

XC30-LC and XC40-LC Repair Procedures (2.0) H-8002 Rev A

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1 About the XC30-LC and XC40-LC Repair Procedures

This publication describes how to remove and replace the field replaceable units (FRUs) in Cray® XC30-LC and XC40-LC systems.

Release Information

Table 1. Record of Revision

Publication Title	Publication Number	Date
XC30-LC and XC40-LC Repair Procedures	H-8002	December 2016
XC Series-LC Repair Procedures		December 2015
Maintenance and Replacement Procedures for Cray XC30 Systems	H80-8002-B	January 2014
Maintenance and Replacement Procedures for Cray XC30 Systems	H80-8002-A	September 2013
Maintenance and Replacement Procedures for Cray XC30 Systems	H80-8002	October 2012

Typographic Conventions

Monospace Indicates program code, reserved words, library functions, command-line prompts,

screen output, file/path names, key strokes (e.g., Enter and Alt-Ctrl-F), and

other software constructs.

Monospaced Bold Indicates commands that must be entered on a command line or in response to an

interactive prompt.

Oblique or Italics Indicates user-supplied values in commands or syntax definitions.

Proportional Bold Indicates a graphical user interface window or element.

\ (backslash) At the end of a command line, indicates the Linux[®] shell line continuation character

(lines joined by a backslash are parsed as a single line). Do not type anything after

the backslash or the continuation feature will not work correctly.

Scope and Audience

This publication is intended for Cray service personnel. Personnel must complete XC30-LC and XC40-LC hardware training before performing these maintenance and replacement procedures.

Torx Fasteners

The XC Series cabinet and blades contain both Torx and Torx+ fasteners. The drivers and bits in the tool kit are Torx. Torx drivers and bits work with both Torx and Torx+ fasteners.

HSS Component Naming Conventions

This publication refers to the HSS ID of the target component as the hostname. The man pages for the various commands refer to the target component as the hostname, physIDlist, id-list, or some other name; these names all refer to the standard HSS ID for the target component. The procedures include an example of the HSS ID for each command.

Feedback

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1.1 Safety Information

Read and comply with the following safety information while servicing XC30-LC and XC40-LC systems.



DANGER:

- Electrocution Hazard
- Cray requires the power to be disconnected from the PDU when working on components inside the PDU chassis. If it is necessary to work on components in the PDU with power applied, a minimum 36-in working clearance must be maintained in front of the PDU. This workspace is required and must be maintained around all electrical equipment where parts of an energized system may be serviced. To maintain this clearance, remove the door from the cabinet facing the energized parts, and install an insulating barrier to prevent any grounded equipment from coming in contact with the energized components in the PDU. Failure to do so could result in serious injury or death.

WEEE Directive

The Waste Electrical and Electronic Equipment (WEEE) directive of the European Union (EU) is designed to reduce waste management problems linked to heavy metals and flame retardants. It attempts to limit the amount of electrical and electronic equipment that enters landfills by encouraging reuse, recycling, and separate collection. Components that bear the crossed-out wheelie bin symbol require special disposal.



In accordance with European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), the presence of the crossed-out wheelie bin symbol on a product or on its packaging indicates that you must not dispose of that item in the normal unsorted municipal waste stream. Instead, it is your responsibility to dispose of that product by returning it to a collection point that is designated for the recycling of electrical and electronic equipment waste. Separate collection of this waste helps to optimize the recovery and recycling of any reclaimable materials and reduces the impact on human health and the environment.

In accordance with European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), the presence of the crossed-out wheelie bin symbol on a product or on its packaging indicates that you must not dispose of that item in the normal unsorted municipal waste stream. Instead, it is your responsibility to dispose of that product by returning it to a collection point that is designated for the recycling of electrical and electronic equipment waste. Separate collection of this waste helps to optimize the recovery and recycling of any reclaimable materials and reduces the impact on human health and the environment.

ESD Precautions

Observe electrostatic discharge (ESD) precautions during any maintenance or repair of Cray systems. Required apparel includes an ESD smock, ESD shoes, and an ESD wrist strap. *ESD and Safety Guidelines H-0016*, contains information about safety procedures and potential hazards. Read these guidelines before servicing any Cray systems.



CAUTION:

- Equipment damage
- Observe all ESD precautions. Failure to do so can result in damage to the equipment.

ESD Smock

Wear a Cray approved static-dissipative smock while servicing or handling an ESD-sensitive device. Completely button the smock and wear it as the outermost layer of clothing. A portion of the smock's sleeves must be in direct contact with the skin of the arms. Skin contact is essential for a dissipative path-to-earth ground. Tuck hair that exceeds shoulder length inside the back of the smock.

ESD Shoes

Wear approved static-dissipative shoes or approved dissipative heel straps on both shoes while servicing or handling an ESD-sensitive device. When sensitive equipment is exposed to static discharge, ESD shoes help prevent an excessive charge from building up.

Blade Handling

Each blade weighs approximately 29 lbs (13 kg). Blades can be removed or installed using a lift.



WARNING:

- Personal injury
- Use and proper lifting techniques when handling blades. Failure to do so could result in serious personal injury.



CAUTION:

- Equipment damage
- Always observe the ESD and safety precautions described in the previous section when handling blades. Failure to do so could result in equipment damage.

Safety Measures

Observe the following safety measures to remove, install, repair, or maintain the system.

- Do not wear watches or jewelry while working on a system cabinet.
- Keep fingers and conductive tools away from high-voltage areas and from high-current areas.



DANGER:

- Serious injury or death
- Keep fingers and conductive tools away from high-voltage areas. Serious injury or death will occur if these precautions are not followed.



WARNING:

- Severe personal injury
- Ensure that the electrical circuit breakers for the equipment being serviced are off, locked, and tagged. Failure to do so could result in severe shock and burns.
- Remove all tools from the system cabinets after performing service.
- Replace all covers and panels that were removed from the system during servicing.
- Some procedures require powering off the system; power off the system only after shutting down the system software in an orderly manner.



CAUTION:

- Loss of data
- Do not power off the system before halting the operating system. Failure to do so could result in loss of data.

Cray systems may reach noise levels where the use of hearing protection is required. The need for this protection depends on such factors as the number of installed cabinets, the speed of the blowers, and the physical design and the materials used in the computer room. The use of hearing protection is highly recommended for all

personnel when working in computer rooms, even if noise exposure dosimetry results are below the USA OSHA or other country's regulatory levels.

1.2 XC30-LC and XC40-LC Spare Part Numbers

Table 2. Tools

Part Number	Description	
80299500	Adjustable Torque Driver, 5-40 in-lbs.	
100737101	Torque Wrench, 1/4" Drive 30-150 in-lbs.	
80294700	Adaptor, 1/4in. hex male to 1/4in. square male	
100784000	Balldriver Set, 11 Piece 5/64-3/8"	
80263400	Dusting gas	
100117500	Thermal grease	

Table 3. XC Series-LC System Cabinet

Part Number	Description	Procedure
100790601	POWER SUPPLY, 52VDC 3KW 230-277VAC (RECTIFIER)	Install a Power Supply
100648000	INTERFACE MODULE, OPERATOR	Install an Operator Interface on page 25
100692802	ENVIRONMENTAL CONTROL ASSY	Install an Environmental Distribution Board on page 27
100673900	SENSOR ASSY, LIQUID SENSE (INC. 100208502 WATER 4WIRE 5VDC SENSOR)	Install a Liquid Sensor on page 30
100931500	BACKPLANE ASSY AND REPLACEMENT KIT	Install a Chassis Backplane on page 36
100542901	PDU ASSY, COMPUTE CABINET	Install a Power Distribution Unit (PDU) on page 43
100826600	BUS BAR ASSY, POWER RACK AND HORIZONTAL, 105KW ELTEK/VALERE	Install a Power Supply Rack on page 48
100697500	MODULE ASSY, CABINET CONTROLLER CS	Install a Cabinet Controller
100727500	BACKPLANE ASSY, CABINET CONTROLLER	Install a Cabinet Controller Backplane

Part Number	Description	Procedure
100189300	DIMM, 2GB PC-6400 (CONTROLLER DIMM)	Install a Cabinet Controller DIMM
100697801	MODULE ASSY, CHASSIS HOST	Install a Chassis Host
100424807	CABLE ASSY, 12.5GBS OPTICAL CXP 10.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424808	CABLE ASSY, 12.5GBS OPTICAL CXP 12.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424809	CABLE ASSY, 12.5GBS OPTICAL CXP 15.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424810	CABLE ASSY, 12.5GBS OPTICAL CXP 17.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424811	CABLE ASSY, 12.5GBS OPTICAL CXP 20.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424803	CABLE ASSY, 12.5GBS OPTICAL CXP 25.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424813	CABLE ASSY, 12.5GBS OPTICAL CXP 28.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424814	CABLE ASSY, 12.5GBS OPTICAL CXP 30.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424815	CABLE ASSY, 12.5GBS OPTICAL CXP 35.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424800	ABLE ASSY, 12.5GBS OPTICAL CXP 4.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424816	CABLE ASSY, 12.5GBS OPTICAL CXP 40.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424817	CABLE ASSY, 12.5GBS OPTICAL CXP 45.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424801	CABLE ASSY, 12.5GBS OPTICAL CXP 5.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424804	CABLE ASSY, 12.5GBS OPTICAL CXP 50.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424805	CABLE ASSY, 12.5GBS OPTICAL CXP 55.0M AOC	Install an Optical Network Cable (AOC) on page 65
100424802	ABLE ASSY, 12.5GBS OPTICAL CXP 6.0M AOC	Install an Optical Network Cable (AOC) on page 65
100659005	CABLE ASSY, NETWORK XCEDE 18PR 40"	Install a Copper Network Cable on page 67
100659006	CABLE ASSY, NETWORK XCEDE 18PR 55"	Install a Copper Network Cable on page 67

Part Number	Description	Procedure
100659007	CABLE ASSY, NETWORK XCEDE 18PR 61"	Install a Copper Network Cable on page 67
100659008	CABLE ASSY, NETWORK XCEDE 18PR 65"	Install a Copper Network Cable on page 67
100659009	CABLE ASSY, NETWORK XCEDE 18PR 79"	Install a Copper Network Cable on page 67
100856102	BLOWER FAN ASSY, 280MM EC FOR BLOWER CAB	Install a Blower Assembly on page 93
100513700	SENSOR, HUMIDITY/TEMP	Install a Temperature and Humidity Sensor on page 70
100625803	PCA, CABINET BLOWER CONTROL	Install a Blower Control Assembly on page 95
100588003	PDU ASSY, BLOWER CABINET	Install a Blower Power Distribution Unit (PDU) on page 99
100692700	COIL CONTROL ASSY (ON SYSTEMS SHIPPED PRIOR TO 01/2014)	Install a Coil Control Board on page 73
100692701	COIL CONTROL ASSY (SYSTEMS SHIPPED AFTER 12/2013)	Install a Coil Control Board on page 73

Table 4. XC Series-LC System Cabinet Redesigned Components

Part Number	Description	Procedure
100681000	Actuator Assy, Control ARB24-SR	Install a Non-Spring Returned Water Valve Actuator on page 77
100681001	ACTUATOR ASSY, CONTROL ARB24-SR W/PLUG SPRING RTN	Install a Spring Returned Water Valve Actuator on page 82
100950500	TRANSDUCER, PRESSURE 100PSIG	Install a Redesigned Water Pressure Transducer on page 85 Remove an Original Water Pressure and Temperature Tranducer on page 86
100950600	CABLE ASSY, WATER CONTROL PCA TO PRESSURE SENSOR	Install a Redesigned Water Pressure Transducer on page 85 Remove an Original Water Pressure and Temperature Tranducer on page 86

Part Number	Description	Procedure
100797100	TRANSDUCER, PRESSURE/ TEMPERATURE 100PSIG	Remove a Redesigned Water Pressure Transducer on page 84 Install an Original Water Pressure and Temperature Transducer on page 87
100950700	CABLE ASSY, WATER CONTROL PCA TO TEMP RTD	Install a Return or Supply Temperature Sensor on page 89

Table 5. XC Series-LC Prconditioner

Part Number	Description	Procedure
100673900	SENSOR ASSY, LIQUID SENSE (INC. 100208502 WATER 4WIRE 5VDC SENSOR)	Install a Liquid Sensor on page 30
100681001	ACTUATOR ASSY, CONTROL ARB24-SR W/PLUG SPRING RTN	Install a Non-Spring Returned Preconditioner Water Valve Actuator on page 107
100797100	TRANSDUCER, PRESSURE/ TEMPERATURE 100PSIG	Install an Original Preconditioner Water Pressure and Temperature Transducer on page 114
100513700	SENSOR, HUMIDITY/TEMP	Install a Preconditioner Temperature and Humidity Sensor on page 124
100692700	COIL CONTROL ASSY (ON SYSTEMS SHIPPED PRIOR TO 01/2014)	Install a Preconditioner Coil Control Board on page 127
100692701	COIL CONTROL ASSY (SYSTEMS SHIPPED AFTER 12/2013)	Install a Preconditioner Coil Control Board on page 127

Table 6. XC Series-LC Prconditioner Redesigned Components

Part Number	Description	Procedure
100681001	ACTUATOR ASSY, CONTROL ARB24-SR W/PLUG SPRING RTN	Install a Spring Returned Preconditioner Water Valve Actuator on page 111
100950500	TRANSDUCER, PRESSURE 100PSIG	Install a Redesigned Preconditioner Water Pressure Transducer on page 116
100950600	CABLE ASSY, WATER CONTROL PCA TO PRESSURE SENSOR	Install a Redesigned Preconditioner Water Pressure Transducer on page 116

Part Number	Description	Procedure
100797100	TRANSDUCER, PRESSURE/ TEMPERATURE 100PSIG	Remove a Redesigned Preconditioner Water Pressure Transducer on page 115
100950700	CABLE ASSY, WATER CONTROL PCA TO TEMP RTD	Install a Preconditioner Return or Supply Temperature Sensor on page 119
101009400	PCA, TEMPERATURE SENSOR ASSY	Install a Preconditioner Air Temperature Sensor on page 122

Table 7. Compute and IO Blades

Part Number	Description	Procedure
100923801	BLADE ASSY FRU, ANC COMPUTE RIGHT	Install a Blade Using xtwarmswap on page 131 Install a Compute or IO Blade on page 134
100923701	BLADE ASSY FRU, ANC COMPUTE LEFT	Install a Blade Using xtwarmswap on page 131 Install a Compute or IO Blade on page 134
100697700	Module Assy, I/O Left	Install a Blade Using xtwarmswap on page 131 Install a Compute or IO Blade on page 134
100872201	DIFFUSSER MODULE ASSY, RIGHT ANC/QPDC	Install a Blade Using xtwarmswap on page 131
100872701	DIFFUSSER MODULE ASSY, LEFT ANC/QPDC	Install a Blade Using xtwarmswap on page 131
101304000	DIFFUSSER MODULE ASSY, HP LEFT ANC/HPDC 145W	Install a Blade Using xtwarmswap on page 131
101304100	DIFFUSSER MODULE ASSY, HP RIGHT ANC/HPDC 145W	Install a Blade Using xtwarmswap on page 131
100609602	DIMM, 4GB PC3-12800 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136
100609603	DIMM, 4GB PC3-12800 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136
100609701	DIMM, 8GB PC3-12800 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136
100609702	DIMM, 8GB PC3-12800 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136

Part Number	Description	Procedure
100609703	DIMM, 8GB PC3-12800 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136
100730401	DIMM, 16GB PC3-12800 Reg Dual Rank ECC (Hynix)	Install a Blade Memory DIMM on page 136
100730403	DIMM, 16GB PC3-12800 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136
100860201	DIMM, 8GB DDR3 PC3-14900 REG DUAL-RANK ECC	Install a Blade Memory DIMM on page 136
100860202	DIMM, 8GB DDR3 PC3-14900 REG DUAL-RANK ECC	Install a Blade Memory DIMM on page 136
100860203	DIMM, 8GB DDR3 PC3-14900 REG DUAL-RANK ECC	Install a Blade Memory DIMM on page 136
100860501	DIMM, 16GB PC3-14900 REG DUAL-RANK ECC	Install a Blade Memory DIMM on page 136
100860502	DIMM, 16GB PC3-14900 REG DUAL-RANK ECC	Install a Blade Memory DIMM on page 136
100860503	DIMM, 16GB PC3-14900 REG DUAL-RANK ECC	Install a Blade Memory DIMM on page 136
100961801	DIMM, 16GB DDR4-2133 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136
100961802	DIMM, 16GB DDR4-2133 REG DUAL RANK ECC	Install a Blade Memory DIMM on page 136
100982901	DIMM, 16GB DDR4-2400 REG DUAL RANK ECC 1.2V 1GX4	Install a Blade Memory DIMM on page 136
100982902	DIMM, 16GB DDR4-2400 REG DUAL RANK ECC 1.2V 1GX4	Install a Blade Memory DIMM on page 136
100961000	DIMM, 32GB DDR3L-1333 REG QUAD RANK ECC	Install a Blade Memory DIMM on page 136
101107701	DIMM, 32GB DDR4-2133 REG DUAL RANK ECC 1.2V 1GX4	Install a Blade Memory DIMM on page 136
101107702	DIMM, 32GB DDR4-2133 REG DUAL RANK ECC 1.2V 1GX4	Install a Blade Memory DIMM on page 136
101131101	DIMM, 32GB DDR4-2400 REG DUAL RANK ECC 1.2V 2GX4	Install a Blade Memory DIMM on page 136
101131103	DIMM, 32GB DDR4-2400 REG DUAL RANK ECC 1.2V 2GX4	Install a Blade Memory DIMM on page 136
100944701	DIMM, 8GB DDR4-2133 REG ECC	Install a Blade Memory DIMM on page 136
100944702	DIMM, 8GB DDR4-2133 REG ECC	Install a Blade Memory DIMM on page 136

Part Number	Description	Procedure
100812302	PCA, IR ARIES VRM (IBB / ANC)	Install a Voltage Module (VRM, VIVOC, and HIVOC) on page 138
100684401	VOLTAGE CONVERTER MOD, VERT 300W 52-13VDC (VIVOC)	Install a Voltage Module (VRM, VIVOC, and HIVOC) on page 138
100824500	VOLTAGE CONVERTER MOD, VERT 300W 48-12VDC (VIVOC)	Install a Voltage Module (VRM, VIVOC, and HIVOC) on page 138
100824600	VOLTAGE CONVERTER MOD, HORIZ 456W 48-12VDC (HIVOC)	Install a Voltage Module (VRM, VIVOC, and HIVOC) on page 138
100684501	VOLTAGE CONVERTER MOD, HORIZ 430W 52-13VDC (HIVOC FOR XPDC)	Install a Voltage Module (VRM, VIVOC, and HIVOC) on page 138
100635202	PCA, INTEL SOCKET R VOLTERA VRM FOR XPDC	Install a Voltage Module (VRM, VIVOC, and HIVOC) on page 138
100874601	IC, INTEL 8-CORE E5-2670 2.6GHZ FOR QPDC	Install a Processor on page 142
100881001	IC, INTEL 8-CORE E5-2680 2.7GHZ 20M CACHE	Install a Processor on page 142
100960200	IC, INTEL 10-CORE E5-2670 2.5GHZ 25M CACHE 115W C1	Install a Processor on page 142
100960500	IC, INTEL 10-CORE E5-2680 2.8GHZ 25M CACHE 115W C1	Install a Processor on page 142
100960600	IC, INTEL 10-CORE E5-2690 3.0GHZ 25M CACHE 115W C1	Install a Processor on page 142
101079100	IC, INTEL 10-CORE E5-2650V3 2.5GHZ 105W M1 HPDC	Install a Processor on page 142
100944500	IC, INTEL 12-CORE E5-2695 2.4GHZ 30G CACHE 115W C0 QPDC	Install a Processor on page 142
100944501	IC, INTEL 12-CORE E5-2695 2.4GHZ 30G CACHE 115W C1 QPDC	Install a Processor on page 142
100944400	IC, INTEL 12-CORE E5-2697 2.7GHZ 30G CACHE 130W C0 QPDC	Install a Processor on page 142
100944401	IC, INTEL 12-CORE E5-2697 2.7GHZ 30G CACHE 130W C1 QPDC	Install a Processor on page 142
101078600	IC, INTEL 12-CORE E5-2670V3 2.3GHZ 120W M1 HPDC	Install a Processor on page 142
101078700	IC, INTEL 12-CORE E5-2680V3 2.5GHZ 120W M1 HPDC	Install a Processor on page 142

Part Number	Description	Procedure
101078900	IC, INTEL 12-CORE E5-2690V3 2.6GHZ 135W M1 HPDC	Install a Processor on page 142
101079000	IC, INTEL 14-CORE E5-2695V3 2.3GHZ 120W C1 HPDC	Install a Processor on page 142
101120400	IC INTEL 16-CORE E5-2698V3 2.3GHZ 135W C1 HPDC	Install a Processor on page 142
101433000	IC, INTEL 18-CORE E5-2695V4 2.1GHZ 120W 45M B0	Install a Processor on page 142
101485200	IC, INTEL 18-CORE E5-2697V4 2.3GHZ 145W 45M	Install a Processor on page 142
101485400	IC, INTEL 20-CORE E5-2698V4 2.2GHZ 135W 50M	Install a Processor on page 142
101485500	IC, INTEL 22-CORE E5-2699V4 2.2GHZ 145W 50M	Install a Processor on page 142
101026800	IC, INTEL XEON PHI W/ HEATSINKS FRU GPDC	Install a Processor on page 142
101534100	IC, INTEL 68-CORE 215W 1.4GHZ TDP 7250	Install a Processor on page 142
101534400	IC, INTEL 64-CORE 215W 1.3GHZ TDP 7210	Install a Processor on page 142
101534200	IC, INTEL 64-CORE 215W 1.3GHZ TDP 7230	Install a Processor on page 142
100845900	DAUGHTER CARD, QPDC	Install a QPDC on page 158
100845901	DAUGHTER CARD, QPDC	Install a QPDC on page 158
100752100	DAUGHTER CARD, XPDC SIO (FOR IO BLADE)	Install an XPDC on page 160
100953000	DAUGHTER CARD, SGDC	Install a SGDC on page 162
100950200	DAUGHTER CARD, GPDC	Install a GPDC on page 164
100938700	DAUGHTER CARD, HPDC W/ HIVOC	Install a HPDC on page 166
101319700	DAUGHTER CARD, HPDC-HP W/ HIVOC'S	Install a HPDC on page 166
101144701	DAUGHTER CARD, KPDC	
100923700	BLADE ASSY FRU, ANC COMPUTE LEFT	Install Components on an Aries Network Card (ANC)
100923800	BLADE ASSY FRU, ANC COMPUTE RIGHT	Install Components on an Aries Network Card (ANC)
100924900	BLADE ASSY FRU, IO LEFT (SUPPORTS IO AND IO-HP)	Install Components on an IO Base Board (IOBB) on page 170

Part Number	Description	Procedure
100509801	PCIE, GEN2 8GB DUAL-PORT FC LOW PROFILE	Install a PCI Card on page 169
100629501	PCIE, GEN2 1GBE QUAD-PORT COPPER INTERFACE	Install a PCI Card on page 169
100900200	PCIE, GEN2 10GBE DUAL-PORT CX4 INTERFACE	Install a PCI Card on page 169
100610400	PCIE, GEN2 10GBE DUAL-PORT LR	Install a PCI Card on page 169
100688600	PCIE, GEN2 10GBE DUAL-PORT LR	Install a PCI Card on page 169
100610500	SFP+ SR TRANSCEIVER, MYICOM DUAL PORT 10GBE	Install a PCI Card on page 169
100826300	PCIE, GEN2 6GB DUAL-PORT SAS-2	Install a PCI Card on page 169
100882000	PCIE, GEN3 14GB DUAL-PORT IB HCA FDR W/QSFP	Install a PCI Card on page 169
100882500	PCIE, GEN3 40GB DUAL-PORT ETHERNET OPTICAL	Install a PCI Card on page 169
100900200	PCIE, GEN2 10GBE DUAL-PORT CX4 INTERFACE	Install a PCI Card on page 169

System Maintenance Workstation (SMW)

Replacement procedures for the Dell PowerEdge R815 workstation are contained in the hardware owner's manual that is available on the Dell Website at http://www.dell.com/support/. Dell system workstation parts may be under warranty.

Table 8. System Maintenance Workstation (SMW)

Part Number	Description
100762104	SMW SERVER, 2ND GENERATION LOW END
100862201	SMW SERVER, 2ND GENERATION HIGH END
101017100	KVM CONSOLE/SHELF, 1U, 17 INCH LCD SCREEN, KEYBOARD, TOUCH PAD
100800200	DIMM, DELL 2GB 1333MHZ DELL R815 SMW
101088500	DISK DRIVE, DELL 7K2 SATA 2.5" 250GB FOR DELL POWEREDGE R815
100792000	DISK DRIVE, DELL 7K2 SATA 2.5" 500GB FOR DELL POWEREDGE R815
100792100	DISK DRIVE, DELL 7K2 SATA 2.5" 1TB FOR DELL POWEREDGE R815

Part Number	Description
100791800	POWER SUPPLY, DELL POWEREDGE R815 SMW2 1100W FRU
100823900	ADAPTER, USB TO PS/2

Boot RAID Cabinet

Replacement procedures for the NetApp E2600 are available for download at the NetApp support website at http://www.netapp.com. To access the documentation, register for a NetApp account.

Table 9. Boot RAID Cabinet

Part Number	Description
100786601	Disk Drive FRU, SAS-2.0 450GB 15K7 FDE 3 1/2" For 12-Bay Tray
100786801	Disk Drive FRU, SAS-2.0 1TB 7K2FDE 3 1/2" For 12-Bay Tray (Replaced by 100846001)
100786901	Disk Drive FRU, SAS-2.0 2TB 7K2 FDE 3 1/2" For 12-Bay Tray (Replaced by 100846201)
100787101	Disk Drive FRU, SAS-2.0 600GB 10K4 FDE 2 1/2" For 24-Bay Tray
100787201	Disk Drive FRU, SAS-2.0 1TBB 7K2 FDE 2 1/2" For 24-Bay Tray
100787300	Controller Assy, FRU 2600 2-6gbs SAS Ports & 4-8gbs FC Ports
100775200	Controller FRU Assy, Netapp 2600 SAS 2-6GBS SAS Ports
100775800	Power Supply, Netapp 585W 2U12 & 2U24 Disk Tray (For use with 2600 Controllers)
100587300	SFP Transceiver 2, 4, 8GBIT
100775400	Battery, Netapp CDE2600

2 System Cabinet Procedures

2.1 Power Down a System Cabinet

Prerequisites

Time:

2-3 minutes

Tools

None

Procedure

1. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition). The Cabinet ID can be found on the operator interface.

- 2. Open the rear door of the cabinet.
- 3. For compute cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- **4.** For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 1. Cabinet (left) and Blower (right) Circuit Breaker



2.2 Power Up a System Cabinet

Prerequisites

Time:

2-3 minutes

Tools

None

About this task

Use this procedure to power up a system cabinet after performing maintenance on the cabinet.

Procedure

- **1.** For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
- 2. For compute cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 2. Cabinet (left) and Blower (right) Circuit Breaker



- 3. Close the rear door of the cabinet.
- 4. Enter the following command in a terminal window on the SMW:

```
smw$ xtcli power up hostname
```

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.3 Power Supply Replacement

2.3.1 Remove a Power Supply

Prerequisites

Tools Required:

none

Time Required:

2-3 minutes

For a XC Series-AC system, a XC Series-AC Power Supply Replacement video is available that shows how to remove and install this component.

About this task

The power supplies on XC30-LC and XC40-LC systems connect in a minimum N+1 configuration, allowing one power supply to be removed while the system is operating.

Procedure

- 1. Open the rear door of the cabinet.
- 2. Loosen the thumb screw completely and pull the extractor lever forward.
- 3.

CAUTION:

- Equipment damage
- Use both hands to support the power supply and do not carry the power supply by the extraction lever. Damage to equipment may result.

Pull on the extractor handle to disengage the power supply from the connector and slide the power supply out of the shelf.

Figure 3. Power Supply



2.3.2 Install a Power Supply

Prerequisites

Tools Required:

none

Time Required:

2-3 minutes

An XC Series-AC Power Supply Replacement video is available that shows how to remove and install this component.

About this task

The power supplies on XC30-LC and XC40-LC systems connect in a minimum N+1 configuration, allowing one power supply to be removed while the system is operating.

Procedure

- 1. Inspect the connectors on the back of the replacement power supply; ensure that the pins are straight.
- 2. Slide the power supply into the rack and seat it firmly.
- 3. Push the extractor handle in and latch the handle.
- **4.** Finger-tighten the thumb screw to secure the power supply latch.

Figure 4. Power Supply



5. Close the rear door of the cabinet.

2.4 Operator Interface Replacement

2.4.1 Remove an Operator Interface

Prerequisites

Tools Required:

Small Phillips screwdriver

5/16-in. socket

Socket driver

Time Required:

15 minutes

About this task

The X and Y cabinet address information, cabinet type, and coordinated cooling region (CCR) position is stored on the cabinet controller backplane SEEP. This information does not need to be reset when replacing the operator interface.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 5. Circuit Breakers for Cabinet (left) and Blower (right)



2.

CAUTION:

- Equipment damage
- Cabinet must be powered down, circuit breakers powered off, and all lights powered down on the
 operator interface before disconnecting any cables. Failure to do so can lead to equipment
 damage.

Disconnect any high-speed network cables required to access the operator interface and label all cables.

- **3.** Loosen the small captive Phillips screws (2) that secure the serial cable to the operator interface and disconnect the cable.
- **4.** Remove the 5/16-in. nuts (4) that attach the operator interface to the cabinet and remove the operator interface.

Figure 6. Operator Interface



2.4.2 Install an Operator Interface

Prerequisites

Tools Required:

Small Phillips screwdriver

5/16-in. socket

Socket driver

Time Required:

15 minutes

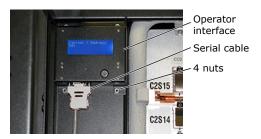
About this task

The X and Y cabinet address information, cabinet type, and coordinated cooling region (CCR) position is stored on the cabinet controller backplane SEEP. This information does not need to be reset when replacing the operator interface.

Procedure

1. Position the operator interface in the cabinet and reinstall the 5/16-in. nuts (4).

Figure 7. Operator Interface



- 2. Reconnect the serial cable to the operator interface and tighten the small captive Phillips screws (2).
- 3. Reconnect all disconnected high-speed network cables.
- 4. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.

b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 8. Circuit Breakers for Cabinet (left) and Blower (right)



- Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.5 Environmental Distribution Board Replacement

2.5.1 Remove an Environmental Distribution Board

Prerequisites

Tools Required:

Small Phillips screwdriver

Slotted screwdriver

5/16-in. socket

Socket driver

Time Required:

15 minutes

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.

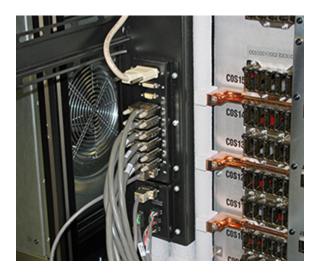
c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 9. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the rear door of the cabinet.
- 3. Disconnect any high-speed network cables required to access the environmental distribution board and label all cables.
- 4. Label all serial cables
- 5. Loosen the screws (2) that secure each serial cable to the environmental distribution board.
- 6. Disconnect the cables.
- 7. Remove the 5/16-in. nuts (6) that attach the environmental distribution board to the cabinet and remove the board.

Figure 10. Environmental Distribution Board



2.5.2 Install an Environmental Distribution Board

Prerequisites

Tools Required:

Small Phillips screwdriver Slotted screwdriver 5/16-in. socket Socket driver

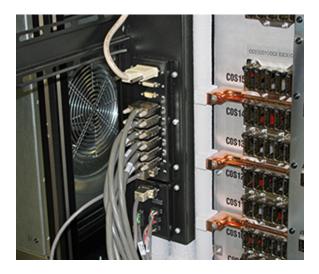
Time Required:

15 minutes

Procedure

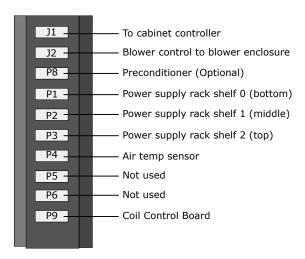
1. Position the environmental distribution board in the cabinet and reinstall the 5/16-in. nuts (6).

Figure 11. Environmental Distribution Board



2. Reconnect the serial cables to the environmental distribution board and tighten the captive screws.

Figure 12. Environmental Distribution Board Connections



- 3. Reconnect the high-speed network cables, as necessary.
- **4.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.

b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 13. Circuit Breakers for Cabinet (left) and Blower (right)



- Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.6 Liquid Sensor Replacement

2.6.1 Remove a Liquid Sensor

Prerequisites

Tools Required:

Diagonal cutter

1/4-in. socket

Socket driver

Tie straps

Time Required:

15 minutes

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.

c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 14. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the rear door of the cabinet.
- 3. Disconnect the liquid sensor control cable from the coil control board.
- **4.** If necessary, cut the tie straps that secure the liquid sensor cable to the adjacent control cables.
- **5.** Remove the 1/4-in. nuts (2) that attach the liquid sensor to the cabinet and remove the sensor.

Figure 15. Liquid Sensor



2.6.2 Install a Liquid Sensor

Prerequisites

Tools Required:

Diagonal cutter

1/4-in. socket

Socket driver

Tie straps

Time Required:

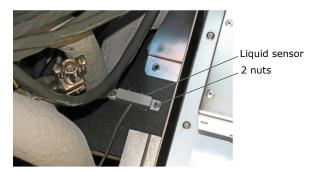
15 minutes

Procedure

- 1. Position the liquid sensor in the cabinet and reinstall the 1/4-in. nuts (2).
- 2. Reconnect the control cable to the coil control board.

3. Replace the tie straps that secure the control cables, if necessary.

Figure 16. Liquid Sensor



- 4. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 17. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.7 Chassis Backplane Replacement

2.7.1 Remove a Chassis Backplane

Prerequisites

Tools Required:

T10 Torx driver

T15 Torx driver

T20 Torx driver

T25 Torx driver

T30 Torx driver

T20 Torx bit

T30 Torx bit

1/4-in. socket, 1/4-in. square drive

7/16-in. socket, 1/4-in. square drive

Socket driver, 1/4-in. square drive

Adjustable torque driver, 5-40 in-lbs

Torque Wrench, 1/4" Drive 30-150 Inch-lbs.

Adaptor, 1/4-in. hex male to 1/4-in. square male

Copper network cable connector plug (80)

Optical network cable cover (40)

Isopropyl alcohol

Absorbent wipes

Time Required:

1.5 hours

About this task

This procedure may require a Cray contracted or customer contracted electrician to complete lockout/tagout procedures or disconnect facility power. Allow time in the preventive maintenance schedule for this requirement.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 18. Circuit Breakers for Cabinet (left) and Blower (right)



2.

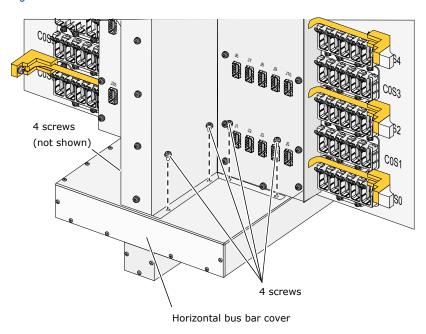
WARNING:

- Electrical hazard
- Make sure that the electrical circuit breaker for the cabinet is off, locked, and tagged. Failure to do so could result in severe shock and burns.

Work with a site electrician to ensure that circuit breakers for the cabinet at the wall panel are off. Use appropriate lockout/tagout or other site-specific procedures to indicate that the breakers are off.

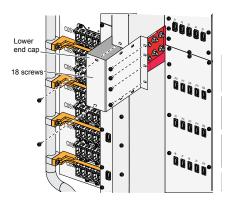
- **3.** Open the front door of the cabinet.
- **4.** Locate the chassis with the defective backplane assembly.
- **5.** Slide all of the blades approximately 2 inches out from the front of the chassis to disconnect the blades from the backplane connectors.
- **6.** Slide the chassis host approximately 2 inches out from the front of the chassis to disconnect the chassis host from the backplane connectors.
- 7. Open the rear door of the cabinet.
- 8. Locate the chassis with the defective backplane assembly.
- 9. Label, disconnect, and install protective covers on all of the high-speed network cables.
 - a. Disconnect the cables from adjacent chassis as necessary to access the defective backplane.
 - b. Place protective covers on the copper network cable connector plugs and on the ends of the optical network cables.
- If removing the chassis 0 backplane, remove the IP15 Torx+ screws (8) that attach the horizontal bus bar cover and remove the cover.
 - If removing chassis 1 or 2 backplane, proceed to the next step.

Figure 19. Horizontal Bus Bar Cover



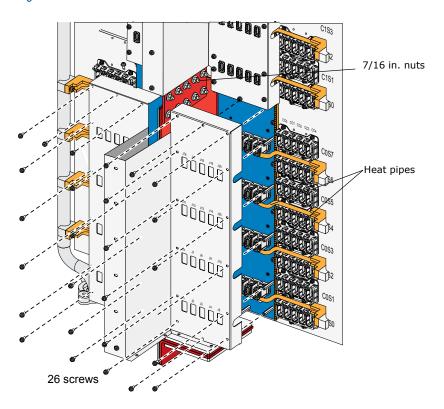
11. Remove the IP15 Torx+ screws (18) that attach the bus cover cap and remove the cap. Chassis 0 and 2 have one cap; chassis 1 has two caps.

Figure 20. Upper Bus Cover Cap



12. Remove the IP15 Torx+ screws (26) that attach the lower vertical bus cover and remove the cover.

Figure 21. Vertical Bus Cover



13.

WARNING:

- Equipment damage
- The heat pipes are very soft and can be easily bent or damaged. A thermal pad is under the heat pipe connection to the heat sink that runs around the perimeter of the cabinet. Try not to damage the thermal pad during removal.

Remove the IP25 Torx+ screw that attaches each of the heat pipes to the chilled-water pipe. Carefully pull the heat pipes out of the tabs that secure them to the optical network cable connectors.

14.

CAUTION:

- Equipment loss
- Insert foam or other material between the vertical bus bar cover and bus bar to prevent hardware from falling down into the bus bar cover opening.

Remove the 7/16-in. nuts (10) that attach each vertical bus joiner plate and remove the plates.

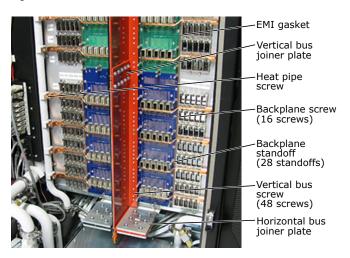
Chassis 0 and 2 have one set of plates; chassis 1 has two sets of plates.

- **15.** If removing the chassis 0 backplane, remove the IP30 Torx+ screws (8) that attach each set of horizontal bus joiner plate and remove the plates.
- **16.** Remove the 1/4-in. standoffs (28) that attach the backplane to the cabinet.
- **17.** Remove the IP20 Torx+ screws (16) that attach the backplane to the cabinet.

Support the backplane while removing the screws. The backplane is supported by two alignment pins, but it can tip off of the pins while removing the screws.

- **18.** Carefully slide the backplane assembly off of the alignment pins and place it on an ESD-safe surface.
- **19.** Remove the IP10 Torx+ screws (48) that attach the vertical bus bars to the backplane assembly and remove the bus bars.

Figure 22. Bus Bar Screws

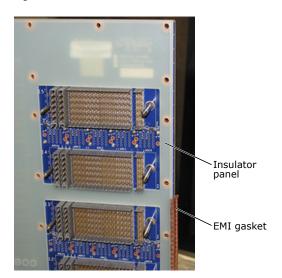


20. Remove the EMI gaskets from the edges and top (chassis 2 only) of the backplane.

The gaskets are secured with reusable adhesive tape. Retain the gaskets for installation on the replacement backplane assembly.

21. Remove the insulator panel from the front side of the backplane. Retain the insulator panel for installation on the replacement backplane assembly.

Figure 23. EMI Gasket and Insulator Panel



2.7.2 Install a Chassis Backplane

Prerequisites

Tools Required:

T10 Torx driver

T15 Torx driver

T20 Torx driver

T25 Torx driver

T30 Torx driver

T20 Torx bit

T30 Torx bit

1/4-in. socket, 1/4-in. square drive

7/16-in. socket, 1/4-in. square drive

Socket driver, 1/4-in. square drive

Adjustable torque driver, 5-40 in-lbs

Torque Wrench, 1/4" Drive 30-150 Inch-lbs.

Adaptor, 1/4-in. hex male to 1/4-in. square male

Copper network cable connector plug (80)

Optical network cable cover (40)

Isopropyl alcohol

Absorbent wipes

Time Required:

1.5 hours

IMPORTANT: Any time fasteners are removed from the main power buss structure, like to replace a back plane or a rectifier rack, there must be an initial torque and a torque verify performed by a second person during reassembly.

About this task

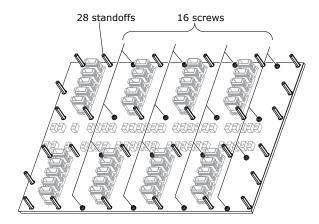
This procedure may require a Cray contracted or customer contracted electrician to complete lockout/tagout procedures or disconnect facility power. Allow time in the preventive maintenance schedule for this requirement.

Procedure

- 1. Position the insulator panel on the front side of the new backplane. Make sure the EMI gasket protrudes 1/16-in (1.59mm) on all sides so a continuous EMI shield exists.
- 2. Reinstall the adhesive EMI gaskets on the sides and top (chassis 2 only) of the backplane assembly.
- **3.** Clean the bare metal conductive surfaces on the vertical bus bars and the contact pads on the backplane PCA with isopropyl alcohol.
- 4. Position the bus bars on the backplane PCA and reinstall, but do not tighten, the IP10 Torx+ screws (48).

- 5. If installing the chassis 0 backplane, clean the bare metal conductive surfaces on the horizontal bus bars on the backplane and the cabinet with isopropyl alcohol.
- **6.** Position the backplane onto the alignment pins on the chassis frame.
 - If installing chassis 2, ensure that the EMI gaskets on the sides and top of the backplane are properly positioned between the backplane assembly and the cabinet frame.
- 7. Reinstall, then hand tighten, the 1/4-in. (28) standoffs that attach the backplane to the chassis.
- 8. Reinstall, but do not tighten, the IP20 Torx+ screws (16) that attach the backplane to the chassis.

Figure 24. Standoff and Screw Positions



- Torque the 1/4-in. standoffs and IP20 screws to 14 in-lbs.
- 10. Clean the bare metal conductive surfaces on the vertical bus bars and the joiner plates with isopropyl alcohol. Make sure the orientation of the conical washers is such that the washers compress when the bolts are tightened.
- 11. Position the joiner plates on the vertical buses and reinstall, but do not tighten, the 7/16-in. nuts (20). Chassis 0 and 2 have one set of plates; chassis 1 has two sets of plates.
- 12. If installing the chassis 0 backplane, position the joiner plates on the horizontal buses and reinstall, but do not tighten the IP30 Torx+ screws (16).

13.

WARNING:

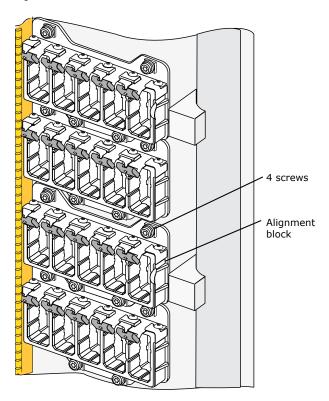
- **Equipment Damage**
- Failure to properly torque all nuts and bolts will damage the bus bar or back plane.

Torque the IP10 vertical bus bar screws (48) to 6 in-lbs. Have another person verify that the torque value is correct and paint the hardware with torque marker paint.

- 14. Torque the 7/16-in. vertical bus bar joiner plate nuts (20) to 75 in-lbs. Have another person verify that the torque value is correct and paint the hardware with torque marker paint.
- 15. Torque the IP30 Torx+ horizontal bus bar joiner plate screws (16) to 95 in-lbs. Have another person verify that the torque value is correct and paint the hardware with torque marker paint.

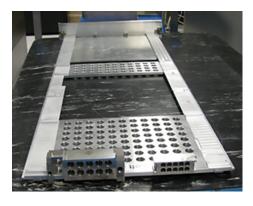
16. Loosen the screws (4) that secure each electrical network alignment block to the chassis on each side of the backplane.

Figure 25. Guide Block Screws



17. After all the EMI blocks have been loosened on both side of the backplane, install the alignment blade in each slot, and then tighten the associated electrical network alignment block screws (4).

Figure 26. Alignment Blade Tool



18. Inspect the heat pipes to ensure that the thermal pad is properly positioned and there are no wrinkles or raised edges. If the thermal pad is attached to the chilled-water pipe in the cabinet, carefully remove the pad and place it on the heat pipe.

19. ATTENTION:

- Equipment Damage
- The heat pipes are very soft and can be easily bent or damaged.

Position the heat pipe on the backplane and carefully engage it in the clips below the optical network cable connectors.

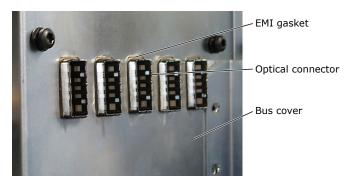
- 20. Reinstall the IP25 Torx+ screw that attaches the heat pipe to the chilled-water pipe. Torque screws to 35 inlbs.
- **21.** Push on the outside end of the heat pipe to ensure that the raised ridge on the heat pipe contacts the mating surface on the chilled-water pipe while tightening the screw.

Figure 27. Thermal Pad



- **22.** Check that the O-ring is properly positioned on each of the AOC connectors on the backplane.
- **23.** Position the left and right bus covers on the backplane and reinstall the IP15 Torx+ screws. Ensure that the EMI gasket is centered around each optical network cable connector.

Figure 28. Optical Network Cable Connector



- 24. Position the bus cover cap on the left and right bus covers and reinstall the IP15 Torx+ screws.
- **25.** If installing the chassis 0 backplane, position the horizontal bus cover on the bottom of the left and right bus covers and reinstall the IP15 Torx+ screws.
- 26. Reinstall the high-speed network cables.
- 27. Reinstall the chassis host board.
- 28. Reinstall the blades into the front of the cabinet.
- 29. Close the front and rear doors of the cabinet.
- **30.** Work with a site electrician to ensure that circuit breakers for the cabinet at the wall panel are turned on.

- **31.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 29. Circuit Breakers for Cabinet (left) and Blower (right)



- Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.8 Power Distribution Unit (PDU) Replacement

2.8.1 Remove a Power Distribution Unit (PDU)

Prerequisites

Tools Required:

T15 Torx driver

T25 Torx driver

Large slotted screwdriver

Time Required:

15 minutes

About this task

This procedure may require a Cray contracted or customer contracted electrician to complete lockout/tagout procedures or disconnect facility power. Allow time in the preventive maintenance schedule for this requirement.

This procedure should be preformed only by qualified Cray personnel.



DANGER:

Electrocution Hazard

Cray requires the power to be disconnected from the PDU when working on components inside the PDU chassis. If it is necessary to work on components in the PDU with power applied, a minimum 36-in working clearance must be maintained in front of the PDU. This workspace is required and must be maintained around all electrical equipment where parts of an energized system may be serviced. To maintain this clearance, remove the door from the cabinet facing the energized parts, and install an insulating barier to prevent any grounded equipment from coming in contact with the energized components in the PDU. Failure to do so could result in serious injury or death.

Procedure

- **1.** Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

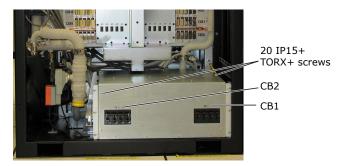
- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 30. Circuit Breakers for Cabinet (left) and Blower (right)



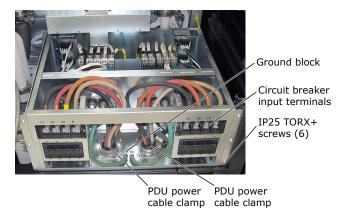
- **2.** Work with a site electrician to ensure that circuit breakers for the cabinet at the wall panel are off. Use appropriate lockout/tagout or other site-specific procedures to indicate that the breakers are off.
- **3.** Open the rear door of the cabinet.
- **4.** Have a Cray contracted or customer contracted electrician disconnect the input power cables from the PDU circuit breakers by using the following procedure:
 - a. Remove the IP15 Torx+ screws (20) that attach the front cover to the PDU and remove the cover.
 - b. Use the digital multimeter to verify that no voltage is present on the input terminals of circuit breakers CB1 and CB2.
 - c. Label and disconnect the PDU power cable wires from the ground blocks and the input terminals of circuit breakers CB1 and CB2.
 - d. Loosen the power-cable clamps and remove the power cables by pulling them through the bottom of the PDU.
- 5. Remove the IP25 Torx+ screws (6) that attach the PDU assembly to the cabinet frame.

Figure 31. PDU Cover Screws



- **6.** Slide the PDU assembly about 6 inches (15 cm) out of the cabinet to access the connectors on the back of the PDU.
- 7. Label and disconnect the power cables (6) from the back of the PDU; press the tabs on the sides of the connectors and pull the connectors straight out.
- 8. Slide the PDU straight out of the cabinet.

Figure 32. PDU Power Cable Clamps



2.8.2 Install a Power Distribution Unit (PDU)

Prerequisites

Tools Required:

T15 Torx driver

T25 Torx driver

Large slotted screwdriver

Time Required:

15 minutes

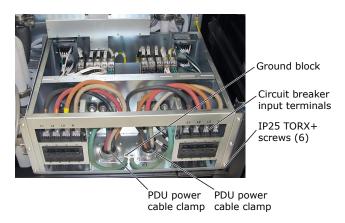
About this task

This procedure may require a Cray contracted or customer contracted electrician to complete lockout/tagout procedures or disconnect facility power. Allow time in the preventive maintenance schedule for this requirement.

Procedure

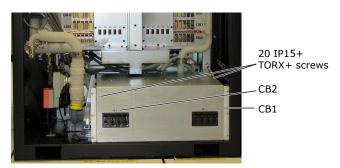
1. Position the back of the PDU assembly onto the support rails, and slide the PDU partially into the cabinet.

Figure 33. PDU Power Cable Clamps



- 2. Reconnect the power cables (6) to the back of the PDU.
- **3.** Slide the PDU fully into the cabinet.
- **4.** Reinstall the IP25 Torx+ screws (6) that attach the PDU to the cabinet frame.

Figure 34. PDU Cover Screws



- **5.** Have a Cray contracted or customer contracted electrician reconnect the input power cables to the PDU circuit breakers by using the following procedure:
 - a. Reinstall the input power cables through the support plates in the bottom of the PDU and reattach the cable clamps.
 - b. Reconnect the PDU power cable wires to the ground blocks and the input terminals of circuit breakers CB1 and CB2.
 - c. Replace the front cover on the PDU and reinstall the twenty screws.
- 6. Close the rear door of the cabinet.
- 7. Work with a site electrician to ensure that circuit breakers for the cabinet at the wall panel are turned on.
- 8. Power up all of the cabinets in the row.

- a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
- b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 35. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.9 Power Supply Rack Replacement

2.9.1 Remove a Power Supply Rack

Prerequisites

Tools Required:

T25 Torx driver

T30 Torx driver

IP25 Torx+ driver (14)

Large slotted screwdriver

Time Required:

20 - 25 minutes

About this task

This procedure may require a Cray contracted or customer contracted electrician to complete lockout/tagout procedures or disconnect facility power. Allow time in the preventive maintenance schedule for this requirement.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 36. Circuit Breakers for Cabinet (left) and Blower (right)



2.

WARNING:

- Electrical hazard
- Make sure the circuit breaker for the cabinet is off, locked, and tagged. Failure to do so could
 result in severe shock and burns.

Work with the site electrician to verify that circuit breakers for the cabinet at the wall panel are off. Use appropriate lockout/tagout or other site-specific procedures to indicate that the breakers are off.

- 3. Open the front door of the cabinet.
- **4.** Remove each power supply from the power supply rack.
 - a. Loosen each thumb screw at the top right of the power supply.
 - b. Pull each extractor handle down.
 - c. Pull the power supply outward.

The system will have 2, 4, or 6 fully populated shelves starting at the bottom. Shelves that do not have power supplies will have blank panels. Note the location of each power supply so that power supplies can be reinstalled in the correct slots.

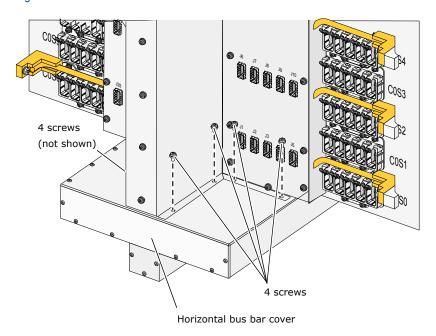
5. Remove the IP25 Torx+ screws (14) that attach the power supply rack assembly to the cabinet frame.

Figure 37. Power Supply Rack



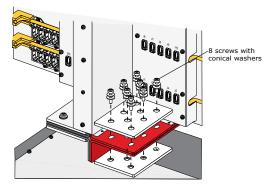
6. Remove the IP15 Torx+ screws (8) that attach the horizontal bus bar to the cover and remove the cover.

Figure 38. Horizontal Bus Bar Cover



7. Remove the T30 Torx screws (8) that attach the black horizontal bus bar to the vertical bus bar.

Figure 39. Horizontal Bus Bar Assembly Screws



- **8.** Disconnect control cables P1 through P6 from the environmental distribution board. If necessary, slide PDU out to disconnect power cables.
- **9.** Slide the power supply shelf out of the cabinet frame to make the connectors on the rear of the power supply rack are accessible.

Cables may need to be fed from the rear as the power supply shelf is pulled out.

10. Disconnect the control cables (6) and power cables (6) from the back of the power supply rack and make sure all are labeled.

11.

CAUTION:

- Heavy equipment
- The power supply rack and the horizontal bus bar assembly weigh 118 lbs (54 kg). The power supply rack must be removed with the assistance of a qualified personnel. Failure to do so may result in personal injury or equipment damage.

With the assistance of qualified personnel, use proper lifting techniques to place the power supply rack on a sturdy work surface.

2.9.2 Install a Power Supply Rack

Prerequisites

Tools Required:

T25 Torx driver

T30 Torx driver

IP25 Torx+ driver (14)

Large slotted screwdriver

Time Required:

20 - 25 minutes

IMPORTANT: Any time fasteners are removed from the main power buss structure, like to replace a back plane or a rectifier rack, there must be an initial torque and a torque verify performed by a second person during reassembly.

About this task

This procedure may require a Cray contracted or customer contracted electrician to complete lockout/tagout procedures or disconnect facility power. Allow time in the preventive maintenance schedule for this requirement.

Procedure

1. 🛕

CAUTION:

- Heavy equipment
- The power supply rack and the horizontal bus bar assembly weigh 118 lbs (54 kg). The power supply rack must be removed with the assistance of a qualified personnel and using proper lifting techniques. Failure to do so may result in personal injury or equipment damage.

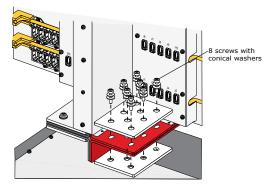
With the assistance of qualified personnel, place the power supply rack near the compute rack to reconnect cables.

2. Reconnect the control cables (6) and power cables (6) to the back of the power supply rack.



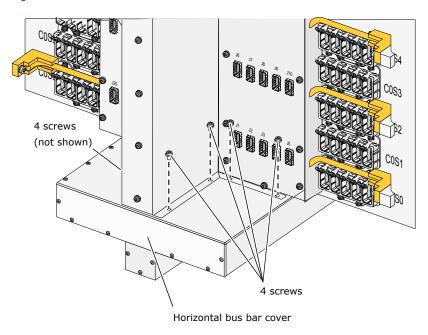
- **3.** Position the back of the power supply rack assembly onto the support rails, and slide the power supply rack into the cabinet. Pull cables back through the grommet holes while pushing assembly in to prevent them from being smashed and possibly damaged.
- **4.** Connect the control cables to the environmental distribution board.
- **5.** Reinstall the T30 Torx screws (8) and torque to 95 in-lbs. to secure the red horizontal bus bar to the vertical bus bar. Have an authorized individual verify that the torque value is correct and paint the hardware with torque marker paint.
- **6.** Reinstall the T30 Torx screws (8) and torque to 95 in-lbs. to secure the black horizontal bus bar to the vertical bus bar. Have an authorized individual verify that the torque value is correct and paint the hardware with torque marker paint.

Figure 40. Horizontal Bus Bar Assembly Screws



7. Replace the horizontal bus bar cover and install the IP15 Torx+ screws (8) that secure the horizontal bus bar to the cover.

Figure 41. Horizontal Bus Bar Cover



8. Reinstall the IP25 Torx+ screws (8) that secure the power supply rack assembly to the cabinet frame.

Figure 42. Power Supply Rack



- 9. Reinstall each power supply in the power supply rack
 - a. Put the power supply into the slot.
 - b. Tighten the thumb screw at the top right of the power supply.
 - c. Pull the extractor handle up.

The system will have two, four, or six fully populated shelves starting at the bottom. Shelves that do not have power supplies will have blank panels.

- 10. Close the front door the cabinet.
- 11. Work with a site electrician to ensure that circuit breakers for the cabinet at the wall panel are turned on.
- 12. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 43. Circuit Breakers for Cabinet (left) and Blower (right)



2.10 Cabinet Controller Replacement

2.10.1 Remove a Cabinet Controller

Prerequisites

Tools Required:

Small slotted screwdriver

Time Required:

5 minutes

An XC Series-AC Cabinet Controller Replacement video is available that shows how to remove and install this component.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 44. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the front door of the cabinet.
- 3. Disconnect the Ethernet and serial cables from the front of the cabinet controller and label all cables.
- 4. Simultaneously pull out on both extractor handles until they stop.
- 5. Slide the cabinet controller straight out of the cabinet and set it on an ESD-safe surface.

Figure 45. Cabinet Controller



2.10.2 Install a Cabinet Controller

Prerequisites

Tools Required:

Small slotted screwdriver

Time Required:

5 minutes

About this task

Procedure

1. Align the guide rail on the cabinet controller with the guide slot in the front of the chassis.

Figure 46. Cabinet Controller



2. Slide the cabinet controller into the chassis until it stops.

Push the center of the face plate to avoid pinching fingers under the extractor handles.

3. Engage the tabs on the extractor handles with the extractor flanges on the sides of the chassis.

- 4. Push in on both extractor handles simultaneously until they lock in place.
- **5.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 47. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.11 Cabinet Controller Backplane Replacement

2.11.1 Remove a Cabinet Controller Backplane

Prerequisites

Tools Required:

T15 Torx driver

Small slotted screwdriver

Time Required:

30 minutes

About this task

The X and Y cabinet address information, cabinet type, and coordinated cooling region (CCR) position for the cabinet controller is stored on the cabinet controller backplane SEEP. This information must be re-entered on the operator interface when replacing the cabinet controller backplane.

Procedure

1. Power down all of the cabinets in the row.

a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

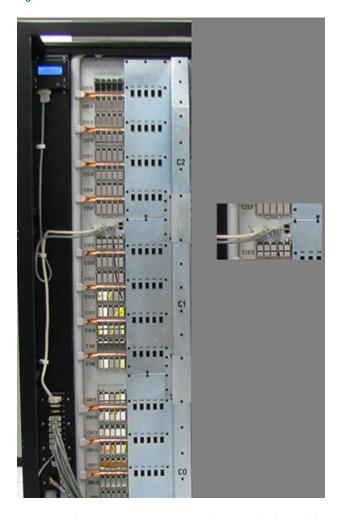
- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 48. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the front door of the cabinet.
- 3. Remove the cabinet controller.
- **4.** Label and disconnect the environmental distribution board cable and operator interface cables from the cabinet controller backplane at the rear of the cabinet.

Figure 49. Cabinet Controller Cables



- **5.** Remove the IP15 Torx+ screws that attach the cabinet controller backplane to the cabinet backplane.
- 6. Remove the module from slot 15.
- **7.** Push the backplane assembly towards the front of the cabinet.
- 8. Working from the front of the cabinet, slide the backplane assembly out and set it on an ESD-safe surface.

2.11.2 Install a Cabinet Controller Backplane

Prerequisites

Tools Required:

Small slotted screwdriver

T15 Torx driver

Time Required:

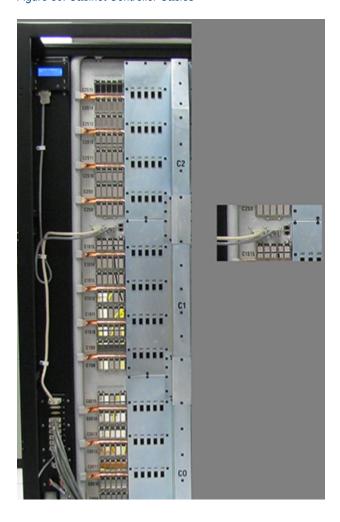
30 minutes

About this task

The X and Y cabinet address information, cabinet type, and coordinated cooling region (CCR) position for the cabinet controller are stored on the cabinet controller backplane SEEP. This information must be re-entered on the operator interface when replacing the cabinet controller backplane.

Procedure

- 1. Align the guide rail on the cabinet controller backplane with the guide slot in the front of the chassis.
- 2. Slide the backplane assembly into the chassis until it stops.
- **3.** Make sure slot 15 is empty.
- **4.** Working from the rear of the cabinet, replace the IP15 Torx+ screws (7) that attach the cabinet controller backplane to the cabinet backplane.
- **5.** Reconnect the environmental distribution board and operator interface cables to the backplane assembly. *Figure 50. Cabinet Controller Cables*



6. Reinstall the cabinet controller.

- 7. Close the front door of the cabinet.
- 8. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 51. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.12 Cabinet Controller DIMM Replacement

2.12.1 Remove a Cabinet Controller DIMM

Prerequisites

Tools Required:

T15 Torx bit

Adjustable torque driver, 5-40 in-lbs

Small slotted screwdriver

Dusting gas

Time Required:

5 minutes

Procedure

- Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 52. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the front door of the cabinet.
- 3. Disconnect the SMW ethernet cables and side band cables.
- 4. Remove the cabinet controller.
- 5. Remove the T15 Torx screws (11) that attach the shroud to the cabinet controller and remove the shroud.
- **6.** Simultaneously push out on both DIMM cams with thumbs to eject the DIMM from the socket.
- 7. Remove the DIMM and place it on an ESD-safe surface.

Figure 53. Cabinet Controller DIMM



2.12.2 Install a Cabinet Controller DIMM

Prerequisites

Tools Required:

T15 Torx bit

Adjustable torque driver, 5-40 in-lbs

Small slotted screwdriver

Dusting gas

Time Required:

5 minutes

Procedure

1. Spray the DIMM contacts and the DIMM socket with dusting gas to remove any debris.



2.

CAUTION:

- Equipment damage
- The DIMM connectors are keyed and the DIMM can be installed in the proper orientation. If the connectors do not mate easily, rotate the DIMM 180 degrees. If connectors are forced together, the DIMM or the blade can be damaged.



CAUTION:

- Equipment damage
- Push down simultaneously and evenly on both ends of the DIMM. If the DIMMs are rocked or one
 end seated before the other end, the DIMM or the blade can be damaged.

Position the DIMM into the socket and simultaneously push down on both ends of the card with thumbs until the card seats and the cams snap closed.

- 3. Replace the shroud and reinstall the T15 Torx screws. Torque the screws to 9 in-lbs.
- 4. Reinstall the cabinet controller.
- 5. Connect the SMW Ethernet cables and side band cables.
- 6. Close the front door of the cabinet.
- **7.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 54. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.13 Chassis Host Replacement

2.13.1 Remove a Chassis Host

Prerequisites

Tools Required:

Small slotted screwdriver

Time Required:

5 minutes

About this task

An XC Series-AC Chassis Host Replacement video is available which shows how to remove and install this component.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.

c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 55. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the front door of the cabinet.
- Label and disconnect the Ethernet and serial cables from the front of the chassis host.
- **4.** Simultaneously push the release button on the end of both extractor handles and pull out on the handles until they stop.
- 5. Slide the chassis host straight out of the cabinet and set it on an ESD-safe surface.

Figure 56. Chassis Host



2.13.2 Install a Chassis Host

Prerequisites

Tools Required:

Small slotted screwdriver

Time Required:

5 minutes

About this task

A XC Series-AC Chassis Host Replacement video is available which shows how to remove and install this component.

Procedure

1. Align the guide rail on the chassis host with the guide slot in the front of the chassis.

Figure 57. Chassis Host



- **2.** Slide the chassis host into the chassis until it stops.
 - Push the center of the face plate to avoid pinching fingers under the extractor handles.
- 3. Engage the tabs on the extractor handles with the extractor flanges on the sides of the chassis.
- **4.** Simultaneously push in on both extractor handles until they lock in place.
- **5.** Reconnect the Ethernet and serial cables to the front of the chassis host.
- 6. Close the door to the front cabinet.
- **7.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 58. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), S0 (for a system), or p0 (for a partition).

2.14 Optical Network Cable Replacement

2.14.1 Remove an Optical Network Cable (AOC)

Prerequisites

Tools Required:

Cable wrap

Diagonal cutter

Time Required:

15 minutes

About this task

The cabinets and blade slots on the XC30-LC and XC40-LC systems do not need to be powered off to remove optical network cables. Optical network cables are often referred to as AOC cables.

ATTENTION: Optical network cables less than one year old do not have the ends cut off. The entire cable is removed from the system and returned to Cray to be submitted for warranty replacement.



CAUTION:

- Damage to AOC cable assemblies as a result of mishandling during the installation, extraction, or return shipping may void the manufacture warranty.
- ESD smocks and shoes must be worn when handling the AOC cables to prevent possible ESD damage.
- AOC connectors should not be dropped or banged against any hard objects.
- The AOC cable has a minimum bend radius of 2 inches (5 cm). Care must be taken to ensure the bend radius is greater than this minimum.
- The cable should not be stepped on nor have heavy or sharp objects placed on them.

Procedure

- **1.** Open the rear door of the cabinet.
- **2.** Locate the cable that needs to be remove and disconnect the cable wraps that secure the cable to the adjacent cables.
- **3.** Gently pull the cable release ring straight out to release the cable from the connector.

Figure 59. Optical Network Cable



- 4. Place the protective cap on the end of the cable.
- 5. Determine how old the cable is.
 - If the cable is more than one year old, cut off the connector on the ends of the optical network cable using a diagonal cutter. Return the ends to Cray.
 - If the cable is less than one year old continue to the following steps.
- **6.** Remove the cable from the cable bundle.
- 7. Coil the cable loosely into 8-10 inch (20-25 cm) loops.
- 8. Wrap Velcro around the coiled cable to hold the bundle together.
- 9. Place the cable into an anti-static bag to be packaged and returned to Cray.

2.14.2 Install an Optical Network Cable (AOC)

Prerequisites

Tools Required:

Cable wrap

Diagonal cutter

Time Required:

15 minutes

About this task

The cabinets and blade slots on the XC30-LC and XC40-LC systems do not need to be powered off to remove optical network cables. Optical network cables are often referred to as AOC cables.

ATTENTION: Optical network cables less than one year old do not have the ends cut off. The entire cable is removed from the system and returned to Cray to be submitted for warranty replacement.



CAUTION:

- Damage to AOC cable assemblies as a result of mishandling during the installation, extraction, or return shipping may void the manufacture warranty.
- ESD smocks and shoes must be worn when handling the AOC cables to prevent possible ESD damage.

- AOC connectors should not be dropped or banged against any hard objects.
- The AOC cable has a minimum bend radius of 2 inches (5 cm). Care must be taken to ensure the bend radius is greater than this minimum.
- The cable should not be stepped on nor have heavy or sharp objects placed on them.

Procedure

- 1. Label the replacement cable.
- 2. Route the replacement cable along the same path as the cable that was removed.

All cables have a tendency to curve or twist in a particular direction. Allow the cable to follow its natural path whenever possible.

3. Align the end of the cable with the backplane connector and push squarely and firmly on the cable to seat it in the connector.

Figure 60. Optical Network Cable



- **4.** Repeat for the other end of the cable.
- **5.** Replace the cable wraps that secure the cable to the adjacent cable bundle.
- **6.** Close the rear door of the cabinet.

2.15 Copper Network Cable Replacement

2.15.1 Remove a Copper Network Cable

Prerequisites

Tools Required:

None

Time Required:

5 minutes

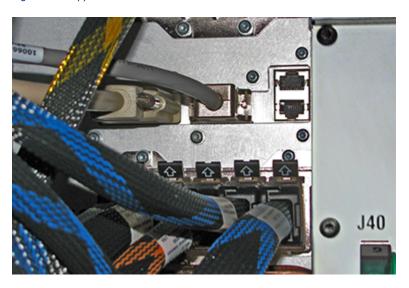
About this task

Copper cables can be intracabinet or intercabinet within a two cabinet pair. The cabinets or blade slots do not need to be powered off to remove copper network cables.

Procedure

- 1. Open the rear door of the cabinet.
- 2. Locate the cable that needs to removed and disconnect the cable wraps that secure the cable to the adjacent cables.
- **3.** Push up the release tab at the top of the cable connector and pull the cable straight out of the connector.
- **4.** Repeat *2* on page 67 and 3 on page 67 for the other end of the cable.
- **5.** Remove the cable from the cabinets.

Figure 61. Copper Network Cable



2.15.2 Install a Copper Network Cable

Prerequisites

Tools Required:

None

Time Required:

5 minutes

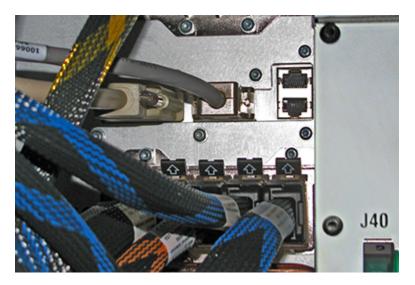
About this task

Copper cables can be intracabinet or intercabinet within a two cabinet pair. The cabinets and blade slots do not need to be powered off to remove copper network cables.

Procedure

- 1. Route the replacement cable along the same path as the cable that was removed.
 - All cables have a tendency to curve or twist in a particular direction. Allow the cable to follow its natural path whenever possible.
- 2. Inspect the cable connector and the corresponding module connector for damage. Ensure that the rows of sockets and pins are straight, that no debris is between the sockets or pins, and that the chamfered surfaces on the cable connector are not scratched or dented.
- **3.** Align the end of the cable with the backplane connector and push squarely and firmly on the cable to seat it in the connector.

Figure 62. Copper Network Cable



- **4.** Repeat for the other end of the cable.
- **5.** Replace the cable wraps that secure the cable to the adjacent cables.
- 6. Close the rear door of the cabinet.

2.16 Temperature and Humidity Sensor Replacement

2.16.1 Remove a Temperature and Humidity Sensor

Prerequisites

Tools Required:

T10 Torx driver

Phillips screwdriver

Time Required:

Approximately 15 minutes; time varies based on the number of compute cabinets in a row

About this task

The temperature and humidity sensor on the XC30-LC and XC40-LC system can only be replaced on the most upstream (with no preconditioner) or downstream end cabinet.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

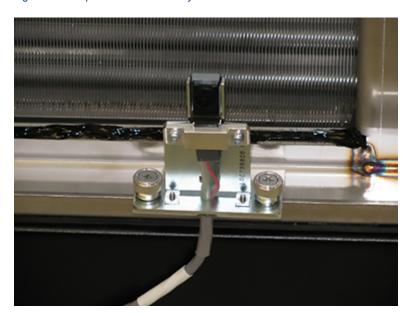
- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 63. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Remove the front and back blowers from the blower cabinet that contains the sensor being replaced.
- 3. Loosen the captive Phillips screws (2) that attach the sensor bracket to the cabinet frame and pull the sensor assembly into the cabinet to access the sensor.
- 4. Remove the T10 Torx+ screws (2) that attach the sensor retainer to the bracket.
- 5. Pull the top of the sensor out from the bracket and disconnect the sensor from the control cable connector.

Figure 64. Temperature and Humidity Sensor



2.16.2 Install a Temperature and Humidity Sensor

Prerequisites

Tools Required:

T10 Torx driver

Phillips screwdriver

Time Required:

Approximately 15 minutes; time varies based on the number of compute cabinets in a row

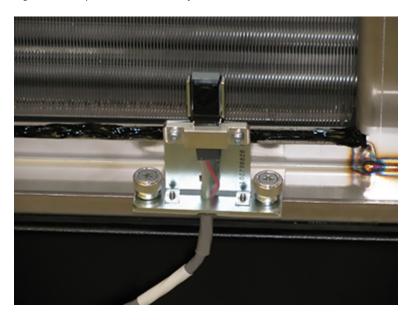
About this task

The temperature and humidity sensor can only be replaced on the most upstream (with no preconditioner) or downstream end cabinet.

Procedure

- 1. Connect the new sensor to the control cable connector and gently position the sensor in the bracket.
- 2. Position the sensor retainer on the bracket and reinstall the T10 Torx+ attachment screws (2).
- **3.** Position the sensor bracket on the blower cabinet frame and tighten the captive Phillips screws (2).

Figure 65. Temperature and Humidity Sensor



- 4. Reinstall the front blower and back blower into the blower cabinet.
- **5.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 66. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.17 Coil Control Board Replacement

2.17.1 Remove a Coil Control Board

Prerequisites

Tools Required:

Small Phillips screwdriver

Slotted screwdriver

5/16-in. socket

Socket driver

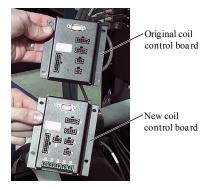
Time Required:

15 minutes

About this task

This removal procedure is the same for the original and new coil control boards on XC30-LC and XC40-LC systems.

Figure 67. Original and New Coil Control Boards



Procedure

L.

WARNING:

- Electrical hazard
- Make sure that the electrical circuit breaker for the cabinet is off, locked, and tagged. Failure to do so could result in severe shock and burns.

Work with a site electrician to ensure that circuit breakers for the cabinet at the wall panel are off. Use appropriate lockout/tagout or other site-specific procedures to indicate that the breakers are off.

- 2. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

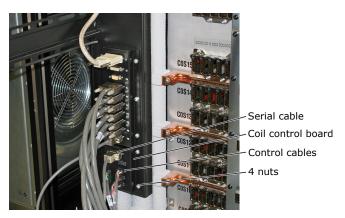
b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.

c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 68. Circuit Breakers for Cabinet (left) and Blower (right)



- **3.** Wait 30 to 40 seconds for the rectifiers to discharge so cables can be safely disconnected. The rectifiers are discharged when the operator interface panel goes dark.
- 4. Open the rear door of the cabinet.
- 5. Disconnect any high-speed network cables required to access the coil control board and label all cables.
- **6.** Loosen the small captive Phillips screws (2) that secure the serial cable to the coil control board and disconnect the cable.



- 7. Label any control cables with missing labels.
- 8. Disconnect the control cables from the coil control board.
- **9.** Remove the 5/16-in. nuts (4) that attach the coil control board to the cabinet and remove the coil control board.

2.17.2 Install a Coil Control Board

Prerequisites

Tools Required:

Small Phillips screwdriver

Slotted screwdriver

5/16-in. socket

Socket driver

Time Required:

15 minutes

About this task

This installation procedure is the same for the original and redesigned coil control boards on XC30-LC and XC40-LC systems.

Figure 69. Original and New Coil Control Boards



Procedure

- 1. Position the coil control board in the cabinet and reinstall the 5/16-in. nuts (4).
- 2. Reconnect the serial cable to the coil control board and tighten the captive screws.
- 3. Reconnect the control cables to the coil control board.
 - P6: Environmental distribution board
 - P1: Temperature sensors
 - P3: Moisture sensor
 - P5: Actuator
 - P2: Transducer
- 4. Reconnect the high-speed network cables removed to access the coil control board.
- **5.** Work with a site electrician to ensure that circuit breakers for the cabinet at the wall panel are turned on.
- **6.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 70. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.18 Non-spring Returned Water Valve Actuator Replacement

2.18.1 Remove a Non-Spring Returned Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Phillips screwdriver

Hex-head tool

Time Required:

8-10 minutes

About this task



CAUTION:

- Equipment damage
- It's recommended to perform this procedure on a powered down cabinet. If performed on a powered
 up cabinet, the actuator must be replaced within 15-20 minutes to prevent possible system EPO and/
 or condensation.



CAUTION:

Equipment damage

• This procedure is affected by the current power consumption and utilization of the system. Be cautious of workload increases or decreases. Significant workflow changes that occur after the system is in manual mode could lead to cabinet EPO and/or condensation.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 71. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the rear door of the cabinet.
- 3. If necessary, cut the tie straps that secure the water valve actuator cable to the adjacent control cables.
- **4.** Verify the water valve is in the fully closed position.
- 5. Place a long piece of tape over the actuator indicator dial to hold it in place.
- 6. Pull on the water valve actuator handle to disconnect the handle from the actuator.
- 7. Remove the hex-head screw that attaches the actuator to the valve and remove the actuator.

 Use the tool on the end of the actuator handle to remove the screw.
- 8. Disconnect the water valve actuator control cable from the coil control board.

Figure 72. Original Actuator



2.18.2 Install a Non-Spring Returned Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Phillips screwdriver

Hex-head tool

Time Required:

8-10 minutes

About this task



CAUTION:

- Equipment damage
- It's recommended to perform this procedure on a powered down cabinet. If performed on a powered up cabinet, the actuator must be replaced within 15-20 minutes to prevent possible system EPO and/ or condensation.



CAUTION:

- Equipment damage
- This procedure is affected by the current power consumption and utilization of the system. Be cautious of workload increases or decreases. Significant workflow changes that occur after the system is in manual mode could lead to cabinet EPO and/or condensation.

Procedure

- 1. Reconnect the water valve actuator control cable to the coil control board and wait until it has finished actuating.
- 2. Verify the actuator is aligned properly. If the actuator is unaligned or is disassembled, use the following steps to realign the actuator.
 - a. Position the metal ring on the actuator. The ring only fits on the actuator in the correct orientation.
 - b. Firmly pull on the water valve actuator handle to disconnect the handle from the actuator.
 - c. Place the actuator shaft in the opening. The shaft only fits in the correct orientation.
 - d. Pull the connecting screw slightly out of the shaft to aid in aligning the shaft in the actuator. Once the shaft is fully inserted, reinstall the hex-head screw.
 - e. Remove the tape covering the actuator indicator dial.
- **3.** If removed, position the handle on the actuator and push firmly to seat the handle.
- **4.** Replace the tie straps that secure the control cables.

5.

CAUTION:

- Equipment damage
- The system must change from manual mode back to automatic mode. Failure to change the system back to manual mode can result in equipment damage.

Implement the following command in the SMW to reactive HSS dynamic control (automatic mode):

6. Close the rear door of the cabinet.

Figure 73. Original Actuator



- **7.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 74. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

2.19 Spring Returned Water Valve Actuator Replacement

2.19.1 Remove a Spring Returned Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Phillips screwdriver

Hex-head tool

Time Required:

8-10 minutes

About this task



CAUTION:

- Equipment damage
- It's recommended to perform this procedure on a powered down cabinet. If performed on a powered up cabinet, the actuator must be replaced within 15-20 minutes to prevent possible system EPO and/ or condensation.



CAUTION:

- Equipment damage
- This procedure is affected by the current power consumption and utilization of the system. Be cautious of workload increases or decreases. Significant workflow changes that occur after the system is in manual mode could lead to cabinet EPO and/or condensation.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 75. Circuit Breakers for Cabinet (left) and Blower (right)



- Stop the MODBUS communication to the actuator while the actuator is replaced from the SMW.
 - a. Determine the manual valve position for the site. Run the xtrsh command to determine the systems current water valve position. Use the largest percentage.

Site water temperatures vary, therefore, the manual valve position must be determined for each site.

```
smw$ xtrsh -l root -b -m \-[0-9]{1,}$' -s'/opt/cray/bin/ccsysd-Q' | grep
"Water valve Position"
   c3-1 ! ** Message: Compute Cab Water Valve Position: 42.00 pct
    c4-0 ! ** Message: Compute Cab Water Valve Position: 40.00 pct
    c6-0 ! ** Message: Compute Cab Water Valve Position: 38.00 pct
   c6-1 ! ** Message: Compute Cab Water Valve Position: 44.00 pct
   c1-0 ! ** Message: Compute Cab Water Valve Position: 46.00 pct
    c4-1 ! ** Message: Compute Cab Water Valve Position: 42.00 pct
    c7-0 ! ** Message: Compute Cab Water Valve Position: 39.00 pct
    c2-0 ! ** Message: Compute Cab Water Valve Position: 38.00 pct
    c1-1 ! ** Message: Compute Cab Water Valve Position: 40.00 pct
    c0-1 ! ** Message: Compute Cab Water Valve Position: 38.00 pct
    c7-1 ! ** Message: Compute Cab Water Valve Position: 42.00 pct
    c0-0 ! ** Message: Compute Cab Water Valve Position: 33.00 pct
    c2-1 ! ** Message: Compute Cab Water Valve Position: 44.00 pct
    c3-0 ! ** Message: Compute Cab Water Valve Position: 36.00 pct
    c5-0 ! ** Message: Compute Cab Water Valve Position: 38.00 pct
   c5-1 ! ** Message: Compute Cab Water Valve Position: 44.00 pct
```

b. Log in to each cabinet controller.

```
smw$ xtlogin cX-Y
```

Change the cabinet directory.

smw\$ cd /sys/kernel/micro/commands/compute_cabinet

d.

CAUTION:

- Equipment damage
- The actuator must return to automatic mode during the installation. Failure to return the actuator to automatic mode can result in equipment damage.

From the current directory, enable manual mode.

0 = manual and 1 = automatic

```
smw$ echo 0 > temp close loop
```

e. Set the valve to the value.

```
smw$ echo 49 > manual_valve_pos
```

f. Verify the updated settings have been written.

smw\$ cat manual valve pos

- 49 The cat command shows the percentage used in 2.d on page 81.
- **3.** Open the rear door of the cabinet.
- 4. Cut the tie straps that secure the water valve actuator cable to the adjacent control cables, if necessary.
- **5.** Verify the water valve is in the fully closed position.
- **6.** Place a long piece of tape over the actuator indicator dial to hold it in place.
- 7. Remove the Phillips screw that attaches the actuator to the valve and remove the actuator.
- 8. Disconnect the water valve actuator control cable from the coil control board.

2.19.2 Install a Spring Returned Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Phillips screwdriver

Hex-head tool

Time Required:

8-10 minutes

About this task



CAUTION:

- Equipment damage
- It's recommended to perform this procedure on a powered down cabinet. If performed on a powered
 up cabinet, the actuator must be replaced within 15-20 minutes to prevent possible system EPO and/
 or condensation.



CAUTION:

- Equipment damage
- This procedure is affected by the current power consumption and utilization of the system. Be cautious of workload increases or decreases. Significant workflow changes that occur after the system is in manual mode could lead to cabinet EPO and/or condensation.

Procedure

- Reconnect the water valve actuator control cable to the coil control board.
- **2.** Verify the actuator is aligned properly. If the actuator is unaligned or is disassembled, use the following steps to realign the actuator.
 - a. Position the metal ring on the actuator. The ring only fits on the actuator in the correct orientation.
 - b. Place the actuator shaft in the opening. The black actuator shaft needs to be perpendicular (90 degrees) to the metal ring for correct alignment.
 - c. Pull the connecting screw slightly out of the shaft to aid in aligning the shaft in the actuator.
 - d. Once the shaft is fully inserted, reinstall the Phillips screw.
 - e. Remove the tape covering the actuator indicator dial.
- **3.** If removed, position the handle on the actuator and push firmly to seat the handle.
- **4.** Replace the tie straps that secure the control cables.
- **5.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 76. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), S0 (for a system), or p0 (for a partition).

6. IMPORTANT: Make sure to work in the correct directory to reactivate the HSS dynamic control.

Reactive the HSS dynamic control (automatic mode) from the SMW.

```
smw$ cd /sys/kernel/micro/commands/compute_cabinet
smw$ echo 1 > temp_close_loop
```

2.20 Redesigned Water Pressure Transducer Replacement

2.20.1 Remove a Redesigned Water Pressure Transducer

Prerequisites

Tools Required:

7/8-in. wrench

1 1/16-in. wrench

Absorbent rags

Teflon tape

Time Required:

15 minutes

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 77. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the rear door of the cabinet.
- **3.** Remove the velcro securing the protective foam cover over the valve.
- **4.** Slide the protective foam cover off the valve.
- 5. Disconnect the control cable from the transducer.
- **6.** Hold the valve in place with a 7/8-in. wrench.
- 7. Once the valve is secure, loosen the transducer with a 1 1/16-in. wrench.

- 8. Remove the transducer from the chilled-water transducer valve.
- 9. Use absorbent rags to clean up any water.

2.20.2 Install a Redesigned Water Pressure Transducer

Prerequisites

Tools Required:

7/8-in. wrench

1 1/16-in. wrench

Absorbent rags

Teflon tape

Time Required:

15 minutes

Procedure

- 1. Hand tighten the new transducer onto the chilled-water transducer valve.
- 2. Hold the valve in place with the 7/8-in. wrench.
- 3. Once the valve is secure, tighten the pressure transducer with two to three turns of the 1 1/16-in wrench.
- Open the chilled-water transducer valve to inspect for leaks.If leaks are found, tighten the tranducer with the wrench until the leak steps.
- 5. Reconnect the control cable to the transducer.
- **6.** Slide the protective foam cover over the valve and secure the cover with Velcro.
- 7. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 78. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

2.21 Original Water Pressure and Temperature Transducer Replacement

2.21.1 Remove an Original Water Pressure and Temperature Tranducer

Prerequisites

Tools Required:

7/8-in. wrench

Absorbent rags

Teflon tape

Time Required:

15 minutes

Procedure

- Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 79. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the rear door of the cabinet.
- 3. Remove the foam insulation from the water pressure and temperature transducer.

4. Close the chilled-water transducer valve.

5. 🛕

CAUTION:

- Personal injury
- Carefully cut the heat shrink tubing using the utility knife to avoid personal injury.

If the pressure transducer is wrapped with heat shrink tubing, use a utility knife to cut the heat shrink and peel it off the transducer.

- **6.** Disconnect the control cable from the transducer.
- 7. Place a rag below the pressure tranducer being replaced.
- **8.** Hold the valve in place with the 7/8-in. wrench.
- **9.** Once the valve is secure, loosen the pressure transducer with a 7/8-in. wrench until it can be removed by hand.
- **10.** Remove the transducer from the chilled-water transducer valve.
- 11. Use absorbent rags to clean up any water.

2.21.2 Install an Original Water Pressure and Temperature Transducer

Prerequisites

Tools Required:

7/8-in. wrench

Absorbent rags

Teflon tape

Time Required:

15 minutes

Procedure

- 1. Hand tighten the new transducer onto the chilled-water transducer valve.
- 2. Hold the valve in place with a 7/8-in. wrench.
- 3. Once the valve is secure, tighten the pressure transducer with two to three turns of the 7/8-in. wrench.
- **4.** Open the chilled-water transducer valve to inspect for leaks.

If leaks are found, tighten the tranducer with the wrench until the leak steps.

- **5.** Reconnect the control cable to the transducer.
- **6.** Slide the protective foam cover over the valve and secure the cover with Velcro.

- 7. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), S0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 80. Circuit Breakers for Cabinet (left) and Blower (right)



2.22 Return or Supply Temperature Sensor Replacement

2.22.1 Remove a Return or Supply Temperature Sensor

Prerequisites

Tools Required:

Utility knife

Sandpaper

Absorbent rags

Time Required:

7-8 minutes

About this task

This sensor is only used in conjunction with the redesigned cooling components on a XC30-LC and XC40-LC system.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 81. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the rear door of the cabinet.
- **3.** Unplug the temperature sensor that needs to be replaced.

Location P10 is the supply sensor and location P11 is the return sensor. Note what pipe the old sensor is attached to so the new temperature sensor is labeled appropriately.

4.

CAUTION:

- Personal injury
- Use caution when cutting the foam with the utility knife. Failure to use caution can cause personal injury.

Cut the foam insulation covering the old temperature sensor using an utility knife and remove it.

Use the new temperature sensor to estimate how much foam to remove. The opening should be approximately 0.5-cm to 1.5-cm larger than the sensor.

5. Peel off the old temperature sensor from the bare metal piping.

CAUTION:

- Personal injury
- Use caution when removing debris with the chissel. Failure to use caution can cause personal injury.

Remove any large pieces of foam from the metal piping with a chissel.

- 7. Use sandpaper to remove any remaining debris.
- 8. Wipe the pipe clean using a clean rag.

2.22.2 Install a Return or Supply Temperature Sensor

Prerequisites

Tools Required:

Utility knife

Time Required:

7-8 minutes

About this task

This sensor is only used in conjunction with the redesigned cooling components on XC30-LC and XC40-LC systems.

Procedure

1. Peel off the adhesive backing from the new temperature sensor and place the sensor on the bare pipe.

2.

CAUTION:

- Personal injury
- Use caution when cutting the foam with the utility knife. Failure to use caution can cause personal injury.

Cut a piece of adhesive foam insulation to cover the new temperature sensor. Make the piece the same size as the hole cut in the foam.

- **3.** Remove the foam adhesive and place the piece of adhesive foam over the new temperature sensor.
- Continue adding foam (2-3 pieces) until the foam over the temperature sensor is flush with the remaining foam.
- Label the temperature sensor connector so it matches the label on the old temperature sensor.
- **6.** Coil the temperature sensor cables and secure them to the water line with Velcro or tapte. Leave enough wire to plug the temperature sensor connectors into the coil control board.
- 7. Connect the new temperature sensor to the same location as the old temperature sensor.

Location P10 is the supply sensor and location P11 is the return sensor.

- 8. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 82. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

3 Blower Cabinet Procedures

3.1 Blower Assembly Replacement

3.1.1 Remove a Blower Assembly

Prerequisites

Tools Required:

T25 Torx driver

Time Required:

10 minutes

About this task



CAUTION:

- Equipment damage
- If the system is powered up, the blower must be reinstalled within 2 minutes after removing the defective blower. Failure to do so can cause the system to overheat.

Procedure

- **1.** Open the front or rear door according to the position of the blower.
- 2. Locate the blower assembly that needs to replaced and place the corresponding circuit breaker in the OFF position.
- **3.** Remove the 25IP Torx+ screws (8) that attach the blower assembly to the cabinet frame.

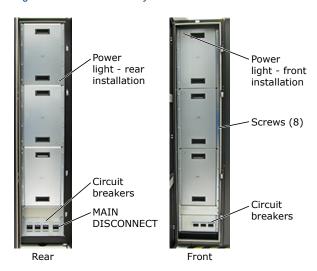
4.

CAUTION:

- Personal injury and equipment damage
- The blower assembly weights 58 lbs (26 kg). Get the assistance of another qualified service personnel, and use proper lifting techniques when handling blower assemblies. Failure to do so could result in personal injury and equipment damage.

Grasp the handles on the front and rear of the blower, and pull the blower straight out of the cabinet with the assistance of a qualified person.

Figure 83. Blower Assembly



3.1.2 Install a Blower Assembly

Prerequisites

Tools Required:

T25 Torx driver

Time Required:

2 minutes

Procedure

.

CAUTION:

- Equipment damage
- If the system is powered up, the blower must be reinstalled within 2 minutes after removing the defective blower. Failure to do so can cause the system to overheat.

Remove the filler assembly, if necessary.

2.

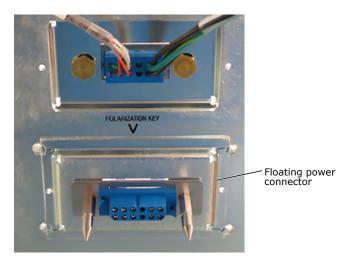
CAUTION:

- Personal and equipment injury
- The blower assembly weighs 58 lbs (26 kg). Get the assistance of another qualified service person and use proper lifting techniques.

Position the blower assembly in the slot and slide it into the cabinet until it stops.

3. Push firmly to seat the connector on the back of the blower.

Figure 84. Blower Power Connector



If the connector does not seat, remove the blower, reposition the floating power connector assembly, and reinstall the blower.

- 4. Reinstall the 25IP Torx+ screws (8) the attach the blower to the cabinet frame.
- 5. Close the front or rear door.

3.2 Blower Control Assembly Replacement

3.2.1 Remove a Blower Control Assembly

Prerequisites

Tools Required:

T10 Torx driver

Time Required:

Approximately 15 minutes; time varies based on the number of compute cabinets in a row

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), S0 (for a system), or p0 (for a partition).

b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.

c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 85. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Open the front door of the cabinet.
- 3. Remove the bottom blower from the front and rear of the cabinet.
- **4.** Disconnect the serial cable and the control cables from the blower control assembly and label cables with missing labels.
- **5.** Remove the 10IP Torx+ screws (10) that attach the blower control cover to the PDU. Note the orientation of the blower control assembly to ensure correct installation.

Figure 86. Blower Control Cover



6. Remove the 10IP Torx+ screws (4) that attach the blower control assembly to the PDU and remove the assembly.

Figure 87. Blower Control Assembly



3.2.2 Install a Blower Control Assembly

Prerequisites

Tools Required:

T10 Torx driver

Time Required:

Approximately 15 minutes; time varies based on the number of compute cabinets in a row

Procedure

1. Position the blower control assembly on the PDU and reinstall the 10IP Torx+ attachment screws (4).

Figure 88. Blower Control Assembly



2. Position the blower control cover on the PDU and reinstall the 10IP Torx+ attachment screws (10).

Figure 89. Blower Control Cover



- 3. Reconnect the serial cable and the six control cables to the blower control assembly.
- **4.** Reinstall the bottom blowers into the front and rear of the cabinet.
- 5. Close the front door of the cabinet.
- **6.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 90. Circuit Breakers for Cabinet (left) and Blower (right)



- Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), S0 (for a system), or p0 (for a partition).

3.3 Blower PDU Replacement

3.3.1 Remove a Blower Power Distribution Unit (PDU)

Prerequisites

Tools Required:

T15 Torx driver

T25 Torx driver

#2 Phillips screwdriver

1/2-in. socket

Socket driver

Digital multimeter

7/64-in. Allen wrench

3/8-in. socket

Time Required:

Approximately 30 minutes; time varies based on the number of compute cabinets in a row

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 91. Circuit Breakers for Cabinet (left) and Blower (right)



2.

WARNING:

- Electrical hazard
- Make sure the circuit breaker for the cabinet is off, locked, and tagged. Failure to do so could
 result in severe shock and burns.

Work with site electrician to ensure that circuit breakers for the cabinet at the wall panel are off. Use appropriate lockout/tagout or other site-specific procedures to indicate that the breakers are off.

- **3.** Open the front door of the cabinet.
- 4. Remove the bottom blower from the front and rear of the cabinet.
- Remove 25IP Torx+ screws (4) that attach the cover panels above the rear of the PDU and remove the panels.

Figure 92. Blower Cabinet PDU (Rear View)



6. Remove 25IP Torx+ screws (4) that attach the cover panels above the front of the PDU and remove the panels.

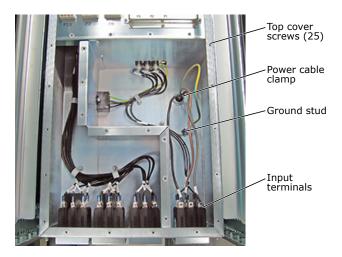
Figure 93. Blower Cabinet PDU (Front View)



- **7.** Have a Cray contracted or customer contracted electrician disconnect the input power cable from the PDU circuit breaker by using the following procedure:
 - a. Disconnect the power cable connector for the cabinet; the connector is located under the raised floor.
 - b. Remove the 7/64-in. Allen head screws that attach the top cover on the rear of the PDU and remove the cover.
 - c. Use a digital multimeter to verify that no voltage is present on the input terminals of the main circuit breaker.

- d. Label and disconnect the power cable wires from the ground stud and the input terminals of the main circuit breaker.
- e. Disconnect the power-cable clamp and remove the power cable by pulling it through the bottom of the PDU.
- f. Disconnect the ground 3/8-in. socket.

Figure 94. Blower Cabinet PDU Connections



- **8.** Label and disconnect the serial cable, the control cables (6), and the power cables (6) from the top of the PDU.
- 9. Remove the 25IP Torx+ screws (4) that attach the PDU to the front frame rails.
- 10. Remove the 15IP Torx+ screws (4) that attach the support brackets to the rear of the PDU.
- **11.** Slide the PDU out the front of the cabinet. Take care not to damage the serial cable that attaches to the adjacent cabinet.

3.3.2 Install a Blower Power Distribution Unit (PDU)

Prerequisites

Tools Required:

T15 Torx driver

T25 Torx driver

#2 Phillips screwdriver

1/2-in. socket

Socket driver

Digital multimeter

7/64-in. Allen wrench

3/8-in. socket

Time Required:

Approximately 30 minutes; time varies based on the number of compute cabinets in a row.

Procedure

- 1. Position the rear of the PDU on the frame rails in the front of the cabinet and slide the PDU into the cabinet. Take care not to damage the serial cable that attaches to the adjacent cabinet.
- 2. Reinstall the 25IP Torx+ screws (4) that attach the PDU to the front frame rails.

Figure 95. Blower Cabinet PDU (Front View)



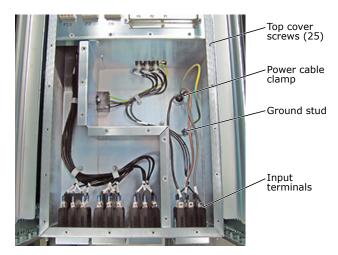
3. Reinstall the 15IP Torx+ screws (4) that attach the support brackets to the rear of the PDU.

Figure 96. Blower Cabinet PDU (Rear View)



4. Reconnect the serial cable, the control cables (6), and the power cables (6) to the top of the PDU.

Figure 97. Blower Cabinet PDU Connections



- 5. Have a Cray contracted or customer contracted electrician disconnect the input power cable from the PDU circuit breaker by using the following procedure:
 - a. Reinstall the power cable through the bottom of the PDU and reattach the cable clamp.
 - b. Reconnect the power cable wires to the ground stud and the input terminals of the main circuit breaker.
 - c. Position the top cover on the PDU and reinstall the 15IP Torx+ attachment screws (25).
 - d. Ensure that the MAIN DISCONNECT switch on the rear of the PDU is in the OFF position.
 - e. Reconnect the power cable connector under the raised floor.
- 6. Position the cover panels above the front and rear of the PDU and reinstall the 25IP Torx+ attachment screws (4).
- 7. Reinstall the bottom blower into the front and rear of the cabinet.
- 8. Close the front door of the cabinet.
- 9. Work with site electrician to ensure that circuit breakers for the cabinet at the wall panel are turned on.
- 10. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 98. Circuit Breakers for Cabinet (left) and Blower (right)



a. Close the rear door of the cabinet.

b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

4 Preconditioner Cabinet Procedures

4.1 Preconditioner Liquid Sensor Replacement

4.1.1 Remove a Preconditioner Liquid Sensor

Prerequisites

Tools Required:

Diagonal cutter

1/4-in. socket

Socket driver

Tie straps

Balldriver Set, 11 Piece 5/64-in. - 3/8-in.

Time Required:

15 minutes

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

```
smw$ xtcli power down Hostname
```

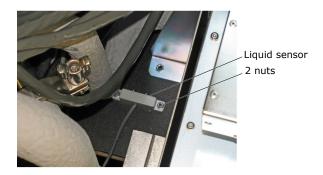
- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 99. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Remove the side panel from the EMI filter.
 - a. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - b. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to open the side panel.
 - c. Grasp both sides of the side panel and lift up to remove the side panel.
 - d. Place the side panel in a safe location.
- 3. Disconnect the liquid sensor control cable from the coil control board.
- 4. Cut the tie straps that secure the liquid sensor cable to the adjacent control cables.
- **5.** Remove the 1/4-in. nuts (2) that attach the liquid sensor to the cabinet and remove the sensor.

Figure 100. Liquid Sensor



4.1.2 Install a Preconditioner Liquid Sensor

Prerequisites

Tools Required:

Diagonal cutter

1/4-in. socket

Socket driver

Tie straps

Balldriver Set, 11 Piece 5/64-in. - 3/8-in.

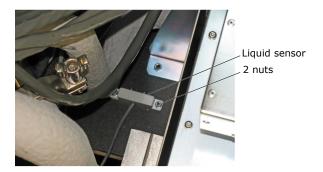
Time Required:

15 minutes

Procedure

- 1. Position the liquid sensor in the cabinet and reinstall the 1/4-in. nuts (2).
- 2. Reconnect the control cable to the coil control board.
- **3.** Replace the tie straps that secure the control cables.

Figure 101. Liquid Sensor



- **4.** Replace the EMI filter side panel.
 - a. Lift the side panel and position it in the lower lip of the cabinet.
 - b. Push the side panel up against the cabinet.
 - c. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - d. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to close the side panel.
- **5.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 102. Circuit Breakers for Cabinet (left) and Blower (right)



- Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

4.2 Non-Spring Returned Preconditioner Water Valve Actuator Replacement

4.2.1 Remove a Non-Spring Returned Preconditioner Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Balldriver Set, 11 Piece 5/64-3/8"

Phillips screwdriver

Time Required:

15 minutes

About this task



CAUTION:

- Equipment damage
- Cray recommends performing this procedure on a powered down cabinet. If performed on a powered
 up cabinet, the procedure must be completed within 15-20 minutes to prevent possible system EPO
 and/or condensation.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 103. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Remove the side panel from the EMI filter.
 - a. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - b. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to open the side panel.
 - c. Grasp both sides of the side panel and lift up to remove the side panel.
 - d. Place the side panel in a safe location.
- 3. Disconnect the water valve actuator control cable from the coil control board.
- 4. Cut the tie straps that secure the water valve actuator cable to the adjacent control cables, if necessary.
- **5.** Verify the water valve is in the fully closed position.
- 6. Place a long piece of tape over the actuator indicator dial to hold it in place.
- 7. Pull up firmly on the water valve actuator handle to disconnect the handle from the actuator.
- Remove the hex-head screw that attaches the actuator to the valve and remove the actuator. Use the tool on the end of the handle to remove the screw.

4.2.2 Install a Non-Spring Returned Preconditioner Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Balldriver Set, 11 Piece 5/64-3/8"

Phillips screwdriver

Time Required:

15 minutes

About this task



CAUTION:

Equipment damage

• Cray recommends performing this procedure on a powered down cabinet. If performed on a powered up cabinet, the procedure must be completed within 15-20 minutes to prevent possible system EPO and/or condensation.

Procedure

- **1.** Reconnect the water valve actuator control cable to the coil control board.
- **2.** Verify the actuator is aligned properly. If the actuator is unaligned or is disassembled, use the following steps to realign the actuator.
 - a. Position the metal ring on the actuator. The ring only fits on the actuator in the correct orientation.
 - b. Place the actuator shaft in the opening. The black actuator shaft needs to be perpendicular (90 degrees) to the metal ring for correct alignment.
 - c. Pull the connecting screw slightly out of the shaft to aid in aligning the shaft in the actuator. Once the shaft is fully inserted, reinstall the Phillips screw.
 - d. Remove the tape covering the actuator indicator dial.
- 3. If removed, position the handle on the actuator and push firmly to seat the handle.
- **4.** Replace the tie straps that secure the control cables.
- **5.** Replace the EMI filter side panel.
 - a. Lift the side panel and position it in the lower lip of the cabinet.
 - b. Push the side panel up against the cabinet.
 - c. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - d. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to close the side panel.
- **6.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 104. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), S0 (for a system), or p0 (for a partition).

4.3 Spring Returned Preconditioner Water Valve Actuator Replacement

4.3.1 Remove a Spring Returned Preconditioner Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Balldriver Set, 11 Piece 5/64-3/8in

Phillips screwdriver

Time Required:

15 minutes

About this task



CAUTION:

- Equipment damage
- It's recommended to perform this procedure on a powered down cabinet. If performed on a powered
 up cabinet, the procedure must be completed within 15-20 minutes to prevent possible system EPO
 and/or condensation.



CAUTION:

- Equipment damage
- This procedure is affected by the current power consumption and utilization of the system. Be cautious of workload increases or decreases. Significant work flow changes that occur after the system is in manual mode could lead to cabinet EPO and/or condensation.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 105. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Remove the side panel from the EMI filter.
 - a. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - b. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to open the side panel.
 - c. Grasp both sides of the side panel and lift up to remove the side panel.
 - d. Place the side panel in a safe location.
- **3.** From the SMW, stop the MODBUS communication to the actuator.
 - a. Site water temperatures vary, therefore, the manual valve position must be determined for each site. Run the xtrsh command to determine the systems current water valve position. Use the largest percentage.

```
smw$ xtrsh -l root -b -m '-[0-9]{1,}$' -s'/opt/cray/bin/ccsysd-Q' | grep
"Water Valve Position"
    c3-1 ! ** Message: Precond Cab Water Valve Position: 42.00 pct
    c4-0 ! ** Message: Precond Cab Water Valve Position: 40.00 pct
    c6-0 ! ** Message: Precond Cab Water Valve Position: 38.00 pct
    c6-1 ! ** Message: Precond Cab Water Valve Position: 44.00 pct
    c1-0 ! ** Message: Precond Cab Water Valve Position: 46.00 pct
    c4-1 ! ** Message: Precond Cab Water Valve Position: 42.00 pct
    c7-0 ! ** Message: Precond Cab Water Valve Position: 39.00 pct
    c2-0 ! ** Message: Precond Cab Water Valve Position: 38.00 pct
    c1-1 ! ** Message: Precond Cab Water Valve Position: 40.00 pct
    c0-1 ! ** Message: Precond Cab Water Valve Position: 38.00 pct
    c7-1 ! ** Message: Precond Cab Water Valve Position: 42.00 pct
    c0-0 ! ** Message: Precond Cab Water Valve Position: 33.00 pct
    c2-1 ! ** Message: Precond Cab Water Valve Position: 44.00 pct
    c3-0 ! ** Message: Precond Cab Water Valve Position: 36.00 pct
    c5-0 ! ** Message: Precond Cab Water Valve Position: 38.00 pct
    c5-1 ! ** Message: Precond Cab Water Valve Position: 44.00 pct
```

b. Log in to each cabinet controller.

```
smw$ xtlogin cX-Y
```

c. Change the cabinet directory.

```
smw$ cd /sys/kernel/micro/commands/precond cabinet
```

d. Set the valve position.

```
echo 49 > manual valve pos
```

e. Verify the updated settings have been written.

```
smw$ cat manual_valve_pos
```

49 - The cat command shows the percentage used in step d.

f.

\triangle

CAUTION:

- Equipment damage
- The actuator must return to automatic mode during the installation. Failure to return the actuator to automatic mode can result in equipment damage.

Enable manual mode.

0 = manual and 1 = automatic

smw\$ echo 0 > temp_close_loop

- 4. Cut the tie straps that secure the water valve actuator cable to the adjacent control cables.
- **5.** Verify the water valve is in the fully closed position.
- 6. Place a long piece of tape over the actuator indicator dial to hold it in place.
- 7. Remove the Phillips screw that attaches the actuator to the valve and remove the actuator.
- 8. Disconnect the water valve actuator control cable from the coil control board.

4.3.2 Install a Spring Returned Preconditioner Water Valve Actuator

Prerequisites

Tools Required:

Diagonal cutter

Tie straps

Balldriver Set, 11 Piece 5/64-3/8-in.

Phillips screwdriver

Time Required:

15 minutes

About this task



CAUTION:

- Equipment damage
- Cray recommends to performing this procedure on a powered down system. If performed on a
 powered up cabinet, the procedure must be completed within 15-20 minutes to prevent possible
 system EPO and/or condensation.

Procedure

- 1. Reconnect the water valve actuator control cable to the coil control board.
- **2.** Verify the actuator is aligned properly. If the actuator is unaligned or is disassembled, use the following steps to realign the actuator.
 - a. Position the metal ring on the actuator. The ring only fits on the actuator in the correct orientation.
 - b. Place the actuator shaft in the opening. The black actuator shaft needs to be perpendicular (90 degrees) to the metal ring for correct alignment.
 - c. Pull the connecting screw slightly out of the shaft to aid in aligning the shaft in the actuator. Once the shaft is fully inserted, reinstall the Phillips screw.
 - d. Remove the tape covering the actuator indicator dial.
- 3. If removed, position the handle on the actuator and push firmly to seat the handle.
- **4.** Replace the tie straps that secure the control cables.
- 5. From the SMW, reactivate HSS dynamic control.

smw\$ echo 1 > temp_close_loop

- **6.** Replace the EMI filter side panel.
 - a. Lift the side panel and position it in the lower lip of the cabinet.
 - b. Push the side panel up against the cabinet.
 - c. Turn the top two guarter-turn fasteners with a 5/16-in. balldriver wrench.
 - d. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to close the side panel.
- 7. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 106. Circuit Breakers for Cabinet (left) and Blower (right)



- Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), S0 (for a system), or p0 (for a partition).

4.4 Original Preconditioner Water Pressure and Temperature Transducer Replacement

4.4.1 Remove an Original Preconditioner Water Pressure and Temperature Transducer

Prerequisites

Tools Required:

Two small adjustable wrenches

Absorbent rags

Teflon tape

Balldriver Set, 11 Piece 5/64-3/8-in.

Time Required:

15 minutes

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 107. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Remove the side panel from the EMI filter.
 - a. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.

- b. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to open the side panel.
- c. Grasp both sides of the side panel and lift up to remove the side panel.
- d. Place the side panel in a safe location.
- 3. Remove the foam insulation from the water pressure and temperature transducer.
- 4. Close the chilled-water transducer valve.
- 5. Loosen the locking collar on the transducer control cable and disconnect the cable from the transducer.
- **6.** Remove the transducer from the chilled-water transducer valve.

Figure 108. Water Pressure and Temperature Transducer



7. Use absorbent rags to clean up any water.

4.4.2 Install an Original Preconditioner Water Pressure and Temperature Transducer

Prerequisites

Tools Required:

Small adjustable wrench (2)

Absorbent rags

Teflon tape

Balldriver Set, 11 Piece 5/64-3/8-in.

Time Required:

15 minutes

Procedure

- **1.** Hand tighten the new transducer onto the chilled-water transducer valve.
- **2.** Hold the valve in place with the 7/8-in. wrench.
- 3. Once the valve is secure, tighten the pressure transducer with two to three turns of the 7/8-in. wrench.
- 4. Install the insulation over the transducer.

Figure 109. Water Pressure and Temperature Transducer



- 5. Replace the EMI filter side panel.
 - a. Lift the side panel and position it in the lower lip of the cabinet.
 - b. Push the side panel up against the cabinet.
 - c. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - d. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to close the side panel.
- 6. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 110. Circuit Breakers for Cabinet (left) and Blower (right)



4.5 Redesigned Preconditioner Water Pressure Transducer Replacement

4.5.1 Remove a Redesigned Preconditioner Water Pressure Transducer

Prerequisites

Tools Required:

7/8-in.

1 1/16-in. wrench

Absorbent rags

Teflon tape

Time Required:

15 minutes

Procedure

- **1.** Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 111. Circuit Breakers for Cabinet (left) and Blower (right)



- **2.** Open the rear door of the cabinet.
- **3.** Remove the Velcro securing the protective foam cover over the valve.
- **4.** Slide the protective foam cover off the valve.
- 5. Disconnect the control cable from the transducer.
- **6.** Hold the valve in place with the 7/8-in. wrench.
- 7. Once the valve is secure, loosen the transducer with a 1 1/16-in. wrench.
- 8. Remove the transducer from the chilled-water transducer valve.
- Use absorbent rags to clean up any water.

4.5.2 Install a Redesigned Preconditioner Water Pressure Transducer

Prerequisites

Tools Required:

7/8-in.

1 1/16-in. wrench

Absorbent rags

Teflon tape

Time Required:

15 minutes

Procedure

- 1. Hand tighten the new transducer onto the chilled-water transducer valve.
- **2.** Hold the valve in place with the 7/8-in. wrench.
- 3. Once the valve is secure, tighten the pressure transducer with two to three turns of the 1 1/16-in. wrench.
- **4.** Open the chilled-water transducer valve to inspect for leaks. If leaks are found, tighten the transducer with the wrench until the leak steps.
- **5.** Reconnect the control cable to the transducer.
- **6.** Slide the protective foam cover over the valve and secure the cover with Velcro.
- **7.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 112. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

4.6 Preconditioner Return or Supply Temperature Sensor Replacement

4.6.1 Remove a Preconditioner Return or Supply Temperature Sensor

Prerequisites

Tools Required:

Utility knife

Sandpaper

Absorbent rags

Balldriver Set, 11 Piece 5/64-3/8-in.

Time Required:

10 minutes

About this task

This sensor is only used in conjunction with the redesigned cooling components on XC30-LC and XC40-LC systems.

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 113. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Remove the side panel from the EMI filter.
 - a. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.

- b. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to open the side panel.
- c. Grasp both sides of the side panel and lift up to remove the side panel.
- d. Place the side panel in a safe location.
- **3.** Unplug the temperature sensor that needs to be replaced.

Location P10 is the supply sensor and location P11 is the return sensor. Note what pipe the old sensor is attached to so the new temperature sensor is labeled appropriately.

4.

CAUTION:

- Personal injury
- Use caution when cutting the foam with the utility knife. Failure to do so can result in personal injury.

Cut the foam insulation covering the old temperature sensor with an utility knife and remove it. Use the new temperature sensor to estimate how much foam to remove. The opening should be approximately 0.5-to-1.5cm larger than the sensor.

5. Peel off the old temperature sensor from the bare metal piping.

6.

CAUTION:

- Personal injury
- Use caution when removing debris with a chisel. Failure to do so can result in personal injury.

Remove any large pieces of foam from the metal piping with a chisel.

- **7.** Remove any remaining debris with sandpaper.
- 8. Wipe the pipe clean with a clean rag.

4.6.2 Install a Preconditioner Return or Supply Temperature Sensor

Prerequisites

Tools Required:

Utility knife

Sandpaper

Absorbent rags

Balldriver Set, 11 Piece 5/64-3/8-in.

Time Required:

10 minutes

About this task

This sensor is only used in conjunction with the redesigned cooling components on XC30-LC and XC40-LC systems.

Procedure

1. Peel off the adhesive backing from the new temperature sensor and place the sensor on the bare pipe.

2.

CAUTION:

- Personal injury
- Use caution when cutting the foam with the utility knife. Failure to do so can result in personal injury.

Cut a piece of adhesive foam insulation to cover the new temperature sensor. Make the piece the same size as the hole cut in the foam.

- 3. Remove the foam adhesive and place the piece of adhesive foam over the new temperature sensor.
- **4.** Continue to add foam until the foam over the temperature sensor is flush with the remaining foam.
- 5. Label the temperature sensor connector to match the label on the old temperature sensor.
- **6.** Coil the temperature sensor cables and secure them to the water line with Velcro or tape. Leave enough wire to plug the temperature sensor connectors into the coil control board.
- **7.** Connect the new temperature sensor to the same location as the old temperature sensor.

Location P10 is the supply sensor and location P11 is the return sensor.

- **8.** Replace the EMI filter side panel.
 - a. Lift the side panel and position it in the lower lip of the cabinet.
 - b. Push the side panel up against the cabinet.
 - c. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - d. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to close the side panel.
- **9.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 114. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

4.7 Preconditioner Air Temperature Sensor Replacement

4.7.1 Remove a Preconditioner Air Temperature Sensor

Prerequisites

Tools Required:

T15 Torx driver

Balldriver Set, 11 Piece 5/64-3/8-in.

Time Required:

10 minutes

Procedure

- Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 115. Circuit Breakers for Cabinet (left) and Blower (right)



- 2. Remove all six blowers from the blower cabinet next to the pre-conditioner.
- 3. From inside the blower cabinet, disconnect the control cable from the temperature strip.
- 4. Remove the T15 screws (4) that attach the temperature sensor to the cabinet.
- **5.** Remove the temperature sensor from the cabinet.

4.7.2 Install a Preconditioner Air Temperature Sensor

Prerequisites

Tools Required:

T15 Torx driver

Balldriver Set, 11 Piece 5/64-3/8in

Time Required:

10 minutes

Procedure

- 1. Place the new temperature sensor in the cabinet and reinstall the T15 Torx screws (4).
- **2.** Connect the control cable to the temperature sensor.
- **3.** Install all six blowers in the blower cabinet next to the pre-conditioner.
- 4. Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 116. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

4.8 Preconditioner Temperature and Humidity Sensor Replacement

4.8.1 Remove a Preconditioner Temperature and Humidity Sensor

Prerequisites

Tools Required:

T10 Torx driver

Phillips screwdriver

Balldriver Set, 11 Piece 5/64-3/8"

Time Required:

Approximately 30 minutes; time varies based on the number of compute cabinets in a row

Procedure

- 1. Power down all of the cabinets in the row.
 - a. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power down Hostname

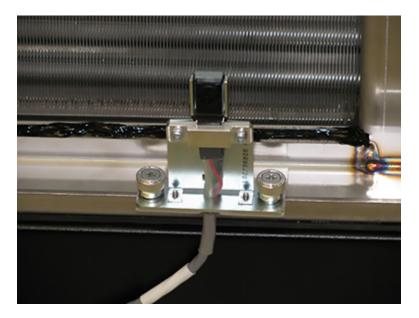
- b. For cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- c. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 117. Circuit Breakers for Cabinet (left) and Blower (right)



- **2.** Remove the side panel from the EMI filter.
 - a. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - b. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to open the side panel.
 - c. Grasp both sides of the side panel and lift up to remove the side panel.
 - d. Place the side panel in a safe location.
- Loosen the captive Phillips screws (2) that attach the sensor bracket to the cabinet frame and pull the sensor assembly into the cabinet to access the sensor.

Figure 118. Temperature and Humidity Sensor



- 4. Remove the IP10 Torx+ screws (2) that attach the sensor retainer to the bracket.
- **5.** Pull the top of the sensor out from the bracket and disconnect the sensor from the control cable connector.

4.8.2 Install a Preconditioner Temperature and Humidity Sensor

Prerequisites

Tools Required:

T10 Torx driver

Phillips screwdriver

Balldriver Set, 11 Piece 5/64-3/8-in.

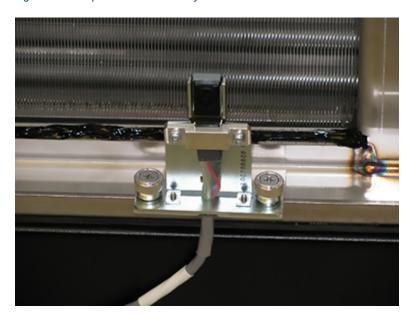
Time Required:

Approximately 30 minutes; time varies based on the number of compute cabinets in a row

Procedure

1. Connect the new sensor to the control cable connector and gently position the sensor in the bracket.

Figure 119. Temperature and Humidity Sensor



- 2. Position the sensor retainer on the bracket and reinstall the IP10 Torx+ attachment screws (2).
- 3. Position the sensor bracket on the cabinet frame and tighten the captive Phillips screws (2).
- **4.** Replace the EMI filter side panel.
 - a. Lift the side panel and position it in the lower lip of the cabinet.
 - b. Push the side panel up against the cabinet.
 - c. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - d. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to close the side panel.
- **5.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 120. Circuit Breakers for Cabinet (left) and Blower (right)



- Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

Hostname is the cabinet, system, or partition ID; examples include c0-0 (for a cabinet), s0 (for a system), or p0 (for a partition).

4.9 Preconditioner Coil Control Board Replacement

4.9.1 Remove a Preconditioner Coil Control Board

Prerequisites

Tools Required:

Small Phillips screwdriver

Balldriver Set, 11 Piece 5/64-3/8"

T15 Torx screwdriver

Socket driver

Time Required:

30 minutes

About this task

This removal procedure is the same for the original and new coil control boards.



DANGER:

- Electrical hazard
- Make sure that the electrical circuit breaker for the cabinet is off, locked, and tagged. Failure to do so could result in severe shock and burns.

Procedure

- 1. Open the rear door of the cabinet.
- 2. For compute cabinets, place main circuit breakers CB1 and CB2 in the OFF (down) position.
- For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the OFF (down) position.

Figure 121. Cabinet (left) and Blower (right) Circuit Breaker



4. Remove the side panel from the EMI filter.

- a. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
- b. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to open the side panel.
- c. Grasp both sides of the side panel and lift up to remove the side panel.
- d. Place the side panel in a safe location.
- Loosen the small captive Phillips screws (2) that secure the serial cable to the coil control board and disconnect the cable.
- 6. Label any control cables with missing labels and disconnect the control cables from the coil control board.
- 7. Remove the T15 screws (2) that attach the coil control board to the cabinet and remove the coil control board.

4.9.2 Install a Preconditioner Coil Control Board

Prerequisites

Tools Required:

Small Phillips screwdriver

Slotted screwdriver

T15 Torx screwdriver

Socket driver

Time Required:

15 minutes

About this task

This removal procedure is the same for the original and new coil control boards.



DANGER:

- Electrical hazard
- Make sure that the electrical circuit breaker for the cabinet is off, locked, and tagged. Failure to do so could result in severe shock and burns.

Procedure

- **1.** Position the coil control board in the cabinet and reinstall the T15 Torx screws (2).
- 2. Reconnect the serial cable to the coil control board and tighten the captive screws.
- **3.** Reconnect the control cables to the coil control board.

P6: Environmental distribution board

P1: Temperature sensors

P3: Moisture sensor

P5: Actuator

P2: Transducer

- **4.** Replace the EMI filter side panel.
 - a. Lift the side panel and position it in the lower lip of the cabinet.
 - b. Push the side panel up against the cabinet.
 - c. Turn the top two quarter-turn fasteners with a 5/16-in. balldriver wrench.
 - d. Turn the four remaining quarter-turn fasteners with a 5/32-in. balldriver wrench to close the side panel.
- **5.** Power up all of the cabinets in the row.
 - a. For blower cabinets, place the MAIN DISCONNECT switch on the rear panel of the blower cabinet PDU in the ON (up) position.
 - b. For cabinets, place main circuit breakers CB1 and CB2 in the ON (up) position.

Figure 122. Circuit Breakers for Cabinet (left) and Blower (right)



- a. Close the rear door of the cabinet.
- b. Enter the following command in a terminal window on the SMW:

smw\$ xtcli power up Hostname

5 Compute and IO Blade Procedures

5.1 Remove a Blade Using xtwarmswap

Prerequisites

Tools Required:

T15 Torx driver

Time Required:

5 minutes

IMPORTANT: Only certain IO blades can be warm swapped. An IO blade with only InfiniBand cards that is labeled LNET on the config sheet may be warm swapped.



WARNING:

- System corruption
- Do not warm swap a boot node, SDB node, DVS node or login/network node. Serious system corruption may occur if an I/O blade is warm swapped during system operation.



CAUTION:

- Equipment damage
- A slot cannot be left empty for more than two minutes on a running system. Leaving a slot empty for more than two minutes can lead to processor throttling.
- Avoid using xtwarmswap when mission critical applications are running.
- Before using xtwarmswap, verify that the system is re-routable using the rtr-s command. If the system cannot be routed, xtwarmswap cannot be used.



CAUTION:

- Equipment overheating
- A filler block needs to be installed for ensure proper cooling.

Procedure

1.

CAUTION:

Loss of data

- The following command terminates any applications that are running; ensure that all applications on the blade are completed. Failure to do so can result in the loss of customer data.
- Avoid using xtwarmswap when mission critical applications are running.

From the login node as root, remove the suspect blade from the job allocation pool.

smw# xtprocadmin -k s admindown -n BladeID

2. From the SMS as crayadm, halt jobs on the admindown slots.

smw\$ xtcli halt BladeID

3. Route the high-speed network around the blade to be removed, and wait for this command to complete.

smw\$ xtwarmswap -r BladeID

4. Power down the blade.

This helps to identify the blade to pull. All lights on the blade will be off.

smw\$ xtcli power down BladeID

- **5.** Open the front door of the cabinet.
- 6. Locate the correct blade.
- 7. Simultaneously push the release button on the end of both extractor handles and pull out on the handles until they stop.

Figure 123. Extractor Handles



- 8. Slide the blade approximately 3/4 of the way out of the cage.
- **9.** Grasp the front of the blade with one hand and the bottom of the blade near the center with the other hand and pull the blade completely out of the cage.
- 10. Set the blade on an ESD-safe surface.

11.

CAUTION:

- Equipment overheating
- If unable to reinstall a blade in the empty slot within 2 minutes, install a filler blade assembly in the empty slot. Failure to do so can cause other blades in the system to overheat.

If returning a blade to Logistics, remove all of the daughter cards, voltage modules, and DIMMs.

5.2 Install a Blade Using xtwarmswap

Prerequisites

Tools Required:

T15 Torx driver

Time Required:

5 minutes

Procedure

- 1. If installing an unpopulated spare blade, acclimatize the blade to the computer room before removing it from the shipping case; reinstall the daughter cards, voltage modules, and DIMMs.
- 2. If a filler blade assembly is installed in the empty slot, remove the filler blade assembly.
- 3. Grasp the front of the blade with one hand and the bottom of the blade near the center with the other hand.
- 4. Align the left and right guide rails on the blade with the guide slots in the sides of the chassis.
- **5.** Slide the blade straight into the cage until it stops; push the center of the face plate to avoid pinching fingers under the extractor handles.
- 6. Push the tabs on the extractor handles with the extractor flanges on the sides of the cage.

Figure 124. Extractor Handles



- 7. Simultaneously push in on both extractor handles until they lock in place.
- 8. Close the front door of the cabinet.
- **9.** From the SMW, power on the blade.

```
smw$ xtcli power up BladeID
```

10. Verify a successful response from the blade controller on replacement blade. Wait for the blade to power on and respond to xtalive before continuing.

```
smw$ xtalive BladeID
```

11. Check the status of the blade slot.

```
smw$ xtcli status -t | BladeID
```

12. Power down then power up components in the Cray system.

```
smw$ xtbounce BladeID
```

- **13.** Update the BIOS, FPGA, and microcontroller firmware on all flash devices associated with the blade.
 - a. If the SMW is running SMW 7.0.UP03.PS11 or later software, ensure the VRMs are updated using the following command.

```
smw$ xtzap vrm -t vdd BladeID
```

Offline diagnostics can now be run on a single blade.

14. Take down all HSN links on the specified blade.

This prepares the blade for the warmswap.

```
smw$ xtbounce --linkdown BladeID
```

15. Activate routing on the newly installed blade.

This command will xtbounce the blade.

```
smw$ xtwarmswap -a BladeID
```

16. Boot compute node Linux.

```
smw$ xtcli boot CNLO BladeID
```

17. Mark the blade nodes up in the SDB.

```
smw$ xtprocadmin -k s up -n BladeID
```

5.3 Remove a Compute or IO Blade

Prerequisites

Tools Required:

T15 Torx driver

Time Required:

5 minutes

About this task

Use this procedure when the operating system is not running. If the operating system is running, use *Remove a Blade Using xtwarmswap* on page 129.

Two videos are available that show how to install and remove these two components:

XC Series-AC Compute Blade Replacement

XC Series-AC IO Blade Replacement

Procedure

- 1. Log on to the SMW as crayadm.
- 2. Power down a blade slot:
 - a. Verify the operating system is not booted.

```
smw$ xtcli status cabinet_id
```

b. Power down the blade slot.

```
smw$ xtcli power down_slot blade_id
```

c. Check the status of the slot to ensure that it powered down properly.

```
smw$ xtcli status blade_id
```

- 3. Open the front door of the cabinet.
- **4.** Locate the blade that needs to be removed.
- **5.** Simultaneously push the release button on the end of both extractor handles and pull out on the handles until they stop.
- **6.** Slide the blade approximately 3/4 of the way out of the cabinet.
- 7. Grasp the front of the blade with one hand and the bottom of the blade near the center with the other hand and pull the blade completely out of the cabinet.
- 8. Set the blade on an ESD-safe surface.
- 9. If returning a blade to Logistics, remove all of the daughter cards, voltage modules, DIMMs, etc.

5.4 Install a Compute or IO Blade

Prerequisites

Tools Required:

T15 Torx driver

Time Required:

5 minutes

About this task

Use this procedure when the operating system is not running. If the operating system is running, use *Install a Blade Using xtwarmswap* on page 131.

Two videos are available that show how to install and remove these components:

XC Series-AC Compute Blade Replacement

XC Series-AC IO Blade Replacement

Procedure

- **1.** If installing an unpopulated spare blade, acclimatize the blade to the computer room before removing it from the shipping case. Then reinstall the daughter cards, voltage modules, DIMMs, etc.
- 2. If a filler blade assembly is in the empty slot, remove the filler blade assembly.
- 3. Grasp the front of the blade with one hand and the bottom of the blade near the center with the other hand.
- Align the left and right guide rails on the blade with the guide slots in the sides of the chassis.
- **5.** Slide the blade straight into the cage until it stops. Push the center of the face plate to avoid pinching fingers under the extractor handles.
- **6.** Engage the tabs on the extractor handles with the extractor flanges on the sides of the cage.
- 7. Simultaneously push in on both extractor handles until they lock in place.
- 8. Close the front door of the cabinet.
- **9.** From the SMW as root, power up the blade slot.

```
smw# xtcli power up slot blade id
```

10. Check the status of the slot to ensure that it powered up properly.

```
smw# xtcli status blade id
```

11. Check for a response from the blade slot.

smw# xtalive

12. Power up the components of the blade slot.

```
smw# xtbounce blade id
```

13. Check the status of the slot to ensure it powered up properly.

```
smw# xtcli status cabinet id
```

5.5 Blade Memory DIMM Replacement

5.5.1 Remove a Blade Memory DIMM

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T10 Torx bit

T15 Torx bit

Dusting gas

Time Required:

7-8 minutes

About this task

Different size and speed grade DIMMs cannot be mixed on a blade. Identical DIMMs must be installed in all of the slots that are common to a node.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- **5.** Locate the defective DIMM.
- 6. Simultaneously push out on both DIMM cams with both thumbs to eject the DIMM from the socket.
- 7. Remove the memory DIMM and place it on an ESD-safe surface.

5.5.2 Install a Blade Memory DIMM

Prerequisites

Different size and speed grade DIMMs cannot be mixed on a blade. Identical DIMMs must be installed in all of the slots that are common to a node.

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T10 Torx bit

T15 Torx bit

Dusting gas

Time Required:

7-8 minutes

Procedure

1. Spray the DIMM contacts and the DIMM socket with dusting gas to remove any debris.

2.

CAUTION:

- Equipment damage
- DIMMs are keyed to allow insertion only in the proper orientation. If the connectors do not mate
 easily, rotate the DIMM 180 degrees. If the connectors are forced together, the DIMM or the blade
 can be damaged.
- Push down simultaneously and evenly on both ends of the DIMM. If the DIMM is rocked or one end is seated before the other end, the DIMM or the blade can be damaged.

Position the DIMM into the socket and simultaneously push down on both ends of the DIMM with both thumbs until the card seats and the cams snap closed.

- 3. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 4. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 5. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- **6.** Reinstall the blade into the cabinet.

5.6 Voltage Module (VRM, VIVOC, and HIVOC) Replacement

5.6.1 Remove a Voltage Module (VRM, VIVOC, and HIVOC)

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

7-8 minutes

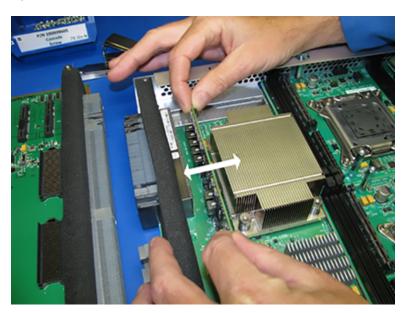
About this task

Four types of voltage modules are attached to the compute and IO blades: Aries VRMs, vertical 48–12Vdc and 52-13Vdc VRMs (VIVOCs), horizontal 48–12Vdc and 52-13Vdc VRMs (HIVOCs), and Intel socket VRMs (IO blades only).

Procedure

- **1.** Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- **5.** Locate the defective voltage module.
- 6. If removing a HIVOC, remove the two IP15 Torx+ screws that attach the voltage module to the daughter card.
- 7. Remove the voltage module.
 - If removing an Aries VRM, or CPU VRM, grab the corners of the voltage module and carefully wiggle it side to side to disconnect it from the VRM connector.

Figure 125. VRM Removal



- For all other voltage modules, grasp the edges of the voltage module and pull out to disconnect it from the VRM connector.
- **8.** Place the voltage module on an ESD-safe surface.

5.6.2 Install a Voltage Module (VRM, VIVOC, and HIVOC)

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

7-8 minutes

About this task

Four types of voltage modules are attached to XC30-LC and XC40-LC: Aries VRMs, vertical 48–12Vdc and 52-13Vdc VRMs (VIVOCs), horizontal 48–12Vdc and 52-13Vdc VRMs (HIVOCs), and Intel socket VRMs (IO blades only).

Procedure

L. 🛕

CAUTION:

- Equipment damage
- The voltage module connectors are keyed for orientation and the voltage module can be installed
 only in the proper orientation. If the connectors do not mate easily, rotate the voltage module 180
 degrees. If the connectors are forced together, the voltage module or the blade can be damaged.
- HIVOCs and VIVOCs have the same key. Verify the replacement components part number before
 inserting it into the connector. Inserting the wrong replacement component into a connector can
 result in equipment damage.

Spray the voltage module contacts and the voltage module socket with dusting gas to remove any debris.

- 2. Position the voltage module in the socket and simultaneously push down on both ends of the voltage module with both thumbs until the voltage module seats.
- 3. If installing a HIVOC, replace the IP15 Torx+ attachment screws (2). Torque the screws to 5.5 in-lbs.
- 4. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- **5.** Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 6. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 7. Reinstall the blade into the cabinet.

5.7 Processor Replacement

5.7.1 Remove a Processor

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T10 Torx bit

T15 Torx bit

Dusting gas

Thermal grease

Isopropyl alcohol

Absorbent wipes

Pen-Vac® processor insertion/removal tool

Time Required:

15 minutes

About this task

The replacement procedure is identical for all types of processors on all daughter cards, except the KPDC.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- 5. Locate the defective processor and remove the processor air duct covering it.
- **6.** Loosen the captive T15 Torx bolts (4) that attach the processor heat sink to the blade in an alternate crisscross pattern until they are completely loose.
- 7. Remove the heat sink and retain it for installation on the replacement processor. If removing more than one processor, note the position of each processor heat sink so each heat sink is returned to its original position.
- **8.** Remove the thermal grease from the processor with a dry, clean cloth.
 - Do not use a liquid, such as isopropyl alcohol. Ensure that the grease does not get under the socket cover.
- **9.** Open the lever near the unlocked symbol and rotate the lever up 100 degrees.



- **10.** Open the second lever and rotate the lever up 100 degrees.
- **11.** Rotate the socket cover up and remove any remaining thermal grease from the processor and the socket cover.

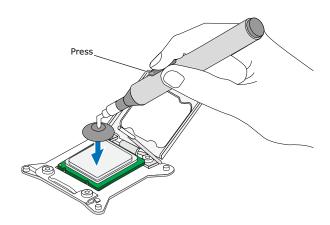
12. 🛕

CAUTION:

- Equipment Damage
- Be careful not to drop the processor on the socket pins. If the processor is dropped into the socket, the pins in the socket can be damaged.

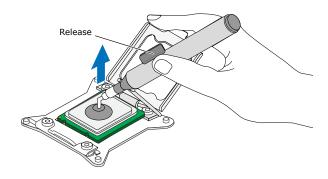
Press the vacuum release button and attach the pen to the processor.

Figure 126. Intel Processor Remove Tool - Attach Pen



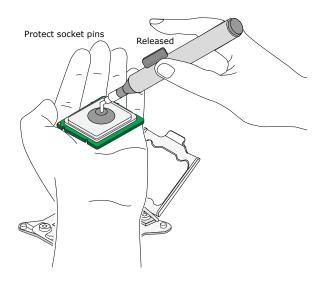
13. Release the vacuum release button and lift the processor out of the socket.

Figure 127. Intel Processor Remove Tool - Release Pen



14. Place hand underneath the processor and transfer to tray or other ESD-safe surface.

Figure 128. Processor Install Tool - Attach



5.7.2 **Install a Processor**

Prerequisites Tools Required:

Adjustable torque driver, 5-40 in-lb

T10 Torx bit

T15 Torx bit

Dusting gas

Thermal grease

Isopropyl alcohol

Absorbent wipes

Pen-Vac® processor insertion/removal tool

Time Required:

15 minutes

About this task

The replacement procedure is identical for all types of processors on all daughter cards, except the KPDC.

Procedure

1.

CAUTION:

- Equipment damage
- The processor is keyed so that it can only be inserted in the proper orientation. If the processor does not mate easily, rotate the processor 90 degrees. If the processor is forced into the socket, the processor or blade may be damaged.

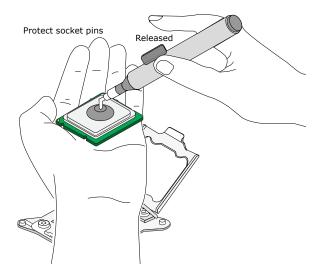


CAUTION:

- Equipment Damage
- Be careful not to drop the processor on the socket pins. If the processor is dropped into the socket, the pins in the socket can be damaged.

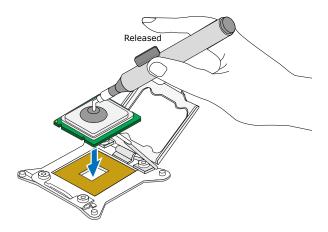
Use the pick up pen to pick up the processor and immediately place another hand underneath.

Figure 129. Processor Install Tool - Attach



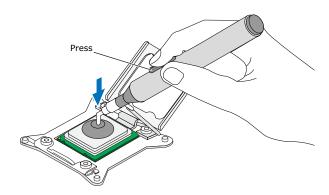
2. Orient the processor in the socket and set it into position.

Figure 130. Processor Install Tool - Insert



3. Press the vacuum release button on the pickup pen to release the processor.

Figure 131. Processor Install Tool - Release



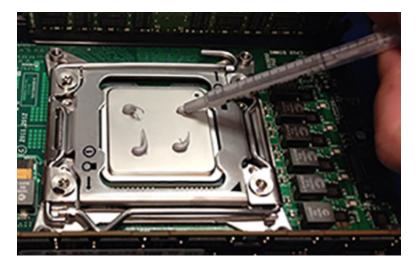
- 4. Close the socket cover.
- **5.** Close the lever near the locked symbol and the second lever to engage the lock.

Figure 132. Processor



- **6.** Use isopropyl alcohol to completely remove the thermal grease from the heat sink.
- **7.** Apply thermal grease in four areas on top of the processor.

Figure 133. Thermal Grease Application



8. Position the heat sink on the processor socket.

If more than one processor heat sink was removed, each heat sink needs to be reinstalled in its original position. Processor heat sinks are not interchangeable.

9.

CAUTION:

- Equipment damage
- Ensure that the heat sink is level while tightening the attachment screws. If the heat sink is tilted, the threads in the processor socket will be damaged.

Hold the heat sink level and with a hand tool. Tighten the T15 Torx bolts (4) that attach the heat sink to the socket.

Tighten the bolts alternately in a criss-cross pattern, one turn each, until they are snug.

Figure 134. Processor Heat Sink



- 10. Torque the T15 Torx bolts to 9 in-lbs.
- **11.** Place the processor air duct over the processor.
- 12. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- **13.** Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- **14.** Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- **15.** Reinstall the blade into the cabinet.

5.8 KPDC Processor Replacement

5.8.1 Remove a Processor on an KPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

Flathead screwdriver

Isopropyl alcohol

Absorbent wipes

Time Required:

10 minutes

About this task



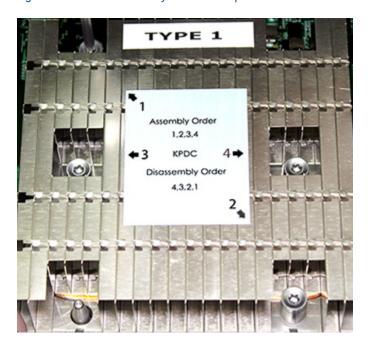
WARNING:

- Equipment Damage
- Do not touch the gold components on the face of the processor chip. This will damage the chip.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- **5.** Locate the defective processor and remove the processor air duct covering it.
- **6.** Remove the T15 screws (4) securing the heatsink to the KPDC in the correct disassembly order.

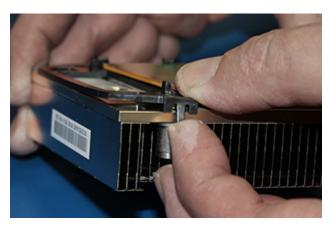
Figure 135. Heatsink Assembly Order Closeup



- a. Remove the screw labeled 4 completely.
- b. Remove the screw labeled 3 completely.
- c. Partially remove the screws labeled 1 and 2 working back and forth between them until completely removed.

7. Remove the clips securing the processor tray to the heatsink.

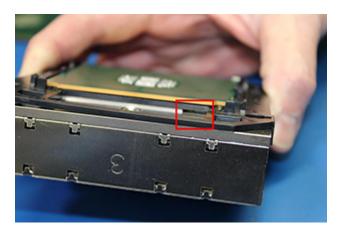
Figure 136. Processor Tray Clip



The processor will still be attached to the heatsink from the thermal grease.

8. Locate a flat slot between the processor tray and the heatsink.

Figure 137. Processor Tray Slot



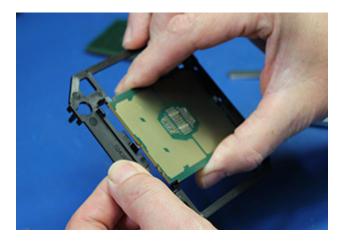
9. Insert a flathead screwdriver into the slot and gently pry the processor tray away from the heatsink to break the seal and remove the tray from the heatsink.

Figure 138. Remove Processor Tray



10. Hold the processor on either side with two fingers and bend back either the top or bottom of the processor tray to release the processor from the retaining clips.

Figure 139. Remove Processor from Tray



11. Still handling the processor from the sides, set it in a holding tray and clean off the thermal grease with a plastic scrapper and isopropyl alcohol.

Figure 140. Clean Processor



12. Clean the thermal grease off the heatsink using a plastic scrapper and isopropyl alcohol.

Figure 141. Clean the Heatsink



5.8.2 Install a Processor on a KPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

Dusting gas

Thermal grease

Time Required:

10 minutes

About this task



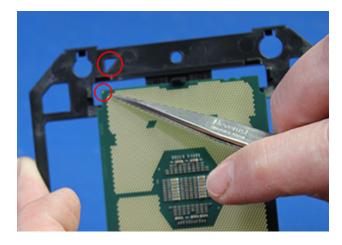
WARNING:

- Equipment Damage
- Do not touch the gold components on the face of the processor chip. This will damage the chip.

Procedure

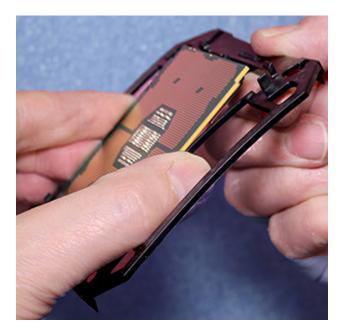
- **1.** Place the processor in the processor tray.
 - a. Hold the processor from the sides with two fingers and line up the gold triangle on the corner of the processor with the triangular hole in the tray.

Figure 142. Triangle Orientation Indicators



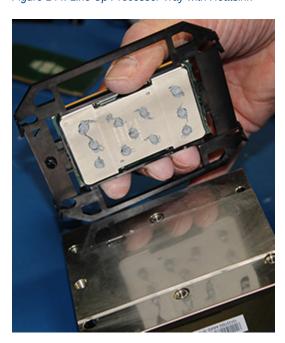
2. Place one end of the processor into the tray, then bend back the other end to properly seat the processor.

Figure 143. Place Processor in Tray



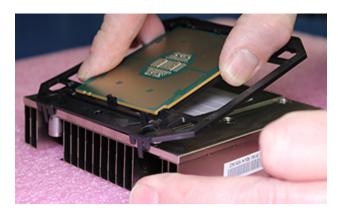
- **3.** Apply 11 small dots of thermal grease to the processor; three on each the top and bottom, and 5 in the middle.
- 4. Line of the holes at the top of both the heatsink and processor tray.

Figure 144. Line Up Processor Tray with Heatsink



5. Snap down the retaining clips to secure the processor tray to the heatsink. Wiggle the tray back and forth and flip the heatsink upside down to test the processor is gripping properly.

Figure 145. Attach Processor Tray to Heatsink



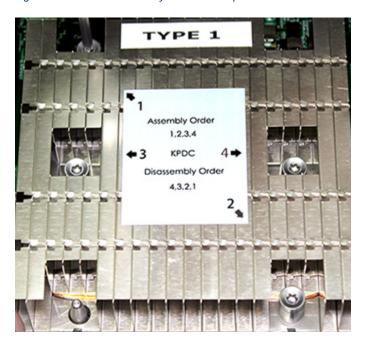
- **6.** Check to make sure all the gold pins on the KPDC are clean and undamaged.
- **7.** Place the heatsink by lining up the heatsink the two pins (one skinny and one fat) to the corresponding holes on the heatsink.

Figure 146. Replace Heatsink on KPDC



8. Tighten the four T15 screws in the correct order and torque to 9 in-lbs.

Figure 147. Heatsink Assembly Order Closeup



- a. Tighten the screw labeled 1 halfway.
- b. Tighten the screw labeled 2 completely.
- c. Tighten screw 1 completely.
- d. Work between screw 3 and 4, tightening them slightly in turn until they are both tightened completely.
- 9. Place the processor air duct over the processor.
- 10. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 11. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 12. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 13. Reinstall the blade into the cabinet.

5.9 KPDC Replacement

5.9.1 Remove a KPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated KPDC

30 minutes to remove a KPDC, transfer the DIMMs and processors to an unpopulated spare KPDC, and install the KPDC

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- **5.** Locate the defective KPDC and remove the processor air ducts covering it.
- 6. Remove the standoffs (6) that attach the KPDC to the blade using the adjustable torque driver.
- 7. Grasp the edges of the KPDC and carefully wiggle the circuit board while pulling straight up to remove it from the blade.

8.

CAUTION:

- Equipment damage
- Carefully place the defective KPDC on a soft, ESD-safe surface with the components facing upward. Place the KPDC down directly and do not drag the KPDC on the surface. Failure to do so can lead to component damage.

Place the KPDC on an ESD-safe surface.

5.9.2 Install a KPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

Time Required:

15 minutes to remove and replace a populated KPDC

30 minutes to remove a KPDC, transfer the DIMMs and processors to an unpopulated spare KPDC, and install the KPDC

Procedure

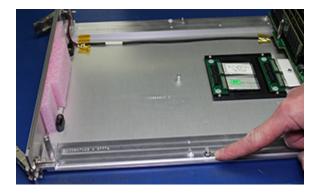
1.

CAUTION:

- Component Damage
- If the standoff on the blade is not in the correct position, the KPDC will be damaged.

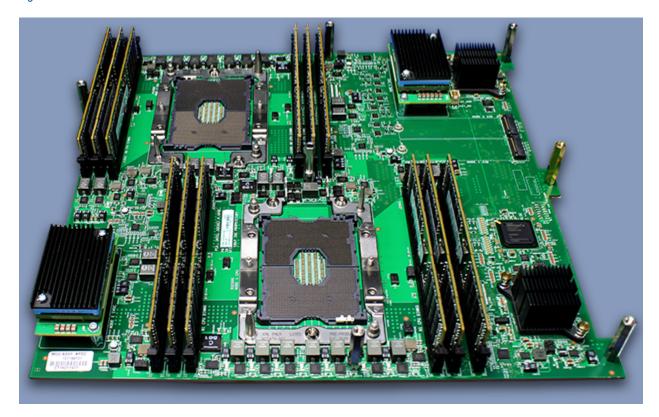
Ensure the small standoff on each side of the blade is in the position labeled "B".

Figure 148. KPDC Standoff Position



- 2. Position the replacement KPDC on the blade and press down firmly in the area of the connector to seat it in the connector on the blade.
- **3.** Hand tighten the standoffs (6) that attach the KPDC to the blade. Torque the standoffs to 14 in-lbs. The bit holder on the torque driver is the same size as the standoff.

Figure 149. KPDC Standoffs



- **4.** Record the location of the DIMMs and processors on the defective KPDC to reinstall them in the same locations on the replacement KPDC.
- **5.** Remove the processors and DIMMs from the defective KPDC.
- **6.** Install the processors and DIMMs on the replacement KPDC.
- 7. Place the processor air ducts and position the power cable assembly on the blade.
- 8. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 9. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 10. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 11. Reinstall the blade into the cabinet.

5.10 QPDC Replacement

5.10.1 Remove a QPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated QPDC

30 minutes to remove a QPDC, transfer the DIMMs and processors to an unpopulated spare QPDC, and install the QPDC

About this task

If installing a spare QPDC, transfer the DIMMs and processors from the defective QPDC to the new QPDC.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- 5. Locate the defective QPDC and remove the processor air ducts covering it.
- **6.** Remove the standoffs (8) that attach the QPDC to the blade with the adjustable torque driver.

The bit holder on the torque driver is the same size as the standoff.

7. Grasp the edges of the QPDC and carefully wiggle the circuit board while pulling straight up to remove it from the blade.

8.

CAUTION:

- Equipment damage
- Carefully place the defective QPDC on a soft, ESD-safe surface with the components facing
 upward. Place the QPDC down directly and do not drag the QPDC on the surface. Failure to do
 so can lead to component damage.

Place the QPDC on an ESD-safe surface with components facing upward.

5.10.2 Install a QPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated QPDC

30 minutes to remove a QPDC, transfer the DIMMs and processors to an unpopulated spare QPDC, and install the QPDC

About this task

If installing a spare QPDC, transfer the DIMMs and processors from the defective QPDC to the new QPDC.

Procedure

- 1. Position the replacement QPDC on the blade and press down firmly in the area of the connector to seat it in the connector on the blade.
- 2. Hand tighten the standoffs (8) that attach the QPDC to the blade. Torque the standoffs to 14 in-lbs.

The bit holder on the torque driver is the same size as the standoff.

- **3.** Record the location of the DIMMs and processors on the defective QPDC to reinstall them in the same locations on the replacement QPDC.
- 4. Remove the processors, DIMMs, and VRMs from the defective OPDC.
- Install the processors, DIMMs, and VRMs on the replacement QPDC.
- **6.** Replace the processor air ducts.
- 7. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 8. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 9. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 10. Reinstall the blade into the cabinet.

5.11 XPDC Replacement

5.11.1 Remove a XPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated XPDC

30 minutes to remove a XPDC, transfer the DIMMs, VRMs, and processors to an unpopulated spare XPDC, and install the XPDC

About this task

If installing a spare XPDC, transfer the DIMMs and processors from the defective XPDC to the new XPDC.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- 5. Locate the defective XPDC and remove the processor air duct covering it.
- **6.** Remove the 1/4-in. standoffs (6) that attach the XPDC to the blade with the adjustable hex driver.

The bit holder on the hex driver is the same size as the standoff.

7. Grasp the edges of the XPDC and wiggle toward the front of the blade while pulling straight up to remove it from the blade.

8. NOTE:

- Equipment damage
- Carefully place the defective XPDC on a soft, ESD-safe surface with the components facing
 upward. Place the XPDC down directly and do not drag the XPDC on the surface. Failure to do
 so can lead to component damage.

Place the XPDC on an ESD-safe surface with components facing upward.

5.11.2 Install an XPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated XPDC

30 minutes to remove a XPDC, transfer the DIMMs, VRMs, and processors to an unpopulated spare XPDC, and install the XPDC

About this task

If installing a spare XPDC, transfer the DIMMs and processors from the defective XPDC to the new XPDC.

Procedure

- 1. Position the replacement XPDC on the blade and press down firmly in the area of the connector to seat it in the connector on the blade.
- 2. Hand tighten the standoffs (6) that attach the XPDC to the blade. Torque the standoffs to 14 in-lbs.

The bit holder on the torque driver is the same size as the standoff.

- **3.** Record the location of the DIMMs, VRMs, and processors on the defective XPDC to reinstall them in the same locations on the replacement XPDC.
- Remove the processors, DIMMS, and VRMs from the defective XPDC.
- 5. Install the processors, DIMMS, and VRMs on the replacement XPDC.
- **6.** Replace the processor air duct.
- 7. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 8. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 9. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.

10. Reinstall the blade into the cabinet.

5.12 SGDC Replacement

5.12.1 Remove a SGDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated SGDC

30 minutes to remove a SGDC, transfer the DIMMs and processors to an unpopulated spare SGDC, and install the SGDC

About this task

If installing a spare SGDC, transfer the DIMMs and processors from the defective SGDC to the new SGDC.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- 5. Locate the defective SGDC and remove the processor air ducts covering it.
- **6.** Remove the standoffs (8) that hold the SGDC to the ANC.
- 7. Grasp the edges of the SGDC and carefully wiggle the circuit board while pulling straight up to remove it from the blade.

8. NOTE:

Equipment damage

• Carefully place the defective SGDC on a soft, ESD-safe surface with the components facing upward. Place the SGDC down directly and do not drag the SGDC on the surface. Failure to do so can lead to component damage.

Place the SGDC on an ESD-safe surface with components facing upward.

5.12.2 Install a SGDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated SGDC

30 minutes to remove a SGDC, transfer the DIMMs and processors to an unpopulated spare SGDC, and install the SGDC

About this task

If installing a spare SGDC, transfer the DIMMs and processors from the defective SGDC to the new SGDC.

Procedure

- 1. Position the replacement SGDC on the blade and press down firmly in the area of the connector to seat it in the connector on the blade.
- 2. Hand tighten the standoffs (2) that attach the KPDC to the blade. Torque the standoffs to 14 in-lbs.

The bit holder on the torque driver is the same size as the standoff.

- **3.** Record the location of the DIMMs and processors on the defective SGDC for reinstalling them in the same locations on the replacement SGDC.
- **4.** Remove the processors, DIMMs, and VRMs from the defective SGDC.
- **5.** Install the processors, DIMMs, and VRMs on the replacement SGDC.
- 6. Place the processor air ducts over the SGDC processors.
- 7. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 8. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.

- 9. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- **10.** Reinstall the blade into the cabinet.

5.13 GPDC Replacement

5.13.1 Remove a GPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated GPDC

30 minutes to remove a GPDC, transfer the DIMMs and processors to an unpopulated spare GPDC, and install the GPDC

About this task

If installing a spare GPDC, transfer the DIMMs and processors from the defective GPDC to the new GPDC.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- 5. Locate the defective GPDC and remove the processor air ducts covering it.
- **6.** Remove the standoffs (8) that attach the GPDC to the blade with the adjustable torque driver.

The bit holder on the torque driver is the same size as the standoff.

7. Grasp the edges of the GPDC and carefully wiggle the circuit board while pulling straight up to remove it from the blade.

8. 🍂

CAUTION:

- Equipment damage
- Carefully place the defective GPDC on a soft, ESD-safe surface with the components facing upward. Place the GPDC down directly and do not drag the GPDC on the surface. Failure to do so can lead to component damage.

Place the SGDC on an ESD-safe surface with components facing upward.

5.13.2 Install a GPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated GPDC

30 minutes to remove a GPDC, transfer the DIMMs and processors to an unpopulated spare GPDC, and install the GPDC

About this task

If installing a spare GPDC, transfer the DIMMs and processors from the defective GPDC to the new GPDC.

Procedure

- 1. Position the replacement GPDC on the blade and press down firmly in the area of the connector to seat it in the connector on the blade.
- 2. Hand tighten the standoffs (8) that attach the GPDC to the blade. Torque to 14 in-lbs.

The bit holder on the torque driver is the same size as the standoff.

- Record the location of the DIMMs and processors on the defective GPDC to reinstall them in the same locations on the replacement GPDC.
- 4. Remove the processors, DIMMs, and VRMs from the defective GPDC.
- 5. Install the processors, DIMMs, and VRMs on the replacement GPDC.
- **6.** Place the processor air ducts on the blade.
- 7. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.

- c. Reconnect the cable connectors.
- 8. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 9. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 10. Reinstall the blade into the cabinet.

5.14 HPDC Replacement

5.14.1 Remove a HPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated HPDC

30 minutes to remove a HPDC, transfer the DIMMs and processors to an unpopulated spare HPDC, and install the HPDC

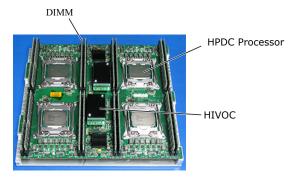
About this task

If installing a spare HPDC, transfer the DIMMs and processors from the defective HPDC to the new HPDC.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- **3.** Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- **4.** Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- **5.** Locate the defective HPDC and remove the processor air ducts covering it.

Figure 150. HPDC Blade



6. Remove the standoffs (8) that attach the HPDC to the blade with the adjustable torque driver.

The bit holder on the torque driver is the same size as the standoff

7. Grasp the edges of the HPDC and carefully wiggle the circuit board while pulling straight up to remove it from the blade.

8.

CAUTION:

- Equipment damage
- Carefully place the defective HPDC on a soft, ESD-safe surface with the components facing upward. Place the HPDC down directly and do not drag the HPDC on the surface. Failure to do so can lead to component damage.

Place the HPDC on an ESD-safe surface with components facing upward.

5.14.2 Install a HPDC

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes to remove and replace a populated HPDC

30 minutes to remove a HPDC, transfer the DIMMs and processors to an unpopulated spare HPDC, and install the HPDC

About this task

If installing a spare HPDC, transfer the DIMMs and processors from the defective HPDC to the new HPDC.

Procedure

- **1.** Position the replacement HPDC on the blade and press down firmly in the area of the connector to seat it in the connector on the blade.
- 2. Hand tighten the standoffs (8) that attach the HPDC to the blade. Torque the standoffs to 14 in-lbs.
 - The bit holder on the torque driver is the same size as the standoff.
- **3.** Record the location of the DIMMs and processors on the defective HPDC to reinstall them in the same locations on the replacement HPDC.
- 4. Remove the processors, DIMMs, and VRMs from the defective HPDC.
- **5.** Install the processors, DIMMs, and VRMs on the replacement HPDC.
- **6.** Place the processor air ducts and position the power cable assembly on the blade.
- 7. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 8. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 9. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 10. Reinstall the blade into the cabinet.

5.15 PCI Card Replacement

5.15.1 Remove a PCI Card

The IO blade accommodates several types of PCI cards. The replacement procedure is identical for each type of PCI card.

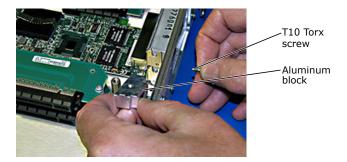
Prerequisites

- Time: 7-8 minutes
- Tools:
 - Adjustable torque driver, 5–40 in-lbs
 - T10 Torx bit
 - o T15 Torx bit
 - o #2 Phillips screwdriver

Procedure

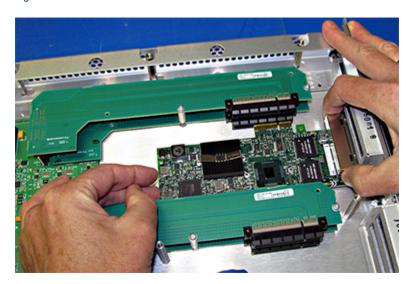
- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove one or both upper PCI mezzanines and risers as needed to remove the defective PCI card.
 - a. Remove the T10 Torx screws (2) that secure the upper PCI mezzanine to the 1/4-in. spacers.
 - b. Remove the upper mezzanine from the standoffs and PCI riser.
 - c. Remove the PCI riser near the lower mezzanine.
 - d. Repeat to remove the opposite PCI mezzanine and PCI riser, if necessary.
- 4. Remove the top T10 Torx screw that attaches the aluminum block to the PCI faceplate.

Figure 151. Aluminum Block



5. Grasp the PCI card and the faceplate and gently pull away from the PCI riser to disconnect the PCI card. If the defective PCI card is underneath the upper PCI card, remove the upper PCI card first.

Figure 152. PCI Card Removal



6. Remove the lower PCI card, if necessary.

5.15.2 Install a PCI Card

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T10 Torx bit

T15 Torx bit

#2 Phillips screwdriver

Time Required:

7-8 minutes

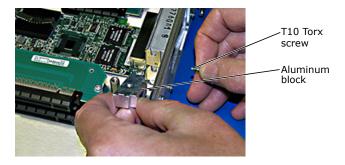
About this task

The IO blade accommodates several types of PCI cards. The replacement procedure is identical for each type of PCI card.

Procedure

- 1. While holding the faceplate, gently push the PCI card into the PCI riser to connect the PCI card. If the defective PCI card is underneath the upper PCI card, reinstall the lower PCI card first.
- **2.** Repeat for the second PCI card, if necessary.
- 3. Reinstall the top T10 Torx screw that attaches the aluminum block to the PCI faceplate.
- 4. Spray the PCI riser socket and mezzanine contacts with dusting gas to remove any debris.

Figure 153. Aluminum Block



- 5. Reinstall one or both upper PCI mezzanines and risers, as needed.
 - Reinstall the PCI riser near the lower mezzanine. The riser is keyed and can only be inserted in one orientation.
 - b. Replace the upper PCI mezzanine on the spacers and PCI riser. Reinstall the two T10 Torx screws to secure the upper mezzanine to the 1/4-in. standoffs.
 - c. Torque the screws to 5.5 in-lbs.

- d. Repeat step a through step c to reinstall the opposite PCI mezzanine and PCI riser, if necessary.
- **6.** Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 7. Reinstall the blade into the cabinet.

5.16 IO Base Board (IOBB) Component Replacement

5.16.1 Remove Components from an IO Base Board (IOBB)

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes

About this task

The processor daughter cards (PDC), PCIe cards, PCIe risers, and PCIe mezzanines must be transferred from the defective IOBB IO blade to the replacement IOBB IO blade. The defective IOBB is not removed from the IO blade. The defective IOBB and IO blade are returned to logistics.

Procedure

- 1. Remove the blade from the cabinet.
- 2. Remove the T15 Torx screws that attach the shroud to the blade and remove the shroud.
- 3. Remove the T10 Torx screws that attach the air diffuser bracket to the blade and remove the bracket.
- 4. Disconnect the power cable connectors (press the release tab and pull cable straight out) and remove the power cable assembly.
- **5.** Remove the PCIe cards, risers, and mezzanines.
- **6.** Remove the processor air duct that covers the processor daughter cards.
- 7. Remove the processor daughter cards from the IO blade.

When removing the daughter cards from the IO blade, do not remove any components from the cards.

5.16.2 Install Components on an IO Base Board (IOBB)

Prerequisites

Tools Required:

Adjustable torque driver, 5-40 in-lbs

T15 Torx bit

T10 Torx bit

Dusting gas

Time Required:

15 minutes

About this task

The processor daughter cards (PDC), PCIe cards, PCIe risers, and PCIe mezzanines must be transferred from the defective IOBB IO blade to the replacement IOBB IO blade. The defective IOBB is not removed from the IO blade. The defective IOBB and IO blade are returned to logistics.

Procedure

- 1. Install the PDC that connect to the IOBB.
- 2. Place the processor air duct over the PDCs.
- 3. Install the PCIe cards, risers, and mezzanines.
- 4. Install the power cable assembly.
 - a. Position the power cable assembly on the blade.
 - b. Insert the two tabs on the center of the cable into the standoffs on the blade.
 - c. Reconnect the cable connectors.
- 5. Replace the air diffuser bracket and reinstall the T10 Torx screws. Torque screws to 5.5 in-lbs.
- 6. Replace the shroud and reinstall the T15 Torx attachment screws. Torque to 9 in-lbs.
- 7. Reinstall the blade into the cabinet.

6 System Maintenance Workstation (SMW)

Replacement procedures for the Dell PowerEdge R815 workstation are contained in the hardware owner's manual that is available on the Dell Website at http://www.dell.com/support/. Dell system workstation parts may be under warranty.

Each XC30-LC and XC40-LC system requires one rack-mount SMW. The SMW server is available in a dual-processor and a quad-processor configuration. The redundant SMW configuration requires the quad-processor servers.

7 Boot RAID Cabinet

Field replacement procedures (FRPs) for the NetApp E2600 are available for download at the NetApp support website at http://www.netapp.com. To access the documentation, register for a NetApp account.