|
| Consumer Displays | Consumer Displays | | | | |
| APA Graphical Display | Option | Option | Option | Option | |
| 2x20 Customer Display | Option | Option | Option | Option | |
| Double Byte Customer Display | Option | Option | Option | Option | |
| 7" Color LCD (Touch or Non-touch) | Option | Option | Option | Option | |
| 10" Color LCD (Touch or Non-touch) | Option | Option | Option | Option | |
| 10" Color LCD with Cube Scanner (Touch or Non-touch) | Option | Option | Option | Option | |

| Model Specs | Good | Better | Best | Best |
|--|--|--------|------|------|
| Dimensions/Weight | | | | |
| 15.6" Projected Capacitive | | | | |
| 15.6" CX7 terminal with base | Dimensions (w x d x 14.95" x 7.81" x 12.0 (379.7 mm x 198.4 m Weight 11.35 lbs (5.15 kg) | 08" | | |
| 15.6" CX7 terminal without base | Dimensions (w x d x 14.95" x 1.26" x 9.3 (379.7 mm x 32.0 m Weight 5.30 lbs (2.40 kg) | 2" | | |
| 15.6" CX7 terminal with integrated I/O | Dimensions (w x d x 14.95" x 2.29" x 9.3 (379.7 mm x 58.1 mm Weight 6.30 lbs (2.86 kg) | 2" | | |

| Model Specs | Good | Better | Best | Best |
|--|--|--------|------|------|
| 15" 4:3 Projected Capaciti | ve | | | |
| 15" 4:3 CX7 terminal with base | Dimensions (w x d x h) 13.88" x 8.23" x 12.52" (352.5 mm x 209.0 mm x 318.0 mm) Weight 12.00 lbs (5.44 kg) | | | |
| 15" 4:3 CX7 terminal without base | Dimensions (w x d x 13.88" x 1.34" x 10.3 (352.5 mm x 34.1 mm) Weight 6.30 lbs (2.86 kg) | 76" | | |
| 15" 4:3 CX7 terminal with integrated I/O | Dimensions (w x d x 13.88" x 2.37" x 10.3 (352.5 mm x 60.2 m Weight 6.80 lbs (3.08 kg) | 76" | | |

| Model Specs | Good | Better | Best | Best |
|--|--|--------|------|------|
| 18.5" Projected Capacitive | | | | |
| 18.5" CX7 terminal with base | Dimensions (w x d x 17.90" x 8.35" x 13.0 (454.7 mm x 212.2 r Weight 14.40 lbs (6.53 kg) | 01" | | |
| 18.5" CX7 terminal without base | Dimensions (w x d x 17.90" x 1.51" x 11.1 (454.7 mm x 38.3 m Weight 8.60 lbs (3.90 kg) | 1" | | |
| 18.5" CX7 terminal with integrated I/O | Dimensions (w x d x 17.90" x 2.53" x 11.7 (454.7 mm x 64.2 m Weight 9.50 lbs (4.31 kg) | 11" | | |

CX7ii

| Model Specs | Better | Best |
|----------------------------|-------------------------|-------------------------|
| Chipset | Intel "Rap | otor Lake" |
| Processor | Intel® Core™ i3-13100TE | Intel® Core™ i5-13500TE |
| Clock Speed | 2.4 GHz | 1.3 GHz |
| Turbo Boost for Peak Loads | Up to 4.1 GHz | Up to 4.5 GHz |
| Cores | 4 | 14 |
| Cache | 12MB | 24MB |
| Level 2 Cache | 5MB | 11.5MB |
| Thermal Design Power | 35 Watts | 35 Watts |
| АМТ | No | Yes |
| Intel vPro | No | Yes |
| Image Recovery Button | Yes | Yes |
| Odometer Chip | Yes | Yes |
| RAID Support | Yes | Yes |
| ТРМ | Yes | Yes |
| Memory | | |
| Memory Type | DDR4-2400MHz | DDR4-2400MHz |
| Form Factor | SODIMM | SODIMM |
| Memory Slots | 2 | 2 |
| Standard Memory | 8GB (1 x 8GB) | 8GB (1 x 8GB) |
| Maximum Memory | 32GB (2 x 16GB) | 32GB (2 x 16GB) |

| Model Specs | Better | Best |
|--|------------------------------|------------------------------|
| M.2 Storage | ' | |
| Solid State Drive (SATA) | 120GB SSD (128GB) | 120GB SSD (128GB) |
| Dual Solid State Drive (SATA) | Dual 120GB SSD (128GB) | Dual 120GB SSD (128GB) |
| Solid State Drive (PCIe) | 240GB SSD (256GB) | 240GB SSD (256GB) |
| Solid State Drive (PCIe) | 480GB SSD (512GB) | 480GB SSD (512GB) |
| Integrated Touch Display | | |
| 15.6" Projected Capacitive | | |
| 15.6" Projected Capacitive 1920 x 1080 10-point touch | Yes | Yes |
| Brightness | 400 nits | 400 nits |
| Screen Life | 50K Hours to half brightness | 50K Hours to half brightness |
| Anti-Glare | Yes | Yes |
| 15" 4:3 Projected Capacitive | | |
| 15" 4:3 Projected Capacitive 1024 x 768 10-point touch | Yes | Yes |
| Brightness | 400 nits | 400 nits |
| Screen Life | 50K Hours to half brightness | 50K Hours to half brightness |
| Anti-Glare | Yes | Yes |

| Model Specs | Better | Best |
|---|------------------------------|------------------------------|
| 18.5" Projected Capacitive | | |
| 18.5" Projected Capacitive 1920 x 1080 10-point touch | Yes | Yes |
| Brightness | 400 nits | 400 nits |
| Screen Life | 50K Hours to half brightness | 50K Hours to half brightness |
| Anti-Glare | Yes | Yes |
| 21.5" Projected Capacitive | | |
| 21.5" Projected Capacitive 1920 x 1080 10-point touch | Yes | Yes |
| Brightness | 300 nits | 300 nits |
| Screen Life | 50K Hours to half brightness | 50K Hours to half brightness |
| Anti-Glare | Yes | Yes |

| Model Specs | Better | Best | |
|--|-------------|----------|--|
| Peripherals | Peripherals | | |
| 3-track Encrypted MSR | Option | Option | |
| Integrated Wireless 802.11 AC & Bluetooth | Option | Option | |
| Integrated Biometric Reader | Option | Option | |
| Integrated 2D Imager | Option | Option | |
| Integrated 2-in-1 Sign-in Device | Option | Option | |
| Integrated UV Bill Validator | Option | Option | |
| Integrated Camera | Option | Option | |
| Integrated External Speaker | Option | Option | |
| Integrated Speaker | Standard | Standard | |

| Model Specs | Better | Best | |
|---|--|--------|--|
| Consumer Displays | Consumer Displays | | |
| APA Graphical Display | Option | Option | |
| 2x20 Customer Display | Option | Option | |
| Double Byte Customer Display | Option | Option | |
| 7" Color LCD (Touch or Non-touch) | Option | Option | |
| 10" Color LCD (Touch or Non-touch) | Option | Option | |
| 10" Color LCD with Cube Scanner (Touch or Non-touch) | Option | Option | |
| Dimensions/Weight | | | |
| 15.6" Projected Capacitive | | | |
| 15.6" CX7 terminal with base | Dimensions (w x d x h) 14.95" x 7.81" x 12.08" (379.7 mm x 198.4 mm x 306.8 mm) Weight 11.35 lbs (5.15 kg) | | |
| 15.6" CX7 terminal without base | Dimensions (w x d x h) 14.95" x 1.26" x 9.32" (379.7 mm x 32.0 mm x 236.6 mm) Weight 5.30 lbs (2.40 kg) | | |
| 15.6" CX7 terminal with integrated I/O | Dimensions (w x d x h) 14.95" x 2.29" x 9.32" (379.7 mm x 58.1 mm x 236.6 mm) Weight 6.30 lbs (2.86 kg) | | |

| Model Specs | Better | Best |
|--|---|-------|
| 15" 4:3 Projected Capacitive | | |
| 15" 4:3 CX7 terminal with base | Dimensions (w x d x h) 13.88" x 8.23" x 12.52" (352.5 mm x 209.0 mm x 318. Weight 12.00 lbs (5.44 kg) | O mm) |
| 15" 4:3 CX7 terminal without base | Dimensions (w x d x h) 13.88" x 1.34" x 10.76" (352.5 mm x 34.1 mm x 273.4 Weight 6.30 lbs (2.86 kg) | mm) |
| 15" 4:3 CX7 terminal with integrated I/O | Dimensions (w x d x h) 13.88" x 2.37" x 10.76" (352.5 mm x 60.2 mm x 273.4 Weight 6.80 lbs (3.08 kg) | l mm) |

| Model Specs | Better | Best |
|--|--|-------|
| 18.5" Projected Capacitive | | |
| 18.5" CX7 terminal with base | Dimensions (w x d x h) 17.90" x 8.35" x 13.01" (454.7 mm x 212.2 mm x 330.) Weight 14.40 lbs (6.53 kg) | 4 mm) |
| 18.5" CX7 terminal without base | Dimensions (w x d x h) 17.90" x 1.51" x 11.11" (454.7 mm x 38.3 mm x 282.3 Weight 8.60 lbs (3.90 kg) | mm) |
| 18.5" CX7 terminal with integrated I/O | Dimensions (w x d x h) 17.90" x 2.53" x 11.11" (454.7 mm x 64.2 mm x 282.3 Weight 9.50 lbs (4.31 kg) | 3 mm) |

| Model Specs | Better | Best |
|--|--|-------|
| 21.5" Projected Capacitive | | |
| 21.5" CX7 terminal without base | Dimensions (w x d x h) 20.81" x 1.75" x 12.61" (528.5 mm x 44.5 mm x 320.2 Weight 10.74 lbs (4.87 kg) | ? mm) |
| 21.5" CX7 terminal with integrated I/O | Dimensions (w x d x h) 20.81" x 2.78" x 12.61" (528.5 mm x 70.5 mm x 320.2 Weight 11.64 lbs (5.28 kg) | ? mm) |

Migration

The table below shows the differences between CX7 and CX7ii.

| | CX7 | CX7ii |
|-----------------|--|--|
| Motherboard | Coffee Lake | Raptor Lake |
| Processors | Intel® Celeron® G4900T Intel® Core™ i3-8100T Intel® Core™ i5-8500T Intel® Core™ i5-9500TE | Intel® Core™ i3-13100TE Intel® Core™ i5-13500TE |
| WiFi | WiFi 5 Dual Band Wireless-AC 9260 | WiFi 6E AX210 |
| OS Image | Not available on CX7ii: • Win 10 IoT Enterprise LTSC 2019 | Not available on CX7: • Win 11 Pro • Win 11 loT Enterprise (Q2 2024) |
| BIOS | АМІ | Insyde |
| Display Sizes | 15.6" Projected Capacitive 15" 4:3 Projected Capacitive 18.5" Projected Capacitive | 15.6" Projected Capacitive 15" 4:3 Projected Capacitive 18.5" Projected Capacitive 21.5" Projected Capacitive |
| Driver Packages | Supports NCRPSW/NCRPSL Supports RPSW or RPSL Note For RPSW, use version RPSW 5.3.2.0 or later. Supports RPDM/CADD Supports Gen3 | Supports NCRPSW/NCRPSL |

| | СХ7 | CX7ii |
|-----------|--|--|
| OS Images | The "no operating system" features for CX7 and CX7ii are different due to the different BIOS contents. Supports any Orderman Windows OS image (F740, F758) Supports any NCRLinuxU 1.0 image (F755) Support any NCRLinuxC images (F780, F781) Any customer-specific OS images for CX7 Windows and Linux will not be available for CX7ii without initiating a new SCER | The "no operating system" features for CX7 and CX7ii are different due to the different BIOS contents. Does not support any Orderman Windows OS image (F740, F758) Does not support any NCRLinuxU 1.0 image (F755) Does not support any NCRLinuxC images (F780, F781) |
| | F756 and F757 will be different due t | ll be the same, but the Linux features F790 |
| | Warning The CX7 image is not usable on the CX7ii. W must be updated based on the latest NCR Go | |
| BIOS | Requires a different BIOS for Windows and Linux Not interchangeable with CX7ii Any customer-specific BIOSs for CX7 will not be available for CX7ii without initiating a new SCER | Uses the same BIOS for Windows and Linux Not interchangeable with CX7 |

Mounting Configurations

In addition to the integration of the board in the base, each I/O can be configured for a wall mount solution, pole mount solution, or ordered in a remote chassis to permit placement under the counter.

- "Table Top Stand" on the next page
- "Remote I/O Chassis Pole Mount" on page 55
- "Integrated I/O Chassis Stand/Wall/Pole Mount" on page 57

Table Top Stand

A Caution

When the CX Head is mounted on a Table Top Stand, it is NOT recommended to flip the CX Head to transition to a customer's view. Constant flipping of the Head causes friction on the cable and can lead to wear over an undetermined timeframe. If constant transitioning to a customer's view is required on a daily basis, it is recommended to mount the CX Head on a pole that permits rotation, such as the 14" Surface Mount Pole (7772-K503) or 14" Bolt-thru Mount Pole (7772-K504).

Table Top Stand with Remote Power Supply

The Power Supply is not integrated in the Base.

For CX7 15.6" 16:9 or 18.5" Display

- with USB Centric I/O (Retail) (F033)
- with Serial Centric I/O (Hospitality) (F035)

For CX7 15" 4:3 Display

- with USB Centric I/O (Retail) (F043)
- with Serial Centric I/O (Hospitality) (F045)



CCP-76587

Table Top Stand with Integrated Power Supply

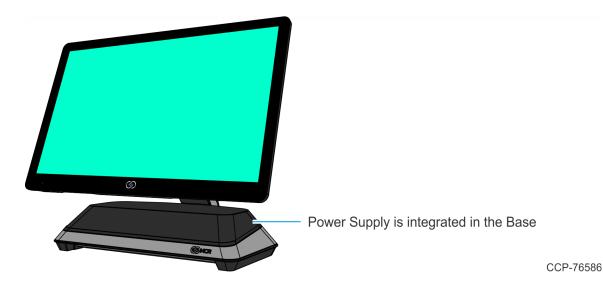
The Power Supply is integrated in the Base.

For CX7 15.6" 16:9 or 18.5" Display

- with USB Centric I/O (Retail) (F032)
- with Serial Centric I/O (Hospitality) (F034)

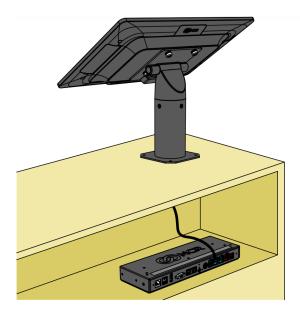
For CX7 15" 4:3 Display

- with USB Centric I/O (Retail) (F042)
- with Serial Centric I/O (Hospitality) (F044)



Remote I/O Chassis - Pole Mount

The CX7, when configured with a Remote I/O, must be mounted on a Pole.



CCP-79967

Remote I/O Chassis Options

For CX7 21.5" Display

• 7772-F038, 7772-K038 — Remote USB Centric I/O (Retail) Chassis

For CX7 15.6" 16:9 or 18.5" Display

- 7772-F038, 7772-K038 Remote USB Centric I/O (Retail) Chassis
- 7772-F039, 7772-K039 Remote Serial Centric I/O (Hospitality) Chassis

For CX7 15" 4:3 Display

- 7772-F048, 7772-K038 Remote USB Centric I/O (Retail) Chassis
- 7772-F049, 7772-K039 Remote Serial Centric I/O (Hospitality) Chassis

Remote I/O Chassis Cable Options

- 7772-F112 (1432-C880-0010) USBC Cable, Remote, Keyed, Black, 1m
- 7772-F113 (1432-C880-0025) USBC Cable, Remote, Keyed, Black, 2.5m

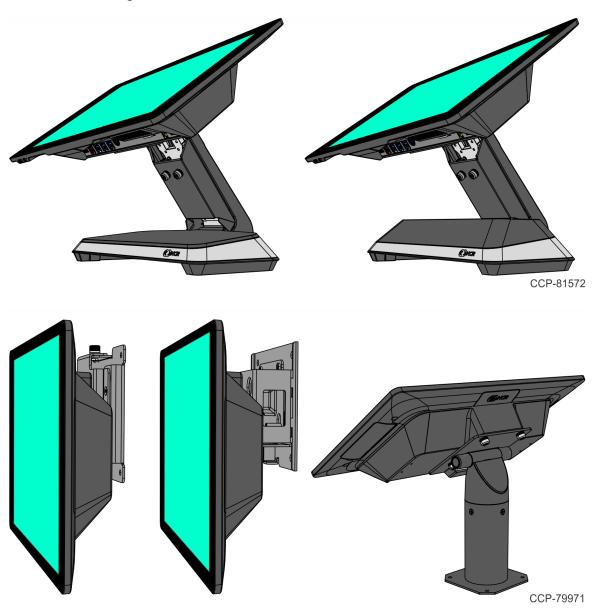
Pole Mount Options

The following kits provide an option to mount the CX7 with Remote I/O on a Pole.

- 7772-K400 Pole Mount
- **7772-K503** 14" Surface Mount Pole
- 7772-K504 14" Bolt-thru Mount Pole

Integrated I/O Chassis – Stand/Wall/Pole Mount

The CX7 with Integrated I/O can be mounted on a stand, on a wall, or on a Pole.



Integrated I/O Chassis Options

For CX7 21.5" Display

• 7772-F036 — Integrated USB Centric I/O (Retail)

For CX7 15.6" 16:9 or 18.5" Display

- 7772-F036 Integrated USB Centric I/O (Retail)
- 7772-F037 Integrated Serial Centric I/O (Hospitality)

For CX7 15" 4:3 Display

- 7772-F046 Integrated USB Centric I/O (Retail)
- 7772-F047 Integrated Serial Centric I/O (Hospitality)

■ Note

Kits are not available to convert units to Integrated I/O.

Mounting Options

The following features/kits provide an option to mount the CX7 with Integrated I/O on a stand, on a wall, or on a Pole.

Table Top Stand (For 15" 4:3 or 15.6" 16:9 or 18.5" Display only)

- 7772-F036 Integrated USB Centric I/O (Retail)
- 7772-F037 Integrated Serial Centric I/O (Hospitality)
- 7772-F040 Stand, CX7, Integrated I/O Mount, without Power Supply
- 7772-F041 Stand, CX7, Integrated I/O Mount, with Power Supply

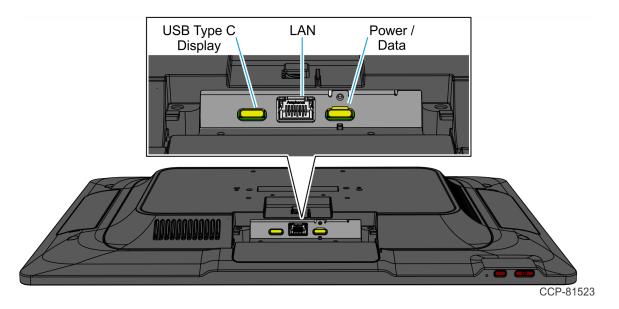
Wall Mount

- 7772-K320 Flush Wall Mount Bracket, Integrated I/O
- 7772-K325 Wall Mount Bracket with Power Supply enclosure, Integrated I/O

Pole Mount

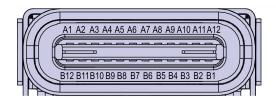
- 7772-K400 Pole Mount
- **7772-K503** 14" Surface Mount Pole
- 7772-K504 14" Bolt-thru Mount Pole

CX Head Ports



CX Head (Motherboard) Connector Pinouts USB-C (USB Type C Display)

The USB Type C connector (Molex 105450-0101-SD) serves as the connection between the Motherboard and the secondary display. The connector is rated at 30V withstand voltage and a current carrying capacity of up to 5A. The connector is compliant with the USB Type C Standard with Alt Mode for Display Port and reversible connection capability.



CCP-73981

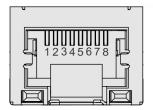
| Signal | Pin | Pin | Signal |
|--------------|-----|-----|--------------|
| GND | A1 | B12 | GND |
| USB 3.0 TX1+ | A2 | B11 | USB 3.0 RX1+ |
| USB 3.0 TX1- | A3 | B10 | USB 3.0 RX1- |
| +V (12V) | A4 | В9 | +V (12V) |
| CC1 | A5 | B8 | SBU2 |
| USB 2.0 D+ | A6 | B7 | USB 2.0 D- |
| USB 2.0 D- | A7 | В6 | USB 2.0 D+ |
| SBU1 | A8 | B5 | CC2 |
| +V (12V) | A9 | B4 | +V (12V) |
| Display Port | A10 | В3 | Display Port |
| Display Port | A11 | B2 | Display Port |
| GND | A12 | B1 | GND |

The Power Delivery (PD) Controller communicates with existing products which use TI TPS6598x devices. The port only supports standard 5V and non-PD (non-Power Delivery) standard voltage of 12V on +V pins to power NCR Customer Displays.

The port requires an MUX with Redriver to support cable lengths up to 4m.

LAN

The Motherboard provides 10/100/1000 LAN support using Intel I219 "Jacksonville".



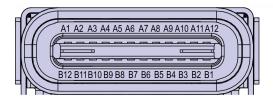
CCP-84007

| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| MDIPO | 1 | 2 | MDIN0 |
| MDIP1 | 3 | 4 | MDIN1 |
| MDIP2 | 5 | 6 | MDIN2 |
| MDIP3 | 7 | 8 | MDIN3 |

The LAN connector features Activity, Link, and Speed indicator LEDs. For more information, refer to "LAN Diagnostic LEDs" on page 134.

USB-C (Power/Data)

The USB Type C connector (Molex 105450-0101-SD) serves as the primary connection between the Motherboard and the I/O Board. The connector is rated at 30V withstand voltage and a current carrying capacity of up to 5A. The port is a non-standard USB-C port and is only intended to connect the Motherboard to the I/O Board. The port provides 24V and up to 4A current directly to the Motherboard from the I/O Board without Power Delivery (PD) handshaking.



CCP-73981

| Signal | Pin | Pin | Signal |
|--------------|-----|-----|--------------|
| GND | A1 | B12 | GND |
| USB 3.0 TX1+ | A2 | B11 | USB 3.0 RX1+ |
| USB 3.0 TX1- | A3 | B10 | USB 3.0 RX1- |
| +V (24V) | A4 | В9 | +V (24V) |
| CC1 (GPIO1) | A5 | B8 | SBU2 |
| USB 2.0 A D+ | A6 | В7 | USB 2.0 B D- |
| USB 2.0 A D- | A7 | В6 | USB 2.0 B D+ |
| SBU1 | A8 | B5 | CC2 (GPIO2) |
| +V (24V) | A9 | B4 | +V (24V) |
| Display Port | A10 | В3 | Display Port |
| Display Port | A11 | B2 | Display Port |
| GND | A12 | B1 | GND |

Since reversibility is not required, the CC1 and CC2 signals will be re-purposed for the following functions:

| Signal | Pin | Function |
|-------------|-----|-------------------------------|
| CC1 (GPIO1) | A5 | Power Status from Motherboard |
| CC2 (GPIO2) | B5 | Display Port Hot Plug Detect |

The port does not require an MUX, but requires independent Redrivers on the USB 3.0 and DP signals to support long cable lengths.

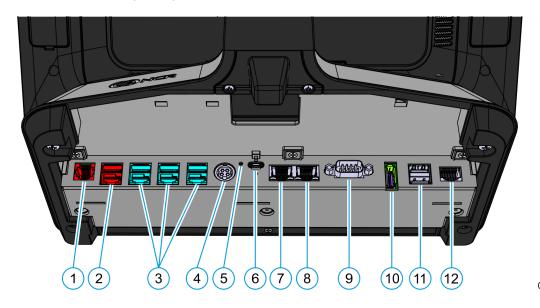
I/O Ports

- USB Centric I/O (Retail)
 - "Base" on the next page
 - "Integrated I/O" on page 68
 - "Remote I/O" on page 69
- Serial Centric I/O (Hospitality)
 - "Base" on page 70
 - "Integrated I/O" on page 72
 - "Remote I/O" on page 74

USB Centric I/O (Retail)

Base

The following are the default I/O ports for the NCR CX7 All-in-One POS (7772) with a USB Centric I/O (Retail) Base.



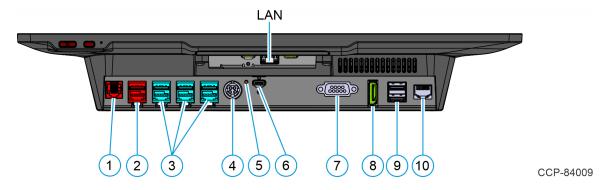
CCP-76592

| Callout | Port Name |
|---------|-----------------------------|
| 1 | Cash Drawer |
| 2 | USB 24V |
| 3 | USB 12V |
| 4 | 24V Power In |
| 5 | Status LED |
| 6 | USB-C |
| 7 | LAN Out |
| | Note Connect to the CX Head |

| Callout | Port Name |
|---------|----------------------------------|
| 8 | LAN In |
| | Note Connect to Ethernet Network |
| 9 | DB9 Serial (Standard UART) |
| 10 | DisplayPort |
| 11 | Dual USB 3.0 |
| 12 | RJ50 Serial (Enhanced UART) |

Integrated I/O

The following are the default I/O ports for the NCR CX7 All-in-One POS (7772) with Integrated USB Centric I/O (Retail).



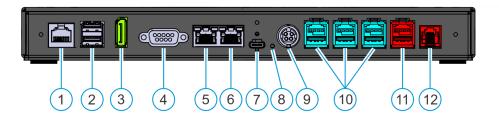
| Callout | Port Name |
|---------|-----------------------------|
| 1 | Cash Drawer |
| 2 | USB 24V |
| 3 | USB 12V |
| 4 | 24V Power In |
| 5 | Status LED |
| 6 | USB-C |
| 7 | DB9 Serial (Standard UART) |
| 8 | DisplayPort |
| 9 | Dual USB 3.0 |
| 10 | RJ50 Serial (Enhanced UART) |

■ Note

The Integrated USB Centric I/O (Retail) does not include a LAN Port. A LAN Port is available on the Motherboard. To connect to a network, refer to "Connecting to a Network" on page 107.

Remote I/O

The following are the default I/O ports for the NCR CX7 All-in-One POS (7772) Remote USB Centric I/O (Retail).



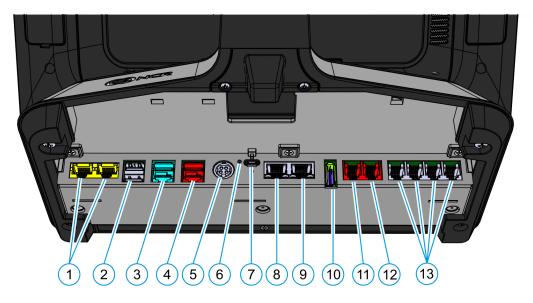
CCP-77891

| Callout | Port Name |
|---------|----------------------------------|
| 1 | RJ50 Serial (Enhanced UART) |
| 2 | Dual USB 3.0 |
| 3 | DisplayPort |
| 4 | DB9 Serial (Standard UART) |
| 5 | LAN In |
| | Note Connect to Ethernet Network |
| 6 | LAN Out |
| | Note Connect to the CX Head |
| 7 | USB-C |
| 8 | LED |
| 9 | 24V Power In |
| 10 | USB 12V |
| 11 | USB 24V |
| 12 | Cash Drawer |

Serial Centric I/O (Hospitality)

Base

The following are the default I/O ports for the NCR CX7 All-in-One POS (7772) with a Serial Centric I/O (Hospitality) Base.



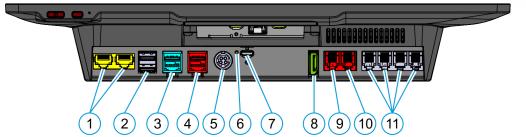
CCP-77864

| Callout | Port Name |
|---------|----------------------|
| 1 | RJ45 Serial |
| | COM5 (Enhanced UART) |
| | COM6 (Standard UART) |
| 2 | Dual USB 3.0 |
| 3 | USB 12V |
| 4 | USB 24V |
| 5 | 24V Power In |
| 6 | Status LED |
| 7 | USB-C |

| Callout | Port Name |
|---------|----------------------------------|
| 8 | LAN Out |
| | Note Connect to the CX Head |
| 9 | LAN In |
| | Note Connect to Ethernet Network |
| 10 | DisplayPort |
| 11 | Cash Drawer B |
| 12 | Cash Drawer A |
| 13 | RJ12 Serial |
| | COM1 (Enhanced UART) |
| | COM2 (Standard UART) |
| | COM3 (Enhanced UART) |
| | COM4 (Standard UART) |

Integrated I/O

The following are the default I/O ports for the NCR CX7 All-in-One POS (7772) with Integrated Serial Centric I/O (Hospitality).

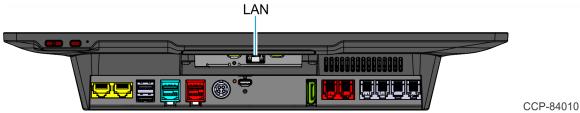


CCP-79084

| Callout | Port Name |
|---------|---|
| 1 | RJ45 Serial COM5 (Enhanced UART) COM6 (Standard UART) |
| 2 | Dual USB 3.0 |
| 3 | USB 12V |
| 4 | USB 24V |
| 5 | 24V Power In |
| 6 | Status LED |
| 7 | USB-C |
| 8 | DisplayPort |
| 9 | Cash Drawer B |
| 10 | Cash Drawer A |
| 11 | RJ12 Serial COM1 (Enhanced UART) COM2 (Standard UART) COM3 (Enhanced UART) COM4 (Standard UART) |

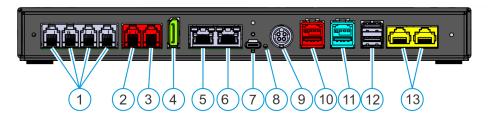
₽ Note

The Integrated Serial Centric I/O (Hospitality) does not include a LAN Port. A LAN Port is available on the Motherboard. To connect to a network, refer to "Connecting to a Network" on page 107.



Remote I/O

The following are the default I/O ports for the NCR CX7 All-in-One POS (7772) Remote Serial Centric I/O (Hospitality).



CCP-77892

| Callout | Port Name | |
|---------|----------------------------------|--|
| 1 | RJ12 Serial | |
| | COM1 (Enhanced UART) | |
| | COM2 (Standard UART) | |
| | COM3 (Enhanced UART) | |
| | COM4 (Standard UART) | |
| 2 | Cash Drawer A | |
| 3 | Cash Drawer B | |
| 4 | DisplayPort | |
| 5 | LAN In | |
| | Note Connect to Ethernet Network | |
| 6 | LAN Out | |
| | Note Connect to the CX Head | |
| 7 | USB-C | |
| 8 | LED | |
| 9 | 24V Power In | |

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| Callout | Port Name | |
|---------|---|--|
| 10 | USB 24V | |
| 11 | USB 12V | |
| 12 | Dual USB 3.0 | |
| 13 | RJ45 Serial | |
| | COM5 (Enhanced UART)COM6 (Standard UART) | |

I/O Board Connector Pinouts

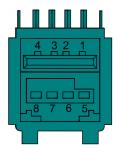
12V USB + Power

The I/O Board provides latching 12V Powered USB port (Foxconn P/N UB11123-GHT2-4F or NCR Voyix approved equivalent). The 12V Powered USB port is capable of supplying 12V at 2.0A max. The color of the connector is teal.

The 12V of each port is fused with a self-healing poly-fuse (Polytronics Everfuse P/N SMD2920P300TF/15 or NCR Voyix approved equivalent). An overcurrent signal is used to detect when this fuse is open. This signal is connected to a GPIO on the Super I/O.

Current limiting power switches are provided on the 5V VBUS pins with a limit current of 1A.

The USB Centric I/O Board provides three 12V Powered USB ports, while the Serial Centric I/O Board provides one 12V Powered USB port.

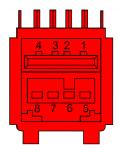


| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| USB PWR | 1 | 5 | GND |
| USB D- | 2 | 6 | +12V |
| USB D+ | 3 | 7 | +12V |
| GND | 4 | 8 | GND |
| FRAME GND | 9 | 10 | FRAME GND |
| FRAME GND | 11 | 12 | FRAME GND |

24V USB + Power

The I/O Board provides one latching 24V Powered USB port (Foxconn P/N UB11123-GHR3-4F or NCR Voyix approved equivalent). The 24V Powered USB port is capable of supplying 24V at 2.3A continuous and 3.0A peak. The color of the connector is red.

The 24V is fused with a resettable fuse (Tyco RUEF250U or NCR Voyix approved equivalent). An overcurrent signal is used to detect when this fuse is open. This signal is connected to a GPIO on the Super I/O. A separate return line, 24V_RET, is used instead of ground to provide noise isolation.

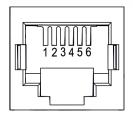


| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| USB PWR | 1 | 5 | 24V_RET |
| USB D- | 2 | 6 | +24V |
| USB D+ | 3 | 7 | +24V |
| GND | 4 | 8 | 24V_RET |
| FRAME GND | 9 | 10 | FRAME GND |
| FRAME GND | 11 | 12 | FRAME GND |

Cash Drawer

Cash Drawer Connector for USB Centric I/O

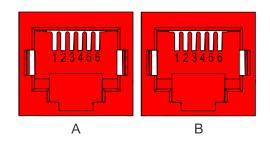
The USB Centric I/O Board provides a single 6-position RJ12 connector (Molex 44248-0065 or NCR Voyix approved equivalent).



| Pin | Signal Name | |
|-----|-------------|--|
| 1 | Frame Gnd | |
| 2 | Solenoid A | |
| 3 | Drawer A/B | |
| 4 | +24V/12V | |
| 5 | Solenoid B | |
| 6 | Logic Gnd | |

Cash Drawer Connector for Serial Centric I/O

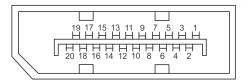
The Serial Centric I/O Board provides a dual package RJ12 connector. The color of the connector is red.



| Pin | Signal Name | |
|-----|-------------|--|
| 1 | Frame Gnd | |
| 2 | Solenoid A | |
| 3 | Drawer A/B | |
| 4 | +24V/12V | |
| 5 | NC | |
| 6 | Logic Gnd | |

DisplayPort

The I/O Board provides a 2-lane DisplayPort. Lanes 2 and 3 of the DisplayPort are not connected internally.



CCP-76975

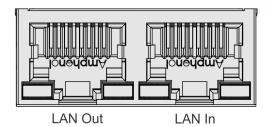
| Pin | Signal Name |
|-----|--------------|
| 1 | ML_LaneO (p) |
| 2 | GND |
| 3 | ML_LaneO (n) |
| 4 | ML_Lane1 (p) |
| 5 | GND |
| 6 | ML_Lane1 (n) |
| 7 | ML_Lane2 (p) |
| 8 | GND |
| 9 | ML_Lane2 (n) |
| 10 | ML_Lane3 (p) |
| 11 | GND |
| 12 | ML_Lane3 (n) |
| 13 | CONFIG1 |
| 14 | CONFIG2 |
| 15 | AUX CH (p) |
| 16 | GND |

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| Pin | Signal Name |
|-----|-----------------|
| 17 | AUX CH (n) |
| 18 | Hot Plug Detect |
| 19 | Return |
| 20 | DP_PWR |

LAN

Both USB Centric and Serial Centric I/O Boards provide Gigabit Ethernet support on an RJ45 connector using a passthrough connection to the motherboard. The connector does not feature an LED indicator.



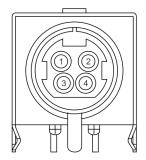
CCP-77853



The Integrated I/O does not have LAN Out and LAN In Ports.

Power In

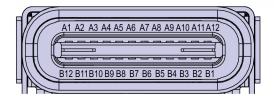
Both USB Centric and Serial Centric I/O Boards accept +24V DC voltage input from an external power supply. The Power In connector is a 4-pin DIN - CUI PD-40S or equivalent.



| Pin | Signal Name | |
|-----|-------------|--|
| 1 | GND | |
| 2 | 24V | |
| 3 | GND | |
| 4 | 24V | |

USB-C

The I/O Board is connected to the motherboard through a non-standard USB Type C connector. The I/O Board provides a +24V power to the motherboard through the VBUS lines of the USB-C connector.



CCP-73981

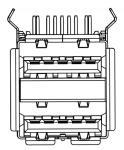
| Signal | Pin | Pin | Signal |
|--------------|-----|-----|--------------|
| GND | A1 | B12 | GND |
| USB 3.0 TX1+ | A2 | B11 | USB 3.0 RX1+ |
| USB 3.0 TX1- | A3 | B10 | USB 3.0 RX1- |
| +V (24V) | A4 | В9 | +V (24V) |
| CC1 (GPIO1) | A5 | B8 | SBU2 |
| USB 2.0 A D+ | A6 | B7 | USB 2.0 B D- |
| USB 2.0 A D- | A7 | В6 | USB 2.0 B D+ |
| SBU1 | A8 | B5 | CC2 (GPIO2) |
| +V (24V) | A9 | B4 | +V (24V) |
| Display Port | A10 | В3 | Display Port |
| Display Port | A11 | B2 | Display Port |
| GND | A12 | B1 | GND |

Since reversibility is not required, the CC1 and CC2 signals will be re-purposed for the following functions:

| Signal | Pin | Function | |
|-------------|-----|-------------------------------|--|
| CC1 (GPIO1) | A5 | Power Status from Motherboard | |
| CC2 (GPIO2) | B5 | Display Port Hot Plug Detect | |

USB 3.0

The I/O Board provides a dual-stack USB 3.0 Type A connector. Each standard +5V USB port is capable of supplying 5V at 900mA which is controlled via load switch.



CCP-77884

Serial Ports

The USB Centric (Retail) and Serial Centric (Hospitality) I/O Boards provide different serial port connectors. The serial ports are connected through a USB to dual UART bridge IC (SiLabs CP2105).

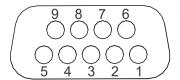
The serial ports either have a Standard or Enhanced UART interface with the following features:

| | Standard UART Interface | Enhanced UART Interface |
|--------------------------------------|--------------------------|-----------------------------------|
| Data formats supported: Data Bits | 8 Data Bits | 5, 6, 7, and 8 Data Bits |
| Data formats supported: Stop Bits | 1 Stop Bit | 1, 1.5, and 2 Stop Bits |
| Parity | Even, Odd, No Parity | Odd, Even, Mark, Space, No Parity |
| Baud Rates | 2,400 bps to 921,600 bps | 300 bps to 2.0 Mbps |

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DB-9 Serial (Standard UART)

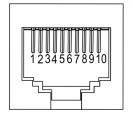
The USB Centric I/O Board provides one full RS-232 serial port (Standard UART) through a DB-9 connector. The port has a shunt to select between +12V (default), +5V, or normal RI functionality. Maximum power capability is 1A from this port. The power output from this port is protected by a self-healing fuse.



| Pin | Signal Name |
|-----|-------------|
| 1 | DCD |
| 2 | RXD |
| 3 | TXD |
| 4 | DTR |
| 5 | GND |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |
| 9 | RI |

RJ50 Serial (Enhanced UART)

The USB Centric I/O Board provides one full RS-232 serial port (Enhanced UART) through an RJ50 connector. The port has a shunt to select between +12V (default), +5V, or normal RI functionality. Maximum power capability is 1A from this port. The power output from this port is protected by a self-healing fuse.



CCP-77849

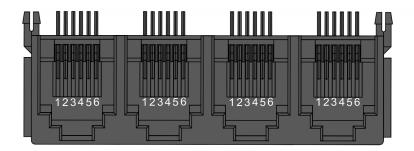
| Pin | Signal Name |
|-----|-------------|
| 1 | NC |
| 2 | DCD |
| 3 | DSR |
| 4 | RXD |
| 5 | RTS |
| 6 | TXD |
| 7 | CTS |
| 8 | DTR |
| 9 | GND |
| 10 | RI |

The RJ50 can be converted to DB9 using these Serial Adapter Cables:

- 1432-C304-0003 RJ50 (10-pin) to DB9 (0.30m)
- 1432-C337-0007 RJ50 (10-pin) to DB9 (0.65m)

RJ12 Serial (Two Enhanced UART and Two Standard UART)

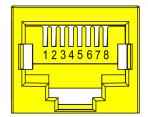
The Serial Centric I/O Board provides a quad-package RJ12 serial port (two Enhanced UART and two Standard UART). The RJ12 port is an unshielded 6-pin. The color of the connector is black.



| Pin | Signal Name |
|-----|-------------|
| 1 | RTS |
| 2 | GND |
| 3 | TX |
| 4 | RX |
| 5 | GND |
| 6 | CTS |

RJ45 Serial (One Enhanced UART and One Standard UART)

The Serial Centric I/O Board provides one dual package RJ45 serial port (one Enhanced UART and one Standard UART). The RJ45 port is an unshielded 8-pin. The color of the connector is yellow.



| Pin | Signal Name |
|-----|-------------|
| 1 | DSR |
| 2 | DCD |
| 3 | DTR/5V |
| 4 | GND |
| 5 | RX |
| 6 | TX |
| 7 | CTS |
| 8 | RTS/12V |

Operator Controls

Power Switch

The Power Switch is located on the bottom of the display. This switch is a momentary contact, push-on-push-off switch.



The behavior of the Power Switch is controlled by an Operating System setting. Options typically include:

- Do nothing
- Sleep
- Hibernate
- Shut down
- Turn off the Display

Do nothing is the recommended setting to avoid accidental power cycles. To ensure a stable system, power cycles should only be controlled through the customer POS application.

Marning

If the Power Switch is pressed for four seconds when powering down, the hardware level override of the processor forces an uncontrolled shutdown. This can corrupt the Operating System. The ONESHOT feature disables this hardware override. To turn on the ONESHOT feature, refer to the following procedures: "Enabling ONESHOT" on page 260.

Image Recovery Button

The Image Recovery Button is for the OS Image Recovery Tool option. The recessed button is located on the bottom of the display. The button is a momentary contact, push-on-push-off switch.



Trusted Platform Module (TPM)

Verifying TPM is Enabled

CX7/CX7ii supports TPM (software) version 2.0. To confirm that TPM is enabled, follow these steps:

- 1. Go to Windows Device Manager.
- 2. Click the drop-down for **Security devices**. Trusted Platform Module 2.0 should display as shown below.
 - Security devices
 Trusted Platform Module 2.0

Activating the hardware TPM

The CX7/CX7ii motherboard supports an optional hardware TPM. The hardware TPM can be activated through the BIOS.

CX7

To activate the hardware TPM in CX7, follow these steps:

- 1. In BIOS Setup, go to Advanced.
- 2. Select **Trusted Computing**.
- 3. Change the TPM Device Selection from PTT to dTPM.

CX7ii

To activate the hardware TPM in CX7ii, follow these steps:

- 1. In BIOS Setup, go to Security.
- 2. Set the FTPM/DTPM to **DTPM**.

Imager

Programming the Imager

To program the imager to work on a Retail or Hospitality (Aloha) POS, refer to the following sections in the Imager Setup Sheets document (BCC5-0000-5470):

https://onlinehelp.ncrvoyix.com/Retail/Scanners/ImagerSetup/HTML/FrontMatter-HTML/Home.htm

- Retail
 - Honeywell N6600/N6700 Retail Quick Imager Setup
- Hospitality (Aloha)
 - Honeywell N6600 Aloha Programming Sheet

Keypad



CCP-82169

The Keypad includes keytips and lenses. These are bagged separately (not installed).

- 1x1 "00" Key, Black (Qty. 1)
- 1x2 "0" Key, Black (Qty. 1)
- 1x1 Keytip Lens (Qty. 1)
- 1x1.5 Keytip Lens (Qty. 11)
- 2x1.5 Keytip Lens (Qty. 1)

Keypad/Keyboard Remap Utility

The NCR POS Keyboard Remap Utility provides a graphical user interface for keyboard remapping. The utility is located in the following location:

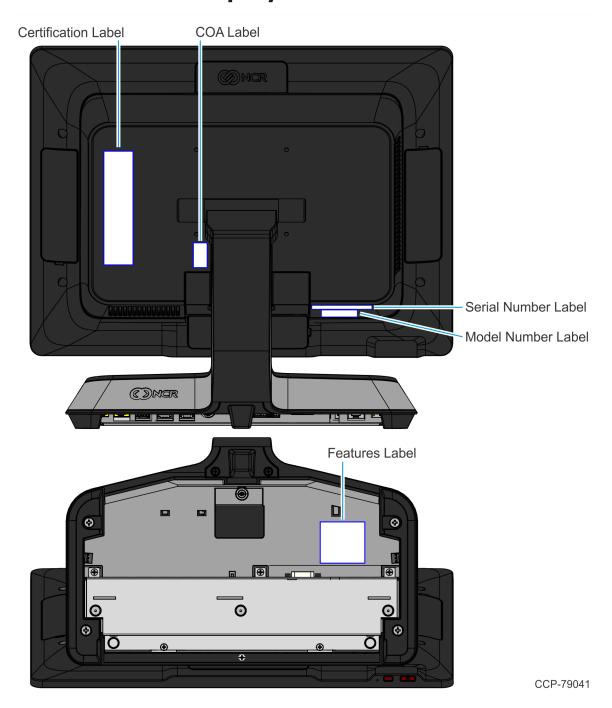
http://www5.ncr.com/support/support_drivers_
patches.asp?Class=External/NCRKeyboard\Remap\display

Refer to the Readme document for the utility installation procedure.

Label Locations

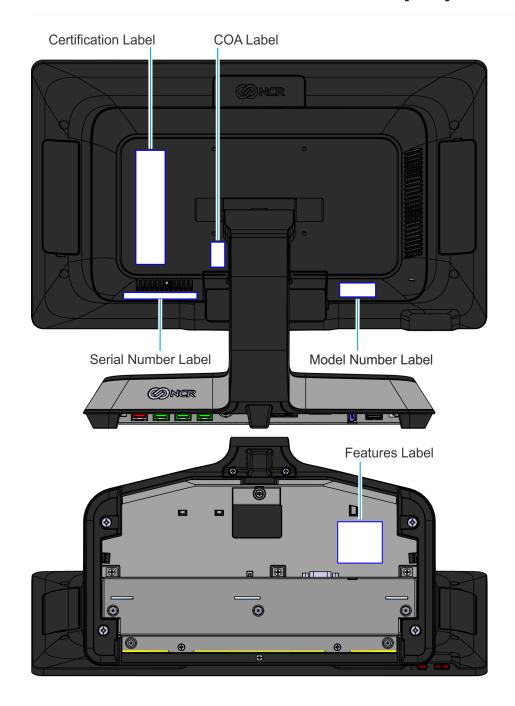
- "CX7 15" 4:3 Display with Base" on the next page
- "CX7 15.6" 16:9 or 18.5" Display with Base" on page 97
- "CX7 15" 4:3 or 15.6" 16:9 or 18.5" or 21.5" Display with Integrated I/O" on page 98
- "CX7 15.6" 16:9 or 18.5" or 21.5" Display with Remote I/O" on page 100

CX7 15" 4:3 Display with Base

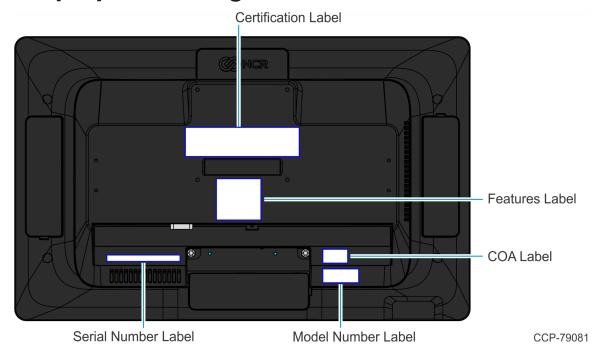


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CX7 15.6" 16:9 or 18.5" Display with Base

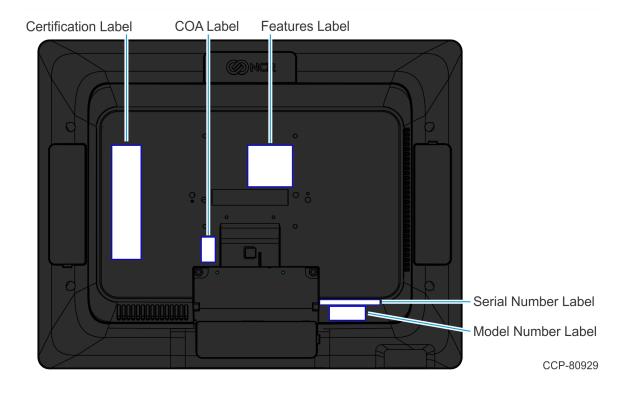


CX7 15" 4:3 or 15.6" 16:9 or 18.5" or 21.5" Display with Integrated I/O

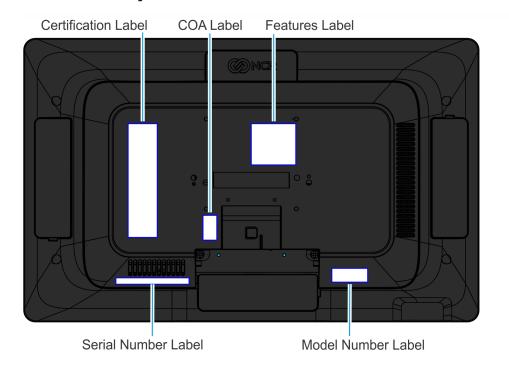


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CX7 15" 4:3 Display with Remote I/O



CX7 15.6" 16:9 or 18.5" or 21.5" Display with Remote I/O



Hardware Installation

Installation Restrictions

- The NCR CX7 All-in-One POS (7772) conforms to all applicable legal requirements. To view the compliance statements see the NCR POS Terminals Safety and Regulatory Information (B005-0000-1589).
- Install the CX7 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 CX7 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 CX7 terminal.

Warning

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 on. This can result in system or printer damage.

Ergonomic Workplace

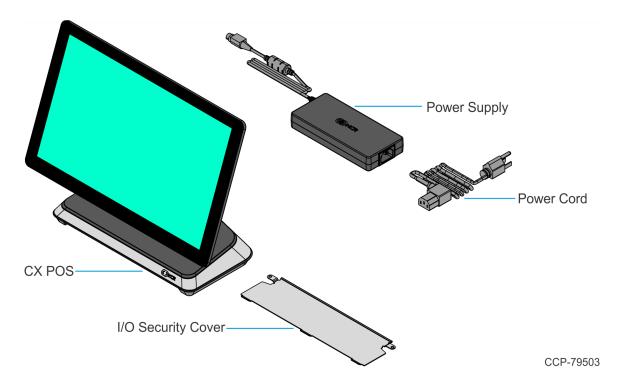
The NCR CX7 All-in-One POS (7772) has a high-brightness LCD with an anti-glare screen. For best results, please observe the following when considering the terminal workplace:

- Avoid direct-glaring and reflective-glaring light. Locate the terminal in a controlled luminance surrounding. When installed next to windows position the terminal so it does not reflect the outside light.
- If possible, avoid reflective glaring caused by electric light sources.
- Position the terminal for ideal viewing angles.

Installing the Terminal

This chapter explains how to perform an "Out-of-box" installation of a CX7 configured with the Base and how to connect optional peripheral devices. The standard items included in the box are:

- CX7 POS
- Power Supply
- Power Cord
- I/O Security Cover



The CX7 comes fully assembled and ready to use. All that is required to install is connect the AC Power Cord, LAN Cable, and peripheral device cables.

For more information about the CX7 I/O ports, refer to:

- "USB Centric I/O (Retail)" on page 66
- "Serial Centric I/O (Hospitality)" on page 70

₽ Note

The POS LCD has a protective film. After removing the film, the LCD should be cleaned. For more information, refer to "Cleaning the Touchscreen" on page 140.

Connecting AC Power



▲ Caution

Do not connect or disconnect the Power Cable from the terminal with the AC Power Cord connected to an AC outlet. It is recommended to disconnect the AC Power Cord from the AC outlet and wait 30 seconds before connecting or disconnecting the Power Supply cable from the terminal.

The CX7 receives power from an external 24V power brick.

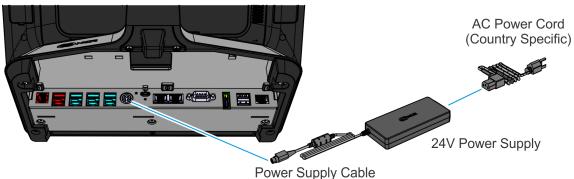


Caution

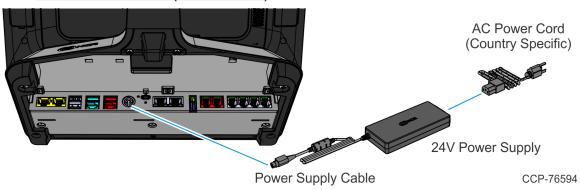
The CX7 requires the NCR 24V power supply that is shipped with the terminal. Use of other power bricks may cause damage to the unit.

- 1. Connect the Power Supply cable to the Power In connector on the Base.
- 2. Connect the AC Power Cord to the Power Supply and to an AC outlet.

USB CENTRIC I/O (RETAIL)



SERIAL CENTRIC I/O (HOSPITALITY)



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Power Consumption

The table below displays the estimated power consumption of the CX7 running on a Windows 10 operating system, Emerald POS application, and without peripherals.

| Duration | Power Consumption (kWh) |
|----------|-------------------------|
| 24 hours | 0.603 |
| 1 year | 220.09 |

Connecting to a Network

Most business configurations require the terminal to connect to a network. Connecting to a network enables communicating with other systems and devices also on the network.

Depending on business configurations, connecting to a network may allow connection to the Internet.

CX7 with Base or Remote I/O

To connect the CX7 terminal with a Base or Remote I/O to a network, follow these steps:

- Connect the 10/100/1000 Ethernet Cable to the port labeled LAN In on the I/O panel. For more information, refer to "I/O Ports" on page 65.
- 2. Connect the other end of the 10/100/1000 Ethernet Cable to the network hub.
 - **₽** Note

Consult with your business Information Technology (IT) representative to determine the available connection, and to locate the network hub.

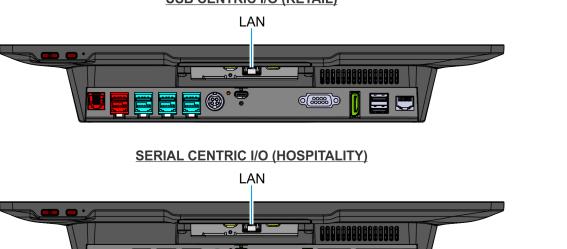
- 3. Connect the Flat Ethernet Cable to the port labeled LAN Out on the I/O panel. For more information, refer to "I/O Ports" on page 65.
- 4. Connect the other end of the Flat Ethernet Cable to the port labeled LAN on the CX Head. For more information, refer to "CX Head Ports" on page 60.

CX7 with Integrated I/O

The Integrated I/O does not have a LAN port. A LAN Port is available on the Motherboard. To connect the CX7 terminal with an Integrated I/O to a network, follow these steps:

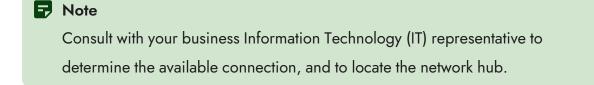
1. Connect the Ethernet Cable to the port labeled LAN on the Motherboard.

USB CENTRIC I/O (RETAIL)



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2. Connect the other end of the Ethernet Cable to the network hub.



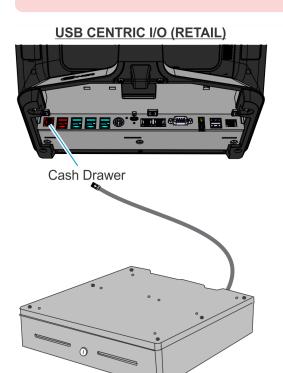
Installing the Cash Drawer

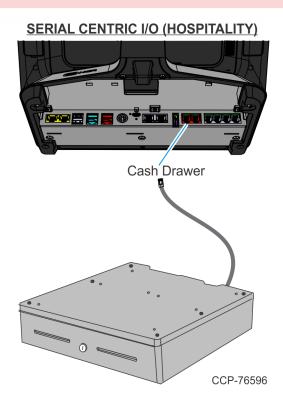
The Cash Drawer can be connected to the Cash Drawer connector on the Base.



Marning

Non-NCR Cash Drawers must contain a protective diode.





The table below shows the cable options.

| Cable | Description | Notes |
|----------------|--|--|
| 1432-C516-0009 | Dual Cash Drawer Splitter for 24V cash drawers | Required if using two 24V cash drawers on a CX7 USB Centric I/O. |
| 1432-C517-0009 | 12V Cash Drawer (RJ12) Adaptor for Single or Dual Cash Drawer | Required if using 12V cash drawers (legacy Radiant) on a CX7 USB Centric I/O. Cable allows software to see which drawer is open/close. |
| 1432-C828-0010 | CX7 Single Cash Drawer 6-pin to 4- pin (12V) Cable | Required if using 12V cash drawer on a CX7 USB Centric I/O or Serial Centric I/O . |

The table below shows the cable needed per configuration.

| Cash Drawer | Cable for USB Centric I/O | Cable for Serial Centric I/O |
|------------------------|---------------------------|------------------------------|
| Single 12V Cash Drawer | 1432-C828-0010 | 1432-C828-0010 |
| Dual 12V Cash Drawer | 1432-C517-0009 | 1432-C828-0010 (Qty. 2) |
| Single 24V Cash Drawer | standard option on I/O | standard option on I/O |
| Dual 24V Cash Drawer | 1432-C516-0009 | standard option on I/O |

Installing the Second Cash Drawer

A second Cash Drawer can be installed on terminals with a:

- USB Centric I/O (Retail) Base For more information, refer to "Second Cash Drawer for USB Centric I/O (Retail)" below.
- Serial Centric I/O (Hospitality) Base For more information, refer to "Second Cash
 Drawer for Serial Centric I/O (Hospitality)" on page 113.

Second Cash Drawer for USB Centric I/O (Retail)

The USB Centric I/O supports a 2-drawer configuration with a Dual Cash Drawer Cable. Connect this cable to the Base or transaction printer cash drawer connector.

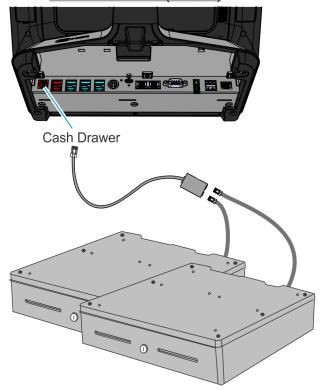
There are two versions of the Dual Cash Drawer Cable for the USB Centric I/O:

- 1432-C516-0009 (24V)
- 1432-C517-0009 (12V)

▲ Caution

The two cables look very similar. Make sure to use the correct one. Connecting the wrong cable can damage the I/O Board.

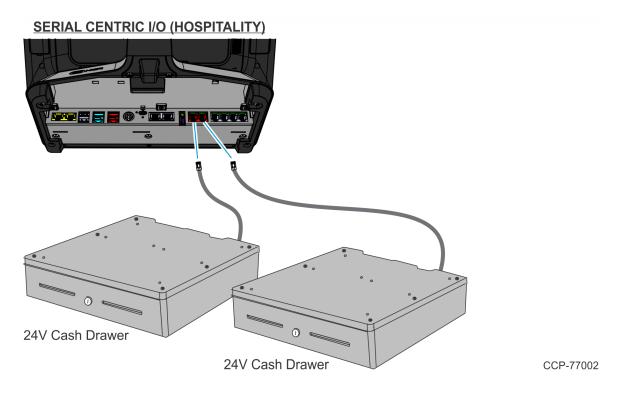
USB CENTRIC I/O (RETAIL)



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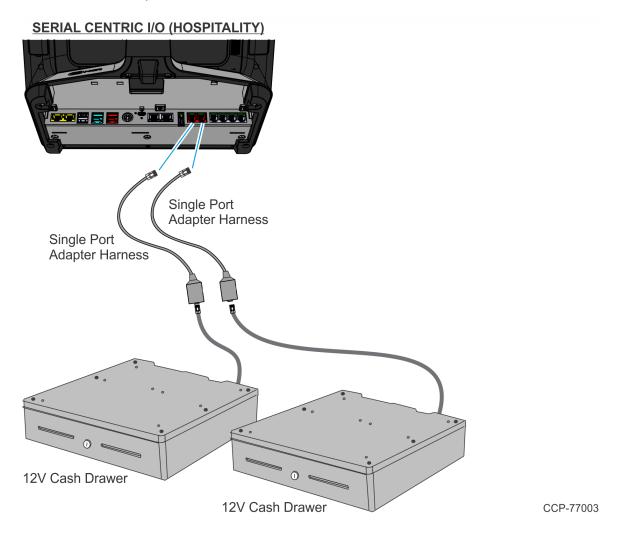
Second Cash Drawer for Serial Centric I/O (Hospitality) 24V Cash Drawers

24V Cash Drawers can be connected to the Cash Drawer connectors on the Serial Centric I/O.



12V Cash Drawers

Single port adapter cables (1432-C828-0010) are required to connect 12V Cash Drawers to the Serial Centric I/O.



Configuring Cash Drawer Switch Polarity

Configuring the cash drawer switch polarity depends on the platform software package used. For more information, refer to:

- "Gen3" below
- "<u>RPSW</u>" on page 118
- "<u>RPSL</u>" on page 121
- "NCRPSW/NCRPSL" on page 122

Gen3

Hospitality (HSR) cash drawers all use 12V coils with *Normally Open* detection switches. By default, the Gen3 Hospitality platform software open/close sense settings is *Normally Open*. To use a drawer with *Normally Closed* detection switches (for example, Retail 24V drawer), the sense settings can be reversed through registry settings.



Gen3 does not support Printer Cash Drawers.

For 64-bit operating systems

To change the sense settings for a 64-bit Operating System, configure the following registry values.

| | | Normally Open Switch Polarity (Default) | Normally Closed Switch Polarity |
|------------------------------|---|--|---|
| | Registry | Action | Action |
| Terminal Cash Drawer 1 | HKLM/Software/Wow6432Node/Radiant/ Platform/CashDrawer/ReverseOpenDetect1 | Delete the DWORD registry value or set the value of the | 1. Create a new DWORD registry value. |
| Terminal Cash Drawer 2 | HKLM/Software/Wow6432Node/Radiant/ Platform/CashDrawer/ReverseOpenDetect2 | DWORD to 0. | 2. Set the value of the new DWORD to 1. |

For 32-bit operating systems

To change the sense settings for a 32-bit Operating System, configure the following registry values.

| | | Normally Open Switch Polarity (Default) | Normally Closed Switch Polarity |
|------------------------------|---|--|---|
| | Registry | Action | Action |
| Terminal Cash Drawer 1 | HKLM/Software/Radiant/ Platform/CashDrawer/ReverseOpenDetect1 | Delete the DWORD registry value or set the value of the | 1. Create a new DWORD registry value. |
| Terminal Cash Drawer 2 | HKLM/Software/Radiant/ Platform/CashDrawer/ReverseOpenDetect2 | DWORD to 0. | 2. Set the value of the new DWORD to 1. |

RPSW

By default, the RPSW open/close sense setting is *Normally Closed*. RPSW cash drawer polarity settings can be configured in either of two ways:

- through the RSM LE utility—for both OPOS and JavaPOS
- through the registry:
 - Windows registry—for OPOS
 - config.xml settings—for JavaPOS

OPOS

Configuring through RSM LE utility

To change the sense settings in the RSM LE utility, configure the value of the following parameters.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|------------------------------------|--------------------------|----------------------------------|---|
| | Parameter Name | Parameter Value | Parameter Value |
| Terminal Integrated Cash Drawer | Model | Integrated_Open | (None) |
| Printer Cash Drawer | Invert CashDrawer Status | True | False |

Configuring through Windows Registry

To change the sense settings in the Windows Registry, set the registry value.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|------------------------|---|-------------------------------------|---|
| | Registry | Value | Value |
| Printer Cash Drawer | HKLM\SOFTWARE\Wow6432Node\OLEForRetail\ ServiceOPOS\CashDrawer\ <profilename>\ InvertCDPolarity</profilename> | Т | F |

■ Note

There are two configurations for InvertCDPolarity for RPSW in OPOS—one in the cash drawer-printer profile and one in the printer profile. When either one is updated, it should reflect on both profiles.

JavaPOS

Configuring through RSM LE utility

To change the sense settings in the RSM LE utility, configure the value of the following parameters.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|------------------------------------|--------------------------|----------------------------------|---|
| | Parameter Name | Parameter Value | Parameter Value |
| Terminal Integrated Cash Drawer | Model | Integrated_Open | (None) |
| Printer Cash Drawer | Invert CashDrawer Status | True | False |

Configuring through config.xml settings

To change the sense settings in <code>config.xml</code>, go to <code>C:\ProgramData\NCR\NCR</code>

JavaPOS\jpos\res\config.xml and configure the following registry values.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|------------------------------------|------------------|----------------------------------|---|
| | Registry Name | Value | Value |
| Terminal Integrated Cash Drawer | Model | Integrated_Open | (None) |
| Printer Cash Drawer | InvertCDPolarity | Т | F |

RPSL

By default, the RPSL open/close sense setting is *Normally Closed*. RPSL printer-cash drawer polarity settings can be configured in either of two ways:

- through the FitClient LE utility
- through the config.xml settings

JavaPOS

Configuring through FitClient LE utility

To change the sense settings in the FitClient LE utility, configure the value of the following parameters.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|---------------------|--------------------------|----------------------------------|---|
| | Parameter Name | Parameter Value | Parameter Value |
| Printer Cash Drawer | Invert CashDrawer Status | True | False |

Configuring through config.xml settings

To change the sense settings in config.xml, go to

/usr/local/NCRRetail/jpos/res/config.xml and configure the following registry values.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|---------------------|------------------|----------------------------------|---|
| | Registry Name | Value | Value |
| Printer Cash Drawer | InvertCDPolarity | Т | F |

NCRPSW/NCRPSL

By default, the NCRPSW/NCRPSL open/close sense setting is *Normally Closed*. NCRPSW/NCRPSL cash drawer polarity settings can be configured in three ways:

- through the DAL (Device Abstraction Layer)
- through the configuration file
- through the Device Configuration Tool

Configuring through the DAL

To change the sense settings in the DAL, set the polarity command.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|----------------------|--|----------------------------------|---|
| | Command Code | Input Parameter | Input Parameter |
| Terminal Cash Drawer | AERO_DAL_CMD_ CASHDRAWER_SET_ POLARITY | POLARITY_ HOSPITALITY = 1 | POLARITY_RETAIL = 0 |

The command echoes back the new polarity. The table below displays the result codes.

| Result Code | Description |
|-------------------------|--|
| AERO_SUCCESS | Valid parameters and successfully set in configuration. |
| AERO_ERR_INTERNAL_ERROR | Failed to set configured polarity to requested polarity. |
| AERO_ERR_INVALID_P1 | Invalid input polarity. |

Configuring through the Configuration File

To change the sense settings in the configuration file, go to

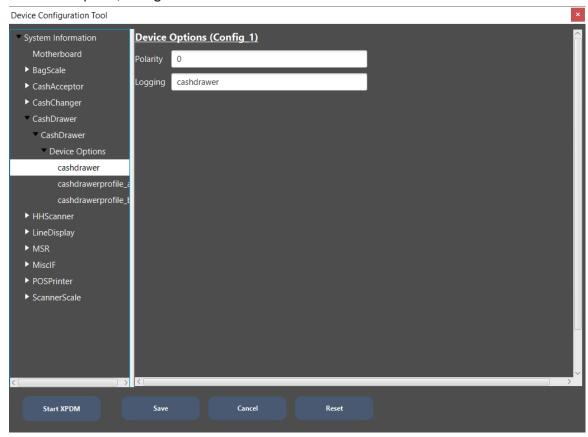
..\ncr\aero\config\cashdrawer.factory.json and configure the value of the following parameters.

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|----------------------|----------------|----------------------------------|---|
| | Parameter Name | Parameter Value | Parameter Value |
| Terminal Cash Drawer | default | 1 | 0 |

Configuring through the Device Configuration Tool

To change the sense settings through the Device Configuration Tool, follow these steps:

- 1. Run the Device Configuration Tool.
- 2. On the left pane, navigate to the device.



3. On the right pane, set the polarity:

| | | Normally Open Switch Polarity | Normally Closed Switch Polarity (Default) |
|----------------------|----------------|----------------------------------|---|
| | Parameter Name | Parameter Value | Parameter Value |
| Terminal Cash Drawer | Polarity | 1 | 0 |

4. Select the Save button.

Additional Reference

For more information on cash drawer switch polarity, refer to the *CX Series (CXIO) Cash Drawer Switch Polarity* sections in the Cash Drawer Ordering Guide - Retail (OCI) and Cash Drawer Ordering Guide - Hospitality and CFR (OCI) in the NCR Voyix Seismic site (https://ncr.seismic.com).

Installing the Transaction Printer

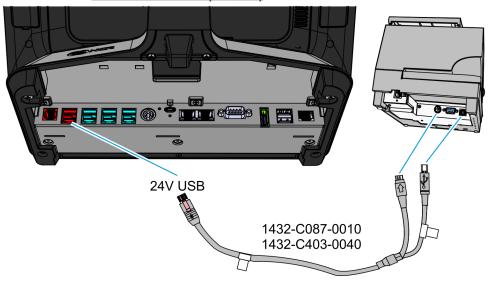


Marning

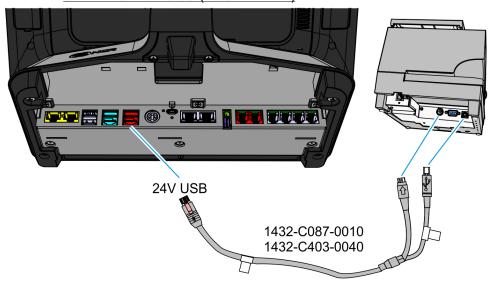
Do not hot plug the printer when connecting the POS terminal. Always power down the POS prior to connecting the printer to prevent damage to the POS and/or printer.

Connect the Powered USB Printer Interface Cable to the USB Connector and Power Connector on the printer and to the 24V Powered USB Connector on the Base.

USB CENTRIC I/O (RETAIL)



SERIAL CENTRIC I/O (HOSPITALITY)



CCP-77070

Powering Up the Terminal

1. After installing the terminal, power up the system by briefly pressing the Power Switch. Release the Power Switch when the green LED turns on.



CCP-76588

■ Note

The system installs the system devices, system settings, and then reboots to continue setup.

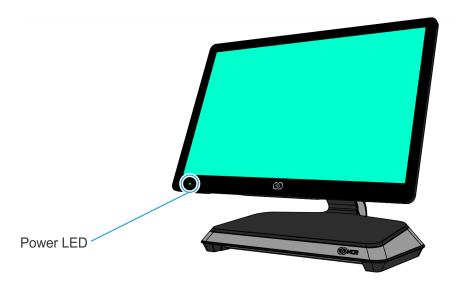
- 2. Complete the System Setup. This varies depending on the operating system, but the following is typical:
 - Starting Windows
 - Preparing the computer for first time
 - Checking video performance
- 3. Accept the License Terms Agreement.

■ Note

Depending on the installed operating system and the selected settings, the amount of time it takes to boot up may vary.

LED

Power LED



CCP-76589

The Power LED, located on the front of the display, has multiple functions as defined below.

| Color | Description |
|----------------|---|
| Solid Green | Terminal is ON and all voltages from power supply and motherboard are okay. |
| Blinking Green | Terminal is in SUSPEND (S3/S4) mode. |
| Solid Red | Processor over temperature. |

Diagnostic LEDs

The Power LED and HDD LED also function as diagnostic indicators, defined below.



The cell colors indicate the color of the LED at that particular time.



CCP-82163

| Current System Operation | Suspect Component/ Failure | Terminal State | HDD LED | Power LED | Debug Path |
|--------------------------------|----------------------------------|--|-----------------------------|----------------------|------------|
| Normal Operation | N/A | System ON | OFF | ON | N/A |
| Normal Operation | N/A | System ON with SSD Activity | Flashing (SSD Access) | ON | N/A |
| Normal Operation | N/A | Unit in Suspend (S3/S4) | ON | Blinking (1x/sec) | N/A |
| OFF with AC Present | N/A | OFF, Not in Standby. External power supply is on. | ON | OFF | N/A |

| Current System Operation | Suspect Component/ Failure | Terminal State | HDD LED | Power LED | Debug Path |
|--------------------------------|----------------------------|--|---------|--|---|
| OFF with AC Present | Power System | OFF, Not in Standby. External power supply is on. | OFF | OFF | Check AC power to power supply. Check power supply. Check connection between unit and power supply. Check power connection from back panel to motherboard and motherboard to front panel. Replace power supply. Replace front panel board. |
| Runtime | Cooling Solution/CPU | Over Temperature | N/A | Flashes red/green, then solid red as temperature increases | Check for blocked cooling vents. Check for fan failure. Check for excessive ambient temperature. Check cooling solution. |

| Current System Operation | Suspect Component/ Failure | Terminal State | HDD LED | Power LED | Debug Path |
|--------------------------------|----------------------------------|--------------------------|------------------------|-----------|---|
| POST | CPU | CPU not Operating | ON | ON | Check for correctly installed CPU. Replace motherboard. |
| POST | BIOS Chip | BIOS Checksum Failure | Flashing (4x/sec) | ON | Perform BIOS crisis recovery. Replace BIOS chip. Replace motherboard. |
| POST | Memory | Memory Issue | Flashing (1x/sec) | ON | Check for properly installed memory. Replace memory. Replace motherboard. |
| POST | Motherboard | No Display | Flashing (1x/4 sec) | ON | Replace motherboard. |

| Current System Operation | Suspect Component/ Failure | Terminal State | HDD LED | Power LED | Debug Path |
|--------------------------------|--|--------------------------|------------------------|-----------|---|
| POST | Display, Motherboard, Peripheral | Stopped Prior to Boot | Flashing (1x/8 sec) | ON | 1. Check for power to display. 2. Check cable connection between unit/ motherboard and display. 3. Check for properly functioning display. 4. Replace motherboard. Display Working: 1. Use display to determine failure point via onscreen message and BIOS setup. |

| Current System Operation | Suspect Component/ Failure | Terminal State | HDD LED | Power LED | Debug Path |
|--------------------------------|----------------------------------|--|---------|-----------|--|
| Boot Time | Boot Media (SSD, LAN) | Display is working, but unit will not boot or it booted from wrong device. | OFF | ON | 1. Check SSD status in BIOS setup. 2. Check connections between SSD and motherboard. 3. Replace or reimage SSD. 4. Replace motherboard. LAN is Boot Device: 1. Check for LAN link and activity LEDs on back panel. 2. Check LAN cable. 3. Replace motherboard. |

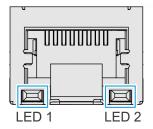
LAN Diagnostic LEDs

The LAN connector on the back of the CX Head features Activity, Link, and Speed indicator LEDs.



■ Note

The LAN diagnostic LEDs are only available for the CX7 with an Integrated I/O configuration.



CCP-84008

| LED | Color | Description |
|-------|--------|-------------|
| LED 1 | Green | 100 Mbps |
| | Orange | 1 Gbps |
| LED 2 | Yellow | Link Active |

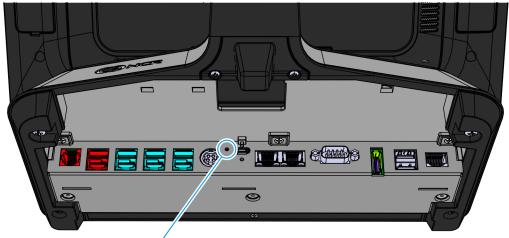
I/O Panel LED

- "Base" on the next page
- "Integrated I/O Expansion" on page 136
- "Remote I/O Chassis" on page 137

Base

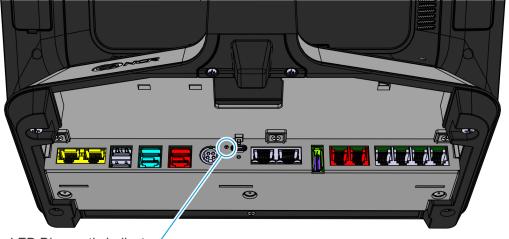
The Status LED is located on the I/O Panel of the Base.

USB CENTRIC I/O (RETAIL)



LED Diagnostic Indicator

SERIAL CENTRIC I/O (HOSPITALITY)



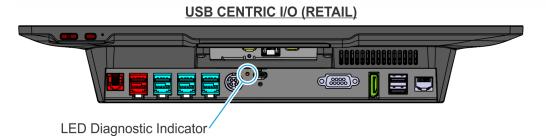
LED Diagnostic Indicator

CCP-76591

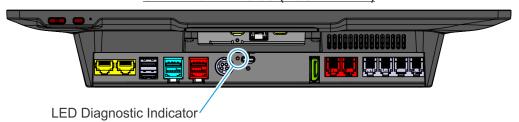
| Color | Description |
|--------|-----------------|
| Green | On |
| Orange | S3 Suspend Mode |
| Off | Off |

Integrated I/O Expansion

The Status LED is located on the I/O Panel on the back of the Display.



SERIAL CENTRIC I/O (HOSPITALITY)



CCP-79079

| Color | Description |
|--------|-----------------|
| Green | On |
| Orange | S3 Suspend Mode |
| Off | Off |

Remote I/O Chassis

USB CENTRIC I/O (RETAIL)



SERIAL CENTRIC I/O (HOSPITALITY)



LED Diagnostic Indicator

CCP-79080

| Color | Description |
|--------|-----------------|
| Green | On |
| Orange | S3 Suspend Mode |
| Off | Off |

Operation and Cleaning

Administrator Login

In order to install certain software on the terminal you may need Administrator rights.

Username: NCR

Password: NCR (Password is case sensitive.)

Projected Capacitive (PCAP) Touchscreen

The NCR CX7 All-in-One POS (7772) has a Projected Capacitive (PCAP) Touchscreen that has the following features:

- · Benefits of normal capacitive touchscreens
- Fast processing of information
- High sensitivity (use conductive pencils, with hands, and with thin gloves)
- Multi-touch capability (10-finger)
- High resolution
- Improved legibility and display brightness due to optimal light transmission

In addition, the active surface of PCAP touchscreens is not directly touched and does not wear off by normal use because it is located on the back side of the touchscreen, instead of the front side. Therefore, the NCR CX7 All-in-One POS (7772) can be used in public or in severe environmental conditions.

Using the PCAP Touchscreen

To use the PCAP touchscreen, do any of the following:

- Use a single finger to resemble the left mouse button.
- Use two fingers to zoom IN (fingers brought together) or zoom OUT (fingers pulled apart).
- Use a circular motion with your finger to rotate an element on the screen. This function must be supported by either the Operating System or the application.

Cleaning the Touchscreen

Touchscreens can be effectively cleaned with water or up to 70% isopropyl alcohol solution. Follow these steps to avoid damage to the touchscreen:

Warning

Turn OFF the terminal before cleaning the touchscreen.



Warning

Do not use sharp objects to clean around the edges of the touchscreen. Do not use abrasive cleaners (powders) or abrasive cleaning materials (scrub brush, scouring pad).

Warning

Do not use Windex or any similar alkaline (weak base) cleaner as it can degrade the anti-glare coating.

1. Clean the screen using a non-abrasive cloth (microfiber cleaning cloth or cloth towel) and water.



Warning

Do not apply any cleaning products directly to the screen. Do not soak the cloth: wring it out before use.

- 2. Dry the screen with another soft cloth.
- 3. Clean the screen further using a cloth dampened with isopropyl alcohol solution, or using pre-packaged wipes.



Warning

Do not apply any cleaning products directly to the screen. Do not soak the cloth: wring it out before use.

4. Ensure that the glass and screen edges are completely dry before using the unit.

Magnetic Stripe Reader

The Magnetic Stripe Reader (MSR) for the CX7 is an ISO 3-Track (Encrypted).

The card reading is bi-directional and can be mounted on Port A (right side) of the display.

Using the MSR

Swipe the card through the slot in the MSR in a quick and steady movement. The magnetic stripe must be facing up and with the stripe in the slot.



CCP-77870

Care of Cards

- Cards should never come in contact with liquids.
- Cards should never be bent or folded in any way.
- Cards should never come in close proximity of a magnetic field.

Card Thickness

The MSR module accepts standard cards within the thickness range of 0.68–0.84 mm.

Cleaning the MSR

Customers who are participating in the NCR Partnership Services Program can purchase cleaning cards through NCR Services using the NCR Part Number.

| Part | NCR Part Number |
|------------------------|-----------------|
| MSR Cleaning Card, Wet | 603-9015143 |

Cleaning Frequency

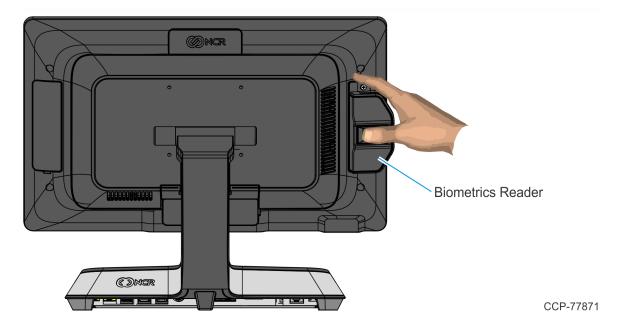
For low use retail establishments, the cleaning procedures should be followed at least once per month. In areas of extremely high traffic (in excess of 500 swipes per day) or an operating environment that is high in contaminants, such as found in the food service industry, a weekly cleaning should be performed.

Biometrics Fingerprint Reader

High quality fingerprint templates are imperative for the security of the biometric security system. Low quality fingerprint templates can impact future read rates. Therefore, using the Biometrics Module should be done very carefully. In case of inexperienced users who are using the module for the first time, the process should be assisted (guided) by an administrator or experienced user.

Using the Biometrics Reader

Place your thumb/finger flat and straight on the sensor. If this is not possible, try to place your thumb/finger on the sensor in the same angle every time.



Under normal usage conditions dirt, residue, oils, and other materials can collect on users' fingers. This can possibly cause poor collection of fingerprint data, which can cause performance degradation. For the best results it is recommended that the user keep their fingers relatively clean and free of residues that may alter the sensor performance.

Scotch tape can be used to clean fingers. Adhere the tape to the finger and then pull it off.

Cleaning the Sensor

Before each authentication, it is recommended that the user first clean the sensor. Place adhesive tape onto the sensor and then pull it off. This assures that residue from previous usage is removed.



A Caution

Do not use abrasive materials to clean the sensor.

Software Drivers

The CX7 biometrics reader is a digitalPersona U.ARE.U 4500 Module. Please visit the Crossmatch website for drivers and application developer tools.

https://www.crossmatch.com/company/support/request/

Cleaning the CX7 Cabinet

- 1. Disconnect the unit from the AC outlet before cleaning.
- 2. Wipe the cabinet using a non-abrasive cloth (microfiber cleaning cloth or cloth towel) dampened with soap and water solution.

A Warning

Do not use alcohol (methyl, ethyl, or isopropyl) or any strong dissolvent. Do not use thinner or benzene, abrasive cleaners (powders), abrasive cleaning materials (scrub brush, scouring pad), or compressed air. Do not use any other types of cleaners such as vinegar, solvents, degreasers, or ammonia-based cleaners. These can damage the unit.

Marning

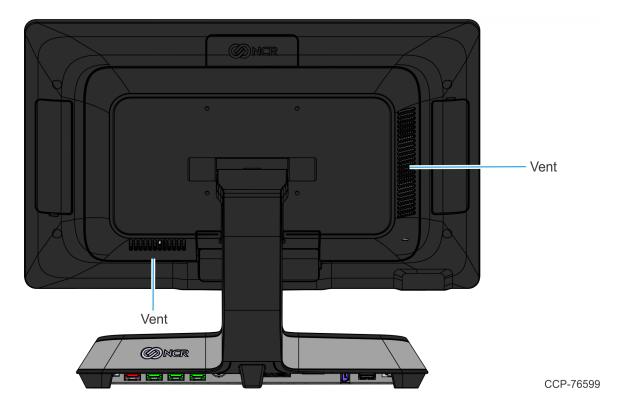
Avoid getting liquids inside the unit. If liquid does get inside, have a qualified service technician check it before you power it on again.

- 3. Wipe the cabinet using a clean and dry lint-free cloth.
- 4. Remove external dust around the cooling vents.

Cleaning the Cooling Vents

The air vents on the back of the terminal should be cleaned periodically to maintain optimum cooling for the CPU.

Use the hose attachment on a standard household vacuum cleaner to remove the dust from the vents.



Disk Image Backup and NCR Image Recovery Tool

Introduction

This section discusses procedures on how to backup or recover the POS image. The terminal has a recovery tool that performs a complete backup of the whole SSD. This includes the operating system, all files, data and the database itself if it is installed on the SSD, making an exact duplicate of everything contained on the terminal.

The NCR Image Recovery Tool uses the Windows Image (.WIM) file format to store the OS image. This is a file-based format for use with the ImageX and DISM tools that Microsoft created for use with Windows Vista and later OS versions. The format can also be used to capture and restore XP-based OS images. More information on the ImageX tool and .WIM format can be found at:

http://technet.microsoft.com/en-us/library/cc722145(WS.10).aspx

The NCR Image Recovery Tool is designed to create a complete backup of, or restore, a previously saved image to the terminal.

The NCR Image Recovery Tool offers the following functions and features:

- Multi-language support for the following languages: EN, DE, FR, IT, ES
- Check and Repair Disk
- Backup the System
- Restore the System to a previous state
- Password Protection
- Network support

You can save and restore your backup from different locations:

- Network
- USB Drive
- Hard Drive/Solid State Device (if present on the terminal)

Running the NCR Image Recovery Tool

Starting the NCR Image Recovery Tool

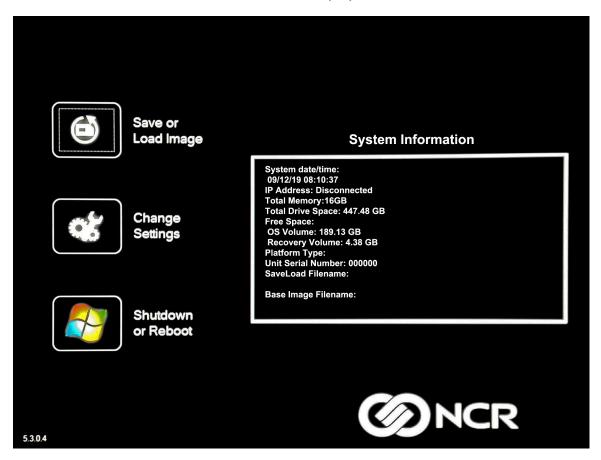
The Image Recovery Button is located on the bottom of the display.

- 1. Begin with the terminal OFF.
- Press and hold the recessed Image Recovery Button. While holding the Image Recovery Button, momentarily press the Power Switch.
- 3. Continue holding the **Image Recovery Button** until the NCR logo has flashed on the screen.



Main Screen

When the terminal boots the Main Screen is displayed.



Save or Load Image

This button opens the Backup and Recovery screen.

Change Settings

This button opens a dialog screen to let you set/change the password and to configure the network settings.

Shutdown or Reboot

This button opens the screen to properly Shutdown and Reboot the POS.

System Information

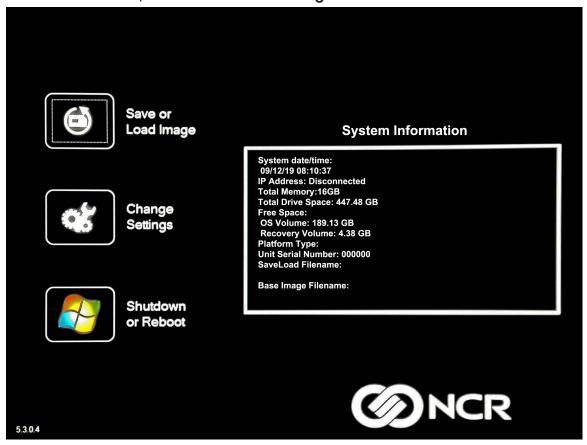
This is where useful information of the POS is displayed, such as Serial Number and Image Names.

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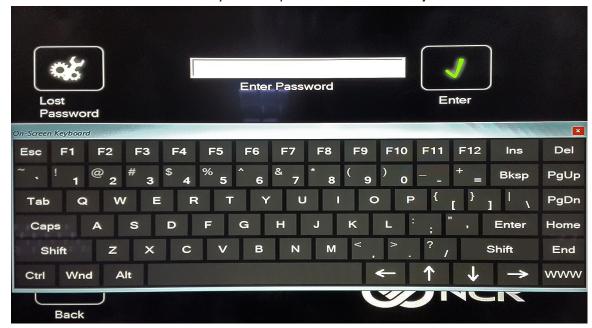
Save or Load Image

This function is used to either Save or Load an image from a device.

1. On the Main Screen, select Save or Load Image.

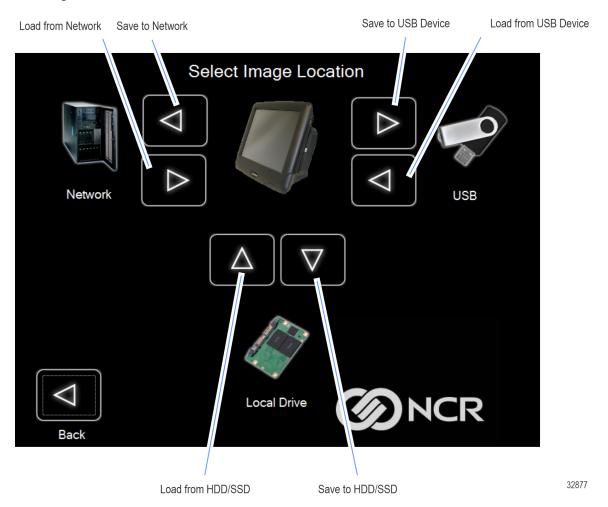


2. Enter the Password. The factory default password is Recovery1234.



Saving an Image

The Select Image Location screen displays a terminal with three sets of In/Out arrow buttons, indicating the direction of data flow when selected. Arrows pointing away from the terminal are used to Save images to a device. Arrows pointing towards the terminal are used to Load an image.



Recovery Partition Size

The size of the Recovery Partition is limited to 8GB on the local drive. The USB and network options can be used to store / backup larger images. The total size is comprised of the base factory image + the user and site backups and the roughly 300MB of space used by WinPE and apps. USB/Network backups are limited only by the hardware that they are being stored to.

After the factory image is copied into the Recovery Partition, there is approximately 3GB remaining in the 8GB partition. Any data stored as an incremental backup to this location is

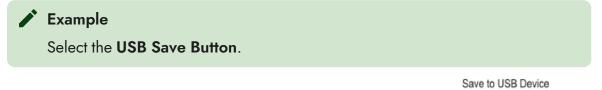
Confidential and proprietary information of NCR Voyix. Use and disclose solely pursuant to company instructions. compressed. A typical, large POS software installation will not outpace the constraints of the local storage.

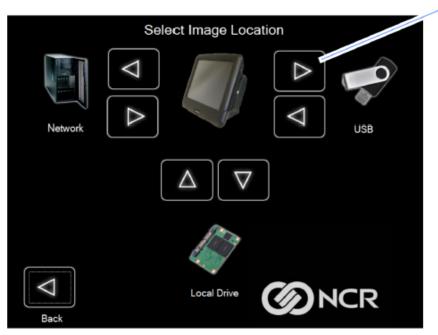
Backups to separate *slots* in the NCR Image Recovery Tool only increase the total storage required by the amount of data *added* to the image. When the contents of the OS partition become too large to store in the 8GB local Recovery Partition, then one of the alternate storage methods available (USB or network) should be used to store backups.

Output Options

There are three output options:

- Solid State Device
- USB Device
- Network
- 1. Select the arrow that points to the desired output.





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2. Select the USB Button.



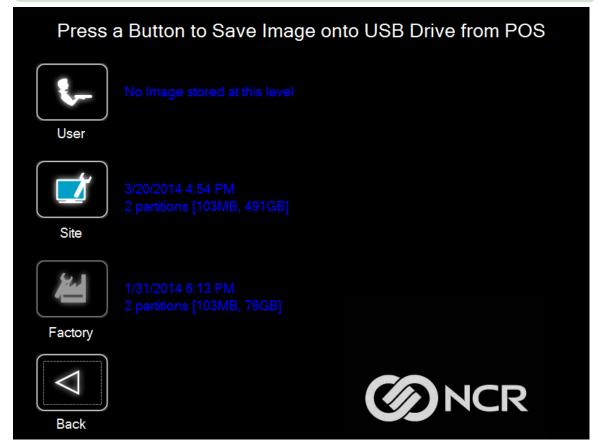
If this is the first backup performed on this POS, the image is automatically saved as a Site backup.



If a backup already exists, you have the choice of performing either a *Site* or *User* backup.

- **Site Image** Use this option immediately after all application components have been loaded and set up for initial operation, or for base image updates.
- **User Image** Use this option for routine day-to-day or periodical backups.





The image information is updated with the new image date.

Loading An Image

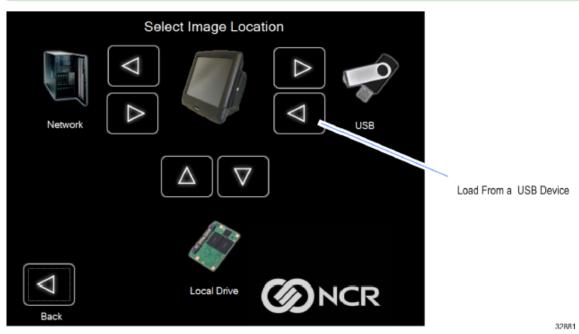


A Caution

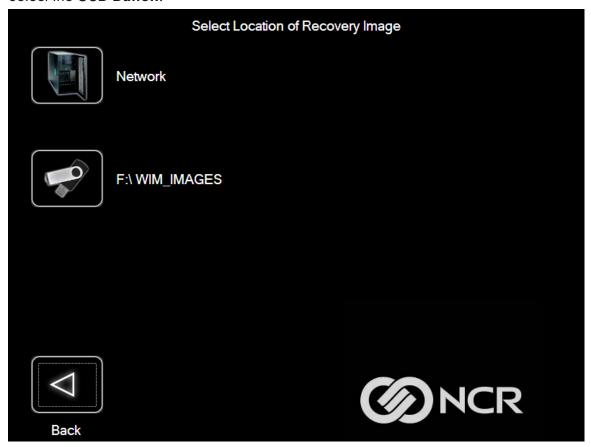
Do NOT remove power during an Image Load. Complete the Operating System setup and then shut down Windows properly. Removing power prematurely will corrupt the image and display various messages like "Windows failed to load" or "missing or corrupt registry". If this happens you can do an Image load of the Factory image with the NCR Image Recovery Tool.

1. Select the arrow that points from the desired load device to the terminal.

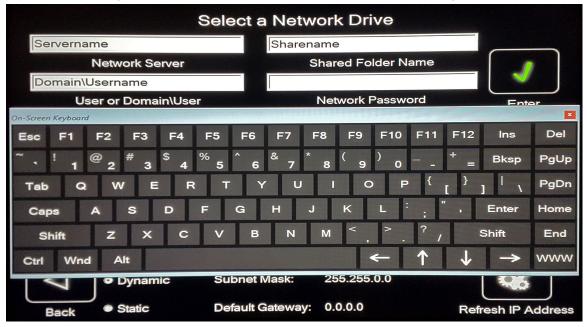




2. Select the USB Button.

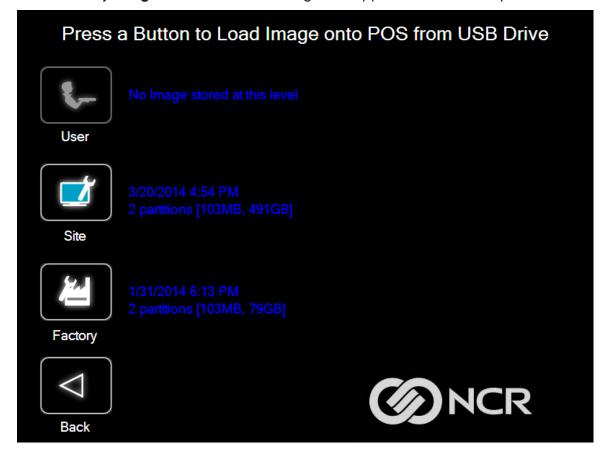


If you are loading from a network, the Select a Network Drive dialog screen will open.



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- 3. Select the Image Type.
 - **User Image** Most recent routine backup.
 - **Site Image** Image of the terminal after application components were loaded.
 - Factory Image The NCR Base Image as shipped from the factory.

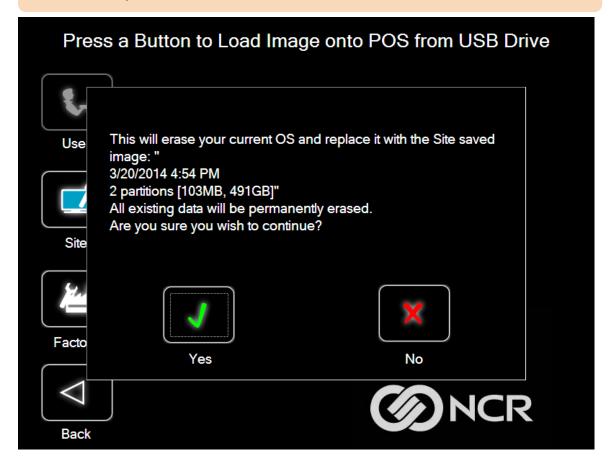


4. Select **Yes** to apply the image.

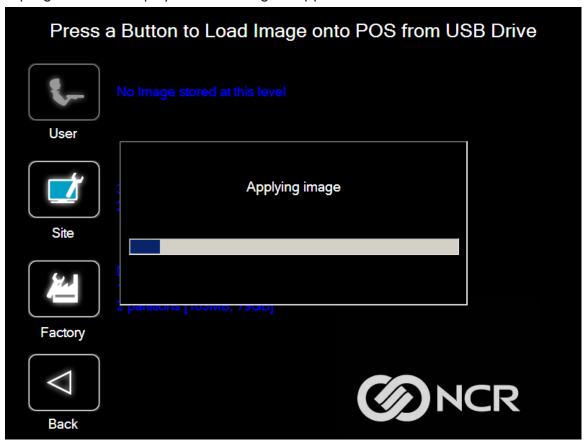


A Caution

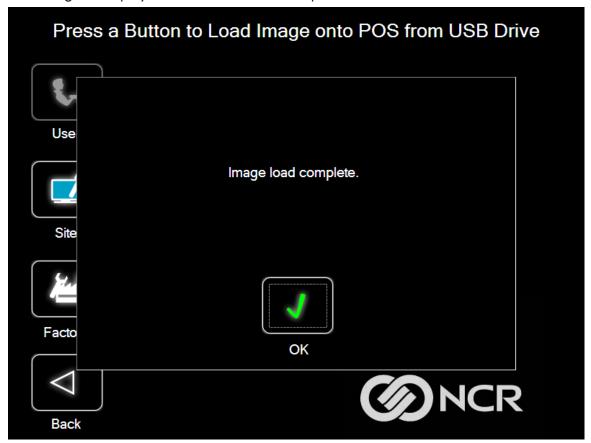
All the information in the current productive/working image on the drive is lost with this operation!



A progress bar is displayed as the image is applied.



A message is displayed when the load is complete.



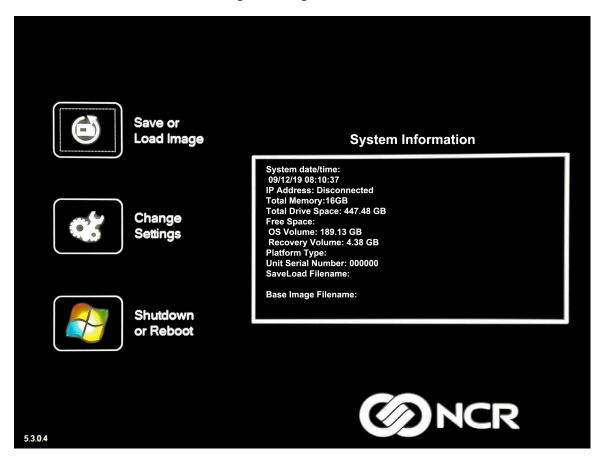
5. **Reboot** the POS.



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Change Settings

On the Main Screen, select Change Settings.



There are four functions available on the Change Settings screen:

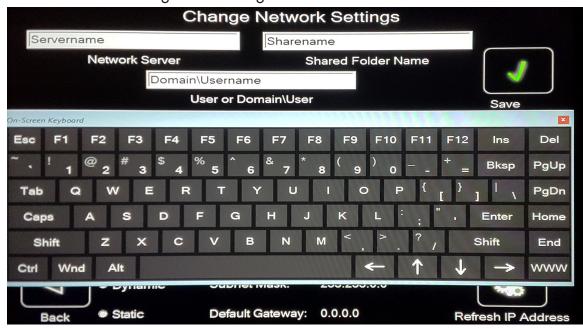
- Change Network Settings
- Change Password
- Replace Recovery Image
- Change Language

Change Network Settings

1. On the Change Settings Screen, select Change Network Settings.



2. Enter the network configuration settings and then select Save.



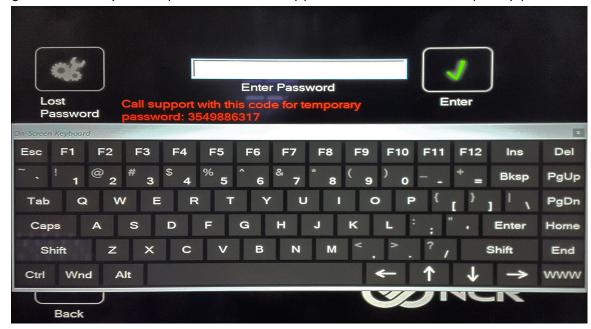
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Change Password

- 1. On the Change Settings Screen, select Change Password.
- 2. Enter the current password and the new password, and then select Enter.



If you have forgotten or lost the password, select **Lost Password**. A unique code is generated that you can provide to NCR Support to receive a new temporary password.



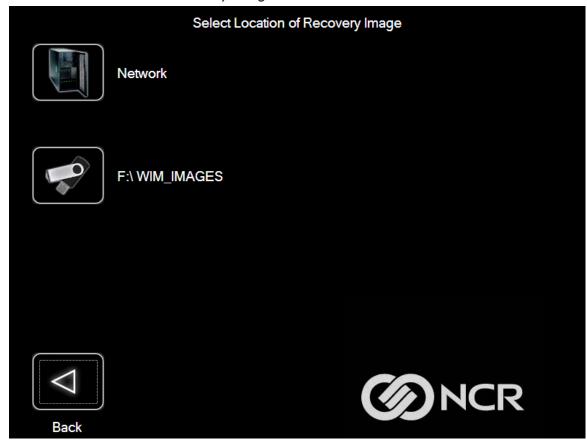
Replace Recovery Image

This feature is used to update the NCR Image Recovery Tool and the environment that it runs in.

1. On the Change Settings Screen, select Replace Recovery Image.



2. Select the source of the Recovery Image.



3. Complete the image replacement in the same manner as with the POS *Site/User* image restore procedures.

Change Language

1. On the Change Settings Screen, select Change Language.



2. Select the language of choice.



Creating a Disk Image

This terminal has an *Image Recovery Button* that permits end users to quickly restore a disk backup from a hidden partition on the NCR system storage. To utilize this valuable feature, the image must be created using the NCR Imaging Suite. The NCR Imaging Suite is available from NCR at:

https://www5.ncr.com/support/support_drivers_patches_radiant.asp?Class=Hospitality/GenDrivers_display

From this site, download the following:

- ImagingSuite_5.3.0.3.zip (or later) The Imaging Suite package consists of three primary parts:
 - · A server application for local area network imaging
 - The NCR Image Recovery Tool, which is a client application that runs on the target or source machine where images will be applied to or captured from
 - A customized version of Windows PE 3.1 boot OS environment from which the client application will be run
- Imaging Suite User Guide This document provides a general overview of the Imaging Suite package, how to configure the system to run it, and how to use the applications to capture and apply system images.

Configuring a Second SSD for RAID

Introduction

This chapter discusses how to add a second hard drive and configure a RAID system using the Intel® Rapid Storage Technology.

The Intel® Rapid Storage Technology provides new levels of protection, performance, and upgradeability for the CX7 platform. Whether using one or two hard drives you can take advantage of enhanced performance and lower power consumption. When using two drives you can have additional protection against data loss in the event of hard drive failure.

Valuable digital memories are protected against a hard drive failure when the system is configured for one of the fault-tolerant RAID levels: *RAID 1* or *RAID 5*. By seamlessly storing copies of data on one or more additional hard drives, any hard drive can fail without data loss or system downtime. When the failed drive is removed and a replacement hard drive is installed, data fault tolerance is easily restored.

A RAID system can be configured using the *Intel® Rapid Storage Technology* through either of the following:

- Windows—For more information, refer to "Configuring a RAID System in Windows"
 on the next page.
- BIOS—The procedure slightly varies for CX7 and CX7ii.
 - CX7—For more information, refer to "Configuring a RAID system in BIOS (CX7)" on page 179.
 - CX7ii—For more information, refer to "Configuring a RAID system in BIOS (CX7ii)" on page 182.

■ Note

RAID Systems can be installed on the CX7 if the 7772-F242 RAID - Dual M.2 120GB SSD feature is present.

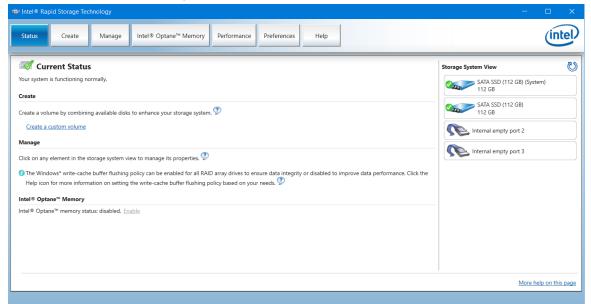
Configuring a RAID System in Windows

To install and configure a RAID system, perform the following steps:

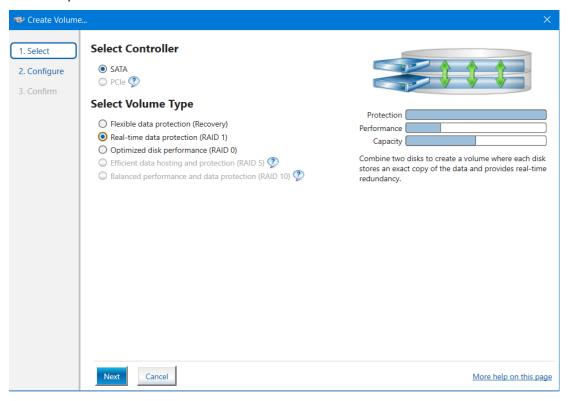
- 1. Install the primary SSD.
- 2. Load the NCR Gold Drive.
- 3. Install the second SSD in the terminal.
- 4. Run the Intel® Rapid Storage Technology Manager.

Start → All Programs → Intel → Intel® Rapid Storage Technology

5. Both disks should be recognized in the Main Screen. Select the Create button.



- 6. Select the type of RAID volume to install. NCR supports *RAID 1* and *RAID 0* volume types.
 - **RAID 1:** Combines two disks to create a volume where each disk stores an exact copy of the data and provides real-time redundancy.
 - **RAID 0:** Combines two disks to create a volume where data is broken down into *strips* that are distributed across both disks.



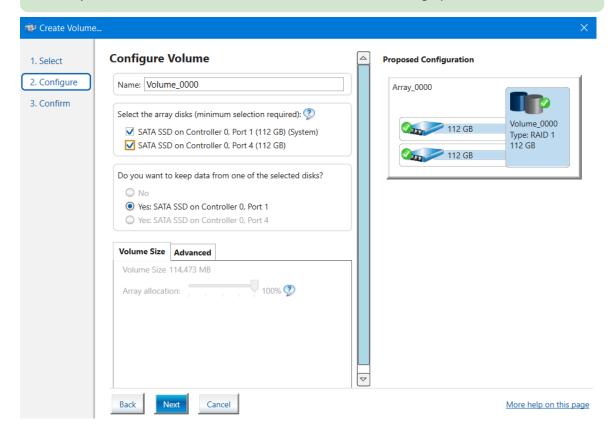
- 7. Select Next.
- 8. Enter a Volume Name (user preference).

9. Select the check boxes for both disks.

RAID 0 Only: Specify the amount of space to be used by the new RAID volume. Use the slider to enter a percentage.

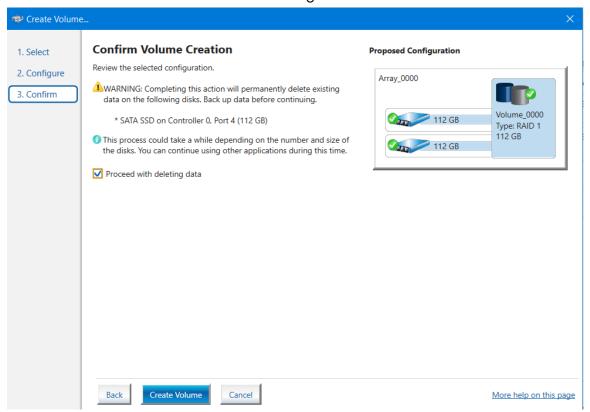


If you create a volume that uses less than 100% of the hard drive space, you may create a second RAID volume to use the remaining space.

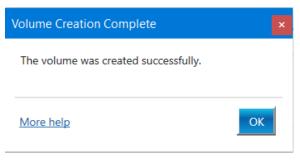


10. Select Next.

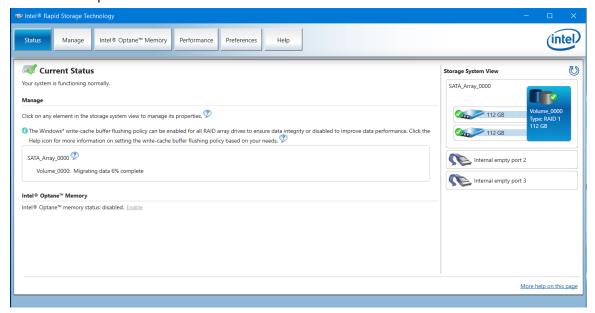
11. Select **Create Volume** to start the volume migration.



12. A window is displayed indicating the volume was created successfully. Select **OK** to close the window.



The status of the migration is displayed, showing the progress. This can take 1 to 3 hours to complete.



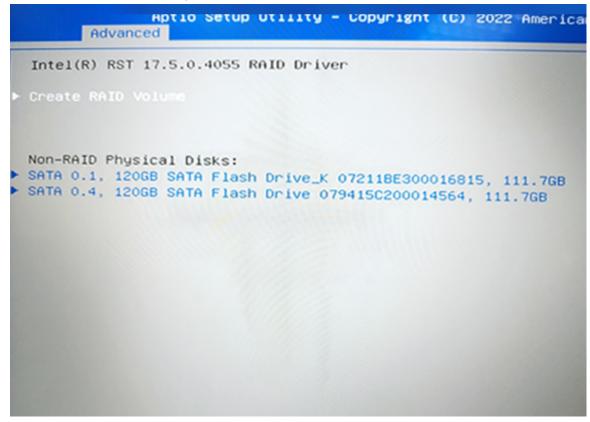
Configuring a RAID system in BIOS (CX7)

To configure a RAID system in BIOS, perform the following steps:

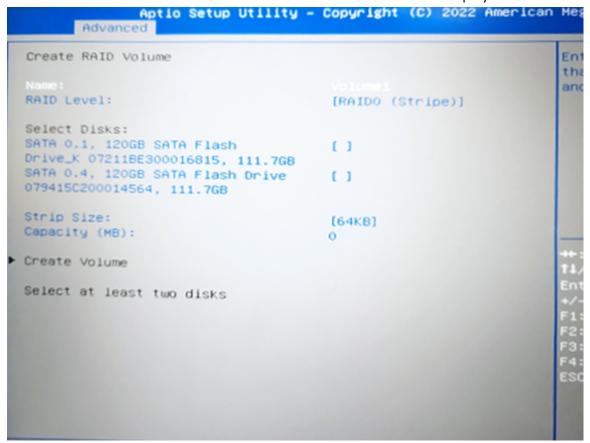
- 1. Install the primary and secondary SSD in the terminal.
- 2. Connect an alphanumeric USB keyboard to the terminal.
- 3. Apply power to the terminal and reboot.
- 4. When the NCR logo is displayed, press [DEL] or [F2] to boot in BIOS.
- 5. Navigate to Advanced → Intel® Rapid Storage Technology.
 - Note

If a RAID volume exists, delete the existing RAID volume. For more information, refer to "Deleting a RAID volume in BIOS (CX7)" on page 181.

6. Both disks should be recognized in the Intel(R) RST screen.



7. Select Create RAID Volume. The Create RAID Volume screen is displayed.



- 8. Do the following:
 - a. Enter a Volume Name (user preference).
 - b. Select a RAID Level.
 - **RAID 0:** Combines two disks to create a volume where data is broken down into *strips* that are distributed across both disks.
 - RAID 1: Combines two disks to create a volume where each disk stores an
 exact copy of the data and provides real-time redundancy.
 - Recovery: Combines two disks to create a recovery volume and control
 how the recovery disk is updated with master disk changes. This feature will
 only work on SATA M.2 SSDs.
 - c. For Select Disks, select the two disks. Selected disks are marked [X].

- d. Enter the following:
 - Strip Size—This option is only available for RAID 0 (Stripe) RAID Level.
 - Synchronization—Select On Request or Continuous. This option is only available for Recovery RAID Level.
 - Capacity (MB)—It is recommended to use the default value.
- 9. Select Create Volume.
- 10. Once completed, the created RAID volume will be displayed in the Intel(R) RST screen.
- 11. Press [F4] to save and exit.
- 12. Load the NCR Gold image.

Deleting a RAID volume in BIOS (CX7)



Warning

All data on volume will be lost when attempting this operation. Make sure to back up before continuing.

To delete an existing RAID volume, perform the following steps:

- 1. Connect an alphanumeric USB keyboard to the terminal.
- 2. Apply power to the terminal and reboot.
- When the NCR logo is displayed, press [DEL] or [F2] to boot in BIOS.
- 4. Navigate to Advanced → Intel® Rapid Storage Technology.
- 5. Select the RAID volume to delete and press [Enter].
- 6. Select **Delete** and press **[Enter]**.
- 7. Select **Yes** and press **[Enter]** to confirm.
- 8. Press [F4] to save and exit.

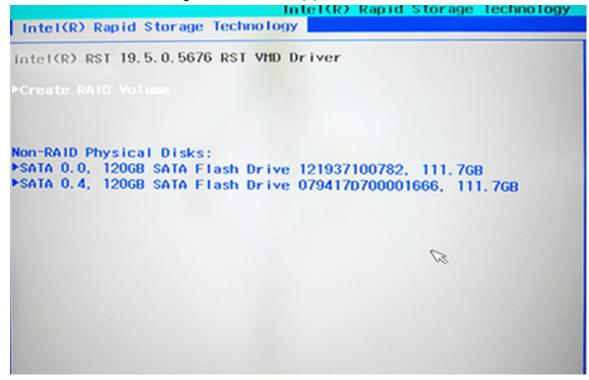
Configuring a RAID system in BIOS (CX7ii)

To configure a RAID system in BIOS, perform the following steps:

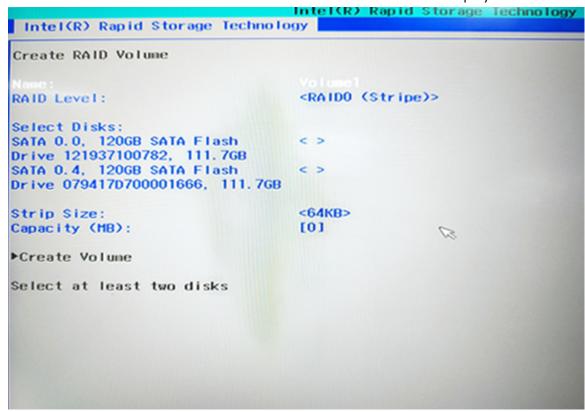
- 1. Install the primary and secondary SSD in the terminal.
- 2. Connect an alphanumeric USB keyboard to the terminal.
- 3. Apply power to the terminal and reboot.
- 4. When the NCR logo is displayed, press [Esc].
- 5. Navigate to **Device Management** → **Intel**® **Rapid Storage Technology**.
 - Note

If a RAID volume exists, delete the existing RAID volume. For more information, refer to "Deleting a RAID volume in BIOS (CX7ii)" on page 184.

6. Both disks should be recognized in the Intel(R) RST screen.



7. Select Create RAID Volume. The Create RAID Volume screen is displayed.



- 8. Do the following:
 - a. Select a RAID Level.
 - **RAID 0:** Combines two disks to create a volume where data is broken down into *strips* that are distributed across both disks.
 - RAID 1: Combines two disks to create a volume where each disk stores an
 exact copy of the data and provides real-time redundancy.
 - b. For Select Disks, select the two disks. Selected disks are marked [X].
 - c. Enter a Volume Name (user preference).
 - d. Enter the following:
 - Strip Size—This option is only available for RAID 0 (Stripe) RAID Level.
 - Capacity (MB)—It is recommended to use the default value.
- 9. Select Create Volume.
- 10. Once completed, the created RAID volume will be displayed in the Intel(R) RST screen.
- 11. Press [F10] to save.

- 12. Press [Esc] to exit.
- 13. Press [Ctrl]+[Alt]+[Del] to reboot.
- 14. Load the NCR Gold image.

Deleting a RAID volume in BIOS (CX7ii)



Marning

All data on volume will be lost when attempting this operation. Make sure to back up before continuing.

To delete an existing RAID volume, perform the following steps:

- 1. Connect an alphanumeric USB keyboard to the terminal.
- 2. Apply power to the terminal and reboot.
- 3. When the NCR logo is displayed, press [Esc].
- 4. Navigate to **Device Management** → **Intel**® **Rapid Storage Technology**.
- 5. Select the RAID volume to delete and press [Enter].
- 6. Select **Delete** and press [Enter].
- 7. Select Yes and press [Enter] to confirm.
- 8. Press **[F10]** to save.
- 9. Press [Esc] to exit.
- 10. Press [Ctrl]+[Alt]+[Del] to reboot.

Linux Software RAID Setup

This chapter explains how to setup an NCR Voyix released Linux OS to use Software RAID on a supported POS terminal.

■ Note

For CX7ii: When using NMVe PCle SSD drive types in combination with older Linux distributions not advocated by NCR Voyix, the drives might not be recognized by the operating system. For the drives to be recognized, turn off the VMD in the BIOS setting. Linux distributions that are certified by NCR Voyix for use with CX7ii do not require this adjustment.

The expected users are developers, testers, deployment and maintenance engineers, and end users with advanced knowledge of Linux OS setup and administration. It is assumed that the user is able to interface with the terminal using a command line, and is able to edit and modify files using the command line.

SLES 15 SP4 Software RAID Gold Master Image

The following procedure incorporates software RAID into an NCR supported terminal running SLES 15 SP4 distribution. The software RAID configuration is set to RAID1 mode.

■ Note

For more information about RAID, refer to <u>SLES 15 SP4 | Storage Administration</u>

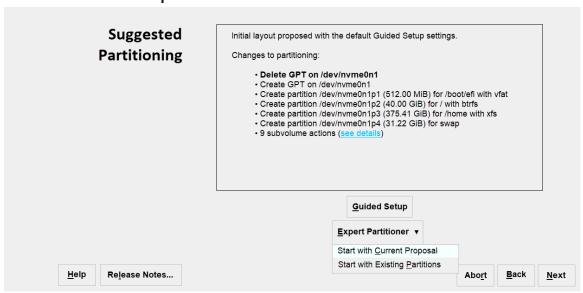
Guide | Configuring software RAID for the root partition (suse.com).

RAID partitioning is done by using the SLES Expert Partitioner during installation of the OS.

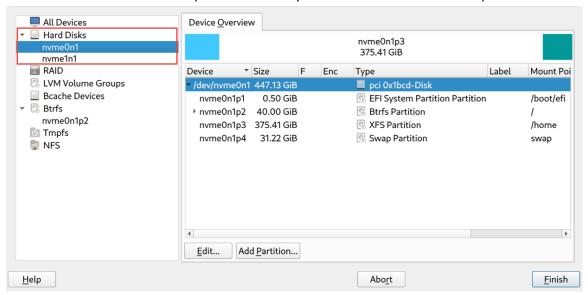
■ Note

The succeeding screenshots are from an NCR terminal with two 480GB hard disks:

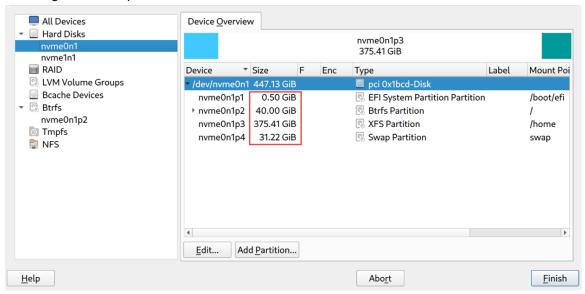
- nvme0n1—disk 1
- nvme1n1-disk 2
- 1. In the Suggested Partitioning screen, from the Expert Partitioner dropdown list, select Start with Current Proposal.



2. Select Next. The hard disks present in the system are shown on the left panel.



3. Take note of the recommended partition sizing for disk 1, as this will be followed when creating the RAID partitions for disk 2.



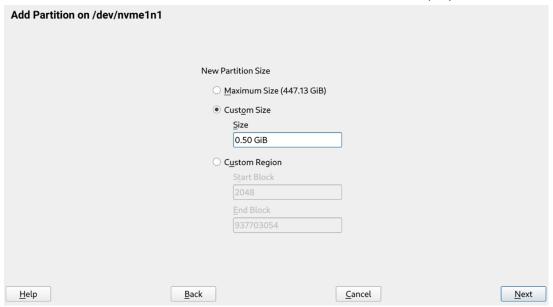
- 4. Create the following RAID partitions for disk 2:
 - /boot/efi
 - /
 - /home

₽ Note

The Swap Partition can be RAIDed but is optional. In the succeeding steps, Swap Partition will not be RAIDed.

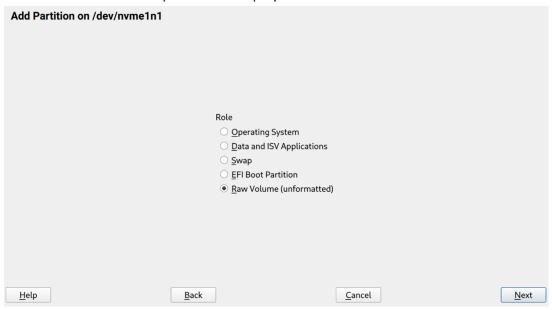
To create the RAID partition, do the following:

- a. From the Hard Disks dropdown list, select the hard disk to partition (nvme1n1).
- b. Select the **Add Partition** button. The Add Partition screen is displayed.

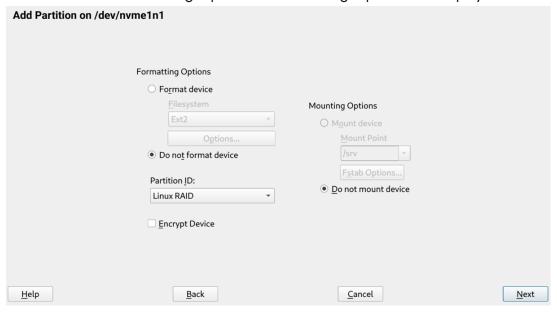


c. From the New Partition Size options, select **Custom Size** and enter the partition size.

d. Select Next. The Role options are displayed.

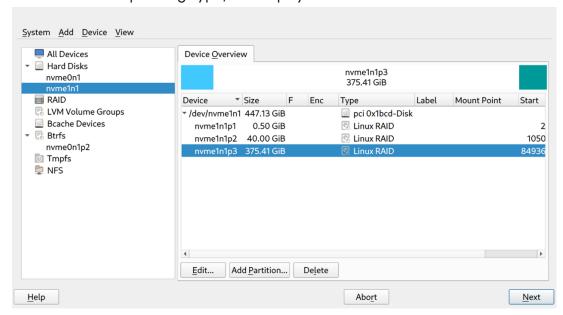


- e. Select Raw Volume (unformatted).
- f. Select Next. The Formatting Options and Mounting Options are displayed.

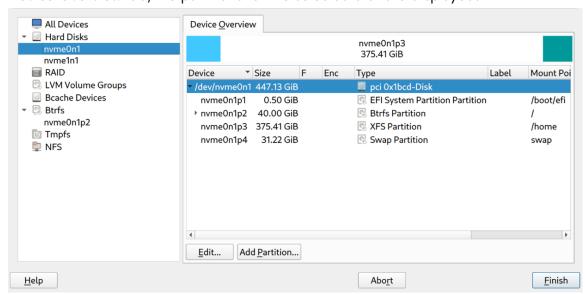


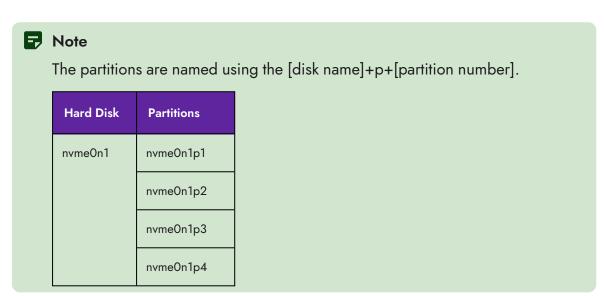
- g. Do the following:
 - From the Formatting Options, select **Do not format device**.
 - From the Partition ID dropdown list, select Linux RAID.
 - From the Mounting Options, select **Do not mount device**.

h. Select **Next**. In the Device Overview tab, the created partitions, with Linux RAID as its corresponding Type, are displayed.

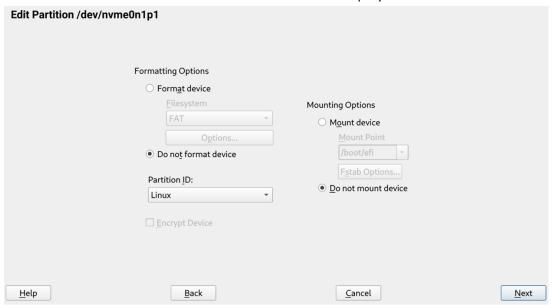


5. On the left panel, from the Hard Disks dropdown list, select disk 1 (nvmeOn1). In the Device Overview tab, the partitions for the selected disk are displayed.

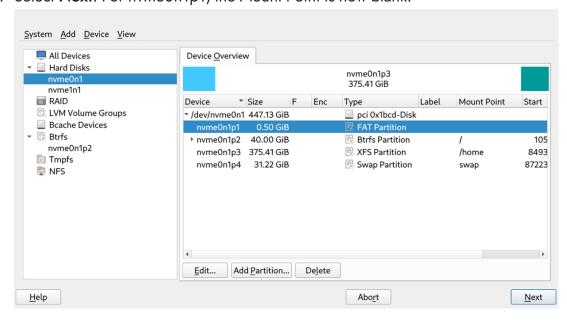




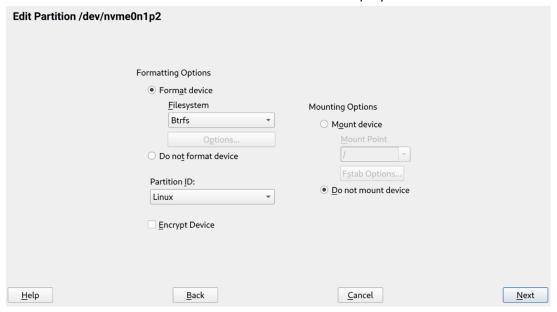
- 6. Edit the first partition of disk 1.
 - a. From the Device Overview tab, select the first partition (nvmeOn1p1).
 - b. Select the **Edit** button. The Edit Partition screen is displayed.



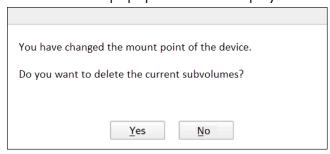
- c. Do the following:
 - From the Formatting Options, select Do not format device.
 - From the Partition ID dropdown list, select **Linux**.
 - From the Mounting Options, select Do not mount device.
- d. Select **Next**. For nymeOn1p1, the Mount Point is now blank.



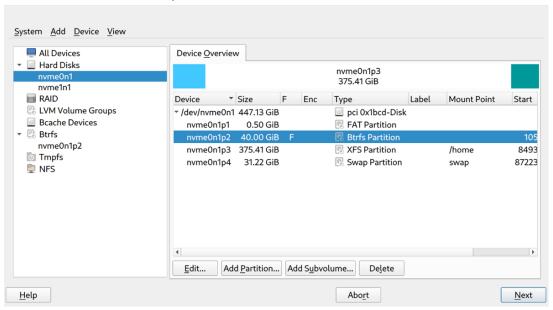
- 7. Edit the second partition of disk 1.
 - a. From the Device Overview tab, select the second partition (nvme0n1p2).
 - b. Select the **Edit** button. The Edit Partition screen is displayed.



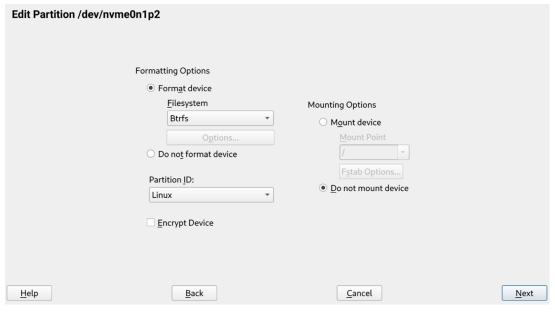
- c. Do the following:
 - From the Formatting Options, select Format device.
 - From the Filesystem dropdown list, select **Btrfs**.
 - From the Partition ID dropdown list, select Linux.
 - From the Mounting Options, select **Do not mount device**.
- d. Select **Next**. A popup window is displayed.



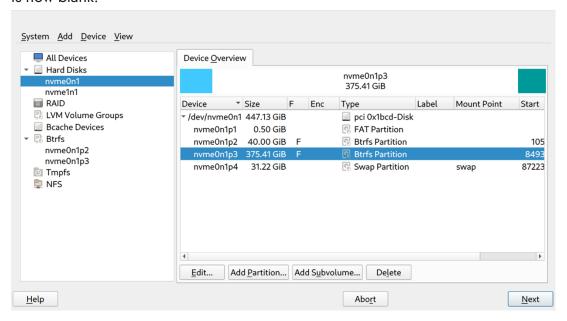
e. Select Yes. For nymeOn1p2, the Mount Point is now blank.



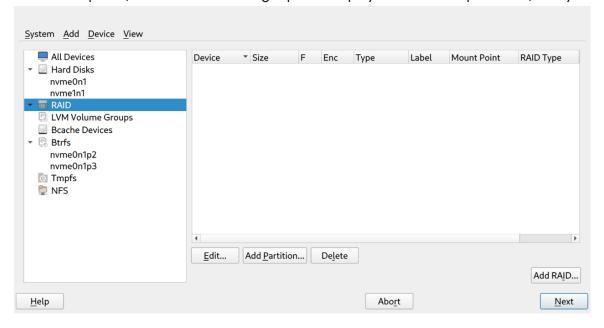
- 8. Edit the third partition of disk 1.
 - a. From the Device Overview tab, select the third partition (nvme0n1p3).
 - b. Select the Edit button. The Edit Partition screen is displayed.



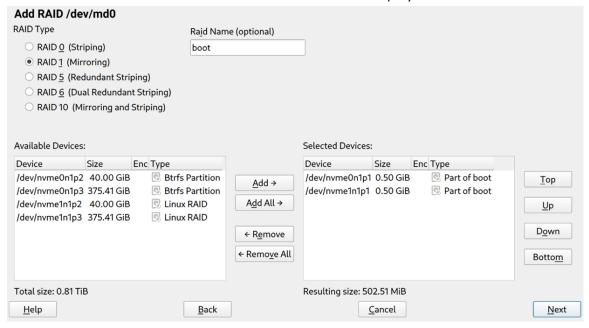
- c. Do the following:
 - From the Formatting Options, select Format device.
 - From the Filesystem dropdown list, select **Btrfs**.
 - From the Partition ID dropdown list, select Linux.
 - From the Mounting Options, select **Do not mount device**.
- d. Select **Next**. For nvmeOn1p3, the Type is now Btrfs Partition and the Mount Point is now blank.



9. On the left panel, select RAID. The right panel displays the RAIDed partitions, if any.



10. Select the Add RAID button. The Add RAID screen is displayed.



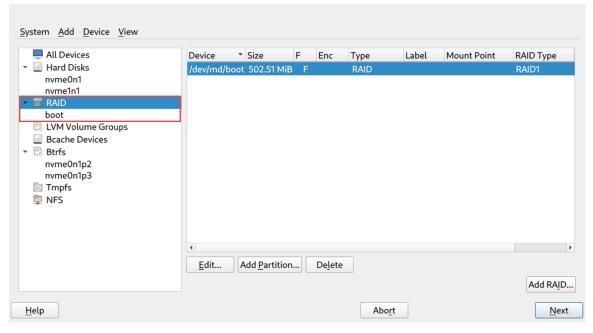
11. Do the following:

- From the RAID Type options, select RAID 1 (Mirroring).
- In the Raid Name field, enter a preferred name. For example, boot.
- From the Available Devices list, select the first partition of disk 1 (nvmeOn1p1) and the first partition of disk 2 (nvme1n1p1), then select Add. In the Selected Devices list, nvmeOn1p1 and nvme1n1p1 are displayed.

12. Select Next. The Chunk Size dropdown list is displayed.

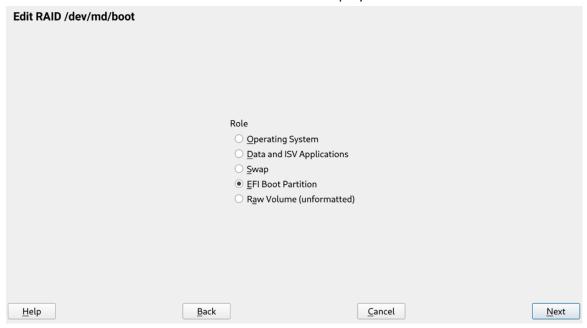


- 13. From the Chunk Size dropdown list, select the preferred size.
- Select Next. On the left panel, from the RAID dropdown list, the newly added RAID (boot) is displayed.

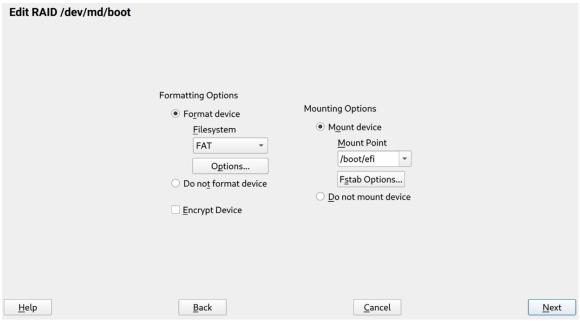


15. On the right panel, select the newly added RAID device (/dev/md/boot).

16. Select the Edit button. The Edit RAID screen is displayed.

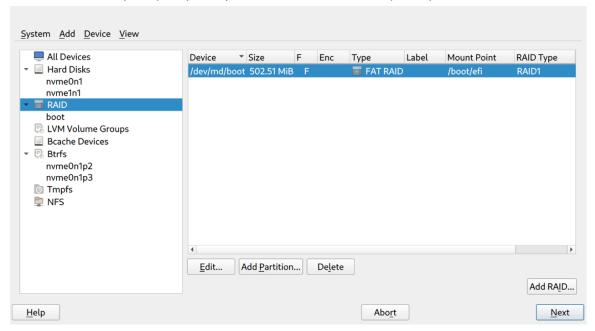


- 17. From the Role options, select **EFI Boot Partition**.
- 18. Select Next. The Formatting Options and Mounting Options are displayed.

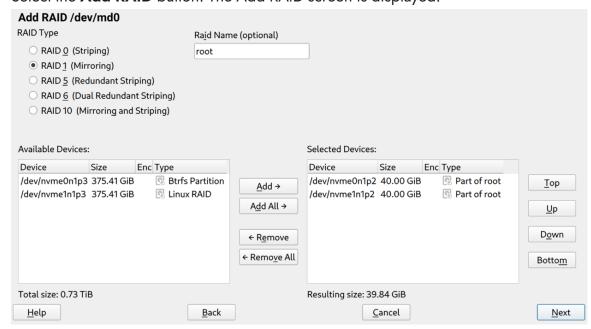


19. Do the following:

- From the Formatting Options, select Format device.
- From the Filesystem dropdown list, select **FAT**.
- From the Mounting Options, select Mount device.
- From the Mount Point dropdown list, select /boot/efi.
- 20. Select Next. For /dev/md/boot, the Mount Point is now /boot/efi.



21. Select the Add RAID button. The Add RAID screen is displayed.



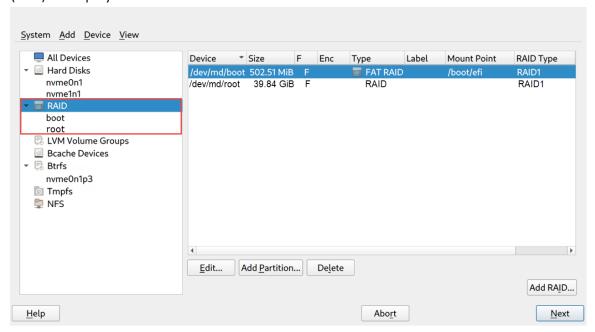
22. Do the following:

- From the RAID Type options, select RAID 1 (Mirroring).
- In the Raid Name field, enter a preferred name. For example, root.
- From the Available Devices list, select the second partition of disk 1 (nvmeOn1p2) and the second partition of disk 2 (nvme1n1p2), then select Add. In the Selected Devices list, nvmeOn1p2 and nvme1n1p2 are displayed.
- 23. Select Next. The Chunk Size dropdown list is displayed.

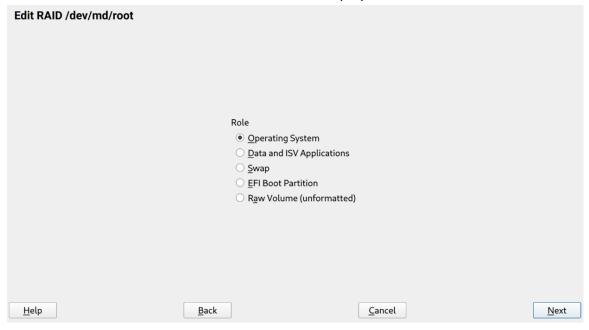


24. From the Chunk Size dropdown list, select the preferred size.

25. Select **Next**. On the left panel, from the RAID dropdown list, the newly added RAID (root) is displayed.



- 26. On the right panel, select the newly added RAID device (/dev/md/root).
- 27. Select the Edit button. The Edit RAID screen is displayed.



28. From the Role options, select Operating System.

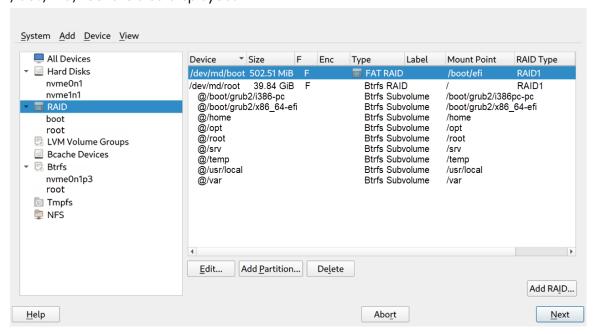
29. Select Next. The Formatting Options and Mounting Options are displayed.



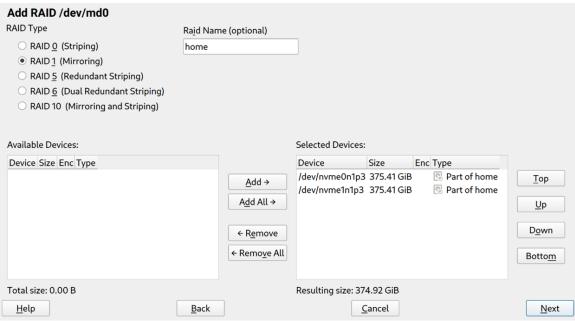
30. Do the following:

- From the Formatting Options, select Format device.
- From the Filesystem dropdown list, select Btrfs
- From the Mounting Options, select Mount device.
- From the Mount Point dropdown list, select /.

31. Select **Next**. For /dev/md/root, the Mount Point is now /. Subvolumes for /dev/md/root are also displayed.



32. Select the **Add RAID** button. The Add RAID screen is displayed.

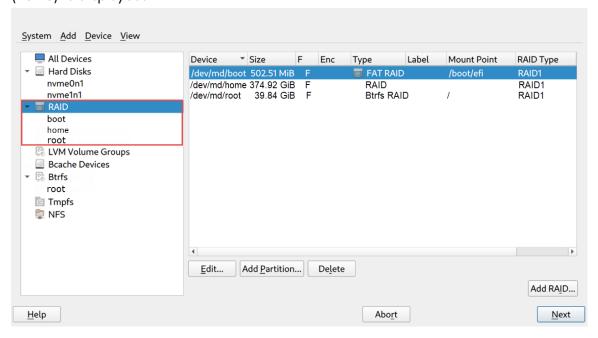


- 33. Do the following:
 - From the RAID Type options, select RAID 1 (Mirroring).
 - In the Raid Name field, enter a preferred name. For example, home.
 - From the Available Devices list, select the third partition of disk 1 (nvmeOn1p3) and the third partition of disk 2 (nvme1n1p3), then select Add. In the Selected Devices list, nvmeOn1p3 and nvme1n1p3 are displayed.
- 34. Select Next. The Chunk Size dropdown list is displayed.

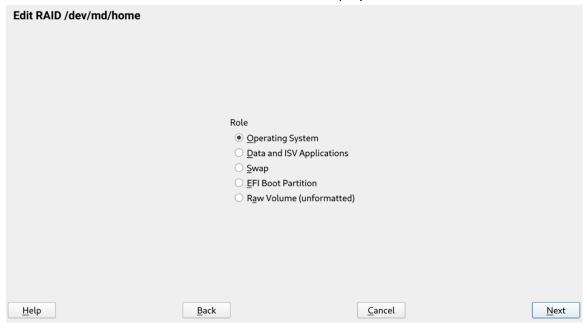


35. From the Chunk Size dropdown list, select the preferred size.

36. Select Next. On the left panel, from the RAID dropdown list, the newly added RAID (home) is displayed.

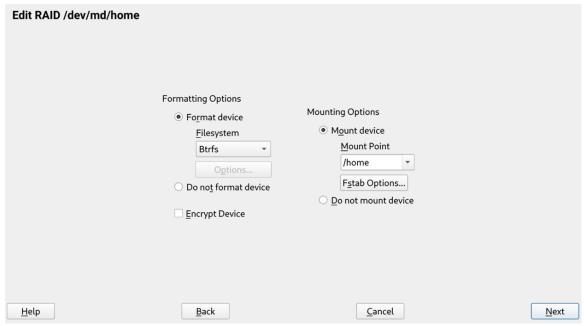


- 37. On the right panel, select the newly added RAID device (/dev/md/home).
- 38. Select the Edit button. The Edit RAID screen is displayed.

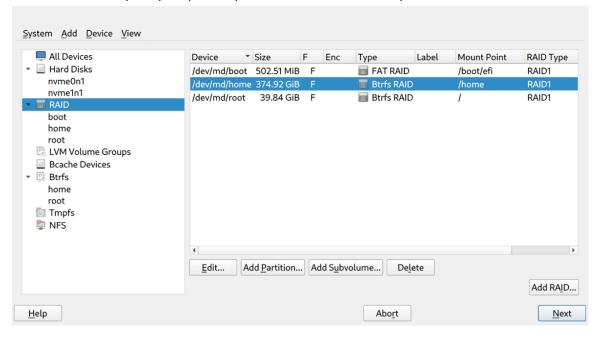


39. From the Role options, select Operating System.

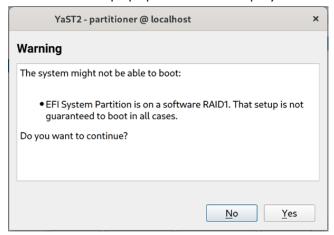
40. Select **Next**. The Formatting Options and Mounting Options are displayed.



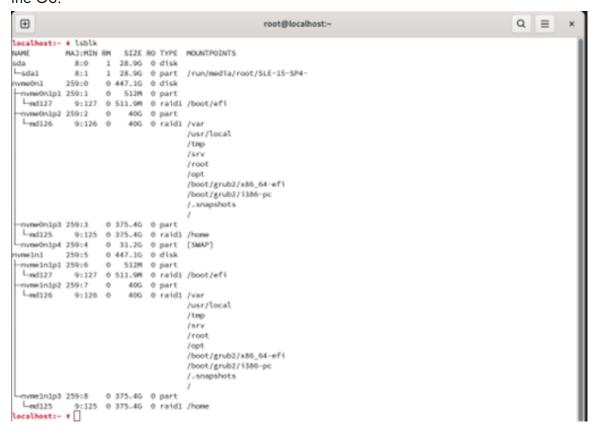
- 41. Do the following:
 - From the Formatting Options, select Format device.
 - From the Filesystem dropdown list, select Btrfs
 - From the Mounting Options, select Mount device.
 - From the Mount Point dropdown list, select /home.
- 42. Select **Next**. For /dev/md/home, the Mount Point is now /home.

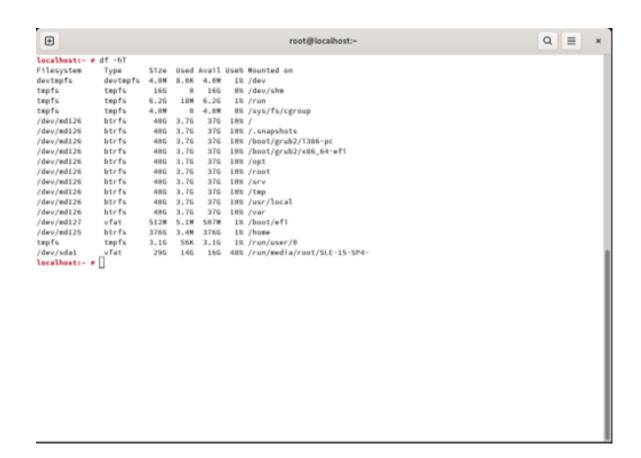


43. Select Next. A popup window is displayed.



44. Select **Yes**, and review the Suggested Partitioning, then continue with the installation of the OS.





SLES 15 SP5 Software RAID (UEFI)

The following procedure incorporates software RAID into an NCR supported terminal running NCR SLES 15 SP5 distribution. The software RAID configuration is set to RAID1 mode.

■ Note

The succeeding screenshots are from a CX7ii terminal with two 480GB NVMe hard disks:

- nvme0n1—disk 1
- nvme1n1-disk 2

The five partitions are as follows:

- 1-MBR
- 2-boot/efi
- 3-boot
- 4— swap
- 5—root

The procedure may need to be modified for use in other OS, when using SATA drives, or using a different terminal. It is also assumed that two drives of the same type are used. At all times, it is assumed that the commands are run as a root user.

- Determine the terminal's current OS partitions. In this case, the current OS is on /dev/nvme0n1 and its partitions are:
 - /dev/nvme0n1p1
 - /dev/nvme0n1p2
 - /dev/nvme0n1p3
 - /dev/nvme0n1p4
 - /dev/nvme0n1p5

```
localhost:" # fdisk -l
Disk /dev/nvme1n1: 447,13 GiB, 480103981056 bytes, 937703088 sectors
Disk model: 480GB PCIe Drive_K
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk /dev/nvme0n1: 447,13 GiB, 480103981056 bytes, 937703088 sectors
Disk model: 480GB PCIe Drive_K
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF
Device
                 Start
                             End
                                   Sectors
                                             Size Type
/dev/nvme0n1p1
                                               2M BIOS boot
                  2048
                            6143
                                     4096
/dev/nvme0n1p2
                  6144
                           47103
                                     40960
                                              20M EFI System
/dev/nvme0n1p3
                 47104
                          661503
                                    614400
                                             300M Linux filesystem
                         2758655
                                   2097152
/dev/nvme0n1p4
               661504
                                               1G Linux swap
/dev/nvme0n1p5 2758656 937703054 934944399 445.8G Linux filesystem
Disk /dev/sda: 28.82 GiB, 30943995904 bytes, 60437492 sectors
Disk model: DataTraveler 3.0
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xb5baeb3f
```



If using a SATA drive, the drive may be mounted at /dev/sda and its partitions are /dev/sda1, /dev/sda2, and so on.

- 2. Create the same partitions for the second disk (/dev/nvme1n1).
 - a. Run the following command:

```
sfdisk -d /dev/nvme0n1 | sfdisk --force /dev/nvme1n1
```

```
t:" • sfdisk -d /dev/nvmeOnl | sfdisk --force /dev/nvmelnl
Checking that no-one is using this disk right now ... OK
Disk /dev/nvwe1n1: 447.13 GiB, 480103981056 bytes, 937703088 sectors
Disk model: 480GB PCIe Drive_K
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal); 512 bytes / 512 bytes
>>> Script header accepted.
>>> Created a new GPT disklabel (GUID: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF),
/dev/nvmeln1p1: Created a new partition 1 of type 'BIOS boot' and of size 2 MiB.
/dev/nvmeln1p2: Created a new partition 2 of type 'EFI System' and of size 20 MiB.
 Partition #2 contains a vfat signature.
/dev/nvme1n1p3: Created a new partition 3 of type 'Linux filesystem' and of size 300 MiB.
Partition #3 contains a vfat signature.
/dev/nymeln1p4: Created a new partition 4 of type 'Linux swap' and of size 1 GiB.
/dev/nymeln1p5: Created a new partition 5 of type 'Linux filesystem' and of size 445.8 GiB.
 Partition #5 contains a ext4 signature.
/dev/nvme1n1p6; Done.
New situation:
Disklabel type: gpt
Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF
Device
                     2048
                                           Sectors
                                                       Size Type
2M BIOS boot
                                   End
                                              4096
/dev/nvme1n1p1
                                   6143
/dev/nvme1n1p2
                      6144
                                 47103
                                              40960
                                                         20M EFI System
/dev/nvme1n1p3
                    47104
                               661503
                                            614400
                                                       300M Linux filesystem
/dev/nvme1n1p4 661504
                              2758655
                                           2097152
                                                         1G Linux swap
/dev/nvme1n1p5 2758656 937703054 934944399 445.8G Linux filesystem
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

b. Verify the copied partitions for the second disk (/dev/nvme1n1). Run the following command:

```
fdisk -1
```

```
localhost:" # fdisk -l
Disk /dev/nvwe1n1: 447.13 GiB, 480103981056 bytes, 937703088 sectors
Disk model: 480GB PCIe Drive_K
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: 9pt
Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF
Device
                                              Size Type
                  Start
                              End
                                    Sectors
/dev/nvme1n1p1
                                       4096
                                                2M BIOS boot
                   2048
                             6143
                            47103
                                               20M EFI System
/dev/nvme1n1p2
                  6144
                                      40960
                  47104
                           661503
                                     614400
/dev/nvme1n1p3
                                              300M Linux filesystem
                661504
                         2758655
                                    2097152
                                                1G Linux swap
/dev/nvme1n1p4
/dev/nvme1n1p5 2758656 937703054 934944399 445.8G Linux filesystem
Disk /dev/nvme0n1: 447,13 GiB, 480103981056 bytes, 937703088 sectors
Disk model: 480GB PCIe Drive_K
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF
Device
                                              Size Type
                  Start
                              End
                                    Sectors
/dev/nvme0n1p1
                   2048
                             6143
                                       4096
                                                2M BIOS boot
/dev/nvme0n1p2
                  6144
                            47103
                                      40960
                                               20M EFI System
/dev/nvme0n1p3
                  47104
                           661503
                                     614400
                                              300M Linux filesystem
/dev/nvme0n1p4
                661504
                         2758655
                                    2097152
                                                1G Linux swap
/dev/nvme0n1p5 2758656 937703054 934944399 445.8G Linux filesystem
Disk /dev/sda: 28,82 GiB, 30943995904 bytes, 60437492 sectors
Disk model: DataTraveler 3.0
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
|Disklabel type: dos
Disk identifier: 0xb5baeb3f
Device
            Boot Start
                            End Sectors Size Id Type
                  2048 60437491 60435444 28.8G c W95 FAT32 (LBA)
/dev/sda1
```

- Change the partition types on the second disk (/dev/nvme1n1) to Linux RAID.
 - a. Run the following commands:

```
sfdisk --part-type /dev/nvme1n1 2 A19D880F-05FC-4D3B-A006-743F0F84911E
sfdisk --part-type /dev/nvme1n1 3 A19D880F-05FC-4D3B-A006-743F0F84911E
sfdisk --part-type /dev/nvme1n1 5 A19D880F-05FC-4D3B-A006-743F0F84911E
```

b. Verify the partitions are now Linux RAID. Run the following command:

fdisk -1

```
localhost:" # fdisk -l
Disk /dev/nvme1n1: 447,13 GiB, 480103981056 bytes, 937703088 sectors
Disk model: 480GB PCIe Drive_K
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: 9pt
Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF
Device
                 Start
                             End
                                   Sectors
                                             Size Type
                            6143
/dev/nvme1n1p1
                                      4096
                                               2M BIOS boot
                  2048
                                              20M Linux RAID
                                     40960
/dev/nvme1n1p2
                  6144
                           47103
/dev/nvme1n1p3
                 47104
                          661503
                                    614400
                                             300M Linux RAID
                         2758655
                                               1G Linux swap
/dev/nvme1n1p4 661504
                                   2097152
Disk /dev/nvme0n1: 447.13 GiB, 480103981056 bytes, 937703088 sectors
Disk model: 480GB PCIe Drive_K
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF
Device
                 Start
                                   Sectors
                                             Size Type
                             End
/dev/nvme0n1p1
                                      4096
                                               2M BIOS boot
                  2048
                            6143
                                              20M EFI System
/dev/nvme0n1p2
                  6144
                           47103
                                     40960
                                    614400
                          661503
/dev/nvme0n1p3
                                             300M Linux filesystem
                 47104
                661504
                         2758655
                                   2097152
/dev/nvmeOn1p4
                                               1G Linux swap
/dev/nvme0n1p5 2758656 937703054 934944399 445.8G Linux filesystem
Disk /dev/sda: 28,82 GiB, 30943995904 bytes, 60437492 sectors
Disk model: DataTraveler 3.0
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xb5baeb3f
```

4. Create the RAID arrays.

a. Run the following commands:

```
mdadm --create /dev/md2 --run --level=1 --metadata=1.0 --raid-devices=2
missing /dev/nvme1n1p2

mdadm --create /dev/md3 --run --level=1 --metadata=1.0 --raid-devices=2
missing /dev/nvme1n1p3

mdadm --create /dev/md5 --run --level=1 --metadata=1.0 --raid-devices=2
missing /dev/nvme1n1p
```

b. Verify the created RAID arrays. Run the following command:

5. Format the RAID arrays with the same file systems as the current OS partitions. Run the following commands:

```
mkfs.fat -F 16 -n "EFI" /dev/md2

mkfs.fat -F 16 /dev/md3

mkswap -L "SWAP" /dev/nvme1n1p4

mkfs.ext4 -L "ROOT" /dev/md
```

```
You have new mail in /var/spool/mail/root
localhost:" # mkfs.fat -F 16 /dev/md3
mkfs.fat 4.1 (2017-01-24)
localhost:" # mkfs.ext4 -L "ROOT" /dev/md5
mke2fs 1.46.4 (18-Aug-2021)
/dev/md5 contains a ext4 file system labelled '"ROOT"'
last mounted on / on Sun Feb 25 15:43:33 2024
Proceed anyway? (y,N) y
Discarding device blocks: done
Creating filesystem with 116868000 4k blocks and 29220864 inodes
Filesystem UUID: 2c546e16-23df-49f6-98e2-dd071ca62506
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208, 4096000, 7962624, 11239424, 20480000, 23887872, 71663616, 78675968,
         102400000
Allocating group tables: done
Writing inode tables: done
Creating journal (262144 blocks): done
Writing superblocks and filesystem accounting information: done
```

6. Edit the /etc/grub.d/40_custom file and add a RAID boot entry.

```
menuentry 'RAID - NCRSLES15 SP5' {
    load_video
    set gfxpayload=keep
    insmod gzio
    insmod part_gpt
    insmod mdraid1x
    insmod fat
    set root='md/3'
    echo 'Loading Linux 5.14.21-150500.53-default raid ...'
    linuxefi /vmlinuz-5.14.21-150500.53-default root=/dev/md5 noresume
splash=silent mitigations=auto
quiet net.ifnames=0 8250.nr_uarts=2 i915.invert_brightness=-1 tpm_tis.interrupts=0
    echo 'Loading initial ramdisk raid...'
    initrdefi /initrd-5.14.21-150500.53-default
}
```

■ Note

- md/3 should be the partition where the /boot is located
- 5.14.21-150500.53-default should be replaced with the vmlinuz and initrd version of the kernel being used

Example

Before

```
#!/bin/sh
exec tail -n +3 $0
# This file provides an easy way to add custom menu entries. Simply type the
# menu entries you want to add after this comment. Be careful not to change
# the 'exec tail' line above.
```

After

```
# I/bin/sh
exec tail -n +3 $0
# This file provides an easy way to add custom menu entries. Simply type the
# menu entries you want to add after this comment. Be careful not to change
# the 'exec tail' line above,
menuentry 'RAID - NCRSLES15 SP5' {
    load_video
        set gfxpayload=keep
        insmod part_gpt
        insmod mdraidlx
        insmod mdraidlx
        insmod fat
        set root='md/3'
        echo 'Loading Linux 5.14.21-150500.53-default raid ...'
        linuxefi /vmlinuz-5.14.21-150500.53-default root=/dev/md5 noresume splash=silent mitigations=auto
quiet net.ifnames=0 8250.nr_uarts=2 i915.invert_brightness=-1 tpm_tis.interrupts=0
        echo 'Loading initial ramdisk raid...'
        initrdefi /initrd-5.14.21-150500.53-default
```

7. Update boot configurations. Run the following commands:

```
grub2-mkconfig -o /boot/grub2/grub.cfg

mkinitrd -m "dm-raid"

grub2-install --modules=mdraid1x.mod /dev/nvme0n1
```

```
localhost: # grub2-mkconfig -o /boot/grub2/grub.cfg
Generating grub configuration file ...
Found theme: /boot/grub2/themes/SLE/theme.txt
Found linux image: /boot/vmlinuz-5.14.21-150500.53-default
Found initrd image: /boot/initrd-5.14.21-150500.53-default
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
done
```

```
localhost:" • skinitrd -m "dm-raid"

Creating initrd: /boot/initrd-5.14.21-150500.53-default

dracut; Executing: /usr/bin/dracut --logfile /var/log/YaSTZ/skinitrd.log --force --force-drivers dm-raid /boot/initrd-5.14.21-150500.53-default 5.
         Co.53-default module 'systemd-networkd' will not be installed, because command 'networkctl' could not be found! dracut; dracut module 'systemd-networkd' will not be installed, because command '/urr/lib/systemd'systemd-networkd' could not be found! dracut; dracut module 'systemd-networkd' will not be installed, because command '/urr/lib/systemd'systemd-networkd-wait-online' could not be found! dracut; dracut module 'systemd-resolved' will not be installed, because command 'yurr/lib/systemd'systemd-networkd-wait-online' could not be found! dracut; dracut module 'systemd-resolved' will not be installed, because command 'resolvectl' could not be found! dracut; dracut module 'systemd-resolved' will not be installed, because command 'yurr/lib/systemd/systemd-resolved' could not be found! dracut; dracut module 'dracuted' will not be installed, because command 'obus-broken' could not be found! dracut; dracut module 'mrad' will not be installed, because command 'dravat' could not be found! dracut; dracut module 'will not be installed, because command 'dravat' could not be found! dracut; dracut module 'will not be installed, because command 'mred' could not be found! dracut; dracut module 'mrad' will not be installed, because command 'nred' could not be found! dracut; dracut module 'mrad' will not be installed, because command 'nred' could not be found! dracut; dracut module 'mrad' will not be installed, because command 'nred' could not be found! dracut; dracut module 'mrad' will not be installed, because command 'mred' could not be found!

dracut; dracut module 'mrad' will not be installed, because command 'mred' could not be found!

dracut; dracut module 'mrad' will not be installed, because command 'mred' could not be found!
                00.53-default
         dracut: dracut module 'memstrack' will not be installed, because command 'memstrack' could not be found!

dracut: fl you need to use rd.memdebug>=4, please install memstrack and procps-rg

dracut: dracut module 'squash' will not be installed, because command 'misquashfs' could not be found!

dracut: dracut module 'squash' will not be installed, because command 'systemd-repart' could not be found!

dracut: dracut module 'systemd-repart' will not be installed, because command 'systemd-repart' could not be found!

dracut: dracut module 'systemd-resolved' will not be installed, because command 'resolvect!' could not be found!

dracut: dracut module 'systemd-resolved' will not be installed, because command 'resolvect!' could not be found!

dracut: dracut module 'systemd-resolved' will not be installed, because command 'dbus-broker' could not be found!

dracut: dracut module 'command' will not be installed, because command 'dbus-broker' could not be found!

dracut: dracut module 'dracid' will not be installed, because command 'mngd' could not be found!

dracut: dracut module 'command' will not be installed, because command 'mngd' could not be found!

dracut: dracut module 'mngf' will not be installed, because command 'mount.cifs' could not be found!

dracut: dracut module 'mngf' will not be installed, because command 'mount.cifs' could not be found!

dracut: dracut module 'mngf' will not be installed, because command 'memstrack' could not be found!

dracut: dracut module 'mngf' will not be installed, because command 'memstrack' could not be found!

dracut: dracut module 'mngf' will not be installed, because command 'memstrack' could not be found!

dracut: dracut module 'mngf' will not be installed, because command 'memstrack' could not be found!

dracut: memstrack is not available
dracut; dracut module "cife" uill not be installed, because command 'noun', cife' could not be found!
dracut; dracut module 'mmef' uill not be installed, because command 'noun' could not be found!
dracut; dracut module 'mmef' uill not be installed, because command 'noun' could not be found!
dracut; menstrack its not available
dracut; menstrack its not available
dracut; dracut module 'squash' uill not be installed, because command 'menstrack' could not be found!
dracut; dracut module 'squash' uill not be installed, because command 'skrauashfs' could not be found!
dracut; dracut module 'squash' uill not be installed, because command 'wisquashfs' could not be found!
dracut; "Including module: gystemd """
dracut; "Including module: dra """
dracut; "Including module: dra """
dracut; "Including module: kernel-modules """
dracut; "Including module: kernel-modules """
dracut; "Including module: resume ""
dracut; "Including module: resume ""
dracut; "Including module: suse-bris"
dracut; "Including module: terminos"
dracut; "Including module: terminos"
dracut; "Sipping uder vule: 50-ricuto, rules
dracut; Skipping uder vule: 50-ricuto, rules
dracut; "Sipping uder vule: 50-ricuto, rules
dracut; "Sipping uder vule: 50-ricuto, rules
dracut; "Sipping uder vule: 50-ricuto, rules
dracut; "Including module: terminos"
dracut; "Sipping uder vule: 50-ricuto, rules
dracut; "Sipping uder vule: 50-ricuto, rule
dracut; "Sipping uder vu
                dracut; *** Creating initramfs image file '/boot/initrd-5,14,21-150500,53-default' done ***
```

localhost:" ● grub2-install --modules=mdraid1x.mod /dev/nvme0n1 Installing for x86_64-efi platform. Installation finished. No error reported.

8. Mount the RAID arrays (except the Swap array) to a temporary mount point. In this case, run the following commands:

9. Copy the current EFI and OS partition data to the mounted RAID arrays. In this case, run the following commands:

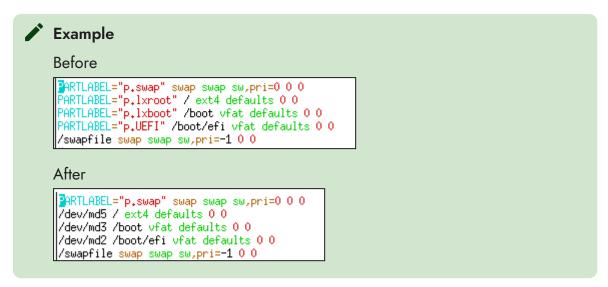
```
cp -dpRx /boot/* /mnt/md3

cp -dpRx /boot/efi/* /mnt/md2

cp -dpRx / /mnt/md5

localhost:  cp -dpRx /boot/* /mnt/md3
localhost:  cp -dpRx /boot/efi/* /mnt/md2
localhost:  cp -dpRx / /mnt/md5
```

10. Edit the /etc/fstab file in the RAID array and replace necessary partitions to its equivalent RAID arrays. At this point, the file is located at /mnt/md5/etc/fstab.



11. Create the RAID configuration file. Run the following command:

```
mdadm --examine --scan > /etc/mdadm.conf
```

12. Chroot to the mounted RAID array that contains the OS data and update the boot configurations. Run the following commands:



```
localhost:/wnt/wd5 # cd /mnt/md5
 localhost:/wnt/wd5 * mount /dev/md2 boot/efi
localhost:/wnt/wd5 * mount --rbind /dev dev
localhost:/wnt/wd5 * mount --rbind /sys sys
 localhost:/mnt/md5 # mount --rbind /proc proc
localhost:/wnt/wd5 * chroot .
localhost:/ * grub2-mkconfig -o /boot/grub2/grub.cfg
Generating grub configuration file ...
                                                                                                                   `(null)'. Some modules may be missing from core image..
`(null)'. Some modules may be missing from core image..
`(null)'. Some modules may be missing from core image..
`(null)'. Some modules may be missing from core image..
`(null)'. Some modules may be missing from core image..
/usr/sbin/grub2-probe: warning: Couldn't find physical volume
Found theme: /boot/grub2/themes/SLE/theme.txt
/usr/sbin/grub2-probe: warning: Couldn't find physical volume
/usr/sbin/grub2-probe: warning: Couldn't find physical volume
                                                                                                                     (null)'. Some modules may be missing from core image..
(null)'. Some modules may be missing from core image..
(null)'. Some modules may be missing from core image..
/usr/sbin/grub2-probe: warning: Couldn't find physical volume
Found linux image: /boot/vmlinuz-5,14,21-150500,53-default
Found initrd image: /boot/initrd-5,14,21-150500,53-default
/usr/sbin/grub2-probe: warning: Couldn't find physical volume
/usr/sbin/grub2-probe: warning: Couldn't find physical volume
                                                                                                                  `(null)'. Some modules may be missing from core image..
`(null)'. Some modules may be missing from core image..
`(null)'. Some modules may be missing from core image..
/usr/sbin/grub2-probe: warning: Couldn't find physical volume
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
done
```

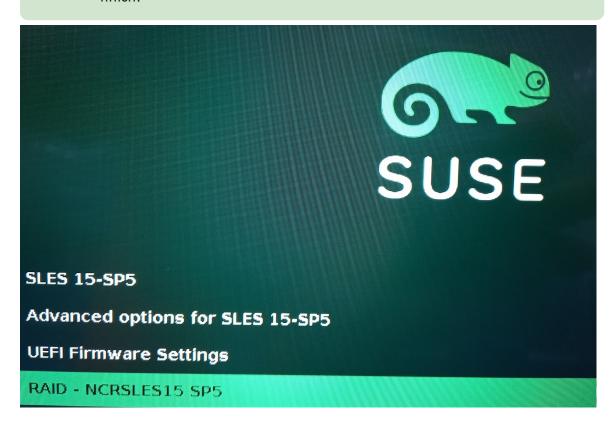
```
mkinitrd -m "dm-raid
           Creating initrd: /boot/initrd-5,14,21-150500,53-default
dracut: Executing: /usr/bin/dracut --logfile /var/log/YaST2/mkinitrd.log --force --force-drivers dm-raid /boot/initrd-5,14.21-150500,53-default 5.
          00.53-default
                                                                                                                                           'systemd-networkd' will not be installed, because command 'networkctl' could not be found!
'systemd-networkd' will not be installed, because command '/usr/lib/systemd/systemd-networkd' could not be found!
'systemd-networkd' will not be installed, because command '/usr/lib/systemd/systemd-networkd-wait-online' could not be found
          dracut: dracut module
dracut: dracut module
           dracut: dracut module
        dracut: dracut module 'systemd-networkd' will not be installed, because command '/usr/lib/systemd/systemd-networkd-wait-online' could not dracut: dracut module 'systemd-repart' will not be installed, because command 'systemd-repart' could not be found! dracut: dracut module 'systemd-resolved' will not be installed, because command 'resolvectl' could not be found! dracut: dracut module 'dws-broker' will not be installed, because command 'rosolvectl' could not be found! dracut: dracut module 'magd' will not be installed, because command 'magd' could not be found! dracut: dracut module 'magd' will not be installed, because command 'magd' could not be found! dracut: dracut module 'dmraid' will not be installed, because command 'magd' could not be found! dracut: dracut module 'cifs' will not be installed, because command 'mount.cifs' could not be found! dracut: dracut module 'nvmf' will not be installed, because command 'nvme' could not be found! dracut: dracut module 'nvmf' will not be installed, because command 'jq' could not be found! dracut: dracut module 'nvmf' will not be installed, because command 'pus' could not be found! dracut: dracut module 'nvmf' will not be installed, because command 'pus' could not be found! dracut: dracut module 'invmf' will not be installed, because command 'pus' could not be found! dracut: dracut module 'invmf' will not be installed, because command 'pus' could not be found! dracut: dracut module 'invmf' will not be installed, because command 'pus' could not be found!
dracut: dracut module 'cife' will not be installed, because command 'mount.cife' could not be found!
dracut: dracut module 'rown' will not be installed, because command 'ja' could not be found!
dracut: dracut module 'rown' will not be installed, because command 'ja' could not be found!
dracut: dracut module 'rown' will not be installed, because command 'ja' could not be found!
dracut: memetrack is not available
dracut: memetrack is not available
dracut: figure module 'squash' will not be installed, because command 'management could not be found!
dracut: dracut module 'squash' will not be installed, because command 'management could not be found!
dracut: dracut module 'squash' will not be installed, because command 'management could not be found!
dracut: dracut module 'squash' will not be installed, because command 'management could not be found!
dracut: dracut module 'squash-resolved' will not be installed, because command 'management could not be found!
dracut: dracut module 'dbus-broker' will not be installed, because command 'dbus-broker' could not be found!
dracut: dracut module 'dbus-broker' will not be installed, because command 'dbus-broker' could not be found!
dracut: dracut module 'dbus-broker' will not be installed, because command 'dbus-broker' could not be found!
dracut: dracut module 'dmisid' will not be installed, because command 'dbus-broker' could not be found!
dracut: dracut module 'emisid' will not be installed, because command 'dbus-broker' will not be found!
dracut: dracut module 'management will not be installed, because command 'management will not be found!
dracut: dracut module 'management will not be installed, because command 'management will not be found!
dracut: dracut module 'management will not be installed, because command 'management will not be found!
dracut: dracut module 'management will not be installed, because command 'management will not be found!
dracut: dracut module 'management will not be installed, because command 'management will not be found!
dracut: dracut module '
                                                                                                                                                   real
820
          dracut: Node:
dracut: Files:
dracut: Linked:
dracut: Compared:
                                                                                                                                                   4 files
0 xattrs
67 files
           dracut: Compared:
        dracut: Lompared: 6/ files
dracut: Saved: 453.38 KiB
dracut: Buration: 0.002748 seconds
dracut: **** Hardlinking files done ****
dracut: **** Generating early-microcode cpio image ***
dracut: **** Constructing GenuineIntel.bin ***
dracut: **** Store current command line parameters ***
        dracut: """ store current command line parameters """
dracut: Stored kernel commandline;
dracut: Stored kernel commandline;
dracut: rd.driver.pre=dm_raid
dracut: rd.md.uuid=2def7d72:f152f8a7:fe2a3a02;58f74eba rd.md.uuid=af212ad7;a4cbed91;199d8746;84002413 rd.md.uuid=c684d619;dd8395a5;376a9dad;848
dracut: root=UUID=2c546e16-23df-49f6-98e2-dd071ca62506 rootfstype=ext4 rootflags=rw,relatime
dracut: **** Stripping files ***
dracut: **** Stripping files done ***
dracut: **** Stripping files done ***
dracut: **** Creating image file '/boot/initrd=5.14.21-150500.53-default' ***
dracut: **** Creating image file '/boot/initrd=5.14.21-150600.53-default' done ***
                                                      *** Creating initramfs image file
```

```
localhost:/ * grub2-install --modules=mdraid1x.mod /dev/nvme1n1
Installing for x86_64-efi platform.
grub2-install: warning: Couldn't find physical volume `(null)'. Some modules may be missing from core image..
grub2-install: warning: Couldn't find physical volume `(null)'. Some modules may be missing from core image..
grub2-install: warning: Couldn't find physical volume `(null)'. Some modules may be missing from core image..
Installation finished. No error reported.
localhost:/ * grub2-install --modules=mdraid1x.mod /dev/nvme0n1
Installing for x86_64-efi platform.
grub2-install: warning: Couldn't find physical volume `(null)'. Some modules may be missing from core image..
grub2-install: warning: Couldn't find physical volume `(null)'. Some modules may be missing from core image..
grub2-install: warning: Couldn't find physical volume `(null)'. Some modules may be missing from core image..
Installation finished. No error reported.
```

13. Reboot the terminal and choose the RAID - NCRSLES15 SP5 boot entry.

₽ Note

- Remove any bootable usb/flash drive at this point.
- EFI boot manager will reset the default boot options. Wait for this
 operation to finish.
- A start job for dev-md*.device is expected. Wait for this operation to finish.



At this point, the terminal should be able to boot the RAID configuration. To verify this, run the following command:

df -h

```
localhost:" # df -h
                      Used Avail Use% Mounted on
Filesystem
                Size
devtmpfs
                4.0M
                                    0% /dev
                          Û
                             4.OM
                3.8G
1.5G
tmpfs
                       4.0K
                             3,8G
                                    1% /dev/shm
tmpfs
                             1.5G
                        16M
                                    1% /run
tmpfs
                4.0M
                                    0% /sys/fs/cgroup
/dev/md5
                438G
                        13G
                             403G
                                    4% /
/dev/md3
                300M
                       102M
                             199M
                                   34% /boot
/dev/md2
                 20M
                       164K
                              20M
                                    1% /boot/efi
                                    1% /run/user/462
tmpfs
                 766M
                        48K
                             766M
                766M
                        32K
                             766M
                                    1% /run/user/0
tmpfs
```

- 14. Change the partition types of the current OS that are on /dev/nvme0n1 to Linux RAID.
 - a. Run the following commands:

```
sfdisk --part-type /dev/nvme0n1 2 A19D880F-05FC-4D3B-A006-743F0F84911E

sfdisk --part-type /dev/nvme0n1 3 A19D880F-05FC-4D3B-A006-743F0F84911E

sfdisk --part-type /dev/nvme0n1 5 A19D880F-05FC-4D3B-A006-743F0F84911E
```

b. Verify that the partitions are now Linux RAID. Run the following command:

```
fdisk -l
```

localhost:" # fdisk -l

Disk /dev/nvme0n1: 447,13 GiB, 480103981056 bytes, 937703088 sectors

Disk model: 480GB PCIe Drive_K Units: sectors of 1 * 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes

Disklabel type: gpt

Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF

| D | evice | Start | End | Sectors | Size | Туре |
|----|---------------|---------|-----------|-----------|--------|------------|
| 1/ | dev/nvme0n1p1 | 2048 | 6143 | 4096 | 2M | BIOS boot |
| 1/ | dev/nvme0n1p2 | 6144 | 47103 | 40960 | 20M | Linux RAID |
| 1/ | dev/nvme0n1p3 | 47104 | 661503 | 614400 | 300M | Linux RAID |
| 1/ | dev/nvme0n1p4 | 661504 | 2758655 | 2097152 | 1G | Linux swap |
| 1/ | dev/nvme0n1p5 | 2758656 | 937703054 | 934944399 | 445.8G | Linux RAID |

Disk /dev/nvme1n1: 447,13 GiB, 480103981056 bytes, 937703088 sectors

Disk model: 480GB PCIe Drive_K

Units: sectors of 1 * 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes

Disklabel type: gpt

Disk identifier: 762E7E2F-5A0B-4A1C-8B30-50056920F8CF

| Device | Start | End | Sectors | Size | Туре |
|----------------|---------|-----------|-----------|--------|------------|
| /dev/nvme1n1p1 | 2048 | 6143 | 4096 | 2M | BIOS boot |
| /dev/nvme1n1p2 | 6144 | 47103 | 40960 | 20M | Linux RAID |
| /dev/nvme1n1p3 | 47104 | 661503 | 614400 | 300M | Linux RAID |
| /dev/nvme1n1p4 | 661504 | 2758655 | 2097152 | 1G | Linux swap |
| /dev/nvme1n1p5 | 2758656 | 937703054 | 934944399 | 445.8G | Linux RAID |

Disk /dev/md2: 19.94 MiB, 20905984 bytes, 40832 sectors

Units: sectors of 1 * 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes

Disklabel type: dos

Disk identifier: 0x00000000

Disk /dev/wd3: 299.94 MiB, 314507264 bytes, 614272 sectors

Units: sectors of 1 * 512 = 512 bytes Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes

Disklabel type: dos

Disk identifier: 0x00000000

Disk /dev/md5; 445,82 GiB, 478691328000 bytes, 934944000 sectors

Units: sectors of 1 * 512 = 512 bytes Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes

15. Add the partitions from the preceding step (current OS) to the RAID arrays accordingly. Run the following commands:

```
mdadm --manage /dev/md2 --add /dev/nvme0n1p2

mdadm --manage /dev/md3 --add /dev/nvme0n1p3

mdadm --manage /dev/md5 --add /dev/nvme0n1p5

localhost: * mdadm --manage /dev/md2 --add /dev/nvme0n1p2
mdadm; added /dev/nvme0n1p2
localhost: * mdadm --manage /dev/md3 --add /dev/nvme0n1p3
mdadm; added /dev/nvme0n1p3
localhost: * mdadm --manage /dev/md5 --add /dev/nvme0n1p5
mdadm; added /dev/nvme0n1p5
```

- 16. Wait for RAID to sync the disks. Run the following commands:
 - To view progress:

```
watch cat /proc/mdstat
```

To quit watching the progress:

```
Ctrl+C
```

17. Create the RAID configuration file. Run the following command:

```
mdadm --examine --scan >> /etc/mdadm.conf
```

18. Edit the /etc/grub.d/40_custom file and remove the RAID boot entry.

19. Edit the /etc/grub.d/10_linux file and replace necessary partitions to its equivalent RAID arrays.

```
linux_entry ()
{
   os="$1"
   version="$2"
   type="$3"
   args="$4"

if [ -n "${linux_root_device_thisversion}" ]; then
      root_device="root=${linux_root_device_thisversion}"
   else
      root_device=""
   fi

root_device="root=/dev/md5"

if [ -z "$boot_device_id" ]; then
      boot_device_id="$(grub_get_device_id "${GRUB_DEVICE}")"
   fi
```

20. Update the boot configurations of the two disks. In this case, /dev/nvme0n1 and /dev/nvme1n1. Run the following commands:

21. Reboot the terminal and expect that there is no RAID boot entry. The terminal should now boot on RAID1 configuration.



■ Note

It is possible to test if RAID1 is working by shutting down and removing one of the drives, the system should still boot as normal. When that happens, one of the drives may be disconnected from the RAID1 array. Add the drive back to the array using the following commands:

mdadm /dev/md2 -a /dev/nvme1n1p2 mdadm /dev/md3 -a /dev/nvme1n1p3 mdadm /dev/md5 -a /dev/nvme1n1p5

NCRLinuxU2 Software RAID (UEFI)

The following procedure incorporates software RAID into an NCR supported terminal running NCRLinuxU2 distribution. The software RAID configuration is set to RAID1 mode.

■ Note

The succeeding screenshots are from a CX8 terminal with two 120GB SATA solid state drives:

- sda-disk 1
- sdb—disk 2

The four partitions are as follows:

- 1-boot/efi
- 2-boot
- 3— swap
- 4—root

The procedure may need to be modified for use in other OS, when using NVMe drives, or using a different terminal. It is also assumed that two drives of the same type are used. At all times, it is assumed that the commands are run as a root user.

- Determine the terminal's current OS partitions. In this case, the current OS is on /dev/sda and its partitions are:
 - /dev/sda1
 - /dev/sda2
 - /dev/sda3
 - /dev/sda4

```
root@localhost:~# fdisk -l
Disk /dev/sda: 111.79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 120GB SATA Flash
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
Device
             Start
                         End
                               Sectors
                                         Size Type
                                         241M EFI System
/dev/sda1
                      495615
              2048
                                493568
/dev/sda2
            495616
                     1495039
                                999424
                                         488M Linux filesystem
                                         977M Linux swap
/dev/sda3
           1495040
                     3495935
                               2000896
           3495936 234441614 230945679 110.1G Linux filesystem
/dev/sda4
Disk /dev/sdb; 111,79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 120GB SATA Flash
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

- 2. Create the same partitions for the second disk (/dev/sdb).
 - a. Run the following command:

```
sfdisk -d /dev/sda | sfdisk --force /dev/sdb
root@localhost:~# sfdisk -d /dev/sda | sfdisk --force /dev/sdb
Checking that no-one is using this disk right now ... OK
Disk /dev/sdb: 111.79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 120GB SATA Flash
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
>>> Script header accepted.
>>> Created a new GPT disklabel (GUID: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8).
/dev/sdb1: Created a new partition 1 of type 'EFI System' and of size 241 MiB.
/dev/sdb2: Created a new partition 2 of type 'Linux filesystem' and of size 488 MiB.
/dev/sdb3: Created a new partition 3 of type 'Linux swap' and of size 977 MiB.
Partition #3 contains a swap signature,
/dev/sdb4: Created a new partition 4 of type 'Linux filesystem' and of size 110.1 GiB.
Partition #4 contains a ext4 signature.
/dev/sdb5: Done.
New situation:
Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
Device
             Start
                          End
                                Sectors
                                           Size Type
                                           241M EFI System
/dev/sdb1
              2048
                       495615
                                 493568
/dev/sdb2
            495616
                      1495039
                                 999424
                                           488M Linux filesystem
/dev/sdb3
           1495040
                      3495935
                                2000896
                                           977M Linux swap
           3495936 234441614 230945679 110.1G Linux filesystem
/dev/sdb4
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

b. Verify the copied partitions for the second disk (/dev/sdb). Run the following command:

fdisk -l

```
root@localhost:~# fdisk -l
Disk /dev/sda: 111.79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 120GB SATA Flash
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
Device
             Start
                          End
                                Sectors
                                           Size Type
                       495615
              2048
                                          241M EFI System
/dev/sda1
                                 493568
/dev/sda2
            495616
                      1495039
                                 999424
                                           488M Linux filesystem
           1495040
                      3495935
                                2000896
                                           977M Linux swap
/dev/sda3
           3495936 234441614 230945679 110,1G Linux filesystem
/dev/sda4
Disk /dev/sdb; 111,79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 120GB SATA Flash
Units: sectors of 1 * 512 = 512 bytes
|Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
Device
             Start
                          End
                                Sectors
                                           Size Type
/dev/sdb1
                       495615
                                           241M EFI System
              2048
                                 493568
                                           488M Linux filesystem
            495616
                                 999424
/dev/sdb2
                      1495039
                                2000896
/dev/sdb3
           1495040
                      3495935
                                           977M Linux swap
           3495936 234441614 230945679 110.1G Linux filesystem
/dev/sdb4
```

- 3. Change the partition types on the second disk (/dev/sdb) to Linux RAID.
 - a. Run the following commands:

```
sfdisk --part-type /dev/sdb 3 A19D880F-05FC-4D3B-A006-743F0F84911E

sfdisk --part-type /dev/sdb 4 A19D880F-05FC-4D3B-A006-743F0F84911E
```

b. Verify the partitions are now Linux RAID. Run the following command:

```
fdisk -1
root@localhost:~# sfdisk --part-type /dev/sdb 3 A19D880F-05FC-4D3B-A006-743F0F84911E
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
root@localhost:~# sfdisk --part-type /dev/sdb 4 A19D880F-05FC-4D3B-A006-743F0F84911E
The partition table has been altered.
Calling ioctl() to re-read partition table.
|Syncing disks.
root@localhost:~# fdisk -l
Disk /dev/sda: 111.79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 120GB SATA Flash
Units: sectors of 1 * 512 = 512 bytes
|Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
Device
             Start.
                         End
                               Sectors
                                         Size Type
/dev/sda1
              2048
                      495615
                                493568
                                          241M EFI System
/dev/sda2
            495616
                     1495039
                                999424
                                          488M Linux filesystem
                                         977M Linux swap
/dev/sda3
           1495040
                     3495935
                               2000896
/dev/sda4 3495936 234441614 230945679 110.1G Linux filesystem
Disk /dev/sdb: 111.79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 120GB SATA Flash
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
|Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
Device
             Start
                         End
                               Sectors
                                          Size Type
                                          241M EFI System
                      495615
/dev/sdb1
              2048
                                 493568
/dev/sdb2
            495616
                     1495039
                                 999424
                                          488M Linux filesystem
/dev/sdb3
           1495040
                     3495935
                               2000896
                                          977M Linux RAID
           3495936 234441614 230945679 110.1G Linux RAID
/dev/sdb4
```

4. Create the RAID arrays.

a. Run the following commands:

```
mdadm --create /dev/md3 --run --level=1 --metadata=1.0 --raid-devices=2
missing /dev/sdb3

mdadm --create /dev/md4 --run --level=1 --metadata=1.0 --raid-devices=2
missing /dev/sdb4
```

b. Verify the created RAID arrays. Run the following command:

5. Format the RAID arrays with the same file systems as the current OS partitions. Run the following commands:

```
mkswap -L "SWAP" /dev/md3

mkfs.ext4 -L "ROOT" /dev/md4
```

```
root@localhost:~# mkswap -L "SWAP" /dev/md3
mkswap: /dev/md3: warning: wiping old swap signature.
Setting up swapspace version 1, size = 976.9 MiB (1024389120 bytes)
LABEL=SWAP, UUID=d5d764d1-4a27-4dda-a329-2b08a9752af6
root@localhost:~# mkfs.ext4 -L "ROOT" /dev/md4
mke2fs 1.46.5 (30-Dec-2021)
/dev/md4 contains a ext4 file system labelled 'ROOT'
        last mounted on / on Mon Sep 23 13:33:44 2024
Proceed anyway? (y,N) y
Discarding device blocks: done
Creating filesystem with 28868176 4k blocks and 7217152 inodes
Filesystem UUID: 26d74801-466b-43d8-bb73-bcfbe38c325c
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000, 7962624, 11239424, 20480000, 23887872
Allocating group tables: done
Writing inode tables: done
Creating journal (131072 blocks): done
Writing superblocks and filesystem accounting information: done
```

6. Edit the /etc/grub.d/40_custom file and add a RAID boot entry.

```
menuentry 'RAID - NCRLinuxU2' {
    load_video
    set gfxpayload=keep
    insmod gzio
    insmod part_gpt
    insmod mdraid1x
    insmod ext2
    set root='(hd0,gpt2)'
    echo 'Loading Linux 5.15.0-73-generic raid ...'
    linux /vmlinuz-5.15.0-73-generic root=/dev/md4 noresume splash=silent
mitigations=auto quiet
net.ifnames=0 8250.nr_uarts=2 i915.invert_brightness=-1 tpm_tis.interrupts=0
    echo 'Loading initial ramdisk raid...'
    initrd /initrd.img-5.15.0-73-generic
}
```

■ Note

'(hd0,gpt2)' should be the partition where your /boot is located

Example

Before

```
#!/bin/sh
exec tail -n +3 $0
# This file provides an easy way to add custom menu entries. Simply type the
# menu entries you want to add after this comment. Be careful not to change
# the 'exec tail' line above.
```

After

```
#!/bin/sh
exec tail -n +3 $0
# This file provides an easy way to add custom menu entries. Simply type the
# menu entries you want to add after this comment. Be careful not to change
# the 'exec tail' line above,
menuentry 'RAID - NCRLinuxU2' {
        load_video
        set gfxpayload=keep
        insmod gzio
        insmod part_gpt
        insmod mdraid1x
        insmod ext2
        set root='(hd0,gpt2)'
        echo 'Loading Linux 5,15,0-73-generic raid ...'
        linux /vmlinuz-5,15,0-73-generic root=/dev/md4 noresume splash=silent mi
tigations=auto quiet net.ifnames=0 8250.nr_uarts=2 i915.invert_brightness=-1 tpm
_tis.interrupts=0
        echo 'Loading initial ramdisk raid...'
        initrd /initrd.img-5.15.0-73-generic
```

7. Create the RAID configuration file. Run the following command:

```
mdadm --detail --scan >> /etc/mdadm/mdadm.conf
```

8. Update boot configurations. Run the following commands:

```
update-initramfs -u

update-grub

grub-install /dev/sda

root@localhost:~# mdadm --detail --scan >> /etc/mdadm/mdadm.conf
```

```
root@localhost;"# mdadm --detail --scan >> /etc/mdadm/mdadm.conf
root@localhost;"# update-initramfs -u
update-initramfs: Generating /boot/initrd.img-5.15.0-73-generic
root@localhost;"# update-grub
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.15.0-73-generic
Found initrd image: /boot/initrd.img-5.15.0-73-generic
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
done
root@localhost:"# grub-install /dev/sda
Installing for x86_64-efi platform.
Installation finished. No error reported.
```

9. Mount the RAID arrays (except the Swap array) to a temporary mount point. In this case, run the following commands:

```
mkdir /mnt/md4

mount /dev/md4 /mnt/md4

root@localhost:~# mkdir /mnt/md4

root@localhost:~# mount /dev/md4 /mnt/md4
```

10. Copy the current EFI and OS partition data to the mounted RAID arrays. In this case, run the following command:

```
cp -dpRx / /mnt/md4
root@localhost;~# cp -dpRx / /mnt/md4
```

11. Edit the /etc/fstab file in the RAID array and replace necessary partitions to its equivalent RAID arrays. At this point, the file is located at /mnt/md4/etc/fstab.



12. Chroot to the mounted RAID array that contains the OS data and update the boot configurations. Run the following commands:



```
root@localhost;"# cd /mnt/md4
root@localhost;/mnt/md4# mount /dev/sda2 boot
root@localhost;/mnt/md4# mount /dev/sda1 boot/efi
root@localhost;/mnt/md4# mount --bind /dev dev
root@localhost;/mnt/md4# mount --bind /dev dev
root@localhost;/mnt/md4# mount --bind /proc proc
root@localhost;/mnt/md4# mount --bind /proc proc
root@localhost;/mnt/md4# chroot .
root@localhost;/# update=initramfs -u
update=initramfs: Generating /boot/initrd.img-5,15,0-73-generic
root@localhost;/# update=grub
Sourcing file /tet/default/grub'
Sourcing file /tet/default/grub,d/init-select.cfg'
Generating grub configuration file ...
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Couldn't find physical volume `(null)'. Some modules may be missing from core image..
/usr/sbin/grub-probe; warning; Coul
```

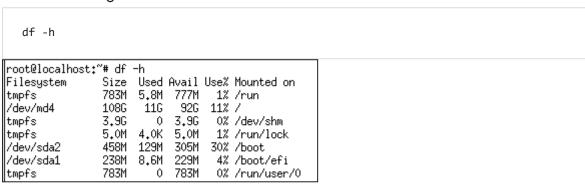
13. Reboot the terminal and choose the RAID - NCRLinuxU2 boot entry.



- Remove any bootable usb/flash drive at this point.
- EFI boot manager will reset the default boot options. Wait for this
 operation to finish.
- A start job for dev-md*.device is expected. Wait for this operation to finish.



At this point, the terminal should be able to boot the RAID configuration. To verify this, run the following command:



- 14. Change the partition types of the current OS that are on /dev/sda to Linux RAID.
 - a. Run the following commands:

```
sfdisk --part-type /dev/sda 3 A19D880F-05FC-4D3B-A006-743F0F84911E

sfdisk --part-type /dev/sda 4 A19D880F-05FC-4D3B-A006-743F0F84911E
```

b. Verify that the partitions are now Linux RAID. Run the following command:

```
fdisk -1
root@localhost;~# sfdisk --part-type /dev/sda 3 A19D880F-05FC-4D3B-A006-743F0F84911E
The partition table has been altered.
Calling ioctl() to re-read partition table,

Re-reading the partition table failed.: Device or resource busy
The kernel still uses the old table. The new table will be used at the next reboot or after you run partprobe(8) or partx(8).
Syncing disks.
root@localhost:~# sfdisk --part-type /dev/sda 4 A19D880F-05FC-4D3B-A006-743F0F84911E
The partition table has been altered.

Calling ioctl() to re-read partition table.

Re-reading the partition table failed.: Device or resource busy

The kernel still uses the old table. The new table will be used at the next reboot or after you run partprobe(8) or partx(8).
Syncing disks.
root@localhost:~# fdisk -l
Pisk /dev/sda: 111.79 GiB, 120034123776 bytes, 234441648 sectors
Bisk model: 1206B SATA Flash
Units; sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
                                                                       Sectors
493568
999424
2000896
                                                                                                Size Type
241M EFI System
488M Linux filesystem
977M Linux RAID
                               Start 2048
                                                     495615
 /dev/sda1
 /dev/sda1 2048 495615
/dev/sda2 495616 1495039
/dev/sda3 1495040 3495935
 /dev/sda4 3495936 234441614 230945679 110.1G Linux RAID
Disk /dev/sdb; 111,79 GiB, 120034123776 bytes, 234441648 sectors
Disk model: 1200B SATA Flash
Disk model: 1200B SATA Flash
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 73F65F48-A2FD-49E7-9495-7B67D0DD65E8
                                                                                               Size Type
241M EFI System
488M Linux filesystem
977M Linux RAID
 Device
                           Start
                                                           End Sectors

        Device
        Start
        End
        Sectors
        Size Type

        /dev/sdb1
        2048
        495615
        493568
        241M EFI System

        /dev/sdb2
        495616
        1495039
        999424
        488M Linux file

        /dev/sdb3
        1495040
        3495935
        2000896
        977M Linux RAID

        /dev/sdb4
        3495936
        234441614
        230945679
        110,16
        Linux RAID

Bisk /dev/md4: 110.12 GiB, 118244048896 bytes, 230945408 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Bisk /dev/md3: 976,94 MiB, 1024393216 bytes, 2000768 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

15. Add the partitions from the preceding step (current OS) to the RAID arrays accordingly. Run the following commands:

```
mdadm --manage /dev/md3 --add /dev/sda3

mdadm --manage /dev/md4 --add /dev/sda4

root@localhost:~# mdadm --manage /dev/md3 --add /dev/sda3
mdadm: added /dev/sda3
root@localhost:~# mdadm --manage /dev/md4 --add /dev/sda4
mdadm: added /dev/sda4
```

- 16. Wait for RAID to sync the disks. Run the following commands:
 - To view progress:

```
watch cat /proc/mdstat
```

• To quit watching the progress:

```
Ctrl+C
```

- 17. Edit the /etc/grub.d/40_custom file and remove the RAID boot entry.
- 18. Edit the /etc/default/grub file and do the following:
 - a. Replace:

```
rootp=$(blkid -L ROOT)
```

- b. In the line GRUB_CMDLINE_LINUX_DEFAULT, remove the string root=LABEL=root.
- c. Replace the string following resume= with /dev/md3.

Example

Before

```
#added for NCR serial configuration

# swapoffset=$(filefrag -v /swapfile | awk '{if($1=="0:"){print $4}}' | sed -e 's/\./''/g')
rootp=$(blkid *nootp -s UUID -o value)
#ruid=$(blkid $rootp -s UUID -o value)
#ruid=$(lsblk -o uuid,LABEL | grep root | cut -d " " -f1)
# If you change this file, run 'update-grub' afterwards to update
# /boot/grub/grub.cfg.
# For full documentation of the options in this file, see:
# info -f grub -n 'Simple configuration'

GRUB_DEFAULT=0
GRUB_TIMEOUT_STYLE=menu
GRUB_TIMEOUT_STYLE=menu
GRUB_TIMEOUT=5
GRUB_DISTRIBUTOR= 'lsb_release -i -s 2> /dev/null | lecho Debian '
GRUB_CMDLINE_LINUX_DEFAULT="root=LABEL=root mitigations=auto net.ifnames=0 resume=UUID=14a819f3-b40f-4383-bbec-f30b71173f6c 8250,nr_uarts=2 i915.invert_brightness=-1 resume_offset=1122304 tpm_tis.interrupts=0 module_blacklist=pinctrl_elkhartlake rd,driver.blacklist=pinctrl_elkhartlake"
#GRUB_CMDLINE_LINUX_DEFAULT="root=LABEL=root mitigations=auto net.ifnames=0 biosdevname=0 resume=LABE
```

After

19. Update the boot configurations of the two disks. In this case, /dev/sda and /dev/sdb. Run the following commands:

```
update-initramfs -u
  update-grub
  grub-install --modules=mdraid1x.mod /dev/sda
  grub-install --modules=mdraid1x.mod /dev/sdb
root@localhost:~# update-initramfs -u
update-initramfs: Generating /boot/initrd.img-5.15.0-73-generic
cryptsetup: ERROR: Couldn't resolve device
    UUID=14a819f3-b40f-4383-bbec-f30b71173f6c
W: initramfs-tools configuration sets RESUME=UUID=14a819f3-b40f-4383-bbec-f30b71173f6c
W: but no matching swap device is available.
I: The initramfs will attempt to resume from /dev/md3
I: (UUID=d5d764d1-4a27-4dda-a329-2b08a9752af6)
I: Set the RESUME variable to override this.
root@localhost;~# update-grub
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5,15,0-73-generic
Found initrd image: /boot/initrd.img-5.15.0-73-generic
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
Adding boot menu entry for UEFI Firmware Settings ...
root@localhost:~# grub-install --modules=mdraid1x.mod /dev/sda
Installing for x86_64-efi platform.
Installation finished. No error reported.
root@localhost:~# grub-install --modules=mdraid1x.mod /dev/sdb
Installing for x86_64-efi platform.
Installation finished. No error reported.
```

20. Copy the boot and EFI partitions from /dev/sda to /dev/sdb. Run the following commands:

```
dd if=/dev/sda1 of=/dev/sdb1

dd if=/dev/sda2 of=/dev/sdb2

root@localhost:~# dd if=/dev/sda1 of=/dev/sdb1
493568+0 records in
493568+0 records out
252706816 bytes (253 MB, 241 MiB) copied, 4.16995 s, 60.6 MB/s
root@localhost:~# dd if=/dev/sda2 of=/dev/sdb2
999424+0 records in
999424+0 records out
511705088 bytes (512 MB, 488 MiB) copied, 10.1097 s, 50.6 MB/s
```

21. Reboot the terminal and expect that there is no RAID boot entry. The terminal should now boot on RAID1 configuration.

■ Note

It is possible to test if RAID1 is working by shutting down and removing one of the drives, the system should still boot as normal. When that happens, one of the drives may be disconnected from the RAID1 array. Add the drive back to the array using the following commands:

mdadm /dev/md4 -a /dev/sdb4

mdadm /dev/md3 -a /dev/sdb3

Power Management

The BIOS supports the Advanced Configuration and Power Management Interface (ACPI) 3.0 specification. A key feature of ACPI is that the operating system, not the BIOS, configures and implements power management. The CX7 terminal supports the Global system power states defined by ACPI.

Computer States

G3 Mechanical Off

A computer state that is entered and left by a mechanical means



Example

Turning off the system's power through the movement of a large red switch.

Various government agencies and countries require this operating mode. It is implied by the entry of this off state through a mechanical means that no electrical current is running through the circuitry and that it can be worked on without damaging the hardware or endangering service personnel. The OS must be restarted to return to the Working state. No hardware context is retained. Except for the real-time clock, power consumption is zero.

G2/S5 Soft Off

A computer state where the computer consumes a minimal amount of power. No user mode or system mode code is run. This state requires a large latency in order to return to the Working state. The system's context will not be preserved by the hardware. The system must be restarted to return to the Working state. It is not safe to disassemble the machine in this state.

G1 Sleeping

A computer state where the computer consumes a small amount of power, user mode threads are not being executed, and the system appears to be off (from an end user's perspective, the display is off, and so on). Latency for returning to the Working state varies on the wake environment selected prior to entry of this state (for example, whether the system should answer phone calls). Work can be resumed without rebooting the OS because large elements of system context are saved by the hardware and the rest by system software. It is not safe to disassemble the machine in this state.

G0 Working

A computer state where the system dispatches user mode (application) threads and they execute. In this state, peripheral devices (peripherals) are having their power state changed dynamically. The user can select, through some UI, various performance/power characteristics of the system to have the software optimize for performance or battery life. The system responds to external events in real time. It is not safe to disassemble the machine in this state.

ACPI Sleep States (SO - S5)

Under the G1 sleeping state ACPI defines levels of system sleep state support. The CX7 supports the following sleeping states:

- SO: Normal Powered-On state
- **S1 (Standby)**: The S1 sleeping state is a low wake latency sleeping state. In this state, no system context is lost (CPU or chip set) and hardware maintains all system contexts.
 - **₽** Note

The CX7 does not support S1 state. Turning off the backlight and hard drives provides the equivalent power savings (due to Intel's processor C-states feature) at nearly zero latency.

• \$2: Not supported

• S3 (Suspend to RAM): The S3 sleeping state is a low wake latency sleeping state. This state is similar to the S1 sleeping state except that the CPU and system cache context is lost (the OS is responsible for maintaining the caches and CPU context). Control starts from the processor's reset vector after the wake event. In NCR systems, during S3, power is only provided to the USB 3.0 ports.

■ Note

When the terminal resumes from an S3 state, all the USB devices re-enumerate. This causes speaker tones as if they were disconnected and then reconnected. This does not present a problem and the USB devices will continue to operate correctly.

Requirements for S3 support:

- O/S must be built on a system with S3 enabled in the BIOS
- Some peripherals may not be S3 capable, which can prevent the system from entering S3 state.
- **S4** (Suspend to Disk): The S4 state is the lowest power, longest wake latency sleeping state supported by ACPI. In order to reduce power to a minimum, it is assumed that the hardware platform has powered off all devices. Platform context is maintained.

Requirements for \$4 support:

- O/S must be built on a system with S3 enabled in the BIOS
- Some peripherals may not be S4 capable, which can prevent the system from entering \$4 state.

Reference the ACPI Specification for details.

Peripherals: ACPI defines power states for peripherals which are separate from the system power state. The device power states range from D0 (fully-on) to D3 (off) It is the responsibility of the driver developer for each peripheral to define and support the available power states.

| Power State | S0 Working | SO Idle, Backlight Off, SSD Idle | S3 Suspend to RAM | S4 Hibernate | S5 Soft Off | SO Idle, Backlight on | | |
|------------------------|-----------------------|---|--|---|---|-----------------------------|--|--|
| Supported: Y/N | Υ | Y | Υ | Υ | Y | Y | | |
| Description | Fully Functional** | Video Backlight Off, SSD Idle | Video Backlight Off, SSD Idle, Cache Flush, Memory in Slow Refresh, CPU Halted | Video Backlight Off, SSD Off, Cache Flush, Memory data to SSD, CPU Halted | OFF Some devices remain powered by standby voltage (LAN, ME- AMT, USB) to allow wake-up | Video backlight on | | |
| Power Supply Status | On | On | Powered Down* | Powered Down* | Powered Down* | On | | |
| Power Consun | Power Consumption | | | | | | | |
| СХ7 | СХ7 | | | | | | | |
| Celeron G4900T | 42.3W | 16.4W | 2.9W | 2.5W | 2.5W | 25.6W | | |
| Core i3- 8100T | 62.2W | 17.4W | 3.25W | 3.0W | 3.0W | 24.9W | | |
| Core i5- 8500T | 63.9W | 17.4W | 3.25W | 3.0W | 3.0W | 24.9W | | |
| Core i5- 9500TE | 65.7W | 27.3W | 4.12W | 3.6W | 3.6W | 33.1W | | |

| Power State | S0 Working | SO Idle, Backlight Off, SSD Idle | S3 Suspend to RAM | S4 Hibernate | S5 Soft Off | SO Idle, Backlight on | |
|------------------------------|------------|---|----------------------|--------------|-------------|-----------------------------|--|
| СХ7іі | | | | | | | |
| Core i3- 13100TE | 57.9W | 30.8W | 4.77W | 4.33W | 4.32W | 39.7W | |
| Core i5- 13500TE | 57.6W | 32.4W | 4.71W | 4.35W | 4.30W | 41.2W | |
| Wake Options | | | | | | | |
| Power Switch | N/A | Y | Y | Υ | Υ | Υ | |
| Touch | N/A | Υ | Υ | N | N | Υ | |
| USB Keyboard [†] | N/A | Y | Y | N | N | Υ | |
| USB Mouse [†] | N/A | Υ | Y | N | N | Y | |
| LAN (magic packet) | N/A | Y | Y | Y | Y | Υ | |
| RTC Alarm | N/A | Υ | Y | Υ | Υ | Y | |
| Serial Port (RI) | N/A | Υ | N | N | N | Y | |

Note

Power consumption based on the following configuration: 16GB RAM x2, 240 GB SSD x2

†USB 3.0 port. The USB 2.0 +12V and +24V ports do not maintain power and can't wake the unit.

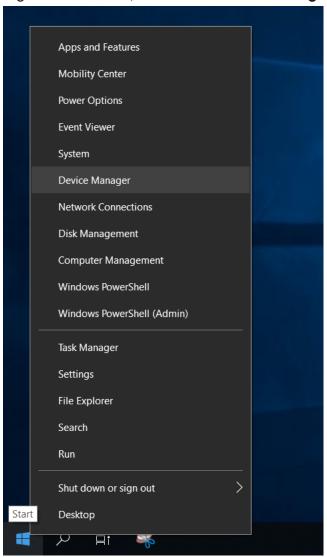
^{*}Maintains small voltage to support wake circuits.

 $^{{\}tt **Passmark\ Burn\ in\ test.\ This\ represents\ a\ maximum\ use\ case.\ Actual\ customer\ usage\ will\ differ.}$

Enabling Wake on LAN

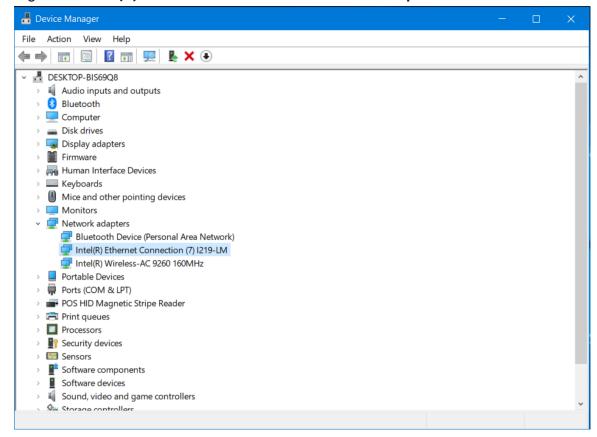
In order for Wake on LAN to function, the Network driver must be enabled (factory default).

1. Right-click on Start, then select Device Manager.

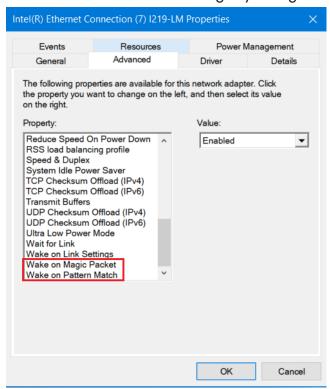


2. Select Network adapters.

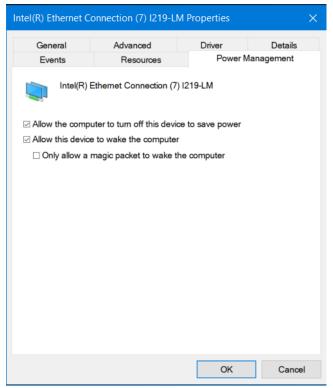
3. Right-click Intel(R) Ethernet Connection I219-LM >> Properties.



4. Under the Advanced tab, Wake on Magic Packet and Wake on Pattern Match should be enabled. Select **OK** after making any changes.



5. Under the Power Management tab, Allow this device to wake the computer option box should be checked. Select **OK** after making any changes.



BIOS Setup

Administrator Password

The administrator password to enter the BIOS Setup menu is NCR.

Entering Setup

- 1. Connect an alphanumeric USB keyboard to the terminal.
- 2. Apply power to the terminal.
- 3. When you see the NCR logo displayed, press [Del] or [F2].

Selecting 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 [Enter] key to select a submenu.
- Use the [+] and [-] 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 Save and Exit Menu, select Save Changes
 & Reset, and press [Enter].

Enabling ONESHOT

When the Power Switch is pressed for four seconds, the hardware level override of the processor forces an uncontrolled shutdown. This can corrupt the Operating System. The ONESHOT feature disables this hardware override. To turn on the ONESHOT feature, follow these steps:

- 1. Enter BIOS Setup using the [Del] or [F2] hotkey.
- 2. In Setup, go to Advanced → NCR POS → ONESHOT Control.
- 3. Set the ONESHOT Control setting to **ENABLED**.
- 4. Press [F4] to save and exit.

Accessing Serial Number and Class-Model Information

Below is an example of a VbScript code on how to obtain the Serial Number and Class-Model Information of the terminal.

```
On Error Resume Next

DIM returnValue

DIM version

strComputer = "."

Set objWMIService = GetObject("winmgmts:\\" & strComputer & "\root\cimv2")

Set colItems = objWMIService.ExecQuery("Select * from Win32_ComputerSystem",,48)

For Each objItem in colItems

Wscript.Echo "Class Model: " & objItem.Model

Wscript.Echo "Serial Number: " & objItem.Name

Next
```

Restoring Factory Settings

To reset all values to their default settings, press [F3] and then [Enter] when the confirmation message is displayed. The terminal automatically loads the BIOS default values. To save the factory default values, go to the *Save and Exit Menu*, select **Save Changes & Reset**, and select [Enter].

BIOS Updating Procedure

Introduction

The BIOS is located in the Serial Peripheral Interface (SPI) chip on the processor board. This chapter discusses procedures on how to update the terminal SPI and/or BIOS. The update software is distributed via the NCR Website:

https://www5.ncr.com/support/support_drivers_patches.asp

The BIOS update can be performed using the following methods:

- Bootable USB Memory Device
- Windows Flash Executable

Prerequisites

The following are required to perform a SPI/BIOS update:

- USB Alphanumeric Keyboard
- BIOS Software. Download from the NCR Website:
 https://www5.ncr.com/support/support_drivers_patches.asp

USB Flash Key update prerequisites

- USB Flash Key with sufficient space for the update files.
- Access to a USB port on the terminal to be updated that is enabled in the BIOS (via BIOS Setup).

Windows Flash Executable update prerequisites

- There should be no other programs running while the BIOS/SPI is updating.
- The Windows Flash Executable is designed to run from an Administrator account.

SPI/BIOS Updating Procedures

Using the Bootable USB Flash Key

1. Create a USB Flash Drive by installing the BIOS update package to this USB key.



The USB flash drive disk size must be more than 512MB.

Linux PC

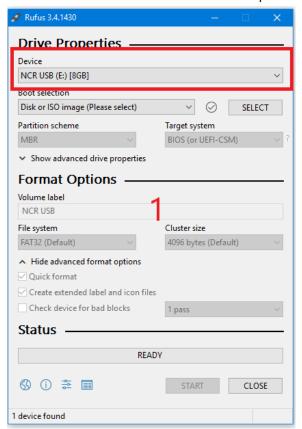
Use "dd" Linux command to deploy image in USB key:

sudo dd if=/CX7-BIOS update T06.iso of=/dev/sdX

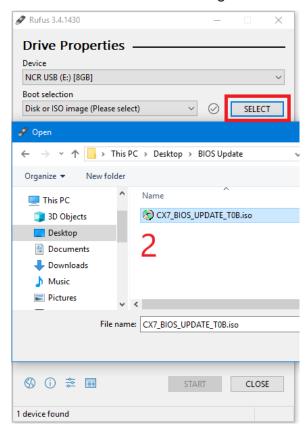
Windows PC

Download the Rufus Tool from the Rufus Website: https://rufus.ie/ and use the tool to deploy image into USB key.

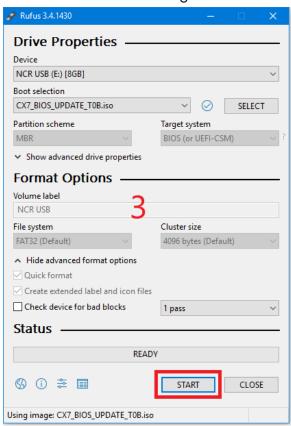
a. Select the device from the Device drop-down list.



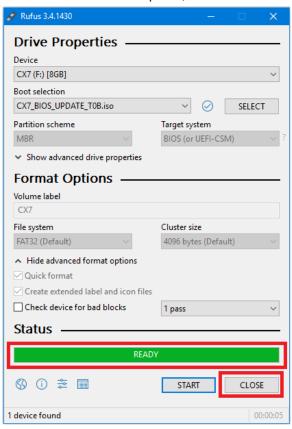
Confidential and proprietary information of NCR Voyix. Use and disclose solely pursuant to company instructions. b. Press Select to choose the image from the Boot Selection drop-down list.



c. Press **Start** to load the image.



d. When the load is complete, select Close.



- 2. Insert the CX7 USB Flash Drive into the USB Port.
- 3. Press [F8] during startup to bring up the Boot Menu.
- 4. Select the USB device to boot the CX7 BIOS flash key. An option menu will load.
- 5. Select option [1] to update BIOS with DMI preserved.

■ Note

After the update has completed and the terminal is rebooted, the terminal may reboot additional times as it powers up. This is normal and expected behavior due to the nature of the features of the BIOS/SPI.

Using the Windows Flash Executable



■ Note

Close all running programs prior to updating the BIOS.

To run the executable, right-click on the file and select Run as administrator. The terminal will reboot after the flash process has completed.



A Caution

The reboot is important to ensure the BIOS initializes properly. Do not interrupt the reboot process.

Updating DMI

DMI information can be updated using a DMI Edit Tool.

- For CX7, refer to "AMI-based BIOS Images" below
- For CX7ii, refer to "Insyde-based BIOS Images" on the next page

AMI-based BIOS Images

For CX7, which uses AMI-based BIOS images, the DMI can be updated using AMI's Windows DMI Edit Tool (AMIDEWINx64.exe), a command-line DMI edit utility.

To update DMI, follow these steps:

- Download the DMI Edit Utilities from the NCR Drivers and Patches page:
 https://www5.ncr.com/support/support_drivers_patches.asp.

 The download path is: Retail Support Files (Drivers, Firmware, Operating Systems, Platform Software (OPOS/JavaPOS), BIOS, etc.) >> NCR POS and SelfServ
 Terminal and Operating System >> [select the POS product class] >> Windows
- 2. Run amidewinx64.exe.

>> BIOS >> REF

3. From a command prompt, use the following command:

| DMI to Update | Command | | | | |
|---------------|--|--|--|--|--|
| PID | amidewinx64.exe /SP "[enter PID number]" | | | | |
| | Example amidewinx64.exe /SP "7602-1100-8801" | | | | |
| Serial Number | amidewinx64.exe /SS "[enter serial number]" | | | | |
| | Example amidewinx64.exe /SS "54-19378230" | | | | |

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Insyde-based BIOS Images

For CX7ii, which uses Insyde-based BIOS images, the DMI can be updated using Insyde's H2OSDE™ SMBIOS Data Editor (H2OSDE¬Wx64.exe). The tool is located in the NCR Drivers and Patches page:

https://www5.ncr.com/support/support_drivers_patches.asp.

The download path is: Retail Support Files (Drivers, Firmware, Operating Systems, Platform Software (OPOS/JavaPOS), BIOS, etc.) >> NCR POS and SelfServ Terminal and Operating System >> NCR CX7ii POS (7772-5xxx) >> Windows >> BIOS >> DMI Tool

For more information about the tool, refer to the PDF document included in the download package.

Initial Terminal Imaging

Introduction

Factory default SSD images for the CX7 are distributed on bootable auto-imaging USB Flash Drive media. The following procedures describe how to apply/restore an image on the terminal.

Marning

Using this procedure will replace any previously stored OS images created using the Disk Image Backup and NCR Image Recovery Tool.

■ Note

A USB Keyboard is required to perform this operation.

Imaging Procedure

- 1. Connect the USB flash drive to the target terminal that you wish to image.
- 2. Connect a USB keyboard to the terminal.
- 3. Power on the terminal and boot from the USB Flash Drive. This can be done by pressing [F8] during the boot and choosing the USB option (NCR), or by entering BIOS Setup and changing the boot order.
- 4. The system boots in the Windows PE OS environment. Press [Y] on the keyboard at the confirmation prompt to re-image the terminal.
- 5. When the imaging process is complete, enter **Exit** on the keyboard to reboot the system.
- 6. After the reboot, remove the USB Flash Drive and disconnect the keyboard.

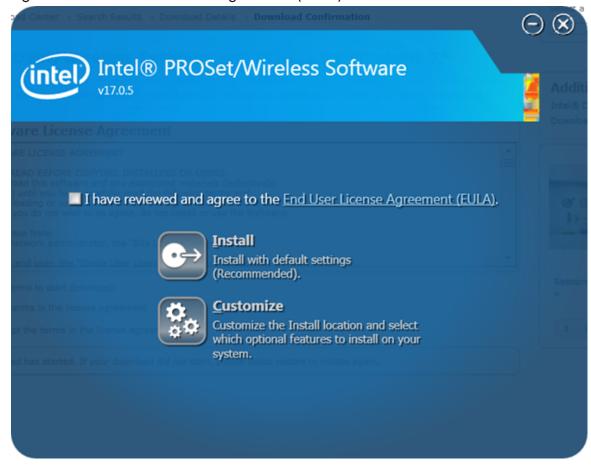
Wireless Adapter Switching

Wireless Adapter Switching is a feature that disables the wireless adapter when a wired Ethernet connection is present.

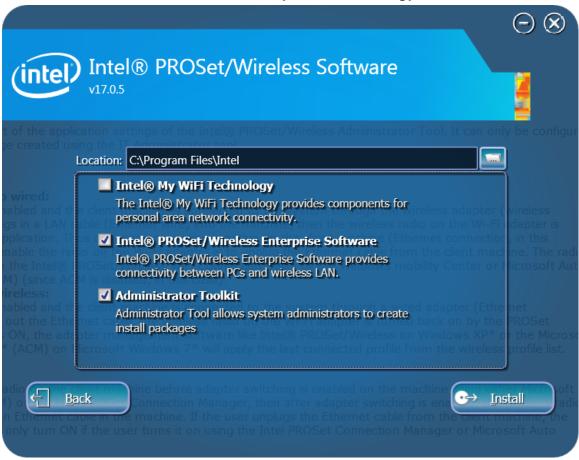
The latest NCR OS Images include the driver, but is not pre-installed. The driver can be installed from the \Install\drivers\wireless directory.

Installing the Software and Driver

- 1. Run the Intel .exe self-extracting executable.
- 2. Agree to the End User License Agreement (EULA) and choose Customize.

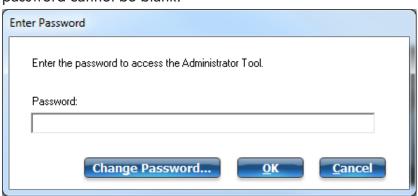


3. Check both Intel® PROSet/Wireless Enterprise Software and Administrator Toolkit. Clear the check box for Intel® My WiFi Technology. Click Install.

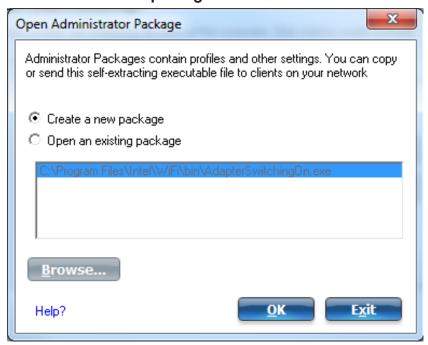


Installation takes several minutes (progress bar shown on-screen).

- 4. After the installation is complete, click **Start>>Wireless Administrator Tool**.
- 5. Enter the **Administrator Tool Password** (not the Windows Administrator password). You are prompted to create a password if this is the first time using the tool. The password cannot be blank.

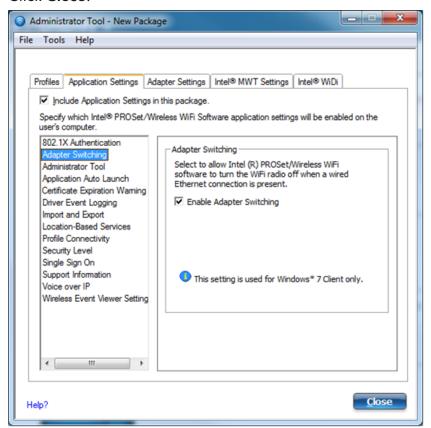


Confidential and proprietary information of NCR Voyix. Use and disclose solely pursuant to company instructions. 6. Select Create a new package>>OK.

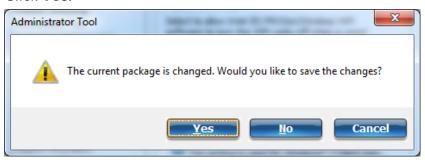


- 7. Select the Application Settings tab.
- 8. Check Include Application Settings in this package.
- 9. Select Adapter Switching.
- 10. Check Enable Adapter Switching.

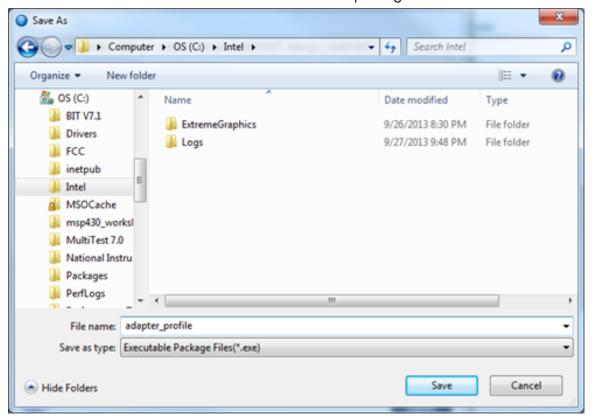
11. Click Close.



12. Click Yes.



Confidential and proprietary information of NCR Voyix. Use and disclose solely pursuant to company instructions. 13. Enter a filename and choose a location to save the package file.

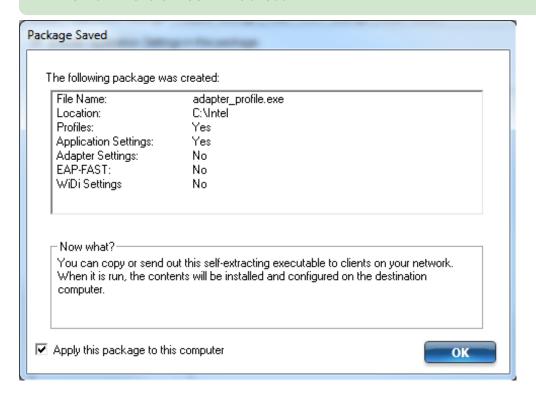


14. Click **Finish** after the save operation completes.

15. Click Apply this package to this computer.



You can open and apply the saved package file on other computers that have the Administrator Toolkit installed.



When connecting and disconnecting the wired LAN cable you should now see system tray icons, indicating PROSet disabling and enabling the wireless adapter.

Enabling Intel® vPro (Active Management Technology)

This chapter describes how to enable Intel® Active Management Technology (Intel® AMT) in NCR motherboards. It also provides an overview of the features, as well as information on configuring Intel® Active Management Technology, and minimum system requirements.

These are the NCR motherboards that support Intel® AMT:

- NCR CX7 All-in-One POS (7772) code named Sonoma
- NCR CX8 POS (7736) code named Vegas1

Overview

Intel® AMT allows you to remotely power on, monitor, update, repair, or control computers with Intel® vPro™ processors regardless of its power state or if it has a functioning OS or not. The only condition is that the computer must be connected to a power source and a network. Intel® AMT is part of the Intel® vPro™ technology.

Preconditions

PC core must have at least i5 or higher processor with Intel vPro. i3 processors will support the smaller set of features known as Intel Standard Manageability (ISM). Using MeshCommander tool, all features are supported on an i5 processor. The following features are not supported on i3 processor:

- Remote Desktop
- Internet Settings

AMT features are supported on version 9.0 and higher. To check ME Firmware Version, follow these steps:

- 1. Reboot the motherboard.
- 2. Press [Delete] to enter BIOS Setup Utility.
- 3. Go to the Main tab and record ME Firmware Version.
 - CX7 (7772) Intel ME Version / SKU: 12.0.0.0
 - CX8 (7736) Intel ME Version / SKU: 12.0.0.0

Before configuring the motherboard, you must know the computer name/ IP address. To know the IP Address in Microsoft Windows, follow these steps:

- 1. In DOS shell in Windows, type ipconfig /all.
- 2. Record the IP Address.



To know the IP Address in other operating systems, consult your system manual.

Enabling Intel® Active Management in BIOS Utility

To enable Intel® AMT in NCR Motherboard with vPro processor, follow these steps:

- 1. Reboot the system.
- 2. Press [F2] or [Delete] during POST.
- 3. Enter the current BIOS admin password.
- 4. Go to Advanced tab and do one of the following:
 - Select Active Management Technology Support
 - Select Intel AMT Support and set the value to Enabled
- 5. Press [F10], then press [Enter] to save and exit.

Configuring Intel® AMT Settings in Intel® MEBx Menu

Intel® Management Engine BIOS Extension (Intel® MEBx) is a BIOS menu extension on the Intel® AMT system. This menu can be used to view and configure some of the Intel® AMT settings.

- 1. Reboot the system.
- 2. Press [Esc] during POST.
- 3. Select Intel Management Engine BIOS Extension, then press [Enter].
- 4. Enter the current BIOS admin password.
- 5. Select **MEBx Login**, then press [Enter].
- 6. Enter the MEBx password.
 - Note

The first time this program is entered, you must use the default password, admin.

7. Define your own unique MEBx password.



Example

Ncr@2020

■ Note

You must use a strong password. Strong passwords are between 8 and 32 characters long, have at least one upper case character, one lower case character, one number, and one special character (examples are !, @, #, \$, %, ^, &, *). Also, you should use a unique password for each provisioned Intel AMT system, to prevent someone from possibly obtaining a master password and compromising the security of the entire network.

Activating Network Access

- 1. Select Intel(R) AMT Configuration and press [Enter].
- 2. Select **SOL/IDER/KVM** and press [Enter].
- 3. Set SOL, IDER and KVM Feature Selection to Enabled.
- 4. Set Legacy Redirection Mode to Disabled.
- 5. Press [**Esc**].
- 6. Select **User Consent** and press [Enter].
- 7. Set User Opt-in to NONE.
- 8. Set Opt-in Configurable from Remote IT to Disabled.
- 9. Press [**Esc**].
- 10. Select Activate Network Access and press [Enter].
- 11. Press [Y] to activate the network interface.
- 12. Press [Esc] >> [Y] to exit the Intel ® Management BIOS Extension and reboot the system.
- 13. The motherboard should now be accessible using its IP address.

Configuring a Static IPv4 Address

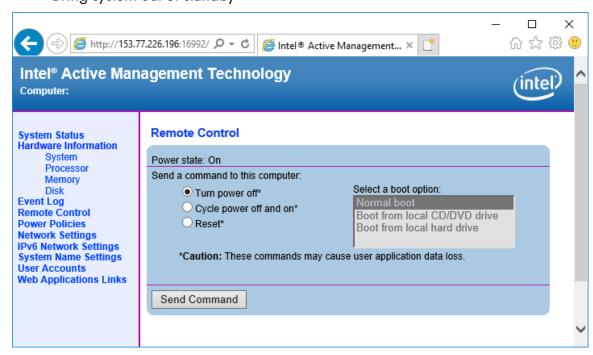
- 1. Open Control Panel.
- 2. Select Network and Sharing Center.
- 3. Click Change adapter settings.
- 4. Right-click on Ethernet Network Connection.
- 5. Select Properties.
- 6. Select Internet Protocol Version 4 (TCP/IPv4).
- 7. Click Properties.
- 8. Check the Radio Button for Use the following IP address.
- 9. Provide the IP Address, Subnet Mask, and Default Gateway.
- 10. Click **OK**.

■ Note

CX7 and CX8 support both IPv4 and IPv6 protocol.

Verifying Intel® AMT Using Internet Explorer

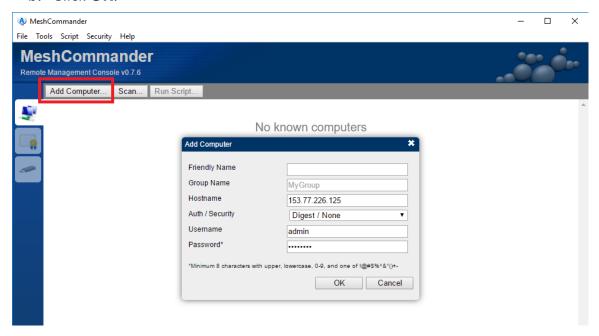
- 1. Using Internet Explorer on another computer, login to the AMT.
 - Enter http://IP Address:16992 in the address field.
 - Enter admin as the username.
 - Enter the MEBx password set in "Configuring Intel® AMT Settings in Intel®
 MEBx Menu" on page 280.
- 2. Verify all basic functions that are available.
 - Verify System Status (On, Off and Standby)
 - Verify Hardware Information (System, Processor, Memory, Disk, etc.)
 - Login to system during all power states (On, Off and Standby)
- 3. Verify Remote Control functions.
 - Perform system resets
 - Perform system power cycles (Off then On)
 - Bring system out of standby



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Verifying Intel® AMT Using MeshCommander

- Download the MeshCommander tool from https://www.meshcommander.com/meshcommander and install it on another computer.
- 2. Open the MeshCommander tool.
- 3. Click the **Add Computer** button to add a new computer.
 - a. In the Add Computer window, enter the following:
 - IP Address
 - Username typically admin
 - MEBx Password as set up in "Configuring Intel® AMT Settings in Intel® MEBx Menu" on page 280
 - b. Click OK.



4. Click on your AMT motherboard's IP Address in the Computer Management list then click the Connect button.

■ Note

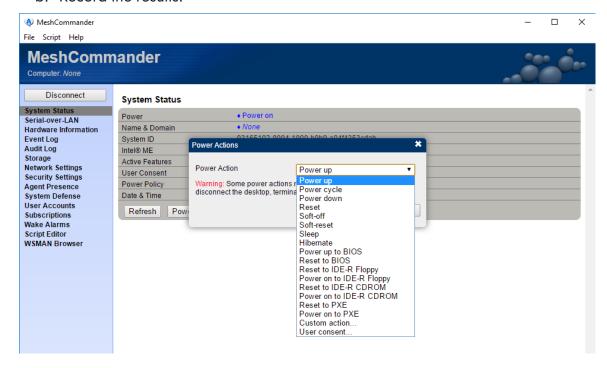
This will take about 5-10 seconds to connect. If unsuccessful, the button will revert to "Connect". If successful, the button will change to "Disconnect".

- 5. Check that all AMT features listed below are present and verify that features are working properly.
 - System Status
 - Remote Desktop (on i5 processor only)
 - Serial-over-LAN
 - Hardware Information
 - Event Log
 - Audit Log
 - Storage
 - Network Settings
 - Internet Settings (on i5 processor only)
 - Security Settings
 - Agent Presence
 - System Defense
 - User Accounts
 - Subscriptions
 - Wake Alarms
 - Script Editor
 - WSMAN Browser

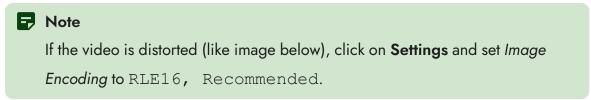
6. In the list of Intel AMT features, select **System Status** and record the details.

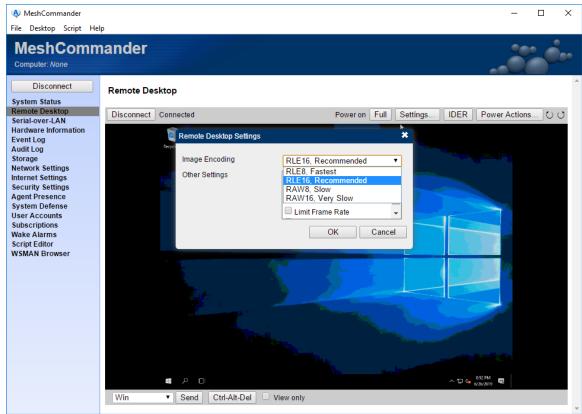


- 7. Under System Status tab, click the Power Actions button.
 - a. In the *Power Actions* window, verify that the AMT motherboard will respond properly to the following remote power commands:
 - Power up
 - Power cycle
 - Power down
 - Reset
 - b. Record the results.



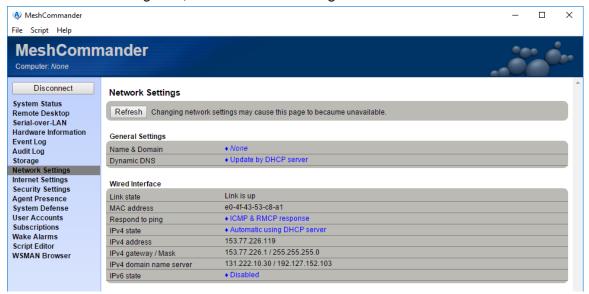
- 8. In the list of Intel AMT features, select **Remote Desktop**.
- 9. Under the Remote Desktop tab, click the Connect button.



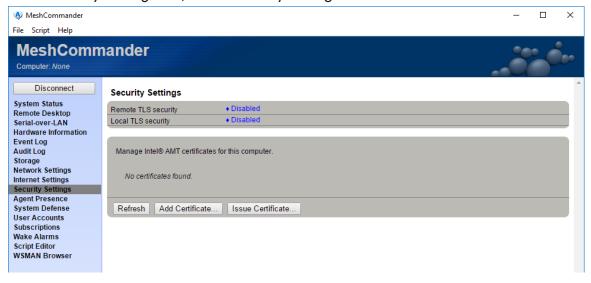


- 10. While remote desktop session is running, verify that the remote video, keyboard, and mouse work.
 - a. On the desktop, right-click and create a new Text Document.
 - b. Double-click the document to open.
 - Test keypresses to ensure the correct keystrokes are being sent to the remote desktop.

- 11. In the list of Intel AM T features, select **Network Settings**.
- 12. In the Network Settings tab, check network settings and record the details.

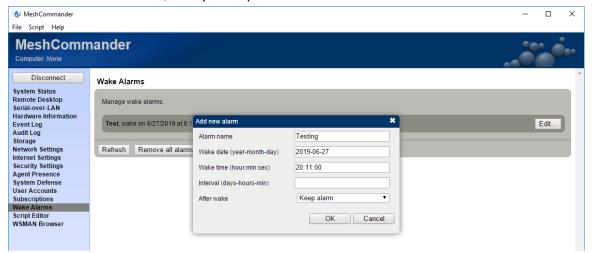


- 13. In the list of Intel AMT features, select **Security Settings**.
- 14. In the Security Settings tab, check security settings and record the details.



15. In the list of Intel AMT features, select Wake Alarms.

16. In the Wake Alarms tab, verify the operations of alarm clock.



Reference

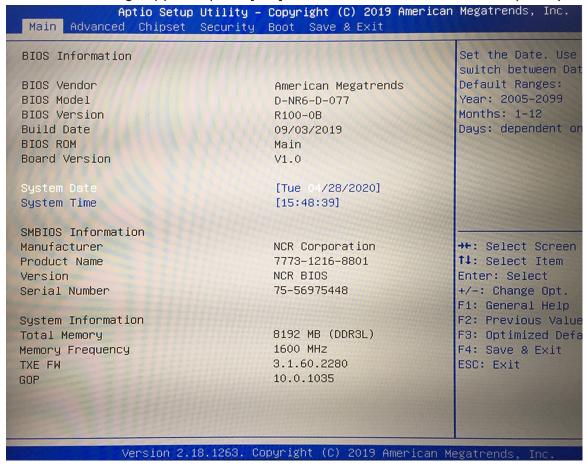
https://www.intel.com/content/www/us/en/architecture-and-technology/intel-active-management-technology.html

Configuring AMT

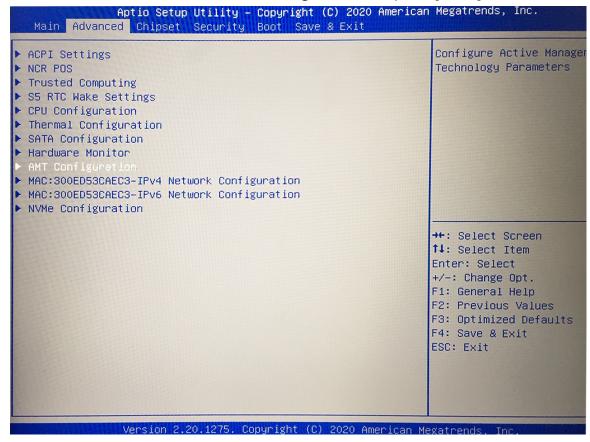
This chapter explains how to configure an NCR CX7 All-in-One POS (7772) so it can be accessed remotely using Intel's *Active Management Technology (AMT)*.

Configuring the Terminal

- 1. Boot the terminal.
- 2. When the NCR logo appears, press [**Del**] several times to start the BIOS Setup Utility.

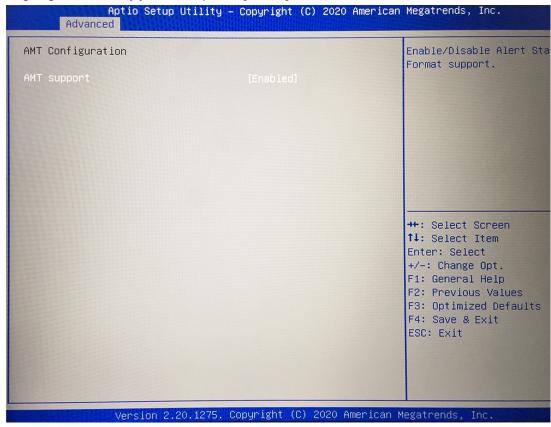


3. Under the Advanced tab, select AMT Configuration and press [Enter].



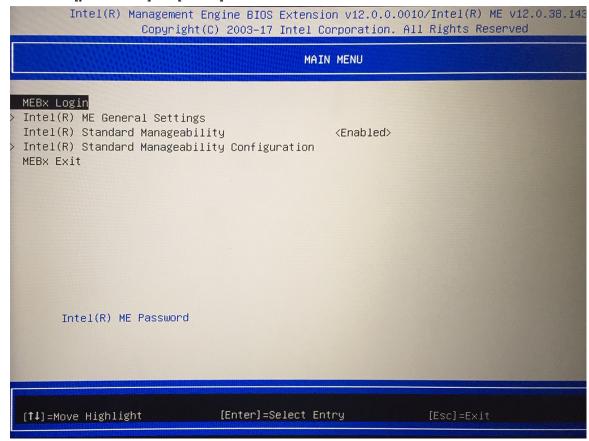
4. Enable AMT Support.

a. Highlight AMT Support and press [Enter].



- b. Set to **Enabled**.
- c. Press [Enter].
- 5. Press [F10] and [Enter] to Save and Exit.
- 6. After the system reboots, press [Ctrl] + [P] to launch the Intel(R) Management Engine BIOS Extension Main Menu.
- 7. Highlight MEBx Login and press [Enter].

8. Enter the [password]>> [Enter].





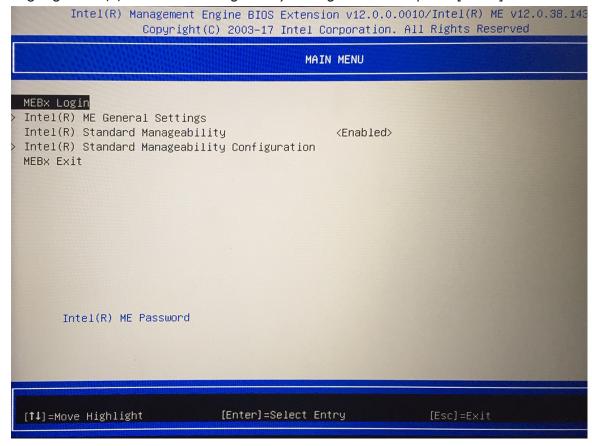
The first time this program is run you must use the default password, admin (lower case). [admin]>> [Enter]

At the prompt, enter the new password (write it down to remember). The password must contain upper, lower, symbol, and numeric characters.

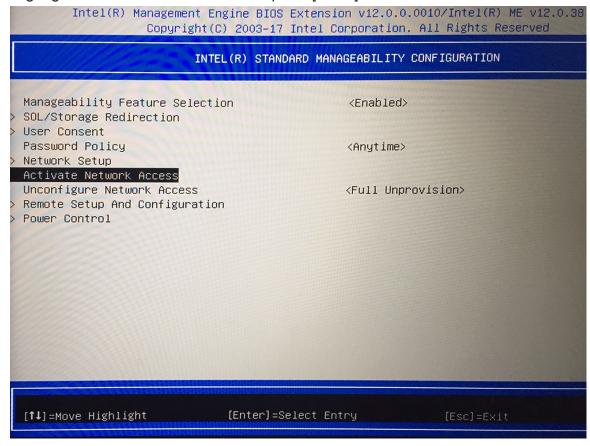


You must enter the password a second time for verification.

9. Highlight Intel(R) Standard Manageability Configuration and press [Enter].



10. Highlight Activate Network Access and press [Enter].



- 11. Enter **Yes** to activate the network interface.
- 12. Press [ESC]>>[ESC]>>[Y] to exit the Intel(R) Management Engine BIOS Extension and reboot the system.
- 13. The terminal should now be accessible using its IP address.

APA Graphical Display

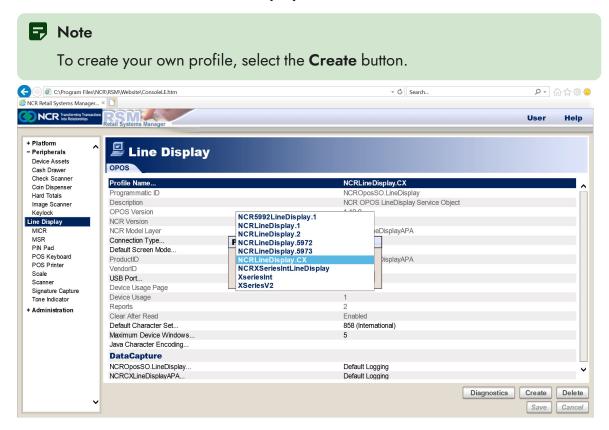
Configuring the APA Graphical Display

To configure the APA Graphical Display to read Kanji characters, follow these steps:

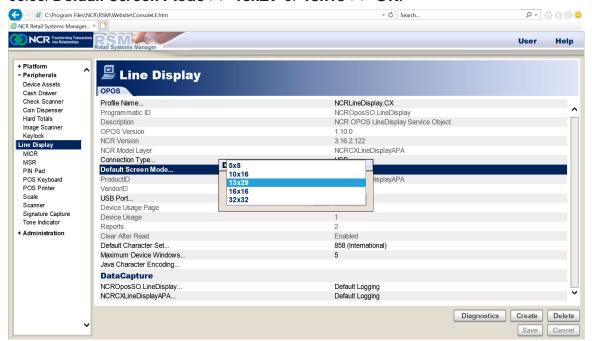
- Download the latest RPSW Installer from the NCR website: http://www5.ncr.com/support/support_drivers_
 patches.asp?Class=External/RPSW\5\3\4\0\display
- 2. Install RPSW.
- 3. Run RSM.



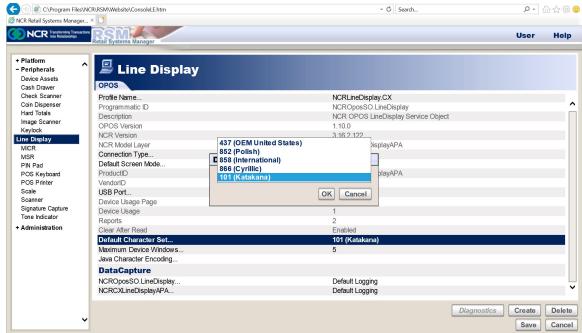
4. In the left menu, select **Peripherals** >> **Line Display**. In the *Line Display* window, select **Profile Name** >> **NCRLineDisplay.CX** >> **OK**.



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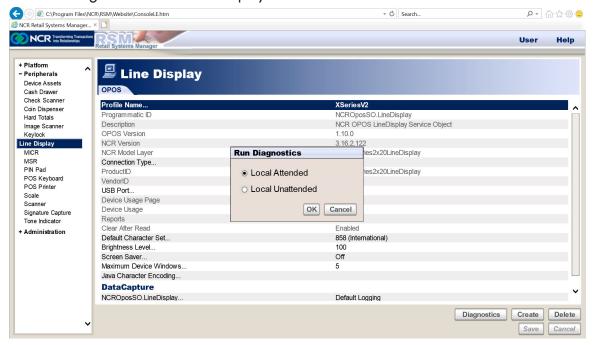


Select Default Character Set >> 101 (Katakana) >> OK.



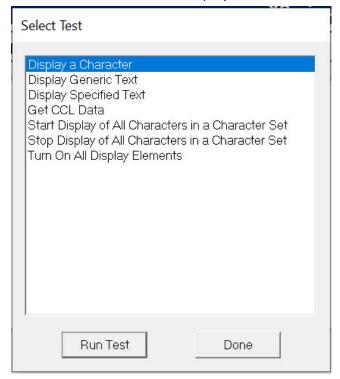
7. Select the **Diagnostics** button.

The Run Diagnostics window is displayed.



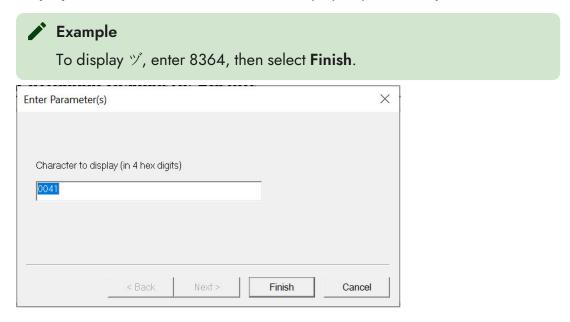
8. Select Local Attended >> OK.

The Select Test window is displayed.



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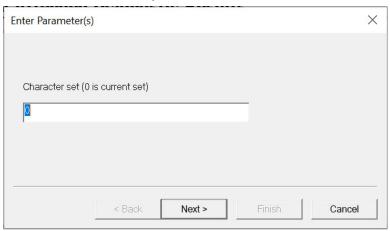
- 9. Select and run the desired test:
 - **Display a Character** Select this test to display a specific Kanji character.



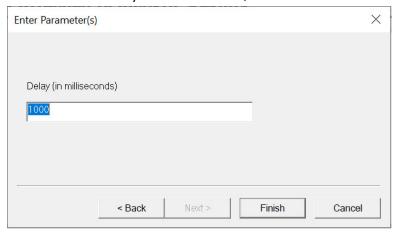
• **Display Specified Text** – Select this test to input and display the desired Kanji text.



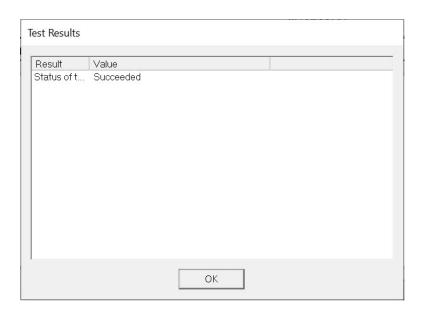
- Start Display of All Characters in a Character Set Select this test to check and confirm the Kanji characters.
 - a. Enter the character set, then select Next.



b. Enter the time delay in milliseconds, then select Finish.



The Test Results window is displayed.



c. Select **OK** to close the window.

Flip Functionality

The flip functionality is a feature that detects and automatically adjusts the screen orientation depending on the device position.

Default Screen Orientation



Flipped Sideways



Flipped Upwards



To enable the flip functionality, the G-Sensor driver must be installed. The NCR OS Image includes a pre-installed G-Sensor driver. The driver can be found in the C:\Install\drivers\G-Sensor directory. If not using an NCR OS Image, follow these steps:

- Download the G-Sensor driver from the NCR website:
 https://www5.ncr.com//support/support_drivers_
 patches.asp?Class=External/GSensor\Windows\Driver
- 2. Right-click on Setup.exe
- 3. Select Run as administrator.
- 4. Follow the GUI instructions to complete the installation.

CX Display Touch Tool

In CX terminals with multiple touch displays, Windows may have difficulty assigning the touch devices to the correct display. The CX Display Touch Tool is used to assign the touch device to its correct display. The tool sets the Windows display to Extended Desktop and assigns detected touch interfaces to the corresponding display.

The tool supports the following CX terminals:

- NCR CX3 POS (7776)
- NCR CX5 POS (7773)
- NCR CX7 POS (7772)

The tool is located in the following location: https://www5.ncr.com//support/support_
drivers_patches.asp?Class=External/CXDisplay%5CTouch%5CTool%5CDisplay

Refer to the Readme document for the installation procedure.