Aurora   Technologies

Multiport Model 800
User Manual
For the Sun386i
SunOS 4.0.1

S/N : 11105-203- 1038

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Multiport Warranty

Warranty: Aurora Technologies expressly warrants that new Multiport 800 and Multiport 1600 products will be free of defective parts and workmanship for a period of 90 days from the date of delivery to the first end-user. Proof of purchase date is required.

Customer must have returned warranty registration form (below) to Aurora Technologies. Proof of purchase is required. Customer will be billed for non-warranty repairs, parts, service and shipping costs.

Important: The above warranty shall be void if customer fails to operate products in accordance with Aurora Technologies' written instructions.

Warranty Registration Form

Company Name _____

Address _____

City _____State _____Zip _____

Technical Contact _____ Country _____

Multiport serial # (from diskette) _____

Purchase Date _____ Sun386i serial #_____

Purchased from (Dealer name) _____

Address & Telephone _____

Please check the applicable box below:
- ☐ Warranty Registration
- ☐ We wish to purchase the Extended Support Agreement (check or P.O. enclosed)
- ☐ Please send Product Literature

Credits

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Dennis Daudelin

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1. Parts List

The following parts are distributed with the Multiport Model 800.

Part	Quantity
Multiport Model 800 circuit board	1
(2 board set)	(2)
Expander box (8 serial port connector)	1
(2 board set)	(2)
3 1/2" Diskette	1
Software License	1
Warranty Registration Form	1
Support Policy Statement	1
User Manual (this document)	1

2. Tools Needed

Quantity	Tool
1	Large Flat head screwdriver, or ordinary coin (to open/close chassis)
1	Medium Flat head screwdriver (to anchor board)
1	Small Flat head screwdriver (to anchor connector)

Installation

Please read these instructions thoroughly before attempting to install the Multiport. Minor mistakes during installation could result in damage to the product.

The Sun386i System Setup & Maintenance manual will be useful to have handy. There are reference to this book throughout this manual.

Quickstart

- Power off Sun386i

- Plug Multiport Board into AT Slot

- Attach expander box

- Hookup peripherals

- Power on Sun386i

- Login as root

    cd /etc/modules
     tar xvf /dev/rfdl0c

- enable modems

    install

- enable peripherals

Hardware

1. <u>Unpack the contents:</u>

   Check that all items are present, refer to the parts list for a complete description. The circuit board is wrapped in a charge resistant foil, be sure to keep the board in this wrap while the board is not installed in the system unit. Save the shipping box, if the product needs to be shipped back, please use the original packaging for returns.

   All the parts for a single board set is packaged in one carton. For a two board set, each board and expander box is packaged in separate cartons. The printed material and software is shipped in the carton containing Board #1.

2. <u>Verify Switches and Jumpers:</u>

   The board's switches and jumpers are preset at the factory. There should be no need to set any switches, however, it is good practice to verify the settings before plugging the board(s) into the system unit.

   For a two board set, Board #1 and Board #2 have been predefined by the switches and jumpers preset at the factory. Each board is identified with a label on the carton that it was shipped in. If the boxes or boards get misplaced, you can verify the board number by checking its switch settings.

   Unwrap the board and place it on the foil wrapper. Verify the switch and jumper settings and remember which board is Board #1 and which board is Board #2. This is important while plugging in the boards and connecting the expander box.

Jumpers:

A jumper is a set of two parallel pins protruding from the board. They can be left unconnected by leaving them exposed, or they can be connected by placing a conductive jacket over both pins. A jumper is CLOSED if this jacket is in place, making a connection. A jumper is OPEN if the jacket is left off, leaving the pins unconnected. The jumpers are labeled with a number printed on the circuit board next to the set of pins for that jumper. The jumper settings are defined as follows:

Board #1	Board #2
3 - OPEN	3 - OPEN
5 - OPEN	5 - OPEN
10 - OPEN	10 - OPEN
11 - OPEN	11 - OPEN
12 - OPEN	12 - CLOSED
15 - CLOSED	15 - OPEN
E1/E2 - CLOSED	E1/E2 - CLOSED

Switches:

There are eight switches contained in one switch package, each switch is numbered. Looking at the switches, with the numbers facing up and under the switches, the switch is OFF when the switch arm is pushed up. The switch is ON when the switch arm is pushed down. The switch settings are defined as follows:

Board #1	Board #2
1 - OFF	1 - OFF
2 - OFF	2 - ON
3 - OFF	3 - ON
4 - ON	4 - OFF
5 - ON	5 - ON
6 - ON	6 - ON
7 - OFF	7 - OFF
8 - OFF	8 - OFF

3. <u>Turn off power of the Sun386i</u>

Notify all users that you will be turning off the computer. This can be done by typing:

```
{system:1} wall
  This computer is being powered down, please logoff.
<^D>
{system:2}
```

<^D> represents pressing the *control* and *D* key at the same time. Make sure all all applications have been stopped or terminated, this will eliminate any possibility of losing data.

If you are running in the Sunview Windowing system you can shutdown the system from the Desktop Menu. Select the **Shutdown** option from the **Exits** submenu. Once you see the following message:

```
writing all filesystem information to disk (syncing) ... done
SunOS halted
```

it is safe to turn off the power. Be sure to turn off power to all peripherals including the monitor and/or peripheral box <u>after</u> turning off the system unit.

If you cannot access the Shutdown menu option, then you must manually shutdown the system. Login as *root* (see your system administrator if you do not have the *root* password). Then at the prompt type

```
{system:3} /etc/halt
```

and the computer will start its software halt sequence. It will take several minutes for this procedure. Watch for the above message indicating the SunOS has halted. Once you see this message it is safe to turn off the power. Be sure to turn off power to all peripherals including the monitor and/or peripheral box <u>after</u> turning off the system unit.

Refer to the Sun386i *System Setup and Maintenance, Chapter 2, Powering Down* (pg. 37) for detailed instructions.

4. Open Sun386i chassis

WARNING: Make sure the system unit's power cord is unplugged.
Failure to take this precaution can result in electrical shock.

Orient the system unit so the floppy drive opening is facing you. Remove the left side panel by unscrewing the large flat head screw. You can use a large flat head screwdriver or a large coin. Swing the top of the panel away from the chassis and lift the panel from its hinges.
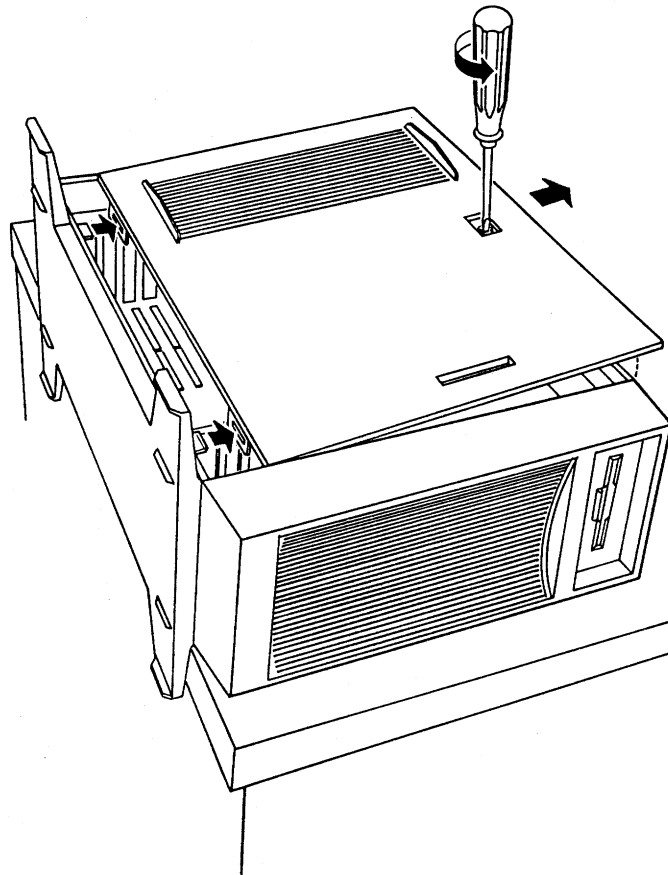
Refer to the Sun386i *System Setup and Maintenance, Appendix B* (pg. 102-103) for further assistance.

5. Choose an AT slot

The AT slots will now be visible at the bottom of the chassis. From the bottom the the system unit there is 1 XT (1 connector) slot, above that are 3 AT (2 connector) slots. Above the AT slots you will see the Sun frame buffer (graphics board) and the Sun memory board. Each Multiport board must be installed into one of the 3 AT slots (Slot 5-7 as labeled below and on the back of the system unit.)
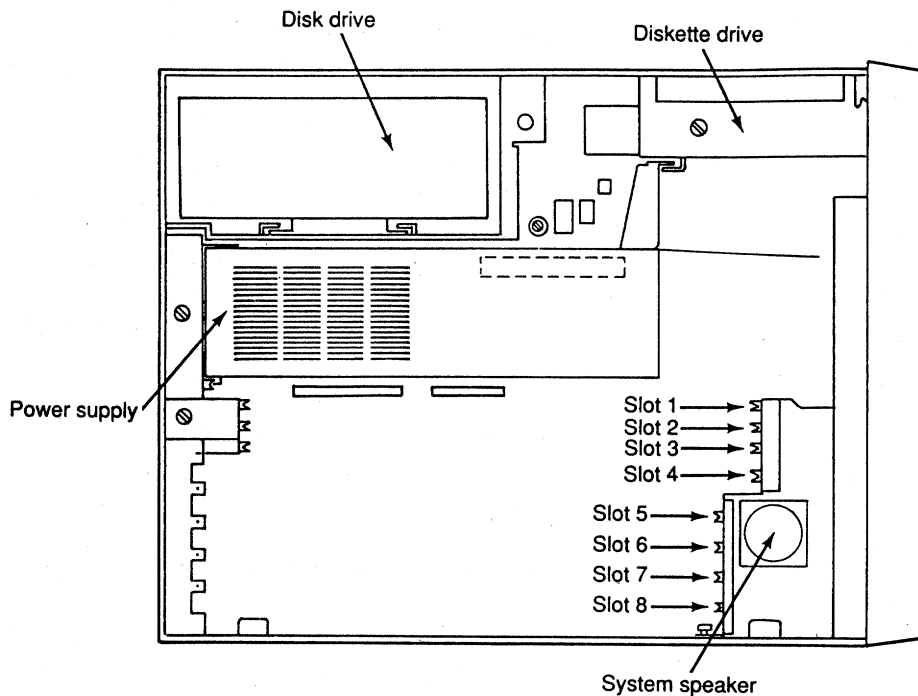
6. Remove slot protector

The slot protector is a metal bracket mounted to the back of the unit. There is one slot protector for each AT/XT slot. Using a medium flat head screwdriver, remove the anchor screw on any one of the AT slots. Save this slot protector in the event that the board is removed later.

Save this screw as it is used to anchor the Multiport in this slot.
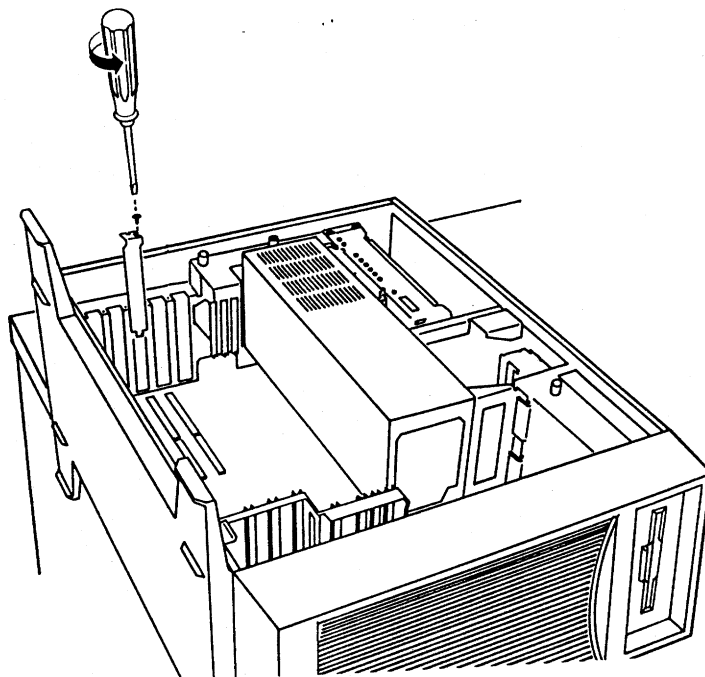
Refer to the Sun386i *System Setup and Maintenance, Appendix B, AT and XT Boards* (pg. 114) for further assistance.

BE CAREFUL NOT TO DROP ANY METAL PARTS INTO THE CHASSIS!!

7. <u>Insert board into chassis</u>

Each board can now be plugged into the chassis. Position the board with the 62 pin female connector facing the back of the chassis and slide the board carefully into the guides for the correct slot. The board should slip into the connectors and the flange should rest flush against the chassis. Firmly seat the board by pressing down with your thumbs. Anchor the board with the screw from the slot protector.

With a two board set there is no preference to board positioning, however, it tends to be easier to remember that Board #1 is above Board #2 when connecting the expander boxes into the boards. Thus putting Board #1 above (with the system standing straight up) Board #2 is desirable.

Refer to the Sun386i *System Setup and Maintenance, Appendix B, AT and XT Boards* (pg. 115) for further assistance.
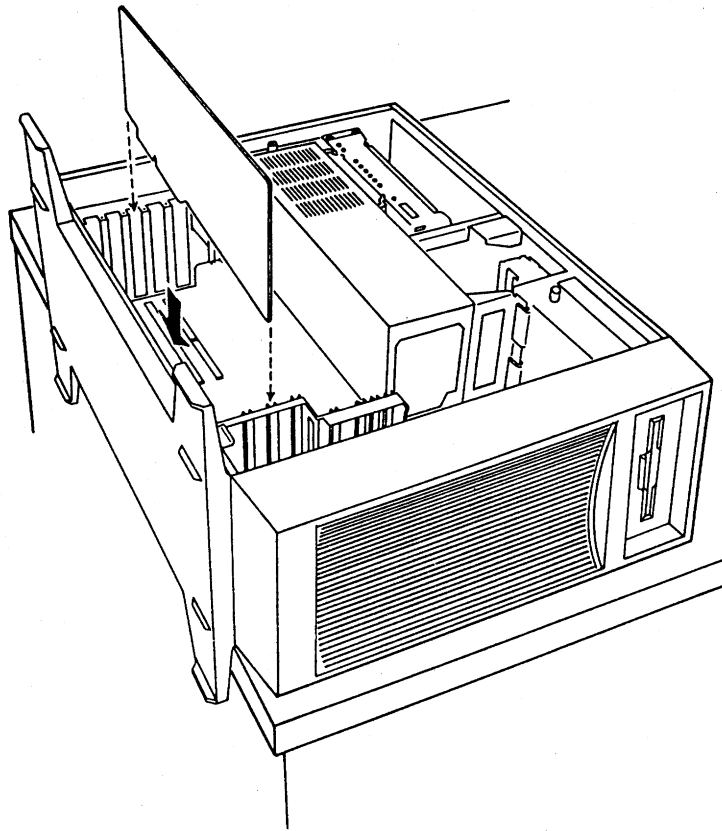
8. <u>Close Sun386i chassis</u>

Slip the side panel onto the hinges of the system unit and swing the top of the panel closed. Tighten the large flat head to hold the panel in place.
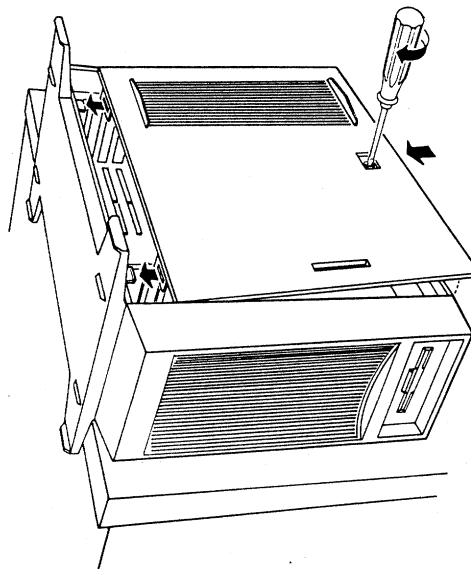
NOTE: Failure to close the chassis can cause damage to the Multiport board and possible parts of the system because the cooling fans will not properly cool the system. Be sure to replace the side panel <u>before</u> turning on the power of the Sun386i.

9. <u>Connect serial expander box</u>

If you are installing a two board set, it is important to know which is Board #1 and which is Board #2. If you followed the recommendation in **Hardware** section **6** then Board #1 should be above Board #2 (with the system standing straight up).

Slip the male connector on the cable of the serial expander box onto the female 62 pin connector of the board. Anchor the connector with the screws included on the connector using a small flat head screwdriver.

10. <u>Turn on power of the Sun386i</u>

With all the connections restored, the computer can now be turned on. Remember to turn on any other peripherals <u>prior</u> to turning on the system unit.

11. <u>Connect peripherals</u>

You can now connect all peripherals to the serial expander box.

12. <u>Removing Multiport Board</u>

You might need to remove the board from your system to send it back to Aurora Technologies for warranty service or to move it to another system.

Follow **Hardware** sections **3,4** to power down the Sun386i and open the chassis. Next, disconnect the serial expander box cable from the connector(s) at the back of the system unit. Use a small flat head screwdriver to unscrew the two mounting screws on the connector(s) and carefully pull the cable connector from the Multiport board connector(s).

Unscrew the anchor screw that holds the Multiport board(s) in place using a medium flat head screwdriver.
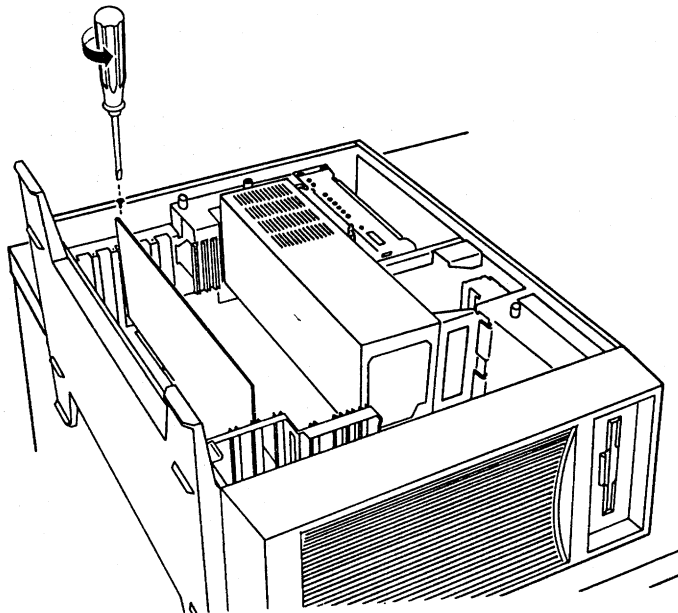
Save this screw, as it is used to anchor the slot protector in place.

Remove the Multiport board gripping the board by the edges, tugging gently until you feel the board decouple from the connector. If the board doesn't decouple easily, rock it gently back and forth. It should slide easily along the plastic guides until it is free of the slot.

Place the board back into its charge resistant foil to protect it from any stray static charges.

Replace the slot protector (saved from the steps taken in **Hardware** section **6**) and use the use the anchor screw to hold the protector in place. This protector <u>must</u> be replaced, otherwise the cooling might be affected and system parts might overheat or be damaged.
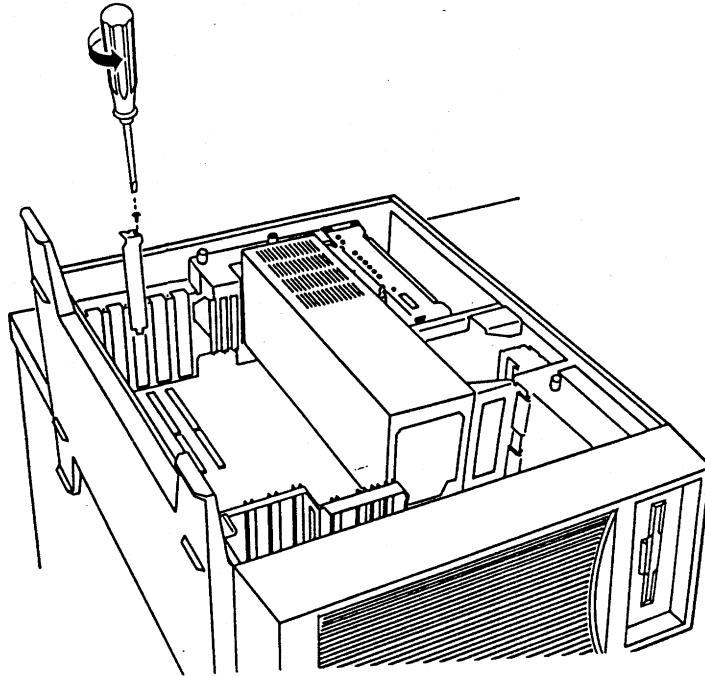
Next follow the steps in **Hardware** section **8,10** to return the Sun386i to operation.

Software

There is one 3 1/2" double sided double density diskette (720K, low density) included in the package containing the Multiport Model 800 UNIX device driver. This section describes how to install this UNIX device driver.

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Each copy of the UNIX driver has a unique serial number. This serial number has been assigned to you. This is your only copy of the driver so you must take every precaution to preserve the contents of the floppy:

- store the diskette in a clean, dust free environment.
- keep the diskette out of direct sun-light or extreme sources of heat or cold.
- keep the diskette away from strong magnetic fields.
- make sure the diskette is write protected.

1. Write protect the diskette

The diskette should already be write protected, however you should verify this. Turn the diskette up-side down (label side down with the metal hub showing). If you hold the diskette at the label end, the write protect notch is in the lower right corner.

High-density notch   Write-protect notch
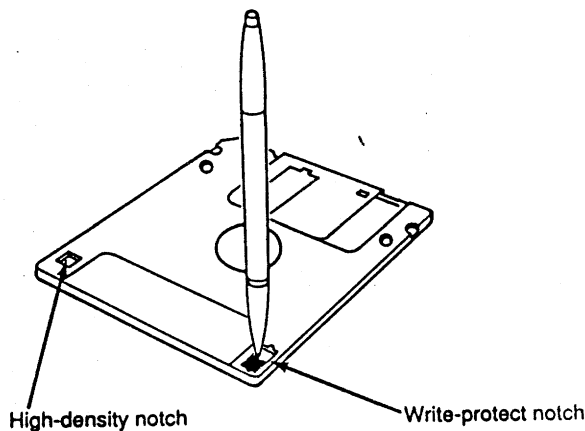
If you can see through the notch, the disk is write protected. If the tab is covering the notch, slide the tab all the way down until it clicks and you can see through the notch. Now your diskette is write protected.

2. <u>Insert diskette</u>

Hold the diskette with the label side up and insert the diskette into the drive.
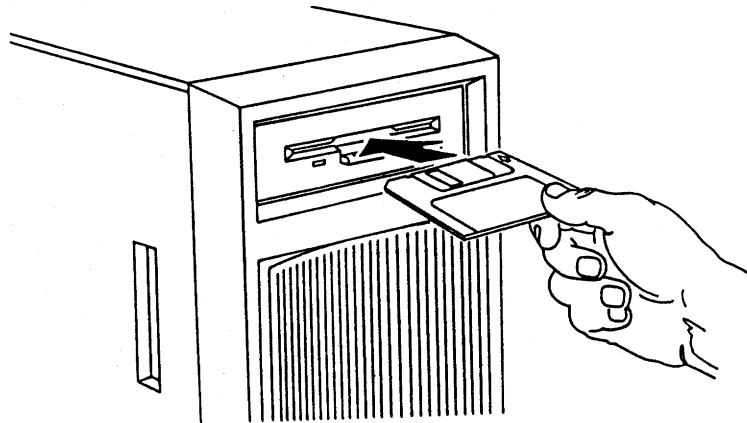
Push the diskette firmly until the release button in the front of the drive pops out.

3. <u>Load the diskette</u>

Login as *root*. If you do not know the *root* password, see your system administrator. Once logged in, type the following commands:

```
{system:1} cd  /etc/modules
{system:2} tar  xvf  /dev/rfdl0c
```

The software requires at least 43 Kbytes of free space to be able to unload the software from the diskette (and run the installation procedure). To check if there is enough space type:

```
{system:3} df
```

Look for the line:

Filesystem	kbytes	used	avail	capacity	Mounted on
/dev/roota	5037	3443	1090	76%	/

Make sure the number under "used" is less than 4980. If it is then you will have enough room to load the driver and run the installation procedure (The software requires 21 Kbytes of free space, the installation procedure will typically need 8-10 Kbytes depending on the size of /etc/rc.local, and loading the driver requires 13 Kbytes to link the driver with the kernel)

If you need to make room on the / filesystem look for files that you created that are no longer needed in /, /etc , /etc/modules , /dev , or /lost+found and save them off onto a spare diskette before deleting them. A possible file might be */etc/rc.local.save* , which is created by the uninstall procedure (see **Software** section **7**).

4. Enable modems

If you plan to connect modems to any port of the Multiport Model 800, now you must instruct the driver there will be modems connected. This is done by modifying */etc/modules/mms.exec* before loading the driver.

Modems require the carrier detect signal (pin 20 on the Multiport serial port) to operate properly. Other devices (i.e. terminals, printers, etc.) will typically not need this signal in order to operate properly. If you have a modem attached to the port, you must enable the carrier detect signal.

If your device doesn't implement the carrier detect signal or your cable does not provide the correct signal to pin 20 (carrier detect) then the default setup, with the carrier detect signal disabled, is satisfactory.

In the file */etc/modules/mms.exec* , we have included commands that will enable the carrier detect signal for each port. Each command is commented with the pound sign (#). In order to enable the carrier detect signal for each port, simply remove the comment character (#) from the line corresponding to that port.

You must first decide which ports will connect to modems. Then you must determine which special device file corresponds to each port (/dev/ttyb0 corresponds to port 0, /dev/ttyb1 to port 1,... /dev/ttyb7 to port 7). Find the entries in *etc/modules/mms.exec* and remove the comment characters (#) from those lines.

For example, if there was a modem connected to ports 2, 4, 5 & 7 of Board #1 then the resulting file would look like:

```
# Below are the commands that will activate the carrier detect signal
# for each individual port. All of theses commands are commented out
# and therefore no executed. If you need hardware carrier detect for
# a port, remove the comment character (#) from the line corresponding
# to the appropriate port.

#/usr/etc/ttysoftcar  -n  /dev/ttyb0
#/usr/etc/ttysoftcar  -n  /dev/ttyb1
/usr/etc/ttysoftcar  -n  /dev/ttyb2
#/usr/etc/ttysoftcar  -n  /dev/ttyb3
/usr/etc/ttysoftcar  -n  /dev/ttyb4
/usr/etc/ttysoftcar  -n  /dev/ttyb5
#/usr/etc/ttysoftcar  -n  /dev/ttyb6
/usr/etc/ttysoftcar  -n  /dev/ttyb7
```

The lines corresponding to ttyb2, ttyb4, ttyb5 & ttyb7 (ports 2, 4, 5 & 7) have the comment characters (#) removed in order to activate the carrier detect signal.

5. <u>Run install procedure</u>

Once the diskette has been unloaded type the following command (you must be in /etc/modules to execute this command):

```
{system:4} install
```

A copyright message will be displayed:

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> Multiport Model 800
>
> Copyright (c) 1988 Aurora Technologies, Inc.
> Copyright (c) 1988 Harris Corp.
> All Worldwide Right reserved
>
> Licensed to Aurora Technologies by Harris Corp.

Then you will be asked to verify that you want to install this driver onto your system (called system):

> You are now going to install the Multiport Model 800 driver onto system.
> Do you wish to continue? (default: yes): **yes**

Type anything to accept the default of installing the driver onto system. Type **n** or **no** to terminate the installation procedure. Upon continuing you will <u>not</u> be able to interrupt (^C) the installation until it is entirely finished.

Before installing the driver, the installation procedure will check to see if a Multiport streams-based driver is already loaded and unload it. (there cannot be more than one Multiport streams based driver loaded at a time) If the driver cannot be unloaded you will see the following message:

> There is a Multiport streams driver already loaded in this system.
> Install must unload this driver before it continues with the
> installation. However, there are processes that have one or more
> ports open (ex: getty). Kill these processes (by unattaching
> the peripherals) and re-execute this command.

At this point the installation procedure will terminate and you will have to terminate the processes that are holding the serial ports open. This will typically be done by unattaching the peripherals that were previously attached to the Multiport serial ports. If you still get the above message type:

> {system:5} **ps ax**

and look for processes that might have a Multiport serial port open (ex: getty, tip, kermit...). Kill these processes by typing:

{system:6} **kill -9 12345**

where 12345 is the process number of the offending process. If you still get the message after trying to install the driver try loading the original diskette and *uninstall* that software and then **Shutdown** the system. Once the system is powered back up, load this diskette and try the installation again. (**Software** sections **2 - 6**)

Continuing with the installation, after the checking for (and unloading) an existing Multiport streams-based driver the installation procedure will store the following command in the system boot file, */etc/rc.local* :

modload -conf mms.conf -exec mms.exec mms.o

This is the command used to load the driver into the system (See *modload* (8), *modunload* (8), *modstat* (8). As a result of this, every time the computer is powered up the Multiport driver will automatically be loaded and operational. A backup copy of the original system boot file is stored in */etc/rc.local.orig* . Remember this file, it's a potential file you can rename and save to free disk space.

The installation procedure will print:

modifying /etc/rc.local to include modload command

If there is not enough room in the file system to make the backup copy (/etc/rc/local/orig) you will see the following message:

ERROR: There is not enough room in /etc. Please remove at least
8 Kbytes from the / partition to make room and re-execute
this command.

8 Kbytes is the standard size of /etc/rc.local however your version might be different if it has been modified. Follow the suggestions from **Software** section 3, to remove enough space from the file system, and then re-execute the install command.

Once /etc/rc.local is modified the installation procedure will print:

original /etc/rc.local is saved in /etc/rc.local.orig

If /etc/rc.local had already been modified to include the modload command you would have seen the message below instead of the above messages:

/etc/rc.local already modified to include Multiport Model 800

Next the installation procedure will load the driver so that you can immediately use the Multiport Model 800.

If the board is not plugged in or isn't properly seated you will see the following message:

ERROR: The Multiport BOARD could not be found. Try plugging
in the board or reasting it, and then re-execute this command.

Follow the procedures in the **Hardware** sections **3-8** to plug or reseat the board. If the board is already plugged in, check to make sure it is in the correct AT slot by refering to the diagram in the **Hardware** section **5**.

While loading the driver, the linker will need approximately 13K bytes. If there is not enough room on the filesystem you will see the following message:

ERROR: The linker failed. If you ran out of disk space please
remove at least 15 Kbytes from the / partition. If there
was an "Undefined" then please insure that you are running
SunOS 4.0.1 or later version.

Follow the suggestions from the above section, **Software** section **3**, to remove enough space from the file system, and then re-execute the install command.

The same message will be displayed if you are running an old version of SunOS. By checking */etc/motd* you should see that the version is equal to or greater than 4.0.1. Or by checking */VERSION* you should see that the version is equal to or greater than *BL9F.3* . If you are running an old version of the operating system, you must upgrade your system to SunOS 4.0.1 or greater. Once the system is upgraded you will have to repeat all the steps in the **Software** section.

When the installation has completed the following message will be printed:

> If you wish to uninstall this driver, just type uninstall
> done.

You have just successfully installed your Multiport Model 800 driver.

Refer to the README file for information on the devices that are used to address each port.

6. Remove diskette

Remove the diskette by pressing the release button at the front of the floppy drive. Remember to store the diskette in a safe, clean place away from direct sun light or magnetic sources. You are now ready to setup your peripherals.

7. Uninstalling Multiport Driver

If you need to move the board(s) to another system or need to remove the driver from your system to create more room on the disk, you can uninstall the driver. The uninstall procedure was loaded into /etc/modules when the software was loaded from the diskette in **Software** section **3**. However, it is best to load the diskette again because the uninstall procedure might have been removed or overwritten since the driver was first installed.

Follow **Software** section **3** to load the diskette, however, the uninstall script will only require 8-10 Kbytes of free space depending on the size of the current */etc/rc.local* file.

Once the diskette has been unloaded type the following command. (you must be in /etc/modules to execute this command)

{system:1} **uninstall**

The uninstall procedure will ask you to verify that you are uninstalling the Multiport Model 800 driver on your machine (called system):

WARNING: You are about to remove all files related to the Multiport
Model 800 from system. Do you wish to continue? (default: no): **yes**

Type anything to accept the default of exiting the uninstall procedure. Type **y** or **yes** to proceed with the uninstall procedure at this point. Upon continuing you will <u>not</u> be able to interrupt (^C) the uninstall until it is entirely finished.

The uninstall procedure will save the current version of */etc/rc.local* in */etc/rc.local.save*   (notice this different from the backup file created by the installation procedure). If there is not enough room in the file system to save a copy you will see the following message:

ERROR: There is not enough room in /etc. Please remove at least
8 Kbytes from the / partition to make room and re-execute
this command.

Follow the suggestions from **Software** section **3** to remove enough space from the file system, and then re-execute the uninstall command.

Next, the uninstall procedure unloads the driver. If the driver cannot be unloaded you will see the following message:

ERROR: There are processes that have one or more ports open
(ex: getty). Kill these processes (by unattaching the peripherals)
and re-execute this command.

Follow the suggestions in **Software** section **5** to terminate the offending processes and then re-execute the uninstall command.

Once the driver is unloaded the uninstall procedure will remove all of the files associated with the Multiport Model 800 files and you will see:

removing Multiport Model 800 files

The files removed all exist is /etc/modules and are: mms.o, mms.conf, mms.exec, mms_copyright, install, uninstall, and README.

Once the files are removed the system will respond with:

done.

You have now uninstalled the Multiport Model 800 from your system. Follow the directions in the **Hardware** section **12** to remove the Multiport board(s) from your system.

Technical Aside

1. <u>Changing interrupt request line</u>

If you have several boards installed in the system, you might have a
conflict with interrupt requests.   The interrupt request pre-set at the
factory is 15 for Board #1 and 12 for Board 32.   If this has to be
changed you have a choice of 3,5,10,11,12 & 15.   To change an interrupt
request you must first modify */etc/modules/mms.conf*   and then
change a jumper on the board.

Login as *root*   (see your system administrator if you do not know the
root password).   Edit */etc/modules/mms.conf* .   If you have a one board
set, there will be one line in the file to modify.   The line will look like

> device   mms0 at atmem ? csr 0xECC000 irq 15 priority 4 dmachan 0xff

The interrupt level is defined by the parameters *irq 15* .   Change the 15
to the interrupt request you choose (3,5,10,11,12 or 15).

If you have a two board set there will be 2 lines in the file, one per
board.   The line beginning with *device mms0*   represents Board #1, the
line beginning with *device mms1*   represents Board #2.   Change the
interrupt request as descibed above for the appropriate board.

Next you must change a jumper on the board to switch the interrupt
level used by the Multiport board.   Power off the system and remove
the board (**Hardware** section **12**).   The jumpers numbered 3,5,10,11,12
& 15 are jumpers corresponding to the interrupt level used by that
board.   Remove the jumper jacket from the existing jumper and place it
onto the jumper corresponding to the interrupt level you choose.

NOTE: There can only be **1** (one) jumper closed among the jumpers
labeled 3,5,10,11,12 & 15.   These jumpers correspond directly to the
interrupt level used by the board, closing more than one of these
jumpers will cause serious degradation of system performance.

Once the jumper has been changed, replace the board back into the
system.   Follow the directions in **Hardware** sections **7-10**.

2. Changing starting memory address

As with the interrupt level, if you have several boards installed in your system, you might nee to change the starting memory location of your Multiport board. The Multiport uses 16K of AT address space. The pre-set starting location for Board #1 is 0xECC000 and for Board #2 is 0xEA8000. There are 64 different starting locations that can be used as defined below. When choosing starting memory locations make sure that Board #1 has a higher address than Board #2.

Switch Postitions								Starting Address
8	7	6	5	4	3	2	1	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	0x080000
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	0x084000
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	0x088000
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	0x08C000
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	0x0A8000
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	0x0AC000
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	0x0B8000
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	0x0BC000
OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	0x0C0000
OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	0x0C4000
OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	0x0C8000
OFF	OFF	OFF	OFF	ON	OFF	ON	ON	0x0CC000
OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	0x0D0000
OFF	OFF	OFF	OFF	ON	ON	OFF	ON	0x0D4000
OFF	OFF	OFF	OFF	ON	ON	ON	OFF	0x0D8000
OFF	OFF	OFF	OFF	ON	ON	ON	ON	0x0DC000
OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	0x108000
OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	0x124000
OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	0x208000
OFF	OFF	OFF	ON	OFF	OFF	ON	ON	0x224000
OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	0x308000
OFF	OFF	OFF	ON	OFF	ON	OFF	ON	0x324000
OFF	OFF	OFF	ON	OFF	ON	ON	OFF	0x408000
OFF	OFF	OFF	ON	OFF	ON	ON	ON	0x424000
OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	0x508000
OFF	OFF	OFF	ON	ON	OFF	OFF	ON	0x524000

OFF	OFF	OFF	ON	ON	OFF	ON	OFF	0x608000
OFF	OFF	OFF	ON	ON	OFF	ON	ON	0x624000
OFF	OFF	OFF	ON	ON	ON	OFF	OFF	0x708000
OFF	OFF	OFF	ON	ON	ON	OFF	ON	0x724000
OFF	OFF	OFF	ON	ON	ON	ON	OFF	0x808000
OFF	OFF	OFF	ON	ON	ON	ON	ON	0x824000
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	0x850000
OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	0x908000
OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	0x924000
OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	0xA08000
OFF	OFF	ON	OFF	OFF	ON	OFF	ON	0xA24000
OFF	OFF	ON	OFF	OFF	ON	ON	OFF	0xA50000
OFF	OFF	ON	OFF	OFF	ON	ON	ON	0xB08000
OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	0xB24000
OFF	OFF	ON	OFF	ON	OFF	OFF	ON	0xB50000
OFF	OFF	ON	OFF	ON	OFF	ON	OFF	0xC08000
OFF	OFF	ON	OFF	ON	OFF	ON	ON	0xC24000
OFF	OFF	ON	OFF	ON	ON	OFF	OFF	0xC50000
OFF	OFF	ON	OFF	ON	ON	OFF	ON	0xC8C000
OFF	OFF	ON	OFF	ON	ON	ON	OFF	0xD08000
OFF	OFF	ON	OFF	ON	ON	ON	ON	0xD24000
OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	0xD50000
OFF	OFF	ON	ON	OFF	OFF	OFF	ON	0xD8C000
OFF	OFF	ON	ON	OFF	OFF	ON	OFF	0xE08000
OFF	OFF	ON	ON	OFF	OFF	ON	ON	0xE24000
OFF	OFF	ON	ON	OFF	ON	OFF	OFF	0xE50000
OFF	OFF	ON	ON	OFF	ON	OFF	ON	0xE8C000
OFF	OFF	ON	ON	OFF	ON	ON	OFF	0xEA8000
OFF	OFF	ON	ON	OFF	ON	ON	ON	0xE54000
OFF	OFF	ON	ON	ON	OFF	OFF	OFF	0xECC000
OFF	OFF	ON	ON	ON	OFF	OFF	ON	0xF08000
OFF	OFF	ON	ON	ON	OFF	ON	OFF	0xF24000
OFF	OFF	ON	ON	ON	OFF	ON	ON	0xF50000
OFF	OFF	ON	ON	ON	ON	OFF	OFF	0xF8C000
OFF	OFF	ON	ON	ON	ON	OFF	ON	0xFA8000
OFF	OFF	ON	ON	ON	ON	ON	OFF	0xF54000
OFF	OFF	ON	ON	ON	ON	ON	ON	0xFCC000

The switch is OFF when the switch arm is pushed up. The switch is ON when the switch arm is pushed down.

First, modify */etc/modules/mms.conf* . Follow the instructions in the previous section on Changing Interrupt Request Level. The only difference is that you modify the paramters that define the starting memory location

mem 0xECC000

Change 0xECC000 to the starting memory location you choose from the above table.

Next open the system unit by following **Hardware** sections **3 & 4** (you do not need to remove the board in order to change the switch settings). The switches are visible and accessible from the side. They are closer to the front of the system unit, next to the LED pack. The switches are numbered where switch #8 is the closest to the back of the system unit and switch #1 is closest to the front of the system unit. Set the switches according to the address picked from the table. Once the switches are set, follow **Hardware** sections **8 & 10** to restore the system to operation.

3. <u>Reconnecting a modem to a different port</u>

If you have already installed the Multiport driver and need to switch the modem to a different port, you will have to indicate the change to the Multiport driver. This is done by unloading the driver (all peripherals must be unconfigured first), modifying */etc/modules/mms.exec* and loading the driver again.

Don't get unloading confused with uninstalling the driver. Unloading the driver is essentially de-activating it (the instructions are below), you do not need to remove the driver with an uninstall.

You must first login as *root* before you attempt to unload the driver. If you do not know the *root* password see your system administrator.

Find out the id of the Multiport driver:

```
{system:1}  /usr/etc/modstat
Id   Type  Loadaddr   Size     B-major   C-major   Sysnum    Mod Name
0    Drv   fd000000   7000               58.                 mmsdrv
```

In this case look for the row with "Mod name" equal to *mmsdrv* . The first parameter of that row is the module id (in this case, 0).

Unload the driver using *modunload* and specifying the id of the driver:

```
{system:2}   /usr/etc/modunload  -id  0
```

If you see the message:

```
can't unload the module: Device busy
```

then there are peripherals that are still configured. These must be unconfigured (using SNAP, or disabling getty, etc.) before trying the *modunload* command again.

Next, modify */etc/modules/mms.exec*   as explained in **Software** section **4**.

Once the file has been modified, you can now reload the driver and restore operation of your Multiport board. Type:

```
{system:5}   cd  /etc/modules
{system:6}   modload mms.o -conf mms.conf -exec mms.exec
```

Now you should reconfigure you peripherals using SNAP to return your Multiport Model 800 to full operation.

4. Cable design

Designing the proper cables is very important for the proper operation of your Multiport product. Below is a description explaining the signals on the Multiport ports to allow you to create the specific cable for your application.

Pin	Signal Name	Input/Output
2	Receive Data	Input
3	Transmit Data	Output
4	Clear to Send	Input
5	Request to Send	Output
7	Ground	
8	Data Terminal Ready	Output
20	Carrier Detect	Input

Below are sample cable designs for typical connections:

Local Terminal	IBM PC/XT/AT	Typical Modem
2 ---------- 2	2 --------- 2	2 -------- 3
3 ---------- 3	3 --------- 3	3 -------- 2
	4 --------- 4	4 -------- 5
	5 --------- 5	5 -------- 4
7 ---------- 7	7 --------- 7	7 -------- 7
	8 --------- 8	8 ------- 20
20 -------- 20	20 ------- 20	20 ------- 8