CRAY J90™ Series AT-1 Upgrade Procedure

Cray Research, Inc.

Record of Revision

REVISION   **DESCRIPTION**

January 1995. Original version that includes FORE systems ATM card.

CRAY J90 SERIES AT-1 UPGRADE PROCEDURE

Figures

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Device to Be Upgraded

This document contains procedures on how to add a FORE Systems AT-1 asynchronous transfer mode (ATM) controller to a CRAY J90 series system.

Description of Upgrade

Cray Research customers have the option of implementing ATM in their CRAY J90 series systems. This procedure is written to aid CRI support personnel in the task of installing, configuring, and testing an AT-1.

This procedure includes only information for installing a FORE Systems ATM controller.

AT-1 Upgrade Prerequisites

The following list describes some special configuration considerations:

- It is recommended that a full backup of existing file systems be completed before this upgrade is started

- UNICOS 8.0.4.2 release or above. The ATM driver is not supported on any earlier releases.

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 must have a system administrator available during this upgrade. Experience in upgrading or installing the UNICOS operating system on a CRAY J90 series system or CRAY Y-MP EL system is advised.

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
⚡ (no ESD symbol)	**Observe all ESD precautions. Failure to do so could result in damage to the equipment.**
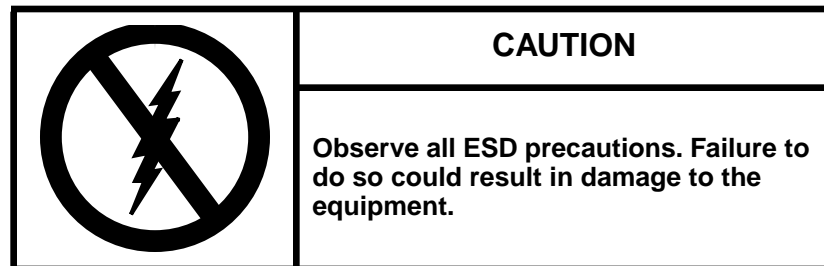
ESD Smock

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 handling an ESD-sensitive device to eliminate possible ESD damage to equipment. Connect the wrist strap cord directly to earth ground.

Reference Publications

- *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

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

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

- *UNICOS Installation/Configuration Menu System User's Guide*, publication SG-2412

Estimated Time to Install Upgrade

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

NOTE: It is recommended that you contact the customer and request that he or she complete a full backup prior to this upgrade.

Table 1. Estimated Times to Install Upgrade

Installation Task	Estimated Time to Install Upgrade
Software Configuration and Verification	1.5 hours
Hardware Installation	1 hour
Hardware Verification Testing	0.5 hour

Parts Required

Table 2. AT-1 Upgrade Kit Contents (P/N 90446600)

CRI Part number	Quantity	Description
90450900	1	Module Assembly, AT-1/OC3
90446400	1	Cable Assembly, AT-1, 20-in. Fiber Optics
90446900	1	Plate Assembly, Bulkhead ATM, BNC
90369300	1	Cable Assembly, Multimode, FDDI 3 Meters
90447000	1	Adapter, Bulkhead, SC-ST
90447100	1	Plate Assembly, Bulkhead. ATM Connector
90047005	2	Screw, Panhead Phillips 2-56X3/16SS
90452200	1	Connector, Loopback, SC Low Loss
90030500	10	Cable Tie, Mounting Nylon 4 inches

Tools Required

The majority of tools required for performing upgrades are common hand-held tools that are included with the Customer Service toolkit.

Software Required

- Minimum IOS kernel revision - 1.7
- Minimum UNICOS revision - 8.0.4.2
- No special considerations

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

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.

Modify the IOS Configuration File

In any window on the workstation, edit the IOS configuration file and add the IOS ATM driver to the appropriate IOS files, as follows:

```
# vi /opt/ios/9xxx/config
```

The following code shows an example of the added IOS ATM driver to the IOS system named IOS1 in the configuration file:

```
                    IOS1: 2093 1228800
                    #------------------
                    #Device driver name
                    #------------------
                    /dev/disk
                    /dev/ipi
                    /dev/esdi
                    /dev/atmv
```

NOTE: The VME connection requires that the `/dev/atmv.img` file be resident on the IOS. The `atmv.img` file is the firmware file that is downloaded to the ATM module when the IOS is loaded. The `atmv.img` file is part of every CRAY J90 series UNICOS release, starting with the UNICOS 8.0.4.2 release.

Configure the VME Interface

This subsection describes the steps needed to configure the VME interface by using the UNICOS Installation / Configuration Menu System (ICMS). For information on how to use the ICMS, refer to the *UNICOS Installation/Configuration Menu System User's Guide*, publication SG-2412, and the *UNICOS Installation and Configuration Tool Reference Manual*, publication SR-3090.

When you configure the VME interface in the UNICOS operating system, you will be updating the following files:

- `/etc/config/param`
- `/etc/config/atm.pvc`
- `/etc/hosts`
- `/etc/networks`
- `/etc/config/interfaces`

Details on the changes made to these files are provided in the "Files Changed by ICMS" subsection, .

NOTE: Because some of the menus are associated with other configuration files, files other than ones previously listed will be updated. If the UNICOS Installation/Configuration Menu System resembles your system's configuration, everything will be updated appropriately. If your system's configuration does not match the UNICOS Installation/Configuration Menu System, perform Step 3 through Step 7 starting on .

To configure the VME interface by using the ICMS, perform the following steps:

1. Log in as `root`.

2. Enter the UNICOS Installation/Configuration Menu System by entering the following command on the system console:

   # **/etc/install/install**

3. Once you are in the ICMS, it is recommended that you use the `import` utility to update the system configuration before you configure anything. To import the current system configuration into the menu system, go to the `Import Options` option, as shown:

```
UNICOS Installation/Configuration Menu System
.      Utilities
.      .      Import Utility
.      .      .      Import Options
```

4. Set the import options to the following values

```
            Import Options

S->    Import root mount point
       Stop import on error?            YES
       Import host or guest versions?   host
       Reload default import table ...

```

After selecting the Import Options, select `e`.

NOTE: It is important to import files used by the site (Step 5) to ensure that any changes initiated outside of the tool get included before changes made for ATM are activated.

5. Exit the `Import Options` option and select the `Import Table` option, as shown:

```
UNICOS Installation/Configuration Menu System
.      Utilities
.      .      Import Utility
.      .      .      Import Table
```

The configuration files associated with ATM must be imported. Set to `NO` any Import Table option that your site does not use. Set the following Import Table options to `YES`:

```
                         Import Table

      Class       Description        Import?    Program        Options
      -----       -----------        -------    -------        -------
 E->  HARDWARE    Param              YES        hdwparam.sh    -i $RELEA
      KERNEL      Config.h uts       YES        utsconfh.sh    -i $RELEA
      KERNEL      Param uts          YES        utsparam.sh    -i $RELEA
      KERNEL      Comm channels      YES        utscparam.sh   -i $RELEA
      HOSTS       Hosts              YES        utlimp.sh      hosts
      NETWORKS    Networks           YES        utlimp.sh      networks
      NETIF       Network Interfaces YES        netifs.sh      -i
```

6. Exit the `Import Table` option by selecting e, and select the `Import Utility` option, as shown:

```
         UNICOS Installation/Configuration Menu System
         .     Utilities
         .     .      Import Utility
```

Set the `Import class to run` option to `ALL`, as follows:

```
                  Import Utility
         Import options ==>
M->      Import table ==>
         Import class to run
ALL
         Run the import process ...
```

7. Execute the `Run the import process` option. This option overwrites the menu system database. Exit the `Import Utility` option and answer y (yes) to the following question:

```
         Do you want to continue? y
```

8. Go to the `Native ATM Configuration` option, as shown:

```
UNICOS Installation/Configuration Menu System
.     Configure System
.     .         Kernel Configuration
.     .     .      Communication Channel Configuration
.     .     .     .      Native ATM Device Configuration
```

Enter the appropriate parameters to build the `atmdev` entries in the `/etc/config/param` file, as in the following example:

```
              Native ATM Configuration

  S->    ATM device ordinal   0
         I/O cluster number    0
         IOP number            0
         IOP Channel number    020
```

The following list describes the parameters:

Parameter	Description
`ATM device ordinal`	Specifies the VME interface that will be defined in the `param` file. Possible values are 0 through 15.
`I/O cluster number`	Specifies the IOS in which the ATM module will reside. Possible values are 0 through 15.
`IOP number`	Value must be 0.
`IOP channel number`	Specifies the channel number that the I/O processor (IOP) uses to communicate with the ATM controller in the IOS. A maximum of two ATM controllers are allowed per IOS. Use channel 20 octal for the first ATM controller and channel 21 octal for the second.

Create entries for all VME interfaces that are being installed.

9. Exit the `Native ATM Configuration` option and answer `y` (yes) to the following question:

    ```
    Do you want to update form file? (y/n):  y
    ```

10. To configure the VME interfaces, go to the `Network Parameters` option, as shown:

    ```
    UNICOS Installation/Configuration Menu System
    .     Configure System
    .     .      Kernel Configuration
    .     .      .      Network Parameters
    ```

    To update the `/etc/config/param` file, enter the appropriate network parameters, as shown in the following example:

```
                         Network Parameters

Number of TCP memory buffers (TCP_NMBSPACE)      4000
Max. Native ATM network devices (atmmaxdevs)     2
ATM ARP receive space (atmarp_recv)              131072
ATM ARP send space (atmarp_send)                 65536
Max. ATM ARP entries (atmarp_entries)            1024
```

The following list describes the parameters:

Parameter	Description
`Number of TCP memory buffers (TCP_NMBSPACE)`	Specifies the number of mbufs to be defined for the system. This value is system-dependent.
`Max. Native ATM network devices (atmmaxdevs)`	Specifies the maximum number of ATM modules allowed for this system. Valid values are 1 through 16. Set this value to the number of ATM interfaces to be installed in this system.
`ATM ARP receive space (atmarp_recv)`	Specifies the amount of socket receive space used by the atmarp(1) command. This value should always be a power of 2. The default value of 131072 should be sufficient for most systems.
`ATM ARP send space (atmarp_send)`	Specifies the amount of socket send space used by the atmarp(1) command. This value should always be a power of 2. The default value of 65536 should be sufficient for most systems.
`Max. ATM ARP entries (atmarp_entries)`	Specifies the maximum number of address resolution protocol (ARP) entries allowed in the ATM ARP table. The default value of 1024 should be sufficient for most systems. This value is directly related to the number of remote hosts that communicate through the ATM.

11. To activate the kernel configuration, go to the `Activate the`
     `Kernel Configuration` option, as shown:

```
        UNICOS Installation/Configuration Menu System
        .      Configure System
        .    .     Kernel Configuration
        .    .      .      Activate the Kernel Configuration
```

Answer y (yes) to the following question:

```
Do you want to proceed with the configuration update?  y
```

You need to complete the next two steps only if you will be configuring
Permanent Virtual Circuits (PVCs) for remote hosts with which this system will
communicate through the VME interface. PVCs provide a means to state a path
to a remote host specifically. PVCs are created and deleted by using the
`atmarp`(8) command. The next two steps configure the parameters that will be
used by the `atmarp`(8) command.

NOTE: Switched Virtual Circuit (SVC) support is under development and
will be added to the UNICOS system at a later release. SVCs are a
dynamic way to create a path to a remote host. SVCs use a protocol
called *signaling* to set up and delete an available path between two
hosts. The software performs SVCs automatically.

12. Exit the `Activate the Kernel Configuration` option by
     entering e, and go to the `Permanent Virtual Circuit`
     `Configuration` option, as shown:

```
UNICOS Installation/Configuration Menu System
.      Configure System
.    .     Network Configuration
.    .     .     Native ATM Configuration
.    .     .     .     Permanent Virtual Circuit Configuration
```

To update the `/etc/config/atm.pvc` file, use the n key to enter the
Permanent Virtual Circuits (PVCs) for all remote hosts with which this system
will communicate through the VME interface. The following text is an example
of a `/etc/config/atm.pvc` file:

```
                  Permanent Virtual Circuit Configuration

      Remote Hostname       Interface  AAL   VPI    VCI QOS (Kb/s)
      ----------------      ---------  ---   ---    --- ----------
E->   remotehost_atm0       atm0       5     0      32  1
      remotehost_atm1       atm1       5     0      33  1
```

Following is a description of the parameters:

Parameter	Description
Remote Hostname	Specifies the IP host name of the remote host. This name must be located in the `/etc/hosts` file.
Interface	Specifies the name of the VME interface that this system will use to reach the remote host. The name is as it appears in the output of the `netstat -i` command.
AAL	Specifies the ATM Adaptation Layer (AAL) to be used by this PVC. This value is based on ATM standards. Currently, the ATM connection supports only AAL 5. Specify this number in decimal form.
VPI	Specifies the Virtual Path Identifier (VPI). The VPI is placed into each ATM cell header so that the cell can be routed through the ATM network. Currently, ATM interfaces support only VPI 0. Specify this number in decimal form.
VCI	Specifies the Virtual Channel Identifier (VCI). The VCI is placed into each ATM cell header so that the cell can be routed through the ATM network. This number should be between 32 and 1023. Consult your local network administrator when determining the VCI. Specify this number in decimal form.
QOS (Kb/s)	Specifies the quality of service expressed in kilobits per second. This is the peak data rate at which this host will deliver ATM cells to the remote host through the ATM interface. Placing a 0 in this field causes the peak rate control feature to be disabled when sending to this remote host, thus allowing unlimited bandwidth. Specify this number in decimal form.

13. Exit the `Permanent Virtual Circuit Configuration` option by entering `e`, and answer `y` (yes) to the following question:

                    `Do you want to update form file? (y/n):` **y**

14. To activate the VME (Native ATM) configuration, go to the `Activate the Native ATM Configuration` option, as shown:

```
UNICOS Installation/Configuration Menu System
.      Configure System
.      .      Network Configuration
.      .      .      Native ATM Configuration
.      .      .      .      Activate the Native ATM Configuration
```

Answer `y` (yes) to the following question:

`Do you want to proceed with the configuration update?` **y**

15. Exit the `Activate the Native ATM Configuration` option by entering `e`, and go to the `Host Address Configuration` option, as shown:

```
UNICOS Installation/Configuration Menu System
.      Configure System
.      .      Network Configuration
.      .      .      General Network Configuration
.      .      .      .      Host Address Configuration
```

To update the `/etc/hosts` file, use the `n` key to configure the VME connection for TCP/IP. The following screen is an example of a `/etc/hosts` file:

```
        Host Address Configuration

Proto   Name              Address          Comment
-----   ----              -------          -------
inet    edge_atm0          128.162.102.25
inet    remotehost_atm0   128.162.102.30
inet    remotehost_atm1   128.162.102.31
```

The following list describes the configuration parameters:

Parameter   Description

`Proto`   Specifies the Internet protocol

`Name`   Specifies the IP address alias

`Address`   Specifies the standard IP address value

16. To update the /etc/networks file, go to the Network Address
    Configuration option, as shown:

```
UNICOS Installation/Configuration Menu System
.     Configure System
.     .     Network Configuration
.     .     .     General Network Configuration
.     .     .     .     Network Address Configuration
```

Configure the ATM Internet network address for TCP/IP by creating an entry in
the /etc/networks file for each ATM network. There will be a network
address for each ATM interface that will communicate through TCP/IP. The
following screen is an example of a /etc/networks file:

```
        Network Address Configuration

        Proto     Name     Address        Comment
        -----     ----     -------        -------
E->     inet      atmnet 128.162.102
```

The following list describes the configuration parameters:

Parameter	Description
Proto	Specifies the Internet protocol
Name	Specifies the IP address alias
Address	Specifies the standard IP address value

17. Exit the Network Address Configuration option by entering e,
    and go to the Network Interface Configuration option, as
    follows:

```
UNICOS Installation/Configuration Menu System
.     Configure System
.     .     Network Configuration
.     .     .     General Network Configuration
.     .     .     .     Network Interface Configuration
```

To update the /etc/config/interfaces file, use the n key to enter the
appropriate information to automatically configure up the VME interface during
a UNICOS boot for this system, as shown in the following example:

```
                    Network Interface Configuration
    Name Hycf Family Address              Dest Subnet          Type   Bcst
    ---- ---- ------ -------              ---- ------          ----   ----
    lo0         inet   localhost
    en0         inet   edge.cray.com          0xffffff00
    fddi0       inet   edge-fddi.cray.com     0xffffff00              128.16
E-> atm0        inet   edge-atm0              0xffffff00   pvc
```

The following list describes the configuration parameters:

Parameter	Description
Name	Specifies the interface name and ordinal of the ATM interface to be configured. The syntax is atm*x*, where *x* is the ordinal number of the ATM interface.
Hycf	Not used.
Family	Must be set to inet.
Address	Specifies the IP host address for this interface connection. This parameter must be defined in the /etc/hosts file.
Dest	Specifies the destination (point-to-point) address. It is not needed for the ATM connection.
Subnet	Specifies the subnetwork address mask to be used for this interface.
Type	Specifies the interface type, used to select the type of signaling to be used across the ATM network. These values also imply the type of encapsulation used for IP datagrams. The following types are supported:

- pvc - Permanent Virtual Circuit. Implies 802.2 LLC encapsulation.

- spans - Simple Protocol for ATM Network Signaling (SPANS) protocol. Implies null encapsulation and Switched Virtual Circuits (SVC).

Parameter   Description

- q2931 - Q2931 is the Switched Virtual Circuit standard. This is under development and does not currently work. Implies 802.2 LLC encapsulation and Switched Virtual Circuits (SVC).

    NOTE: If the interface type is set to pvc, signaling will **not** be performed on that interface. However, if an interface is marked as spans or q2931, PVCs are still supported on that interface when you use the atmarp command to place them in the atmarp table.

Bcst   Specifies broadcast address.

18. Exit the Network Interface Configuration option by entering e, and answer y (yes) to the following question:

    ```
    Do you want to update form file? (y/n):  y
    ```

19. Go to the General Network Configuration option, as follows:

    ```
    UNICOS Installation/Configuration Menu System
    .       Configure System
    .    .      Network Configuration
    .    .    .      General Network Configuration
    ```

20. Activate general network configuration, as follows:

    ```
          General Network Configuration

          Host address configuration ==>
          Network address configuration ==>
          Networking services configuration ==>
          Network hardware address configuration ==>
          Network interface configuration ==>
          Import general network configuration ==>
    A->   Activate general network configuration
    ```

    Answer y (yes) to the following question:

    ```
    Do you want to proceed with the configuration update? y
    ```

21. Copy the `param` file to the console disk by selecting the `Expander File Transfers` menu, as follows:

```
        UNICOS Installation/Configuration Menu System
        .       Utilities
        .    .        File Transfer Utilities
```

22. Verify that the following parameters are configured to transfer the `/etc/config/param` file to the console disk:

```
        Expander File Transfers

S->Transfer UNICOS kernel to the expander? NO
   Transfer CSL param file to the expander? YES

Expander directory name                    sys
Expander file name suffix

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

23. Execute the transfer by selecting the following option:

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

24. Exit the UNICOS Installation/Configuration Menu System by typing `q` (quit) and answering `y` (yes) to the following question:

```
Do you want to quit?   y
```

For examples of the files that have been updated by the preceding process, refer to the following subsections.

Files Changed by ICMS

The following subsections describe and show examples of the files that are updated when you configure the VME interface by using the ICMS. The examples in the following subsections show only the part of the files that relate to the ATM interface configuration. Exact parameter settings will be system-dependent.

The following files are updated:

- `/etc/config/param`
- `/etc/config/atm.pvc`
- `/etc/hosts`

- `/etc/networks`
- `/etc/config/interfaces`

`/etc/config/param` File

The `/etc/config/param` file contains the parameters needed to configure the VME interface for the host system.

In the `network` section of the file, you must create entries for all VME interfaces that are being installed. Enter appropriate values for the following parameters:

Parameter	Description
`tcp_nmbspace`	Number of TCP memory buffers. Specifies the number of mbufs to be defined for the system. This value is system-dependent.
`atmmaxdevs`	Maximum VME (Native ATM) network devices. Specifies the maximum number of VME modules allowed for this system. Valid values are 1 through 16. Set this value to the number of VME interfaces to be installed in this system.
`atmarp_recv`	ATM ARP receive space. Specifies the amount of socket receive space used by the `atmarp(1)` command. This value should always be a power of 2. The default value of 131072 should be sufficient for most systems.
`atmarp_send`	ATM ARP send space. Specifies the amount of socket send space used by the `atmarp(1)` command. This value should always be a power of 2. The default value of 65536 should be sufficient for most systems.
`atmarp_entries`	Maximum ATM ARP entries. Specifies the maximum number of address resolution protocol (ARP) entries allowed in the ATM ARP table. The default value of 1024 should be sufficient for most systems. This value is directly related to the number of remote hosts that communicate through the ATM.
`atmdev`	ATM device ordinal. Specifies the ATM interface that will be defined in the `param` file. Possible values are 0 through 15.

Parameter	Description
`path`	I/O path that consists of the following three parameters: `cluster`, `eiop`, and `channel`.
`cluster`	I/O cluster number. Specifies the IOS in which the ATM module will reside. Possible values are 0 through 15.
`eiop`	IOP number. This number will always be 0.
`channel`	IOP channel number. Specifies the channel number that the I/O processor (IOP) uses to communicate with the ATM module in the IOS. This number is unique to each IOS. Valid values for this field are octal 20 and octal 21. Use octal 20 for the first module and octal 21 for the second module.

The following screen is an example of a `/etc/config/param` file:

```
# /etc/config/param file
.
.
.
network {
   4000 tcp_nmbspace;
      2 atmmaxdevs;
131072 atmarp_recv;
 65536 atmarp_send;
 1024 atmarp_entries;
.
.
.

atmdev 0 {
    iopath {
         cluster 0;
       eiop 0;
       channel 020;
            }
     }
   }
.
.
.
```

`/etc/config/atm.pvc` File

The `/etc/config/atm.pvc` file shows the Permanent Virtual Circuits (PVCs) for all remote hosts that will communicate to this system through the ATM interfaces.

Create the following parameters in the `/etc/config/atm.pvc` file:

Parameter	Description
`remote.host.name`	IP host name of the remote host. This name must be located in the `/etc/hosts` file.
`interface`	Name of the ATM interface that this system will use to reach the remote host. The name is as it appears in the output of the `netstat -i` command.
`AAL.number`	ATM Adaptation Layer (AAL) to be used by this PVC. This value is based on ATM standards. Currently, the ATM connection supports only AAL 5. Specify this number in decimal form.
`VPI.number`	Virtual Path Identifier (VPI), placed into each ATM cell header so that the cell can be routed through the ATM network. Currently, ATM interfaces support only VPI 0. Specify this number in decimal form.
`VCI.number`	Virtual Channel Identifier (VCI), placed into each ATM cell header so that the cell can be routed through the ATM network. This number should be between 32 and 1023. Consult your local network administrator when determining the VCI. Specify this number in decimal form.
`QOS.number`	Quality of service expressed in kilobits per second. This is the peak data rate at which this host will deliver ATM cells to the remote host through the ATM interface. Placing a 0 in this field causes the peak rate control feature to be disabled when sending to this remote host, thus allowing unlimited bandwidth. Specify this number in decimal form.

The following text is an example of a `/etc/config/atm.pvc` file:

```
#/etc/config/atm.pvc file

# hostname        ifc     AAL     VPI     VCI     QOS
# --------        ---     ---     ---     ---     ---
#
remotehost_atm0 atm0    5       0       32      0
remotehost_atm1 atm1    5       0       33      0
```

/etc/hosts File

The /etc/hosts file contains host names. Create the following parameters in this file:

Parameter	Description
address	Standard IP address value
name	IP address alias

The following screen is an example of a /etc/hosts file:

```
#/etc/hosts file

128.162.102.25          edge-atm0
128.162.102.30          remotehost_atm
128.162.102.31          remotehost_atm1
```

/etc/networks File

The /etc/networks file contains the name and address of your ATM network. Create the following parameters in this file:

Parameter	Description
name	IP address alias
address	Standard IP address value

The following screen is an example of a /etc/networks file:

```
#/etc/networks file

atm01       128.162.102
.
.
.
```

Create as many entries as there are VME ATM interfaces configured for TCP/IP.

`/etc/config/interfaces` File

The `/etc/config/interfaces` file contains the parameters required to configure up the ATM interface by using the `/etc/initif` script.

Create the following parameters in the `/etc/config/interfaces` file:

Parameter	Description
name	Interface name and ordinal of the ATM interface to be configured.
family	Interface family name. Must be set to `inet`.
IP. host_ address	IP host address for this interface connection. This parameter must be defined in the `/etc/hosts` file.
subnet	Subnetwork address mask to be used for this interface.
interface.type	Interface type, used to select the type of signaling to be used across the ATM network. These values also imply the type of encapsulation used for IP datagrams. The following types are supported:

- `pvc` - Permanent Virtual Circuit. Implies 802.2 LLC encapsulation.

- `spans` - Simple Protocol for ATM Network Signaling (SPANS) protocol. Implies null encapsulation and Switched Virtual Circuits (SVCs).

<div align="center">Parameter   Description</div>

- `q2931` - Q2931 is the Switched Virtual Circuit standard. This is under development and does not currently work. Implies 802.2 LLC encapsulation and Switched Virtual Circuits (SVC).

  NOTE: If the interface type is set to `pvc`, signaling will **not** be performed on that interface. However, if an interface is marked as `spans` or `q2931`, PVCs are still supported on that interface when you use the `atmarp` command to place them in the `atmarp` table.

The following text is an example of a `/etc/config/interfaces` file:

```
#/etc/config/interfaces file
# File format is:
#
# name  hycf_file    family  address        pt-to-pt-dest  args:
#                                                          netmask
#                                                          iftype
#                                                          broadcast
#                                                          mtu
#                                                          rbuf
#                                                          wbuf
#                                                          bg
#                                                          hwloop
atm0    -            inet    edge-atm0 -  netmask 0xffffff00 iftype pvc
```
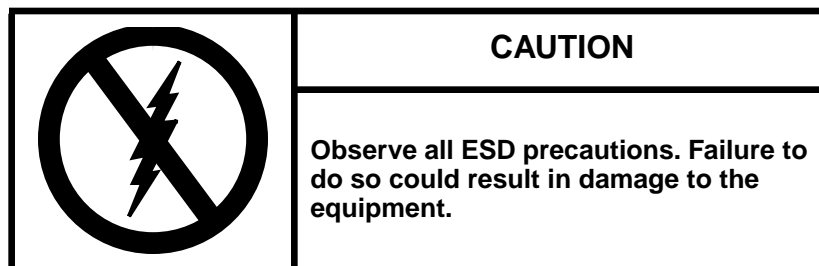
Installing the VME Hardware

The installation of the VME hardware consists of the following procedures:

- Powering down and removing panels
- Setting VMA-200 module switches and jumpers

NOTE: The labels on the AT-1 cables have the following meanings:

Transmit [TX] = output
Receive [RX] = input

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

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     (executes after 120 seconds)
   # /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. Open the mainframe cabinet front door by pushing down on the latch and swinging the door open.

8. Power off the system by pressing the CCU SYSTEM OFF button.

Open the CRAY J90 Series I/O Cabinet Rear Door

1. At the rear of the I/O cabinet, locate the two door-locking fasteners at the left top and left bottom of the door. Turn these fasteners 1/4-turn counterclockwise with a 5/32-in. allen wrench.

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

Open the CRAY J90 Series I/O Cabinet Front Door

1. At the front of the I/O cabinet, locate the latch on the upper-right corner of the door.

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

Install the AT-1 Controller

Install the AT-1controller board into the correct IOS (depending on customer's system configuration) using the next available slot in that IOS.

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. Release the screws that hold the top cover to the VME tray.

    d. Remove the top cover from the VME tray and set it aside.

2. Unpack the new controller board if you are performing an upgrade.

3. Place the new board on an ESD-protected surface.

4. Change any jumpers or switches necessary on the new AT-1 controller board. Refer to Figure 1.

5. Select and remove the appropriate VME slot filler from the slot where the AT-1 controller board will be installed.

6. Insert the AT-1 controller board into the guide slots in the VME chassis.

7. Secure the AT-1 controller board by tightening the screws to the VME chassis.
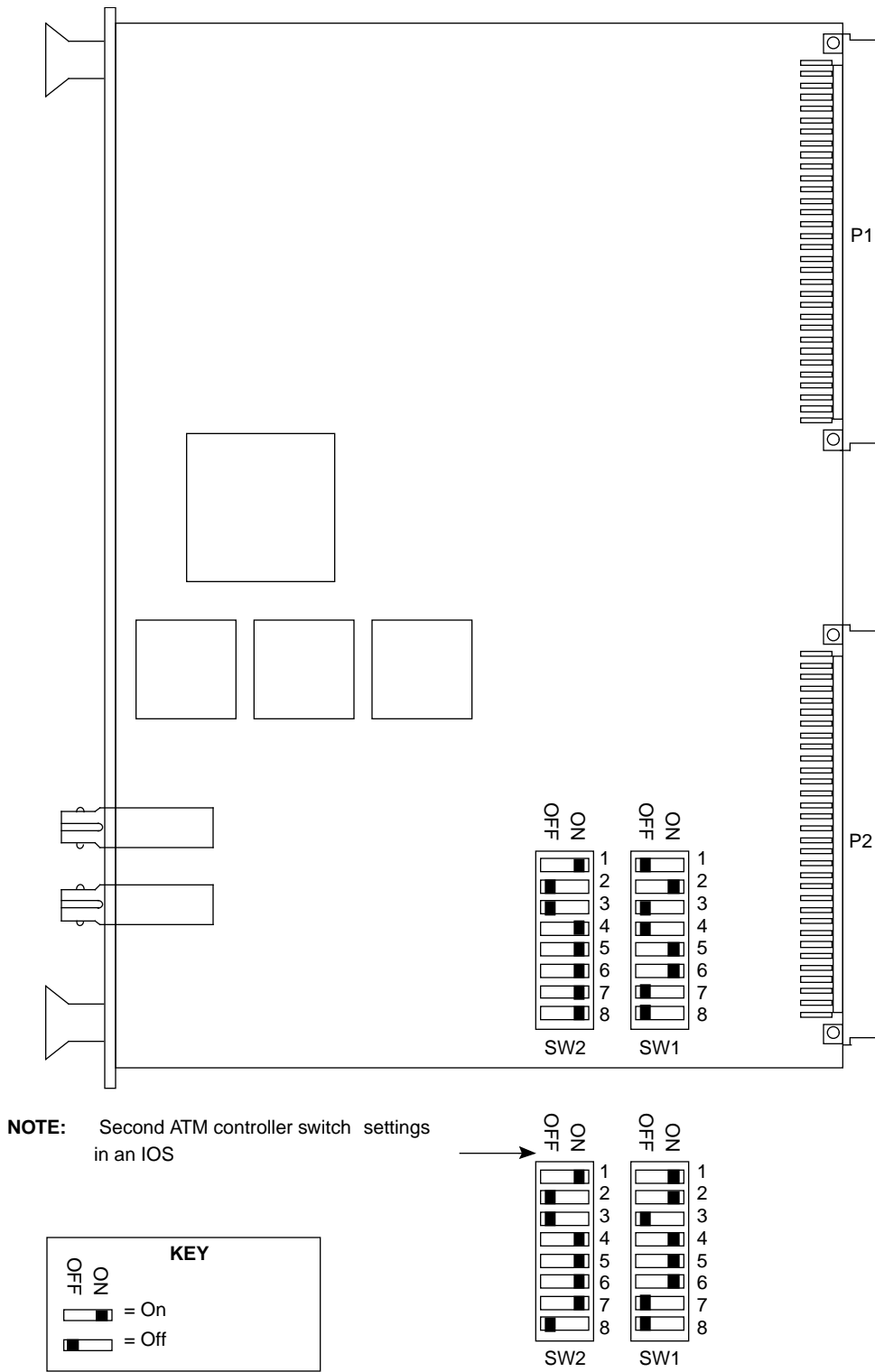
Figure 1. AT-1 Jumper Settings

Install VME Bulkhead Plate

Try to use a location on the bulkhead that is in line with the new AT-1 controller in the IOS to minimize the crossing of cables.

1. Remove the appropriate blank bulkhead plate that is attached to the VME bulkhead by two screws. Refer to Figure 2 for the location of the VME bulkhead.

2. Install the BNC bulkhead plate assembly (P/N 90446900); use the two screws that you removed in the previous step (Step 1). The upper connector on the plate is the transmit connector and the lower connector is the receive connection.

NOTE: Ensure that the plate's gasket is positioned away from the metal mesh of the adjacent plate.
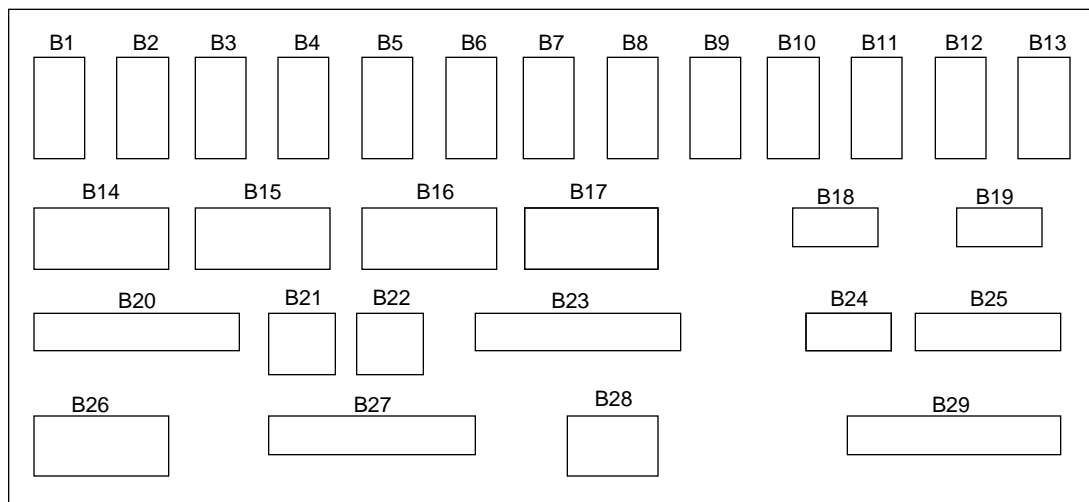

Figure 2. VME Bulkhead (Back View)

Connect AT-1 Controller Cables

1. Locate the 20-in. fiberoptic cable assembly (P/N 90446400) and connect the 90-degree bend ends to the AT-1 controller ports.

   a. Attach the cable end labeled TX to the transmit port (T) on the AT-1 controller.

   b. Attach the other end of the cable to the VME bulkhead plate transmit (upper) connector installed in the previous subsection.

c. Attach the cable end labeled RX to the receive port (R) on the AT-1 controller.

d. Attach the other end of the cable to the VME bulkhead plate receive (lower) connector installed in the previous subsection.

Install I/O Bulkhead Plate and Connectors

NOTE: The bulkhead plate assembly may be shipped preassembled. Install the SC-ST adapter (P/N 90447000) into the ATM connector bulkhead plate assembly (P/N 90447100). Secure the assembly with the two panhead screws provided (P/N 90047005).

1. Remove the cover plates from I/O bulkhead location A14 or A12. Refer to Figure 3. Each cover plate is connected by two screws.
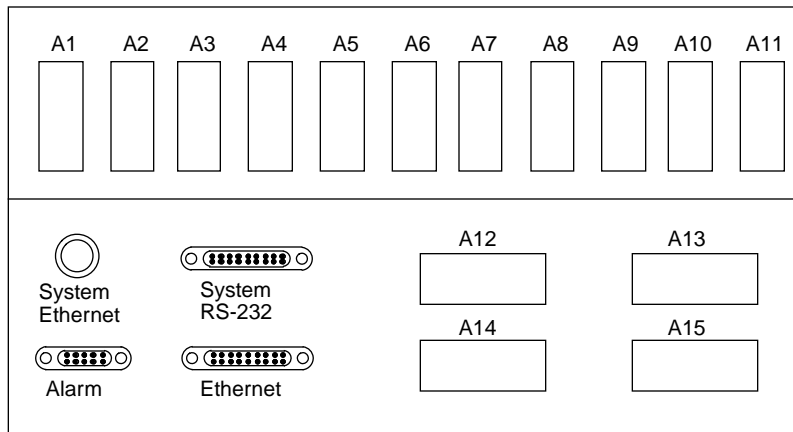

Figure 3. I/O Bulkhead

2. Install the assembled ATM bulkhead plate into slot A14 or A12 with the keys facing upwards. Refer toFigure 4.
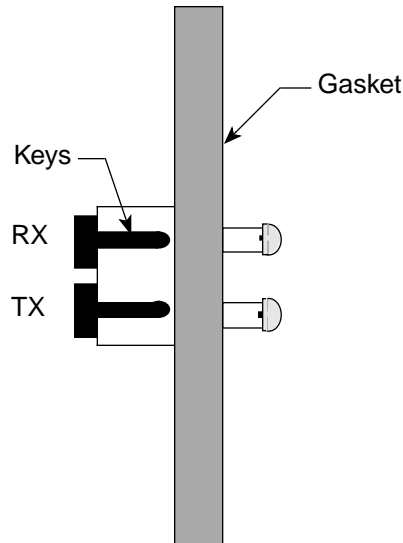
Figure 4. AT-1 Bulkhead Connector Assembly

Connect Intermediate Cable to VME Bulkhead

1. Ensure that the multimode 3-meter cable assembly (P/N 90369300) is labeled with RX and TX on both cable ends.

2. Connect one of the ends (2 connectors, RX or TX) of the multimode 3-meter cable assemblies (P/N 90369300) to the VME bulkhead plate assembly to match the RX and TX controller cables inside the VME cabinet.

Disconnect all Cables from VME Bulkhead

NOTE: You may want to push the VME tray in and secure it with a single screw to disconnect the cables.

1. Disconnect all cables from the VME bulkhead that are routed through the flexible cable way.

NOTE: Whether one or both of the flexible cable ways are disconnected depends on the number of cables being routed and where the cables will be attached on the VME bulkhead.

2. Disconnect the flexible cable way by removing the two screws that secure it to the VME tray. Refer to Figure 5.

3. Lay the cable way 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.

NOTE: If the AT-1 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 cables will be routed through both of the flexible cable ways, both crossbars will have to be opened.

6. 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 6.
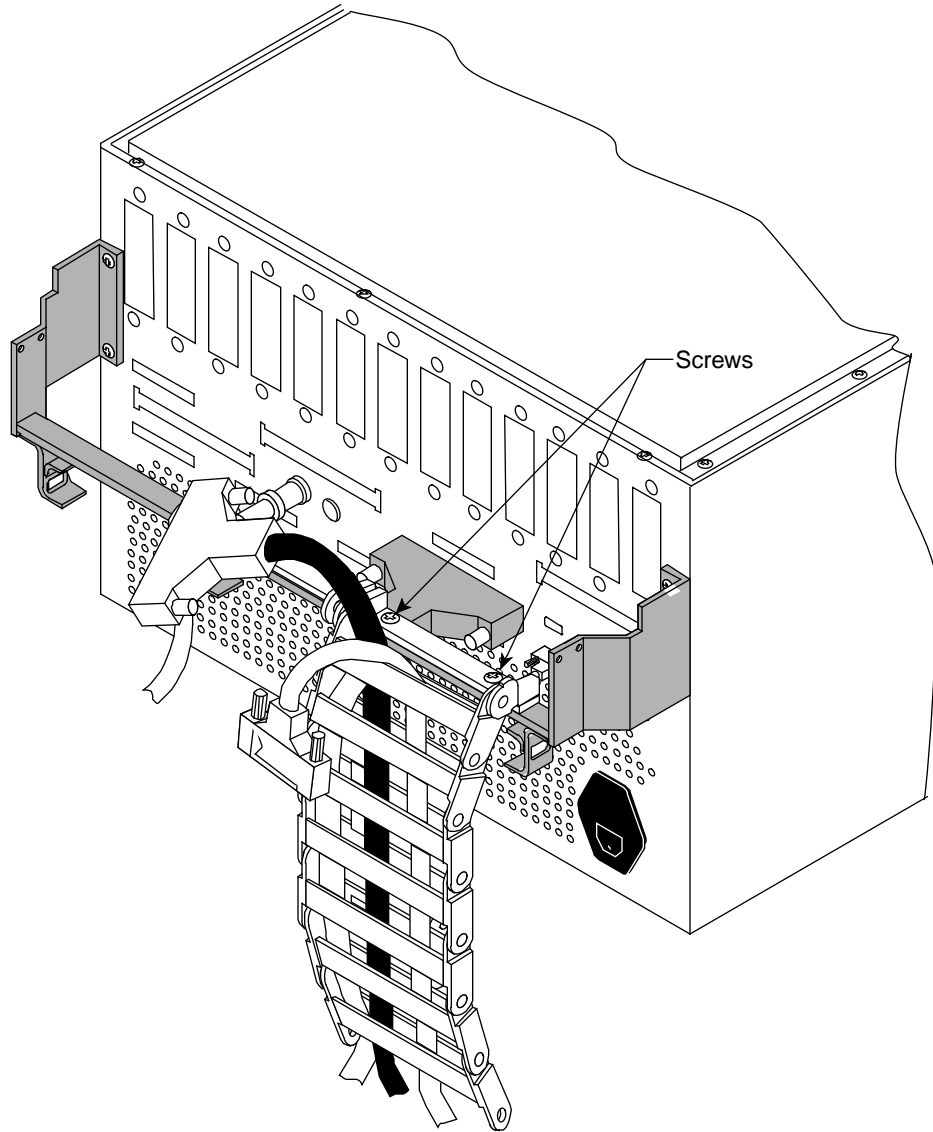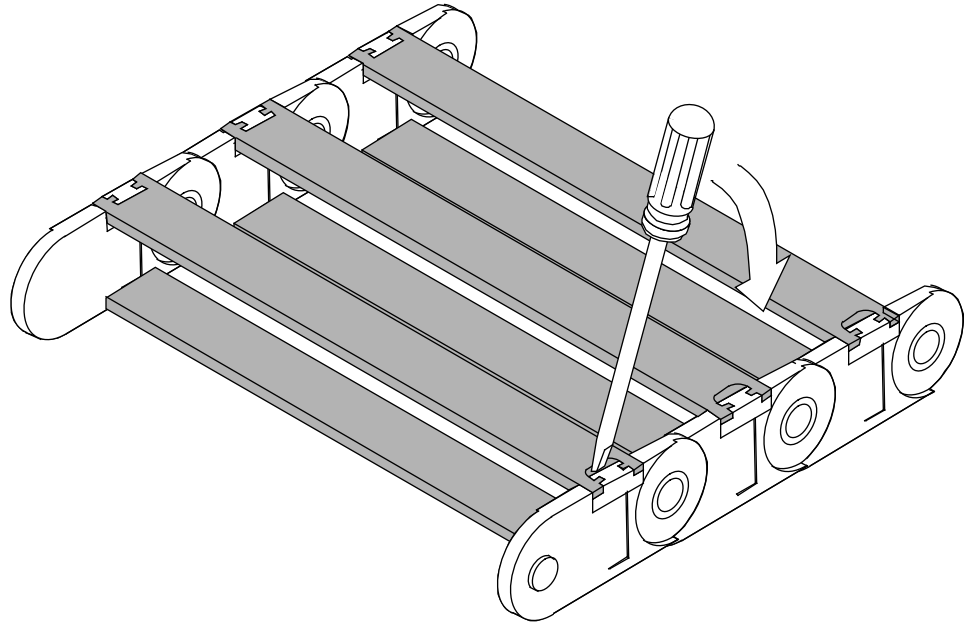
Screws

Figure 5. Flexible Cable Way

Figure 6. Flexible Cable Way Crossbars

Route Cables through Cable Tray and Flexible Cable Way

1. Place the AT-1 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.

2. After the cables have been routed, loosely secure the AT-1 cables with tie wraps.

3. Snap down all crossbars for the flexible cable way. (This is not easy!) Then, ensure that both ends of each crossbar are secure.

4. Slide the VME tray into the cabinet carefully and secure it with one screw.

CAUTION

Do not pinch the cables when sliding in the VME tray or the cable cover.

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

5. Reconnect the flexible cable way using the two screws originally removed from the flexible cable-way bar. Refer to Figure 4.

6. Reattach the Y1 cables to the back of the bulkhead.

7. Reattach the rest of the cables to the VME bulkhead using cable and bulkhead labels.

Connect the Multimode 3-meter Cables to the I/O Bulkhead

Connect the multimode 3-meter cable assembly (P/N 90369300) cable to the I/O bulkhead plate as shown in Figure 3. Ensure that the keys are facing upwards as shown in Figure 4, and then connect the cable connectors labeled RX and TX.

Replace VME Tray

1. Remove the single retaining screw and extend the VME tray out until the tray slides lock.

2. Adjust the cables slightly inside the cable tray and flexible cable way if there is excess slack at the VME bulkhead.

3. Tighten all tie wraps.

4. Reinstall the cable tray cover by sliding it carefully in and over the cable tray from the front of the I/O cabinet.

5. Secure the cable tray cover at the front of the I/O cabinet with two 1/4-turn screws.

6. Install the VME cover. Ensure that the cables are not kinked.

7. Slide the VME tray in carefully.

8. Install the four screws in the front of the VME tray.

Close the CRAY J90 Series I/O Cabinet Front Door

Swing the door shut and ensure that it latches.

Close the CRAY J90 Series I/O Cabinet Rear Door

1. Swing the door shut.

2. Turn the fasteners clockwise with a 5/32-in. allen wrench until the two circle symbols meet and the fastener latches.

Power Up the CRAY J90 Series System

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 front door.

Loading the IOS and Booting the System

To boot the system, perform the following steps from the system console:

1. To load the IOS, enter the following command at the IOS prompt:

    ```
    # load
    ```

    If the ATM module is recognized in the IOS, you should see the following message displayed:

    ```
    ATM: Unit 0 - detected
    ```

    If there are two ATM modules in an IOS, you should see the following

message also:

```
ATM: Unit 1 - detected
```

If you do not see these messages, you might see the following message:

```
drv_exec: /DEV/ATMV initialization failed
```

If you see this message, perform the following steps:

    a.   Power down the IOS.
    b.   Remove the AT-1 modules.
    c.   Recheck DIP switch settings.
    d.   Recheck the jumper settings.
    e.   Reinstall the AT-1 modules.
    f.   Perform the IOS load again.

2.   Boot the system to single-user mode by entering the following command:

```
# boot
```

3.   Enter multiuser mode in the UNICOS system by entering the following command:

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

Testing the AT-1 Upgrade

1.   Connect the loopback connector, P/N 90452200, at the I/O bulkhead.

2.   Log in as `root`.

3.   Configure down the VME controllers by using the following command:

```
# /etc/ifconfig atm0 down
```

    Repeat this command for each VME interface.

4.   Configure up each VME controller with hardware loopback turned on for the interface by issuing the following `ifconfig` command:

```
# /etc/ifconfig atm0 edge_atm0 netmask 0xffffff00 hwloop
```

    Repeat this command for each VME interface. Change the ATM IP address and network mask values to the site's chosen values.

5. Issue the following command to configure an ATM ARP table entry:

    # **/etc/atmarp -s edge_atm0 atm0 5 0 50**

    Substitute your system's ATM IP address in this command.

6. With the cable connected in loopback configuration (from the transmit connector to the receive connector), use the `ping` command to test the ATM, as shown in the following example:

    # **/etc/ping edge_atm0**

    Execute the following command to see the input and output packets (`Ipkts` and `Opkts` fields, respectively) for each of the VME interfaces:

    # **netstat -i**

    The following example shows the output from a `netstat -i` command:

```
netstat -i

Name    Mtu     Network      Address      Ipkts    Ierrs Opkts   Oerrs
en0     1496    128.162.101  edge         253535   0     61027   0
fddi0   4352    128.162.84   edge-fddi    204070   0     24363   0
atm0    9180    128.162.83   edge_atm0    56       0     56      0
hi0*    65536   none         none         0        0     0       0
lo0     65535   127          localhost    200366   0     200366  0
```

7. Remove one end of the cable to verify that the ping processes stop. This verifies that the packets are going out of the transmit port of the ATM card and being received through the receive port. If the ping process continues to run, verify that each step in this section was performed.

8. Make the ATM network connection.

9. At this point, you can perform other tests across the loopback connection. Some TCP tests that can be executed are `nettest`(8), `ftp`(1B), and `telnet`(1B). Refer to the appropriate man pages for details.

10. After performing these tests, disable the hardware loopback on each VME interface by executing the following command:

    # **/etc/ifconfig atm0 down**

    Repeat this command for each VME interface.

Configure Up TCP/IP for the VME Interfaces

To configure TCP/IP for the VME controllers, issue the `initif` command, as follows:

> # **/etc/initif atm0**

The `initif`(8) command configures up the interface by performing an `ifconfig up` command and creates `atmarp` entries for each Permanent Virtual Circuit (PVC). Repeat this command for each VME interface.

Debugging a VME Problem

You can use the following commands as tools to debug a VME problem:

- `ifconfig`(8)
- `netstat`(1B)
- `atmarp`(8)
- `atmadmin`(8)

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

Cruise Reporting

Report upgrades in CRUISE. Refer to *CS Reporting and Tracking Guidelines*, publication HOM-203-0, and *CRUISE User Guide*, publication HOM-248-0, for requirements and instructions.