

# CRAY J90 Series IOS Upgrade Procedure

HMU-202-A  
CRAY J90 Series Systems  
Last Modified: November 1995

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## Record of Revision

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### October 1995

Original printing.

### Revision A: November 1995

Revised to correct Y1 channel assignments.

## Overview

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This document contains procedures on how to add additional IOS capabilities to a CRAY J90 series system.

## Description of Upgrade

This upgrade document provides the CRAY J90 series customer with a new working IOS. It is assumed that additional controllers will be added to this IOS; a customer may be adding extra network or storage capacity as part of this field upgrade notice (FUN). The procedures for adding and configuring these additional controllers and peripherals are described in the appropriate upgrade document. This procedure ends after having verified that the IOS is basically operational.

The following procedure is written for the purpose of aiding CRI support personnel in adding an IOBB-64, an IOP, and cables to a CRAY J90 series system. The upgrade kit includes all the parts and instructions that a support person needs to complete the upgrade.

**NOTE:** The maximum number of SI-3 or SI-3X controllers per IOS is three if no network controllers reside on the same IOS. Decrement the maximum by 1 for each network controller in that IOS.

## IOS Upgrade Prerequisites

A maximum of four IOSs may be included in an I/O cabinet before a new I/O cabinet is required (PC-1 upgrade). It is assumed that the appropriate number of Y1 channels between the mainframe and I/O cabinet is available. This may require additional CPU modules. CPU configuration information is covered in the CPU upgrade document, Cray Research publication number HMU-181-0.

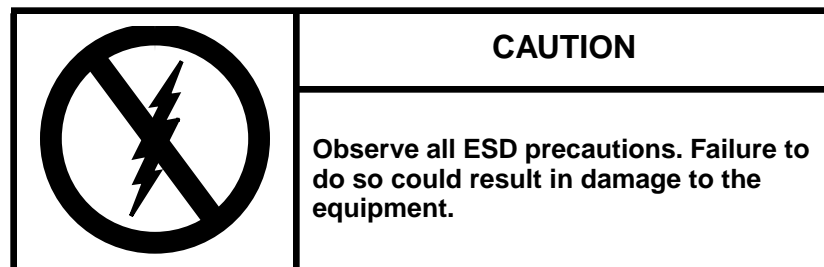
**NOTE:** Before you install the new IOP, record the Ethernet address found on a label located on the P2 connector of the IOP.

## Training Requirements

Cray Research personnel who perform this upgrade must have completed training in CRAY J90 series hardware and system administration. If this is not possible, a hardware-trained person should have a system administrator available during this upgrade. Prior experience in upgrading or installing the UNICOS operating system on a CRAY J90 series system or CRAY EL series system is advised.

## ESD Precautions

Observe ESD precautions during the entire upgrade process. Wear an ESD smock and an ESD wrist strap. Do not wear jewelry when you work on a CRAY EL or CRAY J90 series cabinet.



### ESD Smock

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

### Wrist Strap

Wear a Cray Research-approved wrist strap when handling an ESD-sensitive device to eliminate possible ESD damage to equipment. Connect the wrist strap cord directly to earth ground.

## Reference Publications

Refer to the following publications if you have questions when performing this upgrade.

- *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, Cray Research publication number SG-2416
- *CRAY IOS-V Commands Reference Manual*, Cray Research publication number SR-2170
- *CRAY IOS-V Messages*, Cray Research publication number SQ-2172
- *Automated Confidence Testing*, Cray Research publication number HDM-110-A
- *CRAY J916 Service Manual Kit*, Cray Research publication number HMK-101-0
- *IOS Based Diagnostics*, Cray Research publication number HDM-099-0
- *UNICOS Installation and Configuration Tool Reference Manual*, Cray Research publication number SR-3090
- *UNICOS System Administration*, Cray Research publication number SG-2113
- International Software Field Notice (ISFN) 262

## Estimated Time to Install Upgrade

Table 1 divides the IOS upgrade process into four separate procedures. Use this table to determine how much system time you should request to complete this upgrade.

*Table 1. Estimated Time to Install Upgrade*

Install Task	Estimated Time to Install Upgrade
Hardware Install	1.5 hour
Hardware Verification Testing	.5 hour
Software Configuration	.5 hour
Software Verification Testing	.5 hour

## Parts Required

*Table 2. IOS Upgrade Kit (P/N 90453400) Kit Contents*

CRI Part Number	Quantity	Description
90384404	1	Module Assembly, IOP-SPARC
90369600	1	Cable Assembly, Internal Ethernet
90256603	1	Module Assembly, IOBB-64
90300501	1	Cable Assembly, Y1 Intermediate
90288400	1	Module Assembly, Y1 Channel (J90)
90294400	1	Harness Assembly, Y1 14 ft.
90398201	2	Standoff, .187HX, 2-56x.157
90205301	1	Adhesive Threadlock
90174000	3	Filler Kit, Plate 1 Slot VME

## Tools Required

All tools required for this upgrade are included with the Customer Service toolkit. You may also need a small hammer, which is not included in the toolkit.

## Software Required

- Minimum IOS kernel revision - 1.3
- Minimum UNICOS revision - 8.0.3.2J

## Conventions

The following conventions are used throughout this document:

Convention	Meaning
<code>command</code>	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
<code>manpage(x)</code>	Man page section identifiers appear in parentheses after man page names.
<i>variable</i>	Italic typeface denotes variable entries, words or concepts being defined.
<b>user input</b>	This bold fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.
<KEY>	This convention indicates a key on the keyboard.

## Getting Started

---

Ensure that you have inventoried the contents of this upgrade kit before you begin. To ensure that you have not missed a step, check off each step as you complete it.

### Create a Backup Copy of the UNICOS File System

It is recommended that you create a backup copy of the UNICOS file system before you proceed with the upgrade procedures. Refer to the *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, publication number SG-2416, for details on how to create a backup copy of the UNICOS file system.

### Power Down the CRAY J90 Series System

1. Ensure that the customer has brought the system to single-user mode.
2. Using the right mouse button, click on any open working space. The `Workspace` menu will appear.
3. From the `Workspace` Menu, select the `J90 Console` menu item.

**NOTE:** You must have superuser privileges to perform Step 4.

4. Log into the UNICOS operating system by entering `<CONTROL-a>` to get a UNICOS prompt and enter the root login and password.
5. Shut down the UNICOS operating system by entering the following commands at a UNICOS prompt:

```
# cd /
# /etc/shutdown 120 (takes 120 seconds to execute)
# /bin/sync
# /bin/sync
# /bin/sync
# /etc/ldsync (if you are using ldcache)
```

6. Stop the `J90 Console` connection by entering the following commands:

```
# <CONTROL-a> (toggles to the IOS)
sn9xxx-ios0> mc
sn9xxx-ios0> reset (takes 30 – 45 seconds to execute)
BOOT[sn9xxx-ios0]> ~. <CONTROL-c>
```



7. Power off the system by pressing the CCU SYSTEM OFF button.
  - a. Open the CRAY J90 Series I/O Cabinet Rear Door
  - b. Open the CRAY J90 Series I/O Front Cabinet Door
  - c. Open the CRAY J90 Series Mainframe Cabinet Rear Door
  - d. Open the CRAY J90 Series Mainframe Cabinet Front Door

## Installing the IOS Upgrade

You will install the new IOP (manufactured by Themis Computer, Inc.) into a specific slot in the new IOS. Refer to Figure 1 and Table 3.

**NOTE:** An upgrade involving adding an IOP to IOS 4, IOS 8, or IOS 12 is referred to as a PC-1 upgrade, which involves adding an additional I/O cabinet.

*Figure 1. IOS Slot Assignments*

IOS 3				IOS 2					IOS 1				IOS 0						
C20	C19	C18	C17	C16	C15	C14	C13	C12	C11	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
						C15 C14	B5 B6	B23								B19	B11 B12	B29	

*Table 3. IOP Slot Locations in the IOS*

IOS Number	IOP Slot Location
1	C7 in I/O cabinet
2	C11 in I/O cabinet
3	C17 in I/O cabinet
5	C7 in PC-1
6	C11 in PC-1
7	C17 in PC-1
9	C7 in PC-2
10	C11 in PC-2
11	C17 in PC-2
13	C7 in PC-3
14	C11 in PC-3
15	C17 in PC-3

1. Pull out the VME tray.
  - a. Remove the four screws that secure the VME tray to the cabinet.

- b. Pull out the VME tray as far as it will go.
  - c. Loosen the 14 captive screws that hold the top cover to the VME tray.
  - d. Remove the VME tray top cover and set it aside.
2. Unpack the new IOP controller board (P/N 90384404).
  3. Check the jumpers; all IOP boards should be addressed identically. Refer to Figure 2.
  4. Loosen the VME IOP slot filler screws and lift out the VME slot filler. Refer to Figure 1 for the designated IOP slot assignments.  
  
**NOTE:** Before you install the new IOP, record the Ethernet address on a label located on the IOP's P2 connector.
  5. Install the new IOP controller board into the VME chassis.

### Connect IOP to Ethernet Transceiver

1. Attach one end of the international Ethernet cable assembly (P/N 90369600) to the Ethernet port on the IOP board.
2. Attach the other end to an available port on the Ethernet transceiver.

### Install the IOBB-64

Refer to Figure 1 for the designated IOBB-64 slot assignments.

1. Unpack the new IOBB-64 controller board (P/N 90256603).
2. Insert the new IOBB-64 controller board into the guide slots in the VME chassis. Refer to Table 4 for IOBB-64 slot assignments.
3. Install VME filler plates (P/N 90174000) into the unused VME IOS slots.
4. Attach the Y1 intermediate cable (P/N 90300501) to the IOBB-64. This cable has two connectors that connect to the controller.

Figure 2. IOP Jumper Configurations

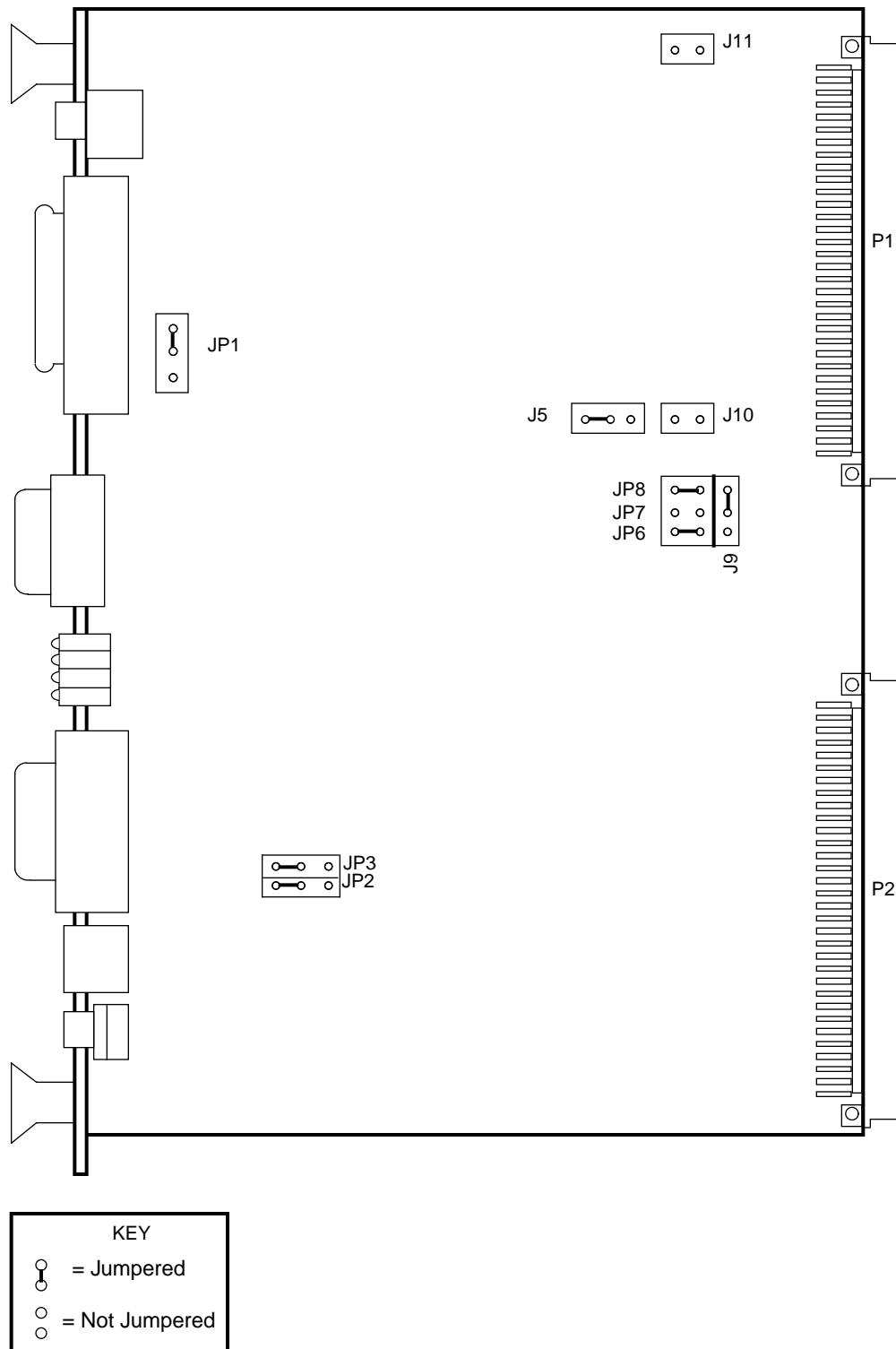


Table 4. IOS IOBB-64 Slot Locations

IOS Number	IOBB-64 Slot Location	Y1 Location
1	C8 in I/O cabinet	B23
2	C12 in I/O cabinet	B27
3	C18 in I/O cabinet	B20
5	C8 in PC-1	B23
6	C12 in PC-1	B27
7	C18 in PC-1	B20
9	C8 in PC-2	B23
10	C12 in PC-2	B27
11	C18 in PC-2	B20
13	C8 in PC-3	B23
14	C12 in PC-3	B27
15	C18 in PC-3	B20

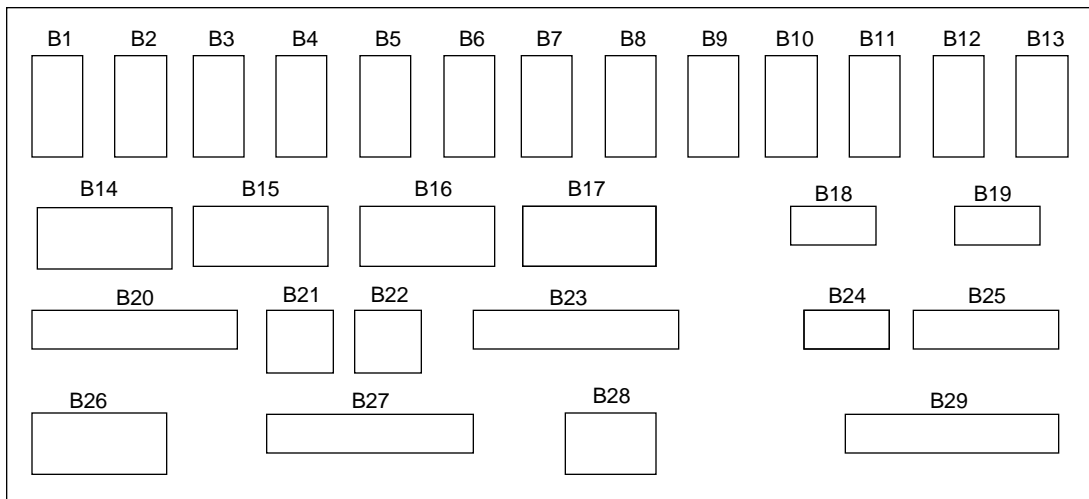
### Connect Y1 Intermediate Cable to VME Bulkhead

1. Remove the VME plates at B20, B23, or B27, depending on the location of the newly installed IOBB-64. Refer to Table 4. The selected location should be in line with the IOBB-64 that you added. Refer to Figure 3.
2. Install the Y1 intermediate connector into this plate. (P/N 90300501).
  - a. Remove the two screws that retain the plate and lift out the plate.

**NOTE:** If a PE tray is located above the VME, remove the four screws from the PE tray and pull the tray out.

- b. Push the VME tray in and secure it with a single screw.
- c. Insert the Y1 connector with the P1 label (longer side) facing up and install and secure the two standoff screws (P/N 90398201) using adhesive threadlock. Do not strip the screws.

Figure 3. VME Bulkhead (Back View)



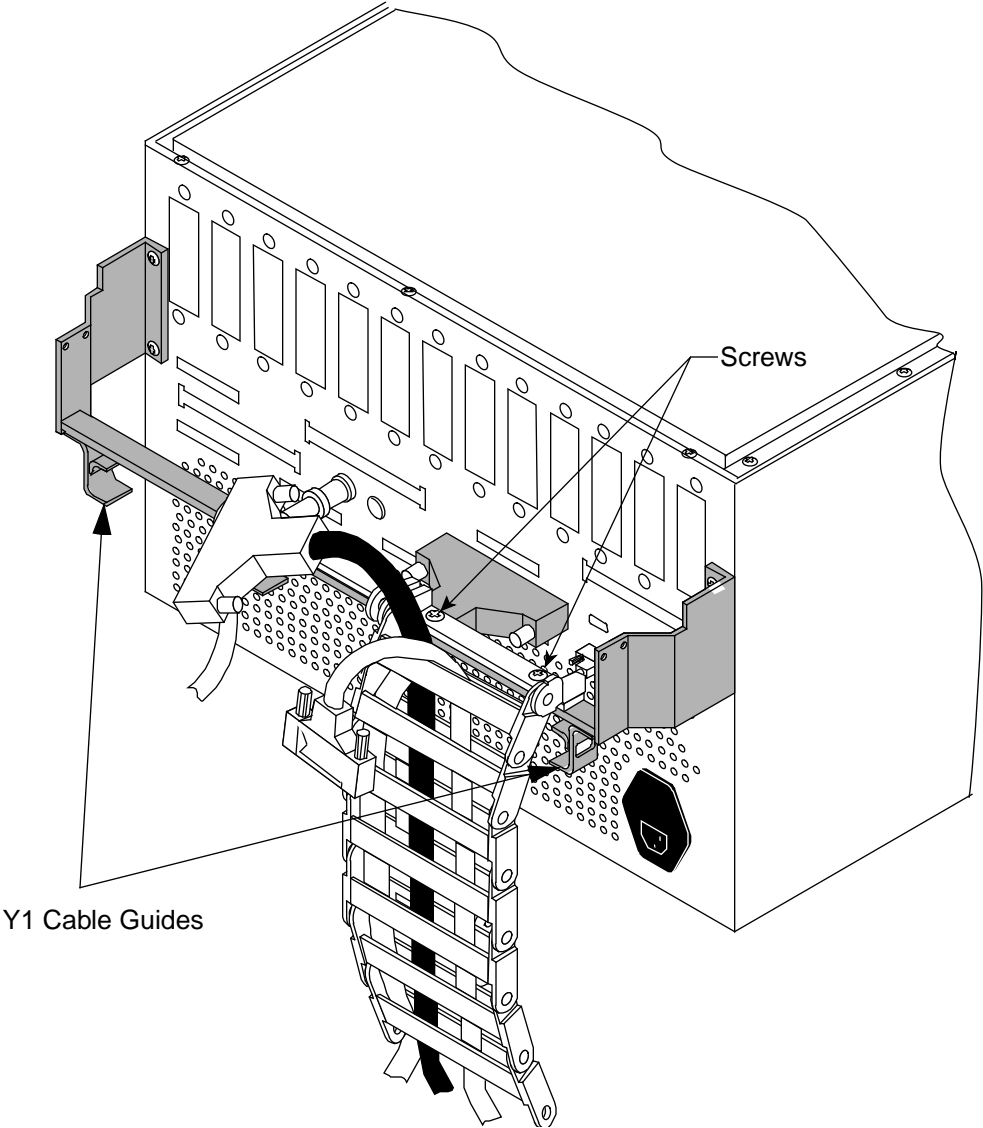
### Disconnect all Cables from VME Bulkhead

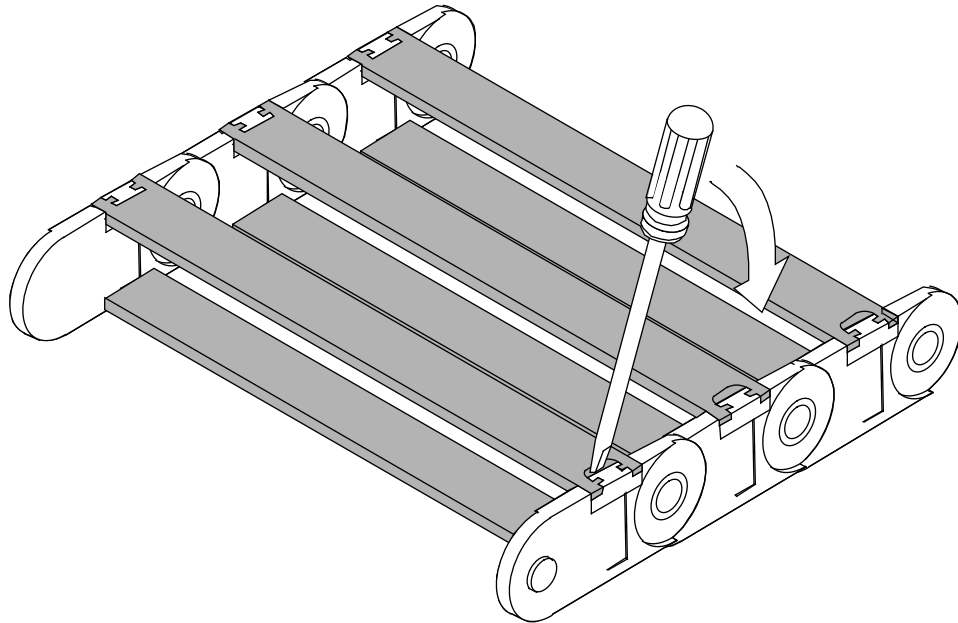
1. Disconnect all cables from the VME bulkhead that are routed through one or both of the two flexible cable ways.
2. Disconnect the flexible cable ways by removing the two screws that secure them to the VME tray. Refer to Figure 4.

**NOTE:** If the Y1 cables will be routed through only one of the two flexible cable ways, only the crossbars for that flexible cable way need to be opened. If the cables will be routed through both of the flexible cable ways, both crossbars will have to be opened.

3. Lay the cable ways flat.
4. Loosen the two 1/4-turn screws from the front of the I/O cabinet just below the VME tray.
5. Remove the cable tray cover by sliding the cover out through the front of the I/O cabinet and set it aside.
6. Remove the single screw from the front of the VME tray.
7. Extend the VME tray completely.
8. Pry open each crossbar of the cable way, using a standard 1/8-in flat-bladed screwdriver and leave the inner side attached. Refer to Figure 5.

Figure 4. Flexible Cable Way



*Figure 5. Flexible Cable Way Crossbars*

### Route Cables through Cable Tray and Flexible Cable Way

1. Place the Y1 cables on the outside edges of the flexible cable ways; do not group them together with other cables.
2. Place the new Y1 harness assembly (P/N 90294400) with one connector aligned to mate with the connector on the VME bulkhead. Leave about 5 inches of slack in the cable to connect it to the VME bulkhead.
3. Place the Y1 cables in the flexible cable way and in the cable-routing tray. Ensure that the cables do not cross in the flexible cable way because this will make adjusting the cables more difficult.
4. Snap down all crossbars for the flexible cable way. You may want to use a small hammer to tap on the crossbars. (This is not easy!) Then, ensure that both ends of each crossbar are secure.
5. After the cables have been routed, loosely secure the Y1 cables in the tray with tie wraps.
6. Slide the VME tray into the cabinet carefully and secure it with one screw.

**NOTE:** Y1, power, and control cables are routed below the VME flexible cable-way attachment bar.



7. Reconnect the flexible cable way using the two screws that you removed from the flexible cable-way bar. Refer to Figure 4.
8. Attach the new Y1 harness assembly to the back of the VME bulkhead in the connector that you installed earlier. Be careful not to strip the screws.
9. Reattach the rest of the cables to the VME bulkhead and label them with cable and bulkhead labels.
10. Attach the Y1 cables to the bracket guides on the back of the VME with tie wraps. Refer to Figure 4.
11. Remove the single retaining screw and extend the VME tray out until the tray slides lock.
12. Adjust the cables inside the cable tray and flexible cable way if there is excess slack at the VME bulkhead.
13. Tighten all tie wraps. Be careful not to crush the cables.

<b>CAUTION</b>
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<b>Do not pinch the cables when you slide in the VME tray or the cable cover.</b>
---

14. Reinstall the cable tray cover by sliding it carefully in from the front of the I/O cabinet and over the cable tray. You may have to go to the rear of the system to finish installing the cable tray cover.
15. Secure the cable tray cover at the front of the I/O cabinet with two 1/4-turn screws.

### Selecting the Y1 Ports

Your new Y1 channel should be installed on the lowest-numbered processor module without a Y1 channel in your CRAY J90 series system. Select the lowest-numbered channel available. Refer to Figure 6, Figure 7, and Table 5.

Figure 6. CRAY J916 Y1 Channel Assignments

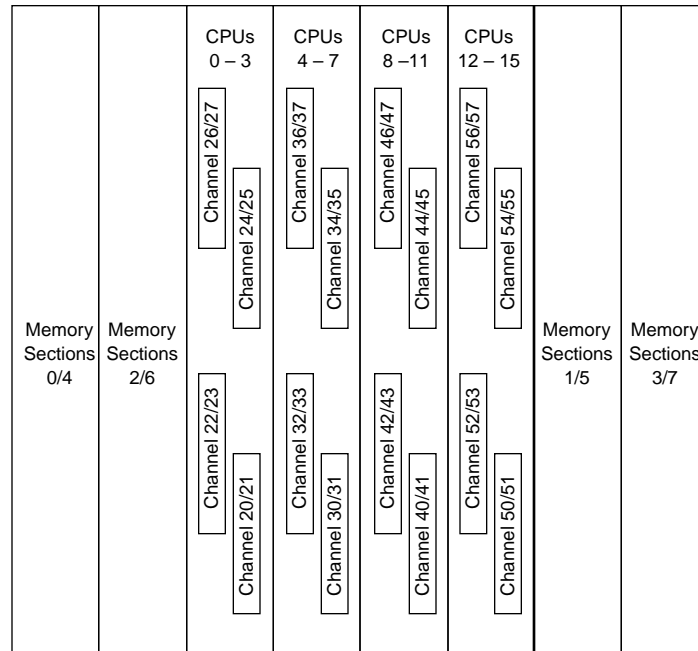
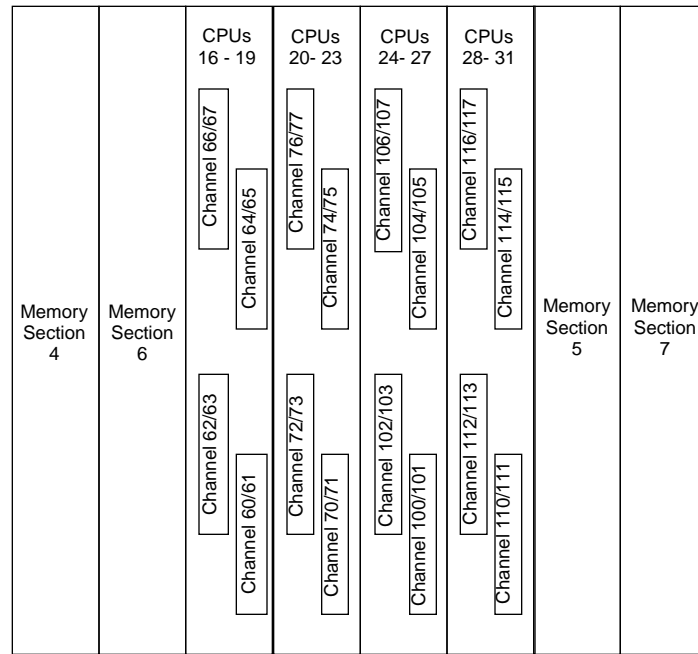


Table 5. CRAY J90 Series Y1 Channel Numbers

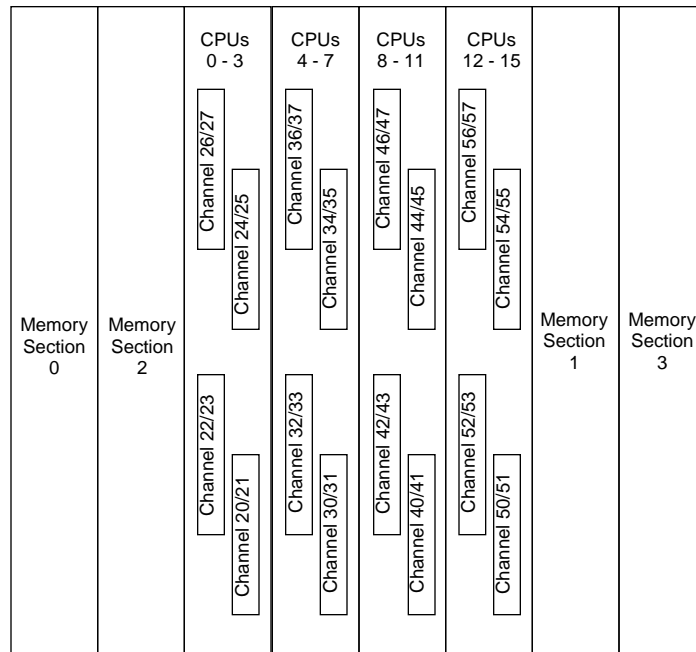
Processor Module Number	CC0				CC1			
	Y1 Channels		Y1 Channels		Y1 Channels		Y1 Channels	
	Input	Output	Input	Output	Input	Output	Input	Output
0	20	21	22	23	24	25	26	27
1	30	31	32	33	34	35	36	37
2	40	41	42	43	44	45	46	47
3	50	51	52	53	54	55	56	57
4	60	61	62	63	64	65	66	67
5	70	71	72	73	74	75	76	77
6	100	101	102	103	104	105	106	107
7	110	111	112	113	114	115	116	117

**NOTE:** All channel numbers listed are octal numbers

Figure 7. CRAY J932 Y1 Channel Assignments

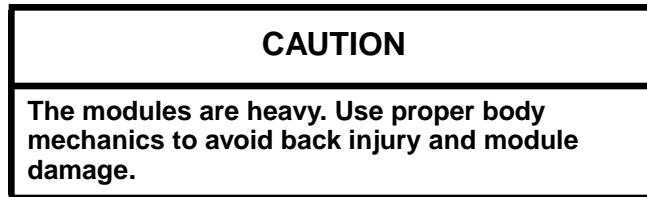


Midplane



## Remove Processor Module on Which the New Y1 Channel will be Installed

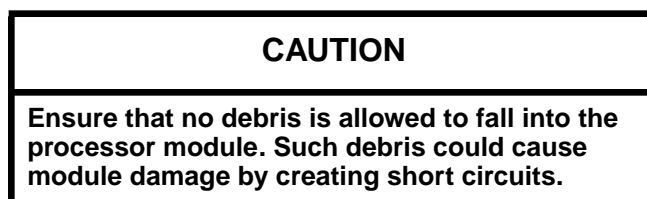
1. Remove the processor module from the card cage.
  - a. Turn the jack screws located at the top and bottom of the module counterclockwise until the module is loose in the chassis.
  - b. Grasp the module securely and remove it from the chassis.



2. Lay the processor module on its side on a static-protected work surface.

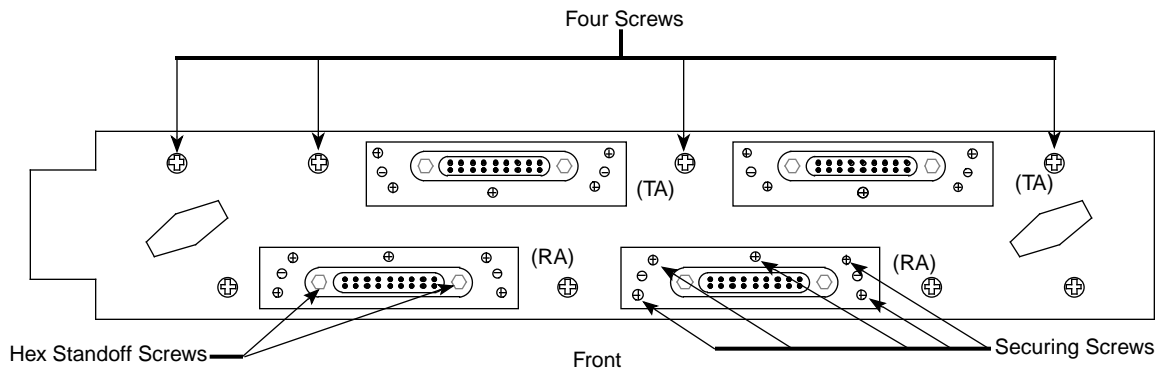
## Prepare Processor Module for Paddle Board Installation

1. Orient the module as shown in Figure 8.
2. Remove the 15 screws (11 on the side and 4 on the front) from the processor module that secure the metal side cover in place.
3. Remove the four screws that secure the cover to the front of the processor module. Refer to Figure 8.
4. Remove the cover from the processor module by lifting straight up. Set the cover aside



5. Remove the five securing screws (with lockwashers) that secure the connector faceplate cover. Retain these screws.

Figure 8. Connector Hardware Screws



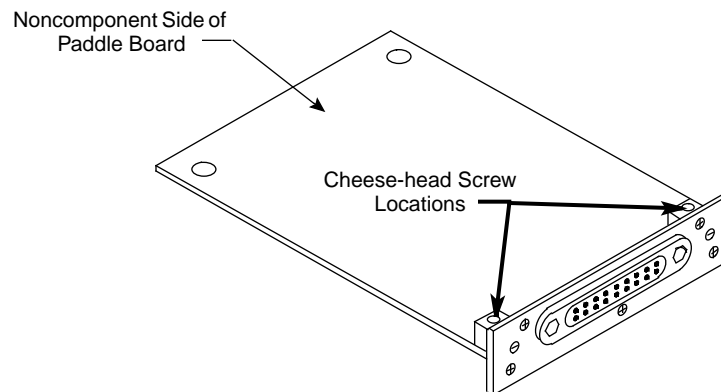
## Install the New Paddle Board

1. Unpack the paddle board (P/N 90288400) and inspect it for damage.
2. Remove the processor module's blank faceplate connector cover.
  - a. Remove the two cheese-head screws from the rear (noncomponent) side of the paddle board. Refer to Figure 9.

**NOTE:** The cheese-head screws are located on the noncomponent side, and the bracket that they screw into is located on the component side of the board.

- b. Remove the two hex standoff screws from the front of the connector faceplate. Refer to Figure 8. (These screws secure the cable to the paddle board.)
- c. Remove the two plastic standoff screws from the processor module and retain them for reuse.

Figure 9. Paddle Board Cheese-head Screw Locations



3. Align the 128 pins on the paddle board with the 128 sockets on the processor module and press the paddle board into position.
4. Replace the connector faceplate and replace and tighten the two cheese-head screws at the rear (noncomponent side) of the paddle board.
5. Replace and tighten the two hex standoff screws on the front of the connector faceplate.
6. Replace the two plastic standoff screws that you removed from the processor module in Step 2, Step c.
7. Replace the side cover of the processor module.
  - a. Insert and tighten the 15 screws to secure the cover to the side of the processor module.
  - b. Insert and tighten the four screws to secure the cover to the front of the processor module.
8. Insert the processor module into the card cage.
  - a. Place the module into the module guides in the mainframe chassis and push the module into the chassis until it contacts the air damper control handle.
  - b. Open the slot air damper to its open position by turning the air damper handle 1/4-turn counterclockwise. Continue to push the processor module into the chassis until it contacts the backplane.
  - c. Tighten the two jack screws simultaneously until the module is fully seated.

## **Connect New Y1 Harness Assembly to CPU**

1. Route, and secure with tie wraps, the new Y1 harness assembly through the I/O cabinet, along the power and control distribution rail and across the mainframe cabinet Y1 cable guide.
2. Connect the Y1 cable to the appropriate port.
3. Tie wrap any excess Y1 cable to the top of the processor module housing and close the rear I/O cabinet door.

## Software Change Procedure

---

The minimum requirement for the IOS kernel revision is 1.3 and the minimum UNICOS revision level is 8.0.3.2J. This section uses examples that show the addition of IOS 3 (sn9xxx-ios3) in its examples.

### Update the I/O Subsystem Setup from J90 Install Menu

Perform the following procedure to update the I/O subsystem configuration. You will be starting from the CRAY J90 series workstation root window.

1. Using the right mouse button, click on any open working space. The `Workspace` menu will appear.
2. From the `Workspace` menu, select the `J90 Install` menu item.
3. From the `J90 Install` menu, select the `Initial Installation` menu item.
4. From the `Initial Installation` menu, select the `I/O Subsystem Setup` menu item.
5. Select the appropriate mainframe serial number. Then select the `Change` action-button. From this `J90 I/O Subsystem Change` window, enter the Ethernet address associated with the new I/O subsystem(s) being added and press the `<RETURN>` key. [The Ethernet board addresses are printed on the I/O Processor (Themis) board.]

After an Ethernet address is entered and the `<RETURN>` key is pressed, the IP address is automatically generated based on the mainframe serial number. Make note of the IP address chosen for each new Themis board. This address will be needed in the following subsection.

6. Click on the `Change` action-button to save this change.
7. Return to the main menu by performing the following steps:
  - a. Select `Cancel` in the `J90 I/O Subsystem Setup` window.
  - b. Select `Return to Main Menu` in the `Initial Software Installation` window.
  - c. Select `Quit` in the `J90 Install Main Window` window.



## Update the IOS Configuration File

The IOS configuration file must be updated with an entry for the IOS that has just been added. Using the `vi` command in a window on the system console, edit the `/opt/ios/9xxx/config` file (where `9xxx` is the serial number of your CRAY J90 series mainframe). Make a new entry for each new IOS that was added to the system. The IP address generated in Step 5 of the previous subsection will be entered in the `config` file. Do not enter strategy or device driver names at this time.

The following example shows the entry for a new IOS number 3 with an IP address of 10.1.15.67. This information is added at the end of the existing `config` file.

```
sn9xxx-ios3:    10.1.15.67
#
# Strategy name
# -----

# Device driver name
# -----
```

You will be adding other strategies and drivers to this IOS `config` file, which will be specified in the appropriate upgrade document.

## Power Up the System

**NOTE:** If the `J90 Console` window is already up, skip to Step 3.

1. Using the right mouse button, click on any open working space. The `Workspace` menu will appear.
2. Select the `J90 Console` menu item.
3. Move the circuit breaker on the back of the I/O cabinet to the ON position first, and then move the circuit breaker on the mainframe cabinet to the ON position.
4. Press the `Alarm Acknowledge` button on the CCU.
5. Press the `CPU RESET` button on the CCU.
6. Press the `VME RESET` button on the CCU.
7. Verify that the `SYSTEM READY` light on the control panel illuminates.

8. Close the mainframe cabinet front door.
9. Install the VME cover.
10. Slide the VME tray in.
11. Install the four screws in the front of the VME tray.
12. Close the front I/O cabinet door.
13. Watch the J90 Console window to ensure that the system powers up correctly. You should see the `BOOT[sn9xxx-ios0]>` prompt when power-up is complete.
14. To further verify that the new IOS is operational, use the following command to log on the new IOS from a window on the system console (IOS 3 is used as an example):

```
% rlogin sn9xxx-ios3
```

The following prompt should appear:

```
BOOT[sn9xxx-ios3]>
```

If you do not receive a boot prompt, ensure that all configuration files are accurate. Verify that the private Ethernet network is cabled up properly. Look at the LED lights on the front of the Themis board. If the LED lights are in the pattern of LEDs 4 through 7 being in a sequence of solid light/flashing light/solid light, then the system console cannot make the connection with the new IOS. Either the configuration files are incorrect or the Ethernet cable was hooked up improperly.

15. Log out of the IOS by entering the following command:

```
BOOT[sn9xxx-ios3]> logout
```

## Load the IOSs

Load the IOS software by entering the following command in the J90 Console window:

```
BOOT[sn9xxx-ios0]> load
```

The load process will recognize the newly added IOS, and if the /diag/scripts/frstload script exists on the IOS's file system, it will execute. However, the frstload script is not yet updated to run diagnostics on the new IOS. This will be done in a subsequent step. Information similar to the following text should be displayed for the newly added IOS:

```
*** sn9xxx-ios3 load has completed ***
SLAVE IOS sn9xxx-ios3 load completed at: TUE SEP 12 12:20:48 1995
```

## Update and Run frstload Script

Complete the following steps to update the /diag/scripts/frstload script so that you can run diagnostics on the new IOS.

1. View the /opt/ios/9xxx/sys/param file to learn which Y1 channels are attached to each IOS. Search for the HARDWARE INFORMATION section. Make note of this channel information for use in Step 2. For example, the following line indicates that Y1 channel, channel 020, is connected to IOS, cluster 0:

```
channel 020 is lowspeed to cluster 0;
```

2. Enter the bldact IOS command in the J90 Console window. This will update the ACT frstload script (/diag/scripts/frstload) as necessary. The bldact command should take less than 1 minute to complete. Refer to Figure 6 and Figure 7 to confirm your CPU channel numbers. Answer the questions generated by bldact appropriately. The following output is sample output:

```
sn9xxx-ios0> bldact
Build Automated Confidence Test script file, IOS-V version.
File /diag/scripts/frstload.

Save current /diag/scripts/frstload?? (y)es or (n)o: y

Is Y1 input channel 20 cabled to IOS 0? (y)es, (n)o: y
.
.
.
Is Y1 input channel 22 cabled to IOS 3? (y)es, (n)o, is (h)ippi:
n
Enter correct input channel number in octal: 50
sn9xxx-ios0>
```

3. Log on the new IOS from a system console window and execute the `frstload` script. Ignore any rotary switch error messages following the `rlogin` procedure. The following example shows typical output:

```
% rlogin sn9xxx-ios3

IOS POWER UP RESET IN PROGRESS

(possible rotary switch error messages - ignore)

sn9xxx-ios3> /diag/scripts/frstload

First load after power up -
Test Revision 1.4 94/10/28 05:22:30
IOBB test (IOS 3) in progress...

First load after power up -
Test Revision 1.9 95/05/18 08:31:39
Data channel test (IOS 3) in progress...

First load after power up -
Test Revision 1.9 95-05-18 08:31:39
Command channel test (IOS 3) in progress...

First load after power up -
Test Revision 1.3 94/12/27 06:10:21
CM->IOBB->CM quick look (IOS 3) in progress...

--- IOS Testing Complete
```

If problems are discovered by these diagnostics, you should run the more complete diagnostics listed in the “Run Diagnostic Tests” section.

### Run Diagnostic Tests (Optional)

Running the following diagnostics is an optional step, but they should be executed if the `frstload` diagnostics exhibited a failure.

- `bb1test`
- `mm1test`
- `cc1test`
- `cc2test`

To run these diagnostics, log on the newly added IOS from a window on the system console. Execute each test, as follows:

```
% rlogin sn9xxx-ios3
sn9xxx-ios3> bbltest
.
.
.
```

For details on how to run these diagnostics, refer to the CRAY J90 Series *IOS Based Diagnostics*, publication HDM-099-0.

## Update the UNICOS Configuration (param) File

1. You must update the UNICOS configuration file (`param`) to reflect the new IOS hardware. The following example shows the `/opt/ios/9xxx/sys/param` file being edited from the system console. You can also make these alterations by using the UNICOS Installation / Configuration Menu System (ICMS). If so, you must boot UNICOS to multiuser mode, make the alterations, and then move the updated `param` file back to the system console.
2. From a system console window, create a copy of the UNICOS `param` file, which you will edit, by entering the following commands:

```
% cd /opt/ios/9xxx/sys
% cp param param.newios
```

3. Add an entry to the `ios_e` section of the `param.newios` file for each new IOP (cluster). The following example shows an entry for IOS 0 and newly added IOS 3.

```
ios_e {
  /*
  * BEGIN SECTION:  IOS INFORMATION
  */
  cluster 0 {
    muxiop; eiop 0; ieop 20; eiop 21; eiop 22; eiop 23;
  }
  .
  .
  .

  cluster 3 {
    muxiop; eiop 0;
  }
}
```

```
/*  
* END SECTION:  IOS INFORMATION  
* /  
}
```

4. Add the Y1 input channel entry to the mainframe section of the `param.newios` file for each new IOP (cluster). The following example shows an entry for IOS 0, which is attached to the mainframe via Y1 input channel 020, and an entry for the newly added IOS 3, which is attached to the mainframe via Y1 input channel 050.

```

/*
 * Update information for "Mainframe" section:
 *
 * HARDWARE INFORMATION:
 */
mainframe {
    /*
     * BEGIN SECTION:  HARDWARE INFORMATION
     */
    8 cpus;
    256 Mwords memory;
    channel 020 is lowspeed to cluster 0;
    .
    .
    .
    channel 050 is lowspeed to cluster 3;
    .
    .
    .
    /*
     * END SECTION:  HARDWARE INFORMATION
     */
}

```

5. To verify the changes that you made to the new param file, boot UNICOS to single-user mode by entering the following command on the J90 console window:

```
sn9xxx-ios0> /bin/boot
```

From the J90 console window, move the param.newios file from the IOS disk to the mainframe and verify the file by entering the following commands:

```
# /bin/exdf -i /sys/param.newios > /param.newios
# /etc/econfig /param.newios
```

You must correct any problems with the new param file at this time. You can edit the param.newios file from a window on the system console, and then move the file to the mainframe and run the econfig command to verify the file again.

6. Reboot UNICOS using the new param file by entering the following commands:

```
# <CONTROL-a> (toggles to the IOS console from single-user mode)
sn9xxx-ios0>
sn9xxx-ios0> cd /sys
sn9xxx-ios0> cp param param.bak
sn9xxx-ios0> cp param.newios param
sn9xxx-ios0> /bin/boot
```

7. UNICOS is now at single-user mode. Proceed to the appropriate upgrade document(s) to add disk, tape, and/or network peripherals.

**NOTE:** The ATM upgrade document is written with the assumption that UNICOS is in multiuser mode. This is achieved by entering the following command:

```
# /etc/init 2
```

## Removed Parts Disposition

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Do not dispose of removed parts locally; return the removed parts to:

Cray Research, Inc.  
1000 Halbleib Road  
Chippewa Falls, WI 54729  
Attention: Removed Equipment Management

## IR Reporting

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There is a separate incident report for upgrades. Refer to *CSH # ADM-COM-9307*. Please fill one out.