RAMiX PMC Ethernet Installation Guide

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READ ME BEFORE INSTALLING THIS PRODUCT

concurrent

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Contents

1.0.   Introduction

This document provides instructions for installing and configuring the RAMiX 665 or 675 PMC Ethernet device on both the Power Hawk™ and PowerMAXION™ systems.

The RAMiX 665/675 is an intelligent dual 100BaseFX PMC Ethernet™ device for high performance data exchange. Features include embedded TCP/IP, embedded firmware allowing user addition of application specific functionality, and failover firmware. It contains an onboard RISC co-processor and dual Ethernet access.

2.0.   Documentation

2.1.   Concurrent Documentation

The *RAMiX PMC Ethernet Installation Guide* is provided by Concurrent Computer Corporation with this product.

2.2.   Vendor Documentation

Vendor documentation for the VMETRO MIDAS 20 PMC Carrier board may accompany this product. Contact the vendor if you have questions regarding this documentation.

3.0. Prerequisites

The following prerequisites apply to the RAMiX 665/675 PMC Ethernet device at firmware revision level 5.17 (665) and 2.1.1 (675).

NOTE: The latest firmware for rmxf is provided as part of the package. After installation, the firmware can be downloaded using the "rmxf_util" utility. There are two versions of the firmware in **/var/sadm**:

- **665_rmxf_fw** - the latest for 665 boards
- **675_rmxf_fw** - the latest for 675 boards

3.1. Software

- PowerMAX OS^{TM} Revision 4.3P11 or later
- PowerMAX OS Revision 5.1SR6 or later
- PowerMAX OS Release 6.3

3.2. Hardware

- Concurrent Power Hawk or PowerMAXION system
- 3.3 volt PMC slot

4.0. Syntax Notation

The following notation is used throughout this manual:

italic	Books, reference cards, and items that the user must specify appear in *italic* type. Special terms may also appear in *italic*s.
list bold	User input appears in **list bold** type and must be entered exactly as shown. Names of directories, files, commands, options and system manual page references also appear in **list bold** type.
list	Operating system and program output such as prompts and messages and listings of files and programs appear in list type.
[ ]	Brackets enclose command options and arguments that are optional. You do not type the brackets if you choose to specify such options or arguments

5.0. Installation Procedures

5.1. RAMiX 665/675 Device Controller Installation

This section includes the following:

- Installing the controller into a PMC slot on a Power Hawk system.
- Configuring the VMETRO MIDAS 20 and installing the controller on a PowerMAXION 6400 system or a Power Hawk 600 system.
- Connecting the controller to the network.

5.1.1. RAMiX 665/675 PMC Ethernet Controller Installation on Power Hawk 600/700/900 Systems

1. With power disconnected and the cpu board faceplate screws unfastened, remove the SBC from the chassis.

2. Remove the spring metal clip covering the mezzanine aperture on the faceplate of the SBC.

3. If the target slot is dusty, remove any dust from the connector ports with dry, compressed air.

4. Attach a grounding strap to your wrist or ankle, and carefully remove the controller from its anti-static bag.

5. Install the controller as follows:

   a. Remove the four screws from the bottom of the standoff of the RAMiX 665/675 controller.

   b. Hold the RAMiX 665/675 controller at an angle and insert it through the rear of the faceplate of the SBC while aligning the dual mating connectors on the SBC with the dual connectors (P1 and P2) on the controller.

   c. Carefully press the controller into place. A metal standoff post on the SBC and an alignment hole on the RAMiX 665/675 controller facilitate alignment.

6. Fasten the cards together with the four screws removed during step a.

7. Replace the assembly in the system chassis.

8. Connect the RAMiX 665/675 controller to the network following the steps in section 5.1.4.

5.1.2.   VMETRO MIDAS 20 Hardware Configuration
in a PowerMAXION 6400 or Power Hawk 600

Note

The VMETRO MIDAS 20 is not supported on Power Hawk 700
and 900 systems.

The MIDAS 20 has one DIP switch and five jumpers used for VMEbus configuration.
Locations and functionality of all jumpers and switches are provided in the *MIDAS
20/20R User's Manual*. The page number in this manual for each jumper/switch setting is
referenced after each step.

1. Enable the **VME Register Access Image (VRAI)** by setting the
   jumper in the "UP" position. (page 11)

2. Set the **VME Register Access Image** (address size) to allow A32
   access by setting both jumpers in the "DOWN/DOWN" positions.
   (page. 12)

3. Disable the **VME64 Auto-Slot ID** function by setting the jumper in
   the "DOWN" position. (page 13)

4. Disable the **SYSFAIL Assertion** by setting the jumper in the "UP"
   position. (page 13)

5. The DIP switch is used to define the **A32** base address for the **VME
   Register Access Image**. (page 12-13)

Board 1:	**0xE1000000**
Board 2:	**0xE2000000**

To reflect a VMEbus address of **0xE1000000**, the DIP switch on the device should be set
to reflect the MSB of the address (**0xE1**).

The following DIP switch setting will configure the device to respond to **0xE1000000:**
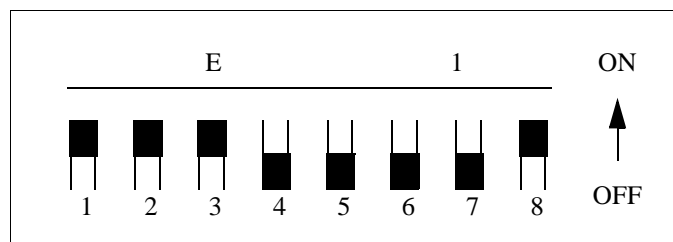
5.1.3.   RAMiX 665/675 PMC Ethernet Controller Installation
on VMETRO MIDAS 20 in a PowerMAXION 6400

1. With power disconnected and the VMETRO MIDAS 20 board
   faceplate screws unfastened, remove the MIDAS 20 board from the
   chassis.

2. Remove the spring metal clip covering the mezzanine aperture on the
   faceplate of the MIDAS 20 for the PMC position required.

3. If the target slot is dusty, remove any dust from the connector ports with dry, compressed air.

4. Attach a grounding strap to your wrist or ankle, and carefully remove the controller from its anti-static bag.

5. Install the controller as follows:

    a. Remove the four screws from the bottom of the standoff of the RAMiX 665/675 controller.

    b. Hold the RAMiX 665/675 controller at an angle and insert it through the rear of the faceplate of the MIDAS 20 while aligning the dual mating connectors on the MIDAS 20 with the dual connectors (P1 and P2) on the controller.

Note

The RAMiX 665/675 controller requires 3.3 volts, and thus must be installed in the first (top) PMC slot of a factory modified MIDAS 20 card (the standard MIDAS 20 does not provide 3.3 volts at either PMC slot). This modified card is available from VMETRO, and is not provided by Concurrent Computer Corp.

    c. Carefully press the controller into place. A metal standoff post on the MIDAS 20 and an alignment hole on the RAMiX 665/675 controller facilitate alignment.

6. Fasten the cards together with the four screws removed during step a.

7. Replace the MIDAS 20 assembly in system chassis in the slot desired.

8. Ensure proper configuration of the backplane by checking that the interrupt acknowledge jumper and the bus grant level jumpers are removed where the board resides.

9. Connect the RAMiX 665/675 controller to the network following the steps in section 5.1.4.

5.1.4.   RAMiX 665/675 Network Connection

Once the controller card has been installed onto the system, the RAMiX 665/675 can then be connected to the network.

1. Attach the RAMiX 665/675 Dual SC Fiber Cables to each port.

2. Turn power on to the computer.

3. Check the RAMiX 665/675 controller's LEDs to verify that the controller is operating correctly. (A yellow LED will be illuminated for each port to indicate the device is properly connected to the network.)

5.2. RAMiX 665/675 Driver Installation

This section includes the following:

- Installing the VMETRO MIDAS 20 and RAMiX 665/675 driver packages for PowerMAX OS on a PowerMAXION 6400 or Power Hawk 600.
- Installing the RAMiX 665/675 driver package for PowerMAX OS on a Power Hawk system.
- Configuring the network interface.
- Verifying the network interface.

5.2.1. Driver Installation on PowerMAXION 6400 or Power Hawk 600 Systems

The PowerMAXION platform requires both the RAMiX 665/675 driver package (**rmxf**) and the VMETRO MIDAS 20 driver package (**vmet**) installed. For Power Hawk 700/900 systems only the **rmxf** driver package is required (follow the instructions in 5.2.2.). For Power Hawk 600 systems, installation may require only the **rmxf** driver package (follow the instructions in 5.2.2.) but could also be configured with the **vmet** package. In the case where the **vmet** is configured, follow the steps below.

Locate the 4mm DAT tape provided by Concurrent Computer Corporation containing both driver packages.

1. Boot the system to single-user mode.

2. Sign onto the system as root user.

3. If a version of the RAMiX 665/675 driver (**rmxf**) already exists on this machine, issue the **pkgrm(1m)** command and confirm to the command that the **rmxf** package is to be removed. (**Note:** this step can be followed to remove the driver regardless of whether a new version is to be installed.) Do the following step:

   ```
   # pkgrm rmxf
   ```

4. Load the package tape into the 4mm DAT tape drive.

5. Install the software packages to the system using the **pkgadd(1m)** command. When asked which packages to install, indicate 'all' to install both packages with a single invocation of **pkgadd**.

   ```
   # pkgadd -d tape1
   .
   .
   .
   Installation of VMETRO MIDAS 20 (vmet) was successful.
   .
   .
   Installation of RAMiX 665/675 Dual Ethernet Driver (rmxf)
   was successful.
   #
   ```

6. Edit the **/etc/conf/sadapters.d/kernel** file to define the VME start and VME end address* of the VMETRO MIDAS 20 device in the kernel. Add the following line to end of the file:

```
#Adapter Logical  Bus   Intr   Slot    I/O      I/O
#Name    Adptr #  Type  Type   Number  Addr 1   Addr 2
#----    -------  --------- ------ ------   ------

vmet      0       vme0 intr   -       e1000000 e13fffff
```

*Note: The VME end address (I/O Address 2) must be at least 128KB greater than the starting address specified (I/O Address 1).

7. Rebuild the kernel and reboot.

```
# /etc/conf/bin/idbuild
```

```
The PowerMAX OS kernel will be rebuilt now.
This will take some time. Please wait.
```

```
Root for this process is /
[...]
The PowerMAX OS kernel has been rebuilt.
```

The following command reboots the system:

```
# shutdown -i6 -g0 -y
```

5.2.2.   Driver Installation on Power Hawk 600/700/900 Systems

Locate the CD-ROM provided by Concurrent Computer Corporation containing the RAMiX 665/675 driver package.

This media also contains the VMETRO MIDAS 20 driver installation package (**vmet**) for PowerMAXION or Power Hawk 600 systems. For Power Hawk 700/900 systems only the **rmxf** driver package is required (follow the instructions below). For Power Hawk 600 systems, installation may require only the **rmxf** driver package (follow the instructions below) but could also be configured with the **vmet** package. In the case where the **vmet** is configured, follow the steps in section 5.2.1.

1. Boot the Power Hawk system to single-user mode.

2. Sign onto the system as root user.

3. If a version of the driver already exists on this machine, issue the **pkgrm(1m)** command and confirm to the command that the **rmxf** package is to be removed. (**Note:** this step can be followed to remove the driver regardless of whether a new version is to be installed.) Do the following step(s):

```
# pkgrm rmxf
```

If installation is NOT being performed on a closely-coupled system – skip to step 7.

4. If the package is on any of the clients, after performing **pkgrm**, also issue a **vmebootconfig(1m)** command for each of these clients to purge the old driver files and find and remove any other related files:

```
# vmebootconfig -U -v client_vme
```

and

```
# find vroot_path -name '*rmxf*' -print | xargs rm -rf
```

5. If the RAMiX card will be used on a VMETRO card, follow the same steps used in #6 on page 6 for the PowerMAXION.

6. If you plan to rebuild the kernel before installing the package, perform further cleanup:

```
# vi /etc/diskless.d/custom.conf/client.private/client_vme/memfs.files.add
```

and delete the following lines:

```
c   /dev/rmxf0      0644      /dev/rmxf0
c   /dev/rmxf1      0644      /dev/rmxf1
c   /dev/rmxf2      0644      /dev/rmxf2
c   /dev/rmxf3      0644      /dev/rmxf3
```

7. Rebuild the kernel and reboot.

```
# /etc/conf/bin/idbuild
```

```
The PowerMAX OS kernel will be rebuilt now.
This will take some time. Please wait.

Root for this process is /
   .
   .
   .
The PowerMAX OS kernel has been rebuilt.
```

The following command will reboot the system:

```
# shutdown -i6 -g0 -y
```

8. Load the CD-ROM into the CD-ROM drive and mount the file system as shown below. In this example, the CD-ROM device is **/dev/cd/0** and the CD-ROM disc is mounted under **/mnt/cdrom**.

```
# mkdir /mnt/cdrom
# mount -F cdfs -r /dev/cd/0 /mnt/cdrom
```

9. Install the **rmxf** package:

```
# pkgadd -d /mnt/cdrom/pkgs.dstream rmxf
   .
   .
   .
Installation of RAMiX 665/675 Dual Ethernet Driver (rmxf)
was successful.
#
```

5.2.3.   Network Configuration

This example assumes an IP network address of 129.134.71.10 and a host name of ramix0 (if on a closely-coupled system, this is the IP address of the RAMiX 665/675 on the boot/file server). The actual IP network address and host name should be determined by the network administrator for your system. Hostnames and IP addresses must be unique.

1. Edit **/etc/conf/sdevice.d/rmxf** to enable the driver by ensuring that a "Y" is indicated in the conf column:

   ```
   #name conf unit
    rmxf   Y     0
   ```

   On PowerMAXION or PowerHawk 600 systems configured with **vmet**, also edit **/etc/conf/sdevice.d/vmet** to enable that driver by ensuring that a "Y" is indicated in the conf column.

   ```
   #name conf unit
    vmet   Y     0
   ```

2. Insert the RAMiX 665/675 Ethernet host IP network address and name to **/etc/hosts** file:

   ```
   129.134.71.10 ramix0 RAMIX0 #RAMiX Dual Ethernet PMC
   ```

3. Define the IP network address entry in the **/etc/confnet.d/ inet/interface** file:

   ```
   rmxf:0:ramix0:/dev/rmxf0:netmask 255.255.255.0 arp::
   ```

If installation is NOT being performed on a closely-coupled system – skip to step 11.

4. Put files such as **/etc/conf/sdevice.d/rmxf** in the root tree for *each* client:

   ```
   # vmebootconfig -U -v client_vme
   ```

5. Add the RAMiX 665/675 device files to the *memfs* root file system that serves as the client's root file system by editing the file **/etc/diskless.d/custom.conf/client.private/** *client_vme***/memfs.files.add**

```
# cp -p /etc/diskless.d/custom.conf/client.shared/nfs/memfs.files.add \
/etc/diskless.d/custom.conf/client.private/client_vme
```

```
# vi /etc/diskless.d/custom.conf/client.private/client_vme/memfs.files.add
```

   Add the following lines:

   ```
   c   /dev/rmxf0      0644      /dev/rmxf0
   c   /dev/rmxf1      0644      /dev/rmxf1
   c   /dev/rmxf2      0644      /dev/rmxf2
   c   /dev/rmxf3      0644      /dev/rmxf3
   ```

6. Enable the **rmxf** module on the client:

   ```
   # vi vroot_path/etc/conf/sdevice.d/rmxf
   ```

   Change '**N**' to '**Y**'.

7. Insert the "client_ramix0" Ethernet host IP network address and name to **`/etc/hosts`** file:

```
129.134.45.11 client_ramix0 #RAMIX 665/675 PMC on client_vme hostname
```

8. Define the IP network address entry in the *vroot_path***`/etc/confnet.d/inet/interface`** file:

```
rmxf:0:client_ramix0:/dev/rmxf0:netmask 255.255.255.0 arp::
```

Note: client_ramix0 is the hostname for the 129.134.71.11 IP address of the RAMiX 665/675 that resides on the diskless client in a closely-coupled configuration.

9. Regenerate the memfs.cpio file system image:

```
# mkvmebstrap -B -r all client_vme
```

10. Perform steps 4-9 for each client.

11. Rebuild the kernel and reboot:

```
# /etc/conf/bin/idbuild
```

```
The PowerMAX OS kernel will be rebuilt now.
This will take some time. Please wait.

Root for this process is /
                 .
                 .
                 .
The PowerMAX OS kernel has been rebuilt.
```

The following command reboots the system:

```
# shutdown -i6 -g0 -y
```

During reboot, observe console messages to ensure the RAMiX 665/675 PMC Ethernet controller has not failed boot diagnostics:

Power Hawk: During reboot, observe that the RAMiX 665/675 (**rmxf**) driver is recognized by observing the following message (this message may not be displayed if the system is built with a dynamic kernel.):

```
rmxf0: on SYS.PCI0.PCI1
```

PowerMAXION: During reboot, observe console messages to ensure the VMETRO MIDAS 20 **vmet** driver has not failed boot diagnostics. Also observe during boot that the RAMiX 665/675 **rmxf** driver is recognized on the VMETRO MIDAS 20.

The following message indicates PCI bus on the vmet:

```
Initialize I/O level 1 interface: SYS.VME0.PCI12
```

The following message indicates RAMiX 665/675 on the MIDAS 20:

```
rmxf0: on SYS.PCI0.VME0.PCI12
```

5.2.4.   Verifying the Network Interface

1. Verify that the **rmxf0** controller was found on the PCI bus by the kernel during boot.

   ```
   # hwstat
   .
   .
   11 Devices Configured:
   Device           Major/Minor    Bus    Bus I/O Addr  Std I/O Addr
   =============    ============   ====   ============  ============
   .
   .
   RMXF 0 Ethernet   ( 7, 70 )      pci0   0xE13FF000    0x00003000
   .
   .
   ```

2. Verify that the IP address was successfully assigned to the **rmxf0** controller using the **ifconfig(1M)** command.

   ```
   # ifconfig rmxf0

    rmxf0: flags=c43<UP,BROADCAST,RUNNING,MULTICAST>
    inet 129.134.71.10 netmask ffffff00 broadcast 129.134.71.255
   ```

3. Verify that the local network functions using the **ping(1M)** command. This determines that the local network is properly configured.

   ```
   # ping ramix0

   ramix0 is alive
   ```

4. Verify that a route exists for the **rmxf0** interface. Use **netstat(1M)** to list all routes in the routing table. Ensure that a route exists for the RAMiX 665/675 PMC Ethernet interface.

   ```
   # netstat -r

   Destination Gateway    Flags   Use   Interface      Pmtu
   .
   ramix0       ramix0     UH      0     rmxf0          8232
   .
   ```

5. Verify there are no conflicting IP addresses. Ensure that for each interface, the information in the Network and Address columns is unique.

```
# netstat -i
Name   Mtu    Network      Address    Ipkts   Ierrs   Opkts   Oerrs   Collis
.
rmxf0  4352   129.134.52   ramix0     4327    0       2886    0       0
.
```

6. Verify that the controller can communicate with other hosts using the **ping(1M)** command. For this example, the remote Ethernet node host name is ramix0.

    ```
    # ping ramix0

    ramix0 is alive
    ```

6.0. Troubleshooting

This section provides possible solutions for common problems encountered while installing and operating the RAMiX 665/675 PMC Ethernet controller.

6.1. Applications

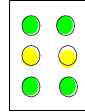| Problem	Possible Solution(s)
A network application no longer works	If the application worked prior to the installation of the RAMiX 665/675 PMC Ethernet controller, there is probably a hardware conflict.

6.2. Controller

Problem	Possible Solution(s)
RAMiX 665/675 controller not found during boot	During kernel boot, the RAMiX controller should be automatically located on the PCI bus and assigned a PCI bus address. If the driver is correctly installed, a driver message should appear on the system console during the boot process. 1. Make sure the controller is seated correctly in the bus expansion slot. Try another controller known to operate correctly. 2. Check for correct configurations of the Ethernet cable into the controller. Verify the cable is properly connected at both ends. Ping the failed system from another host on the network. 3. Inspect the LEDs on the controller's faceplate (see section 6.3. for LED definitions). Re-seat the card.
The card cannot communicate with other hosts on the network	1. Check the Ethernet cables. Make sure the Ethernet media is correctly installed. 2. Try to ping other hosts on the network from your host computer. If this is not successful, check the LEDs on the controller's faceplate (see section 6.3. for LED definitions). 3. Check the interface configuration.
Cannot connect to Network	1. Check Primary and Secondary Fiber Cables to verify that they are in the appropriate ports. 2. Check the interface software configuration. 3. Check the Ethernet cable. Make sure the Ethernet media is correctly installed.

6.3. RAMiX 665/675 LED Definition

Primary (Top)   Secondary (Bottom)

Green (XMIT) LED   Green (XMIT) LED
Yellow (LINK) LED   Yellow (LINK) LED
Green (RCV) LED   Green (RCV) LED

Green (XMIT)	Yellow (LINK)	Green (RCV)	Meaning
Off	On	Off	Network link established
On	On	Off	Device Xmit on respective link (Primary or Secondary)
Off	On	On	Device Receiving on respective link
Off	Off	Off	• Device not powered • Network link not established

7.0. Direct Software Support

Software support is available from a central source. If you need assistance or information about your system, please contact the Concurrent Software Support Center at our toll free number 1-800-245-6453. For calls outside the continental United States, the number is 1-954-283-1822. The Software Support Center operates Monday through Friday from 8 a.m. to 5 p.m., Eastern Standard Time.

Calling the Software Support Center gives you immediate access to a broad range of skilled personnel and guarantees you a prompt response from the person most qualified to assist you. If you have a question requiring on-site assistance or consultation, the Software Support Center staff will arrange for a field analyst to return your call and schedule a visit.

You may also submit a request for assistance at any time by using the Concurrent Computer Corporation web site at **http:// www.ccur.com/isd_support_contact.asp** or by sending an email to **support@ccur.com**.

Direct Software Support