CRAY J90™ Series
Memory Upgrade Procedure

Cray Research, Inc.

Record of Revision

Memory Upgrade Procedure

Overview

Device to Be Upgraded

This document contains the procedures for adding memory to the CRAY J90 series system.

Description of Upgrade

Customers have the option of increasing the amount of memory in their CRAY J90 series system. This procedure for performing a memory upgrade procedure is written for Cray Research support personnel. The upgrade kit includes all the parts and instructions that the support person will need to complete the upgrade. Refer to Table 1 for the CRAY J90 system memory configurations.

Table 1. CRAY J90 Series System Memory Configuration

Backplane Configuration	Number of Processor Modules	Number of Memory Modules	Memory Chip Sizes 256K X 16 DRAM		Memory Chip Sizes 1M X 16 DRAMs	
			MEM16	MEM32	MEM64	MEM128
2×2	1 or 2	2	32 MW 256 MB	64 MW 512 MB	128 MW 1,024 MB	256 MW 2,048 MB
4×4	1, 2, 3, or 4	4	64 MW 512 MB	128 MW 1,024 MB	256 MW 2,048 MB	512 MW 4,096 MB
8×8	5, 6, 7, or 8	8	128 MW 1024 MB	256 MW 2048 MB	512 MW 4096 MB	1024 MB 8192 MB

A label that indicates the Memory Board Type of the system is located on the faceplate of each memory module. Table 6 on page 13, Table 7 on page 13, and Table 8 on page 14, contain specific configuration information for each memory board type.

This upgrade procedure includes separate hardware and software procedures for adding additional memory to a CRAY J90 series system. The procedures require you to swap out the existing memory modules and insert the new memory modules.

Upgrade Prerequisites

Ensure that the following system configuration items are available before the installer begins this upgrade:

- Backplane type (2 X 2, 4 X 4, or 8 X 8)

- Memory module type label value

- Super user login and password

- Memory size that you are upgrading to

- Boundary scan number for each module, which can be found on a label on the back of each module (BSN=*X*; *X* is the revision letter)

Training Requirements

Cray Research personnel who perform this memory upgrade should have completed training in CRAY J90 series hardware and software. 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 Y-MP EL system is required.

ESD Precautions

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

CAUTION

Observe all ESD precautions. Failure to do so could result in damage to the equipment.
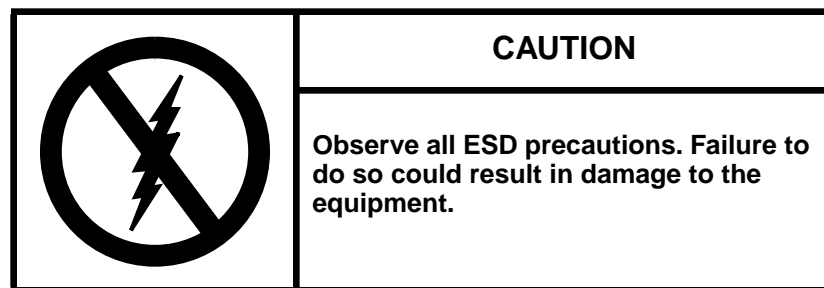
ESD Smock

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 servicing or 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-110-0

- *CRAY J916 Service Manual Kit*, Cray Research publication number HMK-101-0

- *UNICOS Installation and Configuration Tool Reference Manual*, Cray Research publication number SR-3090

- *J90 UNICOS 8.0.3.2J Errata*; this is shipped with the UNICOS 8.0.3.2J release

- `vi` online manual (man) page

Estimated Time to Install Upgrade

> Table 2 divides the memory upgrade process into three separate procedures. Use this table to determine how much system time you should request to complete this upgrade.

Table 2. Estimated Time to Install Upgrade

Install Task	Estimated Time to Install Upgrade
Hardware Install	1 hour
Hardware Verification Testing	1 hour
Software Install	1 hour

Parts Required

> All memory module slots in a mainframe cabinet are always occupied. A system configuration with a 2 X 2 backplane has two memory module slots filled (see Table 3), a system with a 4 X 4 backplane configuration has four memory module slots filled (see Table 4), and a system with an 8 X 8 backplane configuration has eight memory module slots filled (see Table 5).

Table 3. 2 X 2 Backplane Memory Upgrade Overview

Memory Upgrade	Remove	Install	Part Number
64 MW (512 MB)	Two existing memory modules	Two MEM32 memory modules	90380500
128 MW (1,024 MB)	Two existing memory modules	Two MEM64 memory modules	90373200
256 MW (2,048 MB)	Two existing memory modules	Two MEM128 memory modules	90373100
512 MW (4,096 MB)	2x2 backplane Two existing memory Modules	4x4 backplane Four MEM128 memory modules	(2x2) 90399400 (4x4) 90286400 90373100

Table 4. 4 X 4 Backplane Memory Upgrade Overview

Memory Upgrade	Remove	Install	Part Number
128 MW (1,024 MB)	Four memory modules	Four MEM32 memory modules	90380500
256 MW (2,048 MB)	Four memory modules	Four MEM64 memory modules	90373200
512 MW (4,096 MB)	Four memory modules	Four MEM128 memory modules	90373100

Table 5. 8 x 8 Backplane Memory Upgrade Overview

Memory Upgrade	Remove	Install	Part Number
256 MW (2048 MB)	Eight memory modules	Eight MEM32 memory modules	90424200
512 MW (4096 MB)	Eight memory modules	Eight MEM64 memory modules	90424300
1024 MW (8192 MB)	Eight memory modules	Eight MEM128 memory modules	90424400

Tools Required

A 5/32-in. allen wrench (provided in the toolkit) is required to open the system doors. The other common hand-held tools needed for this upgrade are also included in the toolkit.

Recommended Software Revisions

- For a CRAY J916 system, the minimum IOS kernel revision is 1.3; for a CRAY J932 system, the minimum IOS kernel revision is 1.6

- For a CRAY J916 system, the minimum UNICOS revision is 8.0.3.2J; for a CRAY J932 system, the minimum UNICOS revision is 8.0.4.1

- Special considerations: See ISFN 262, CRAY J90 Offline Diagnostic Problems

- This procedure was tested at IOS kernel revision 1.7 and UNICOS revision 8.0.4.2 on a J932 system.

Conventions

The following conventions are used throughout this document:

Convention	Meaning
command	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
manpage(*x*)	Man page section identifiers appear in parentheses after man page names.
variable	Italic typeface denotes variable entries, words or concepts being defined.
user input	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

See Figure 1 for a top view of the module slot locations in 2 X 2 and 4 X 4 backplane configurations. See Figure 2 on page 9 for 8 X 8 backplane configurations.

The following procedures must be performed to begin the memory upgrade procedure.

NOTE: Check off each step or procedure as you complete it to avoid missing a step.
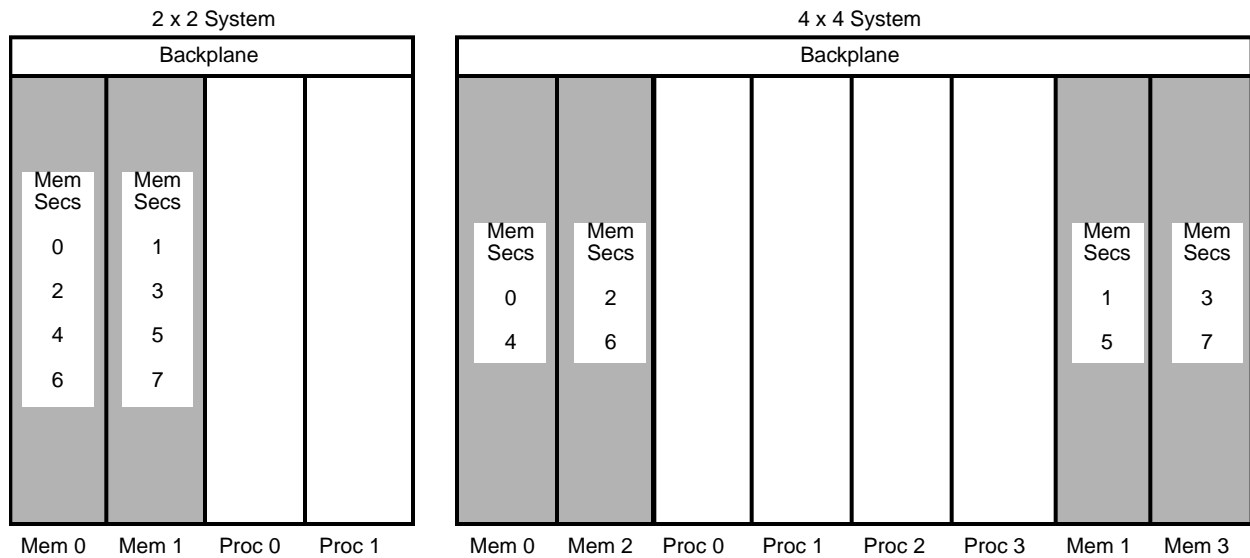
NOTES: Proc 1 slot may be vacant in 2 x 2 configurations.
Proc 1, Proc 2, and Proc 3 slots may be vacant in 4 x 4 configurations.
All memory module slots will always be filled.

Figure 1. Module Slot Locations (Top View)

Front

8 X 8 System

Mem 4	Mem 6	Proc 4	Proc 5	Proc 6	Proc 7	Mem 5	Mem 7

Card Cage A

| Mem Sec 4 | Mem Sec 6 | CPUs 16 17 18 19 | CPUs 20 21 22 23 | CPUs 24 25 26 27 | CPUs 28 29 30 31 | Mem Sec 5 | Mem Sec 7 |

Midplane

Card Cage B

| Mem Sec 0 | Mem Sec 2 | CPUs 0 1 2 3 | CPUs 4 5 6 7 | CPUs 8 9 10 11 | CPUs 12 13 14 15 | Mem Sec 1 | Mem Sec 3 |

Mem 0	Mem 2	Proc 0	Proc 1	Proc 2	Proc 3	Mem 1	Mem 3
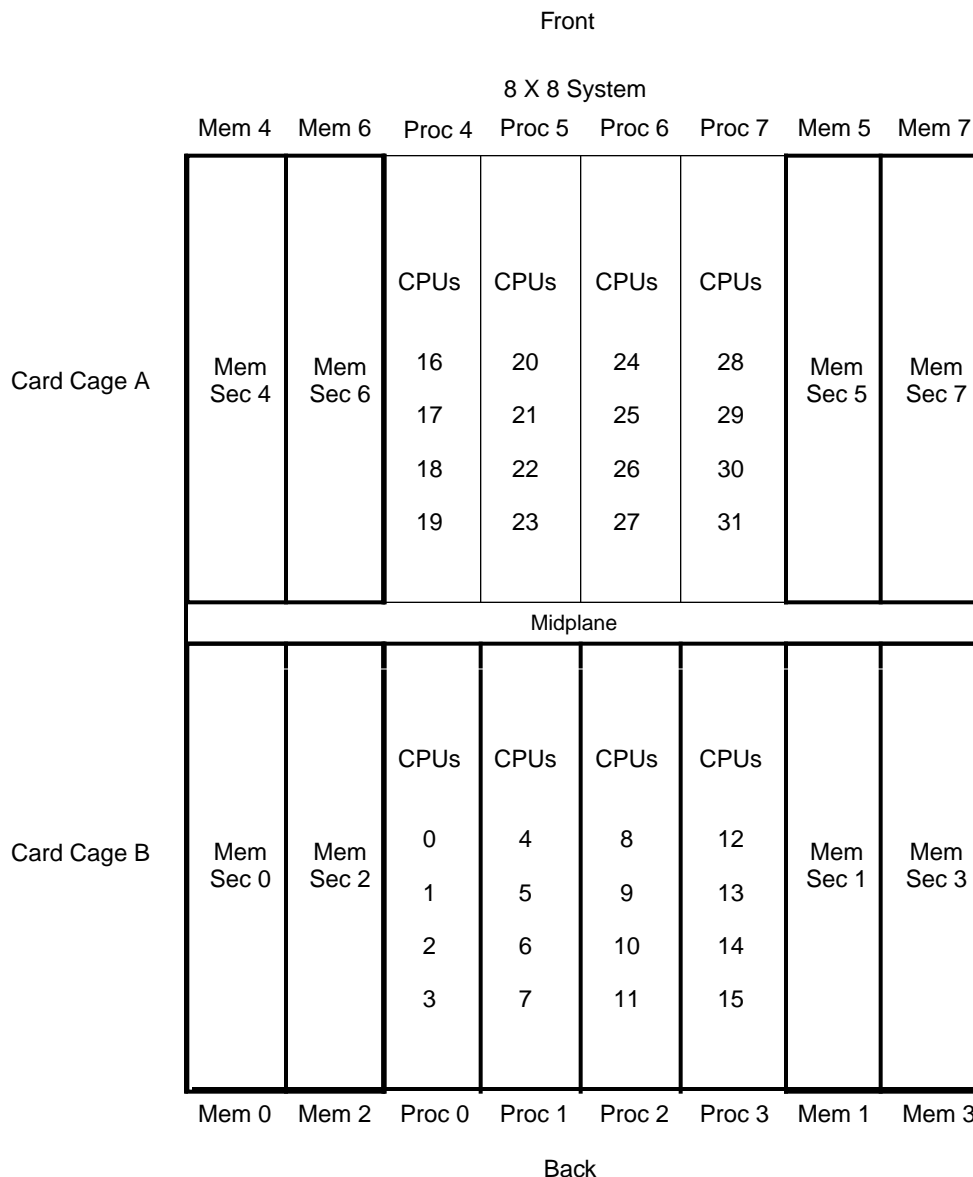
Back

NOTES: Proc 4, Proc 5, Proc 6, and Proc 7 slots may be vacant in an 8 x 8 configuration. All memory module slots will always be filled.

Figure 2. Backplane Slot Locations for Memory and Processor Modules

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. See 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 Mainframe Cabinet

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 Console` menu item.

3. Log into the UNICOS operating system by entering `<CONTROL-a>` to get a UNICOS prompt and enter the root login and password.

    NOTE: You must have super user privileges to perform Step 4.

4. Shut down the UNICOS operating system by entering the following commands:

    > \# **cd /**
    > \# **/etc/shutdown 120** *(this step will take 120 seconds to*
    > *execute; wait for the UNICOS prompt)*
    > \# **/bin/sync**
    > \# **/bin/sync**
    > \# **/bin/sync**
    > \# **/etc/ldsync**   *(if you are using ldcache)*

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

    > \# **<CONTROL-a>**   *(toggles to the IOS)*
    > sn9*xxx*-ios0> **mc**
    > sn9*xxx*-ios0> **reset**   *(takes 30 – 45 seconds to execute)*
    > BOOT[sn9*xxx*-ios0]> **~. <CONTROL-c>**

6. Move the circuit breaker to the 0 or OFF position on the back of the mainframe cabinet.

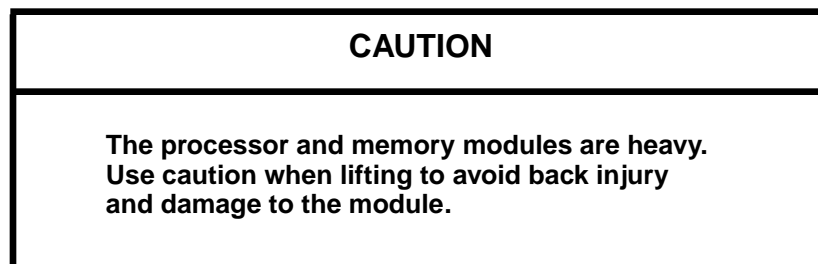## Open the Mainframe Rear Door

1. At the rear of the mainframe cabinet, locate the two door-locking fasteners at the left top and left bottom of the door. Turn these fasteners counterclockwise with a 5/32-in. allen wrench.

2. Grasp the door handle and swing the door open to the right.

3. (J932 only) At the front of the mainframe cabinet, locate the latch located on the upper-right corner of the door.

4. Push down on the latch and swing the door open.

5. Locate the two screws on the internal door. Loosen these screws by turning them counterclockwise with a phillips screwdriver.

6. Swing door open to the left.

Remove Existing Memory Modules

1. Connect a wrist grounding strap to the grounding points provided on the mainframe cabinet.

2. Turn the jack screws located at the top and bottom of the module faceplate counterclockwise until the module is loose in the chassis.

3. Grasp the module securely and remove it from the chassis.

+---+
| **CAUTION** |
+---+
| **The processor and memory modules are heavy.** |
| **Use caution when lifting to avoid back injury** |
| **and damage to the module.** |
+---+

4. Place the module on an ESD-safe surface.

5. Repeat Step 1 through Step 3 for each memory module removed (2x2 has 2 memory modules, 4x4 has 4 memory modules, 8x8 has 8 memory modules).

Insert the New Memory Modules

1. Carefully unpack the new memory module. Retain the shipping container for future use.

2. 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.

3. Open the memory slot air damper to its open position by turning the air damper handle one-fourth turn counterclockwise. Continue to push the processor module into the chassis until it contacts the backplane.

4. Tighten the jack screws until the module is fully seated.

5. Repeat Steps 1 through 4 for each memory module inserted.

6. Pack the removed memory modules into the new module shipping
    containers. Refer to the "Removed Parts Disposition" section at the end of
    this document.

7. Ensure that the memory module DC enable indicator is green.

8. Close the rear door of the cabinet by swinging the door shut and turning
    the two door-locking fasteners clockwise.

9. (J932 only) Close the internal door by swinging the door shut and
    tightening the two screws.

Power Up Mainframe

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 mainframe cabinet to the ON
    position.

4. Press the Alarm Acknowledge button on the central control unit (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 CCU illuminates and no
    fault conditions exist (no other lights are illuminated).

8. Close the mainframe front door.

9. Check the console window for error messages and the `BOOT sn`*xxxx*`>`
    prompt.

Update Hardware Configuration Registers

Perform the following procedure to update the hardware configuration registers.
You will start from the CRAY J916 workstation root window.

1. Close the current `J90 Console` session by entering the following:

    ~. <CONTROL-c>

2. Using the right mouse button, select the `Workspace` menu.

3. From the `Workspace` menu, select the `J90 Install` menu item.

4. From the `J90 Install` Menu, select the `Initial Installation` menu item.

5. From the `Initial Installation` Menu, select the `Mainframe Hardware Setup` menu item.

6. Select the appropriate mainframe serial number. Then select the `Setup Hardware Button`. From within that window, select the following items:

    a. Appropriate backplane type (2 X 2, 4 X 4, or 8 X 8).

    b. Appropriate number of memory modules and the memory type of each module. The memory type is on a label on the front of the module. (See Table 6, Table 7, and Table 8).

Table 6. Configuration Values for a 2 X 2 Backplane

Memory Board Type	MegaWords (MEGAWD-1) Value	NBANKS Value	CHIPSZ Value	Memory Module Name
8	32	128	M4MCH	MEM16
0	64	256	M4MCH	MEM32
B	128	128	M16MCH	MEM64
3	256	256	M16MCH	MEM128

Table 7. Configuration Values for a 4X 4 Backplane

Memory Board Type	Megawords (MEGAWD-1) Value	NBANKS Value	CHIPSZ Value	Memory Module Name
8	64	256	M4MCH	MEM16
0	128	512	M4MCH	MEM32
B	256	256	M16MCH	MEM64
3	512	512	M16MCH	MEM128

Table 8. Configuration Values for an 8 X 8 Backplane

Memory Board Type	Megawords (MEGAWD-1) Value	NBANKS Value	CHIPSZ Value	Memory Module Name
V	128	512	M4MCH	MEM16
P	256	1024	M4MCH	MEM32
Y	512	512	M16MCH	MEM64
S	1024	1024	M16MCH	MEM128

c.   Verify the number of processor modules and the appropriate bitmap for each CPU processor module. For example, for a J916 system, the CPU bitmap for a 7-CPU system would be a value of "f" (1111) for CPU module 1 and "7" (0111) for CPU module 2. Use the CPU Enable Block part number and Table 9 to choose the correct CPU bitmaps for your system. For a J932 system, the CPU bitmap would

Table 9. CRAY J916 CPU Configurations

CPUs Enabled	Proc 3				Proc 2				Proc 1				Proc 0				CPU Enable Block Part Number
To 5 CPUs												X	X	X	X	X	90343600
To 6 CPUs											X	X	X	X	X	X	90343601
To 7 CPUs										X	X	X	X	X	X	X	90343602
To 8 CPUs									X	X	X	X	X	X	X	X	90343603
To 9 CPUs								X	X	X	X	X	X	X	X	X	90343604
To 10 CPUs							X	X	X	X	X	X	X	X	X	X	90343605
To 11 CPUs						X	X	X	X	X	X	X	X	X	X	X	90343606
To 12 CPUs					X	X	X	X	X	X	X	X	X	X	X	X	90343607
To 13 CPUs				X	X	X	X	X	X	X	X	X	X	X	X	X	90343608
To 14 CPUs			X	X	X	X	X	X	X	X	X	X	X	X	X	X	90343609
To 15 CPUs		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	90343610
To 16 CPUs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	90343611

be a value of "f" for each installed processor module.

d.   Select the `Configure Hardware` button. The "Hardware Setup Speedometer" indicates progress.

e.   Click on `OK` on the "Completed Hardware Setup Window" to acknowledge completion of the hardware configuration.

7. The hardware configuration register files are now updated. Select `Return to Main Menu` and then `Quit` to exit the `J90 Install` menu(s).

8. Using the right mouse button, select the `Workspace` menu.

9. From the `Workspace Menu`, select the `J90 Console` menu item.

10. At the `QLOAD>` prompt, enter the following command and wait for the `BOOT[sn9xxx-ios0]` prompt:

    `QLOAD0>` **`reset`**

11. Load the IOS kernel by entering the following command (this step takes 3 to 30 minutes):

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

12. To verify that your hardware configuration is correct, display the System Hardware Configuration by entering the `jconfig` command.

    The following is a sample output for an 8-CPU system with a system memory size of 64 Mwords. If the values displayed in the jconfig output do not match your system's new configuration, return to Step 1 in this subsection ("Update Hardware Configuration Registers") and repeat all steps. If the values displayed match your system's new configuration, enter <CONTROL-c>.

```
sn9xxx-ios0> jconfig

**********System Hardware Configuration **********

CP BOARDS PRESENT    CPUs PRESENT ON EACH CP BOARD
-------------------- ------------------------------
0                    0   1    2    3
1                    0   1    2    3

MEM BOARDS PRESENT: 0    1
MEMORY BOARD TYPES: 0    0

Backplane Type:          2x2
Is This Configuration Correct (y, n, <CTRL-C>)?
```

13. Using the right mouse button, select the `Workspace` menu.

14. From the `Workspace` menu, select the `xterm` menu item.

15. Verify the boot script by performing the following steps:.

    a. From the xterm window, use `vi` to edit the `boot` script:

        ```
        # vi /opt/ios/9xxx/bin/boot
        ```

    b. Verify that the fill memory (`fm`) command has been replaced with the `offline jclr` routine and the `ds` command (see the highlighted lines in the `boot` script example that follows). It is recommended that the number of seconds for the system to "wait"(`wait` *nn* command) before executing the next command is 30 seconds for a system with a memory size of less than or equal to 256MW and 50 seconds for a system with a memory size of greater than 256MW. The following is an example for a system with 512MW of memory:

        ```
        #!
        mc
        echo Executing jclr Please wait...
        offline jclr
        ds
        wait 50
        mc
        echo Jclr complete. Loading UNICOS...
        lu /sys/unicos.ymp /sys/param
        echo Starting unicos
        iostart
        ds
        conswitch
        ```

    c. Exit the xterm window by entering the `exit` command.

Use ACT to Verify Hardware Operation

The second level of ACT, the menu system, provides a menu-driven interface that selects and runs specific diagnostics. If ACT detects a failure, refer to *Automated Confidence Testing*, Cray Research publication number HDM-110-0.

1. Invoke the ACT menu system by entering the following command:

    ```
    sn9xxx-ios0> act_menu
    ```

2. Configure the J90 boundary scan revision number for the new module and verify that the other module revisions are correct by entering the `JBS - J90 Boundary Scan` submenu. Enter 3 and <RETURN> to start `Run System Boundary Scan`.

3. The following menu will be displayed. Enter 2 and <RETURN> to select the `Boards Specified for Test`.

```
        JBS - J90 BOUNDARY SCAN


1.    Boundary Scan Test Level   : All tests
2.    Boards Specified for Test  : Default
3.    Number of Passes           : 1
4.    Error Information          : Standard
5.    Number of Errors           : 10000


R.    Run Selected Tests(s)


H.    Help Screen
Q.    Quit Program


Enter Selection: 2 <RETURN>
```

4. The `Boards Specified for Test` menu appears, displaying the boundary scan revision numbers. Verify that the revision number of each board listed in the display matches the revision number located on the module sticker on the back of the module (BSN=*X*; *X* is the revision number). If any of the listed values differ from the module stickers, change the value in the menu to match the sticker by choosing the appropriate module (by number) and selecting the correct revision letter. Below is a sample display of a 2 X 2 backplane system with one processor module at revision A and two memory modules, one at revision A and the other at revision B. If you make any changes, write the changes to the `/sys/config.jbs` file by selecting the `W` option. When all revisions are correct, exit this submenu by selecting `P`.

```
        Boards Specified for Test


        1. PROC0  : rev A
        2. PROC1  : -----
        3. MEM0   : rev A
        4. MEM1   : rev B
        D. Default Settings
        W. Write Changes
        P. Previous Menu


        Enter selection:
```

5. Exit (quit) the `JBS - J90 Boundary Scan` submenu by entering q.

6. Select 1 to run all basic tests from the `Automated Confidence (BASIC) Test` menu. This step will take 4 to 16 minutes, depending on the system configuration.

7. Select n from the `Automated Confidence (BASIC) Test Menu` to go to the `Automated Confidence (INTERMEDIATE) Test` menu.

8. Select 1 to run all intermediate tests. This step will take 3 to 7 minutes, depending on the system configuration.

9. Select n from the `Automated Confidence (INTERMEDIATE) Test` menu to go to the `Automated Confidence (COMPREHENSIVE) Test` menu.

10. Select 1 to run all comprehensive tests. This step takes about 20 minutes, depending on the system configuration.

11. Select q to quit the ACT menu system.

Software Change Procedure

You must rebuild the UNICOS operating system as part of the CRAY J90 series memory upgrade. You can do this by using one of the following procedures explained in this section:

-   The UNICOS Installation / Configuration Menu System

-   Manually changing kernel configuration files

The software verification procedure consists of ensuring that additional memory is accessible from the UNICOS operating system. When the system boots, it should report the amount of available memory.

Use the UNICOS Installation / Configuration Menu System (ICMS)

NOTE: To use the UNICOS Installation/Configuration Menu System, your system must be running the UNICOS operating system release 8.0.4 or later.

Perform the following procedure to use the UNICOS ICMS to rebuild the UNICOS operating system. You must have super user privileges. For additional information on the ICMS, see the *UNICOS Installation and Configuration Tool Reference Manual*, publication SR-3090.

NOTE:　If you have not already done so, it is recommended that you create a backup copy of the UNICOS file system.

1. Save the existing UNICOS kernel and `/sys/param` file by entering the following commands:

   ```
   sn9xxx-ios0> cd /sys
   sn9xxx-ios0> cp unicos unicos.old
   sn9xxx-ios0> cp param param.old
   ```

2. Start the UNICOS operating system by entering the following command:

   ```
   sn9xxx-ios0> boot
   ```

3. Enter multiuser mode by entering the following command: (for more information on bringing your system to multiuser mode, see the *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, publication SG-2416)

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

4. Log on as super user (`root`).

5. To ensure that the `/etc/config/param` file is up-to-date, copy it from the IOS disk to the UNICOS file system by entering the following command:

   ```
   # exdf -i /sys/param > /etc/config/param
   ```

6. Enter the UNICOS Installation / Configuration Menu System by entering the following command:

   ```
   # /etc/install/install
   ```

7. Select the following menu:

   ```
   UNICOS 8.0 Installation / Configuration Menu System
   . Configure System
   . . Mainframe Hardware Configuration
   ```

8. Execute the following action to ensure that the install tool database is up-to-date:

> **A->** Import the hardware configuration...

Answer yes (y) to the question, `Do you want to continue?`

9. Change the value of `Physical memory size in Mwords` to the number of Mwords of memory the system will have after the upgrade:

> **S->** Physical memory size in Mwords   **#**

10. Change the value of `Number of memory banks (NBANKS)` to the number that corresponds to the number of memory boards the system will have after the upgrade. Use Table 6 on page 13, Table 7 on page 13, and Table 8 on page 14, to choose the correct NBANKS value for a 2 X 2 backplane, 4 X 4 backplane, or 8 X 8 backplane, respectively.

> **S->** Number of memory banks (NBANKS)   **#**

11. Change the value of `Bits per memory chip (CHIPSZ)` to the number that corresponds to the label on your memory modules. If your memory modules are labeled 0 or 8, use the value M4MCH, otherwise, use the value M16MCH. Use Table 6 on page 13, Table 7 on page 13, and Table 8 on page 14, to choose the correct CHIPSZ value for a 2 X 2 backplane, 4 X 4 backplane, or 8 X 8 backplane, respectively.

12. Verify that the rest of the configuration information is correct.

13. Execute the following action:

> **A->** Activate the hardware configuration...

Answer yes (y) to the question, `Do you want to proceed with the configuration update?`

14. Select the following menu to configure the parameters to build a new UNICOS kernel:

```
UNICOS 8.0 Installation / Configuration Menu System
. Build/Install System
```

15. Verify that the following parameters are configured:

```
          Build/Install System

M->  Build options ==>
     /usr/src reconfiguration files ==>
     Build action to take             install
```

```
       Build object                          all objects
       Components to build                   specific component
       Major components section ==>
       Specific component to build      uts
       Do the build in batch?           NO
       NQS submission options ==>
       Do the build ...
       Restart the build ==>
       Review last build summary ...
       Escape to a chroot shell ...

    Keys: ^? Commands H Help Q Quite V ViewDoc W WhereAmI
```

16. Execute the build action to build the new UNICOS kernel:

```
       A-> Do the build ...
```

17. Select the following menu to copy the UNICOS kernel and `param` files
    to the IOS:

```
    UNICOS 8.0 Installation / Configuration Menu System
    .  Utilities
    . . Expander File Transfers
```

18. Verify that the following parameters are configured to transfer the
    UNICOS kernel (`/usr/src/uts/cf.9`*xxx*`/unicos`) to the IOS:

```
              Expander File Transfers
  s-> Transfer UNICOS kernel to the expander?    YES
      Transfer CSL param file to the expander?   NO

      Expander directory name                    sys
      Expander file name suffix                  .ymp

      Do the transfer to the expander ...
```

19. Execute the transfer by selecting the following:

    ```
    A-> Do the transfer to the expander ...
    ```

20. Verify that the following parameters are configured to transfer the
    `/etc/config/param` file to the IOS:

    ```
            Expander File Transfers
       Transfer UNICOS kernel to the expander?    NO
    S-> Transfer CSL param file to the expander?   YES

       Expander directory name                     sys
       Expander file name suffix

       Do the transfer to the expander ...
    ```

21. Execute the transfer by selecting the following:

    ```
    A-> Do the transfer to the expander ...
    ```

22. Exit the UNICOS Installation and Configuration Menu System by typing
    q and answering y to the question: `Do you want to`
    `quit? (n/y)`

23. Shut down the UNICOS operating system by entering the following
    commands:

    ```
    # cd /
    # /etc/shutdown 120 (this step will take 120 seconds to
                              execute )
    # /bin/sync
    # /bin/sync
    # /bin/sync
    # /etc/ldsync  (if you are using ldcache)
    # <CONTROL-a>  (toggles to the IOS console)
    ```

24. Reload the IOS and boot UNICOS by entering the following commands:

    ```
    sn9xxx-ios0> reload
    sn9xxx-ios0> boot
    ```

    Verify that the kernel recognizes all of the system memory by reviewing
    the output of the `boot` command. The value associated with `Memory`
    `Configured` is the number of Cray words that is configured for the
    system. This number will not be an exact multiple of 1048576
    (megaword) due to aligning the bits for the Exchange Package; however,

it should be very close. The following is sample output of `Memory Configured` for a 128-Mword system:

```
May  9 08:22:06 sn9001 unicos: Memory Configured = 134216704 words
```

25. Enter multiuser mode by entering the following command (for more information on bringing your system to multiuser mode, see the *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, publication SG-2416):

    # **/etc/init 2**

26. Continue with the "Update the `mfdumpa.arg` File" section on .

Manually Change the Kernel Configuration Files

NOTE: If you have already used the UNICOS Installation / Configuration Menu System to rebuild the UNICOS kernel, do not perform the following procedure.

Perform the following procedure to manually change the kernel configuration files to rebuild the UNICOS operating system. Refer to the *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, publication SG-2416, for details on these steps.

1. Start the UNICOS operating system by entering the following:

   sn9*xxx*-ios0> **boot**

2. Enter multiuser mode by entering the following (for more information on bringing your system to multiuser mode, see the *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, publication SG-2416):

   # **/etc/init 2**

3. Log on as super user (`root`).

4. Verify that the `/usr/src/uts/cf.9`*xxx*`/sn.h` file exists by typing the following command:

   # **ls /usr/src/uts/cf.9*xxx*/sn.h**

   If it does not, create it by entering the following commands (9*xxx* is the

serial number of your machine):

```
# mkdir /usr/src/uts/cf.9xxx
# cd /usr/src/uts/cf.9xxx
# cp /usr/src/uts/c1/sys/sn.9001.h sn.h
```

5. Edit the sn.h file by executing the following commands:

```
# TERM=vt100; export TERM
# vi /usr/src/uts/cf.9xxx/sn.h
```

This file contains values for the system serial number, number of CPUs, and memory parameters. To obtain the correct memory parameters for your system, refer to Table 6, on page 13, if your system has a 2 X 2 backplane, to Table 7, on page 13, if your system has a 4 X 4 backplane, and to Table 8 on page 14, if your system has an 8 X 8 backplane.

6. Update kernel configuration values in the sn.h file. The following is a sample file for an 8-CPU, 64-Mword system with a memory label=0 in a 2 X 2 backplane system:

```
#define NBANKS   256
#define CHIPSZ   M4MCH
#define VHISPS   0
#define L2CS     0
#define MEMORY   64*MEGAWD-1
#define NCPU     8
#define MAXCLUS  9
```

The NBANKS value reflects the number of memory banks in the system. To determine the appropriate value for your system, see Table 6, on page 13, for a 2 X 2 backplane system, Table 7, on page 13, for a 4 X 4 backplane system, and Table 8 on page 14, for an 8 X 8 backplane system.

The CHIPSZ is the size of the memory chips on each memory module in the system. To determine the appropriate value for your system, see Table 6, on page 13, for a 2 X 2 backplane system, Table 7, on page 13, for a 4 X 4 backplane system, and Table 8 on page 14, for an 8 X 8 backplane system.

The VHISPS value should be set to 0.

The L2CS value should be set to 0.

The MEMORY value is the total number of Mwords of memory in the system. The NCPU value is the number of CPUs configured for your

system. To determine the appropriate value for your system, see , for a 2 X 2 backplane system, , for a 4 X 4 backplane system and , for an 8 X 8 backplane system.

The MAXCLUS should be set to the number of CPUs configured for your system plus 1 (NCPU+1).

7. Update the `/etc/config/param` file by entering the following command:

   ```
   # exdf -i /sys/param > /etc/config/param
   ```

8. Edit the `/etc/config/param` file by entering the following command:

   ```
   # vi /etc/config/param
   ```

9. Change the following memory value in the `/etc/config/param` file. The following is the entry for a 128 megaword system:

   ```
   128 Mwords memory;
   ```

10. Verify that the `/etc/config/param` file is correct by executing the `econfig` command against the updated `/etc/config/param` file. Enter the following command line:

    ```
    # /etc/econfig /etc/config/param
    ```

    Correct any errors displayed before proceeding to the next step. Refer to the *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, publication SG-2416, for specific information on configuring the `param` file for the CRAY J916 system.

11. Rebuild the kernel by entering the following commands:

    ```
    # cd /usr/src/uts
    # rm -f cf.9xxx/lib/*.o
    # rm -f cf.9xxx/Nmakefile*
    # /usr/bin/nmake rmexe
    # /usr/bin/nmake install  (this step takes 20 – 35 minutes)
    ```

12. Save the old `unicos` kernel and `/sys/param` file and move the new `unicos` kernel and `/sys/param` file to the IOS disk by executing the following commands:

    ```
    # <CONTROL-a>   (toggles to the IOS console)
    ```

```
sn9xxx-ios0> mv /sys/unicos.ymp /sys/unicos.old
sn9xxx-ios0> mv /sys/param /sys/param.old
sn9xxx-ios0> <CONTROL-a> <RETURN> (toggles to UNICOS)
# cd /usr/src/uts/cf.9xxx
# exdf -ro /sys/unicos.ymp < unicos
# exdf -ro /sys/param < /etc/config/param
```

13. Shut down the UNICOS operating system by entering the following commands:

```
# cd /
# /etc/shutdown 120 (this step will take 120 seconds to
                                    execute )
# /bin/sync
# /bin/sync
# /bin/sync
# /etc/ldsync (if you are using ldcache)
# <CONTROL-a> (toggles to the IOS console)
```

14. Reload the IOS and boot UNICOS by entering the following commands:

```
sn9xxx-ios0> reload
sn9xxx-ios0> boot
```

Verify that the kernel recognizes all of the system memory by reviewing the output of the boot command. The value associated with Memory Configured is the number of Cray words that is configured for the system. This number will not be an exact multiple of 1048576 (megaword) due to aligning the bits for the Exchange Package; however, it should be very close. A sample output of Memory Configured follows for a 128-Mword system.

```
May  9 08:22:06 sn9001 unicos: Memory Configured = 134216704 words
```

15. Enter multiuser mode by entering the following command (for more information on bringing your system to multiuser mode, see the *UNICOS Basic Administration Guide for CRAY J90 and CRAY EL Series*, publication SG-2416):

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

Update the `mfdumpa.arg` File

The `mfdumpa.arg` file contains the dump parameters for the mainframe dump utility (`mfdump`). Update this file to contain the new hardware configuration by performing the following procedure:

1. Within a window on the CRAY J90 workstation, edit the `mfdump` parameter file:

    ```
    % vi /opt/ios/9xxx/sys/mfdumpa.arg
    ```

2. Change the MEM value in the `mfdumpa.arg` file to match the amount of memory currently configured on your CRAY J90 system, and exit from the editor. The following is the entry for a 256 MW system:

    ```
    MEM=256
    ```

Removed Parts Disposition

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

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