# ifconfig lan0 ⇒ what are you

# ping

CUSTOMER SERVICES TRAINING

Protocol not supported
need to rebuild kernel

① load package
② setup package
③ rebuild kernel - which creates links to TCP/IP

# who -r
what run level

# INIT 3
go to level 3

rc.tcpipport – started at run level 3
rc.tcpipserv –

# STUDENT GUIDE

CBT's

# OPEN SYSTEMS TROUBLESHOOTING

TCP/IP
System administration
UUCP
Network management
Scripts
88K I/O

Hayden Books
UNIX system libraries

88K PROCESSOR
UNIX

G3810

1 CBT on each AVIION MACHINE

CAVI - AVIION TROUBLESHOOTING
LAN

# Open Systems Troubleshooting

**Prerequisites:**

**Field Personnel** who have successfully completed the P1042 Aviion Operations and P1090 Unix Communications.

Abstract:
This course is intended to assist Field Personnel, who have successfully completed the Aviion Operations and Unix Communications courses in troubleshooting and maintaining Aviion systems in a networked environment. The course consists of lecture and laboratory based training.

This FRU level course is designed to provide the student with the expertise to allow him/her to install or reconfigure an Aviion series machine in a networked environment and verify it's proper operation.

The course will include discussions of Aviion Hardware, VME/SCSI controller jumpering, hardware installation and reconfiguration and Aviion Diagnostics. The software discussion will include installation and configuration of Aviion hardware in a TCP/IP networked environment. A discussion of Unix commands available to the student for troubleshooting installation problems in a networked environment will be presented. These commands along with hardware diagnostics will subsequently be employed by the student in a troubleshooting lab.

Terminal Objective:

Upon completion of this course, the student will be able to install or modify Aviion Hardware configurations and will also be able to successfully troubleshoot Hardware and Software problems involving Aviion Equipment in a networked environment.

Enabling Objectives:

**Given available** documentation, tools and test equipment the **student who** completes this course will be able to do the **following:**

Identify the major FRU's and describe their functions.

Install and configure a Aviion system.

Enabling Objectives (continued)

Run selected diagnostics and self-tests.

Boot diagnostics as a tool to isolate faults to the FRU level.

Perform any adjustments and required preventive maintenance.

Use appropriate documentation, tools and test equipment.

Be able to list the products in the "TCP/IP family" of communications products.

Be able to describe the Internet addressing scheme.

Be able to install an Aviion system in a networked environment and verify it's ability to reach other hosts on the network.

Be able to install the Network File System and mount remote resources across the network.

Be able to list the various server processes that must be present on networked machines to provide communication ability.

Be able to list the various files used during network initialization to bring the network up.

Be able to utilize various Unix commands to troubleshoot and repair network problems.

# Open Systems Troubleshooting

1) System board overview
   - single/double cpu population
   - board types 8/16mb
   - ecc controller
   - led stop lights
   - duart
   - printer
   - vme interface
   - switches and jumpers

2) System board block diagram
   - 88k major bus structure
   - pbus
   - mbus
   - badbus
   - vmebus
   - pexbus

3) Chassis discription
   - front panels
   - rear bulkhead connections
   - disk/tape removals
   - pcb to bulkhead connections
   - slot assignments
   - iack/bus grant jumpers

4) System block diagram
   - memory expansion
   - vlc controllers
   - esdi/smd controllers
   - scsi controllers
   - asyn/sync controllers
   - terminal srever controllers

5) Optional board jumpering
   - ciprico esdi/smd
   - ciprico scsi
   - systec async/sync
   - systec lan
   - systec cluster boxes

6) Boot paths

- scsi drive ids
- smd drive ids
- lan ids
- sync/async ids

7) SCM commands

8) Removal and replacement lab

9) Power up testing messages

10 Diagnostics

- acceptence testing
- status reports
- error codes
- tools menu
- disk media maintenence
- run tape adjustment
- tdr testing
- help menu
- scm return

11. Review of DG/UX TCP/IP

A. Reviewing Basic Terms

B. What is DG/UX TCP/IP?

1. Kernel-Level Protocols
   a. IP
   b. understanding internet Addresses
   c. ICMP
   d. TCP
   e. UDP
   f. ARP
   g. RARP

## Open Systems Troubleshooting
(continued)

2. User Commands and User-Level Protocols
   brief overview of applications
   with emphasis on telnet, rlogin
   a. telnet
   b. ftp
   c. tftp
   d. sendmail
   e. R commands

3. Servers to Start Daemons
   a. inetd
      1. ftpd
      2. telnetd
      3. tftpd
   b. smtp
   c. routed
   d. rwhod

12. Setting Up a DG/UX TCP/IP network

A. Determining Network Architecture
   1. Reviewing Basic Terms
   2. Choosing an Internet Address
   3. Connecting Networks: Some Examples
   4. Determining Network Routes
   5 Using the route command

B. Network Files and Databases used by TCP/IP
   1. Using the sysadm Program
   2. Editing /etc/hosts
   3. Editing /etc/networks
   4. Editing /etc/protocols
   5. Editing /etc/services
   6. Editing /etc/hosts.equiv
   7. Editing /etc/ethers
   8. Editing /etc/tcpip.params
      a. Setting the Hostname
      b. Setting the Hostid
      c. Setting Network Interface Devices
      d. Setting Security Parameters
      e. Setting Parameters for the Communications Board
      f. Setting Routing Parameters
      g. Starting Network Daemons
      h. Setting Parameters for Network Daemons
   10. Editing /etc/inetd.conf

13. Reviewing the Network File System
   - A. How NFS Allows File Sharing
     1. The Network Services Concept
     2. Maintaining Service When a Server Crashes
   - B. Understanding NFS Terms
   - C. How NFS Works
     1. Mounting a Remote File System
     2. Exporting a File System
     3. Establishing a Machine as an NFS Server
     4. How to Export Directories with exportfs
     5. How to Remote-Mount a File System
   - D. General Hints for Debugging NFS

14. Reviewing Yellow Pages
   - A. What Are Yellow Pages?
     1. Understanding YP Terms
   - B. Overview of the Yellow Pages
     1. The YP Map
     2. The YP Domain
     3. Servers and Clients
     4. Masters and Slaves
   - C. Commands for Maintaining YP
     1. How Administrative Files Are Consulted on a YP Network
   - D. How the YP Network Service Works
     1. How YP Stores Data
     2. How Servers Provide Information
     3. How Clients Obtain Information
   - E. Default YP Files
     1. Accessing Information from hosts Files
     2. Accessing Information from the passwd Files
     3. Accessing Information from Other YP Files
   - F. YP Administration
     1. How to Set up a Master YP Server
     2. Altering a YP Client's Files to Use YP Services
     3. How to Set Up a Slave YP Server
     4. How to Modify Existing YP Maps After YP Installation
     5. Propagation of a YP Map
     6. If You Do Not Use YP

15. Troubleshooting on a Network Running DG/UX TCP/IP

A. Troubleshooting: A Strategy
   1. Isolating a Problem After Setup
   2. Step 1: Check the Hardware
   3. Step 2: Determine If the Problem is with the Local Host
   4. Step 3: Determine If the Problem is with the Remote Host

B. Using Administrative Commands to Troubleshoot
   1. Using the ifconfig Command
      a. Activating the Communication Controller
      b. Troubleshooting When the Network Hangs
   2. Using the ping Command
   3. Using the netstat Command
      a. Checking Incoming and Outgoing Packets
      b. Checking Network Statistics
      c. Checking Network Connections
      d. Checking the Routing Tables
   4. Using the arp Command
   5. Interpreting Error Messages

C. Troubleshooting Specific Problems at the High Layer
   1. Troubleshooting Problems with telnet & rlogin
   2. Troubleshooting Problems with ftp
   3. Troubleshooting with the results from rwhod

AViion 300/400 SERIES STATIONS:PROGRAMMING SYSTEM CONTROL AND I/O REGISTERS (014-1800)

MAINTAINING AViion 300 SERIES STATIONS (014-1803)

SETTING UP AND STARTING THE AViion 300 SERIES STATION (014-1801)

USING THE SYSTEM CONTROL MONITOR (SCM) (014-1802)

SETTING UP AND STARTING THE AViion 400 SERIES STATION (014-1858)

EXPANDING AND MAINTAINING THE AViion 400 SERIES STATION (014-1859)

SETTING UP AND STARTING AViion 3000/4000 SERIES COMPUTER SYSTEMS (014-1872)

EXPANDING AND MAINTAINING THE AViion 3000/4000 SERIES COMPUTER SYSTEM (014-1874)

AViion 3000/4000 SERIES STATION:PROGRAMMING SYSTEM AND CONTROL REGISTERS (014-1878)

SETTING UP AND STARTING AViion 5000 SERIES COMPUTER SYSTEMS (014-1806)

EXPANDING AND MAINTAINING AViion 5000 SERIES COMPUTER SYSTEMS (014-1850)

AViion 5000/6000 SERIES STATIONS:PROGRAMMING SYSTEM CONTROL AND I/O REGISTERS (014-1805)

STARTING AViion 6000 SERIES SYSTEMS (014-1819)

SETTING UP AND INSTALLING VME OPTIONS IN AViion SYSTEMS (014-1867)

USING AViion SYSTEM DIAGNOSTICS (014-1863)

INSTALLING AND OPERATING THE 10565 PERIPHERAL HOUSING UNIT (014-1810)

MC88100 USERS MANUAL,REDUCED INSTRUCTION SET COMPUTER (RISC) (014-1809)

MC88200 USERS MANUAL,REDUCED INSTRUCTION SET COMPUTER (RISC) (014-1808)

MANUALS FOR VME HARDWARE

HPS DOWNLOADABLE CLUSTER CONTROLLER TECHNICAL MANUAL (014-1813)

HPS DOWNLOADABLE CLUSTER CONTROLLER INSTALLATION GUIDE (014-1814)

HPS VME BUS HOST ADAPTERS TECHNICAL MANUAL (014-1815)

HPS VME BUS MULTIPLEXOR (6236/6237) TECHNICAL MANUAL (014-1817)

V/ETHERNET 3207 HAWK LOCAL AREA NETWORK CONTROLLER FOR ETHERNET USER'S GUIDE (014-1818)

VME BUS DATA COMMUNICATIONS PROCESSOR (DCP-8820) TECHNICAL MANUAL (014-1816)

SOFTWARE MANUALS

LEARNING THE UNIX OPERATING SYSTEM (069-701402)

INSTALLING AND MANAGING THE DG/UX SYSTEM (093-701052)

PORTING APPLICATIONS TO THE DG/UX SYSTEM (069-701059)

WRITING A DEVICE DRIVER FOR THE DG/UX SYSTEM (093-701053)

USING THE DG/UX EDITOR (069-701059)

USING THE DG/UX SOFTWARE DEVELOPMENT TOOLS (093-70178)

USING THE DG/UX SYSYEM (069-70135)

USING THE KERNAL DEBUGGER (093-70175)

PROGRAMMING IN THE DG/UX APPLICATIONS ENVIROMENT (093-701076)

SETTING UP AND MANAGING DG/UX TCP/IP (093-701051)

PROGRAMMING WITH TCP/IP ON THE DG/UX SYSTEM (093-701024)

USING DG/UX TCP/IP (093-701023)

SETTING UP AND MANAGING X.25 ON THE DG/UX SYSTEM (093-701071)

MANAGING NFS AND ITS FACILITIES (093-701049)

SYSTEM MANAGERS REFERENCE FOR THE DG/UX SYSTEM (093-0701050

USER'S REFERENCE FOR THE DG/UX SYSTEM (093-701054)

MODULE 1

AVIION PRODUCT OVERVIEW

OBJECTIVES:

1. IDENTIFY THE VARIOUS PRODUCTS THAT MAKE UP THE AVIION LINE OF HARDWARE.

2. DESCRIBE THE SIMILARITIES AND DIFFERENCES BETWEEN THE AVIION PRODUCTS.

3. IDENTIFY THE OPTIONS THE CAN BE USED WITH THE AVIION PRODUCTS.

REFERENCES:

MAINTAINING AViion 300 SERIES STATION (014-1859) CHAPTER 1

EXPANDING AND MAINTAINING AViion 400 SERIES STATION (014-1859) CHAPTER 1

SETTING UP AND STARTING AViion 3000/4000 SERIES COMPUTER SYSTEMS (014-1872) CHAPTER 1

SETTING UP AND STARTING AViion 5000 SERIES COMPUTER SYSTEMS (014-18060 APPENDIX A

STARTING AViion 6000 SERIES (014-1819) CHAPTER 1

MAVERICK

AVIION 300 SERIES STATION AND OPTIONS = monochrome

300c = color

STANDARD COMPONENTS

THE BASIC AVIION 300 SERIES CONSISTS OF A DESKTOP COMPUTER UNIT,A GRAFICS MONITOR,AND A IBM-COMPATABLE KEYBOARD.THE AVIICN 300 SYSTEM BOAERD CONSIST OF THE FOLLOWING:

o 4 MBYTES OF MINIMUM MEMORY,EXPANDABLE IN 4 MB INCREMENTS TO A MAXIMUM OF 28 MB.

INEN o AN ETHERNET LAN PORT.

o A PARALLEL PRINTER PORT,CENTRONICS/DATA PRODUCTS COMPATABLE.

o AN RS-232-C/RS 422 ASYNC. PORT FOR A DATA TERMINAL DEVICE,SUCH AS A MODEM,DISPLAY TERMINAL,SERIAL PRINTER, OR PLOTTER.

o A SCSI PORT FOR ADD-ON MASS STORAGE DEVICES.

OPTIONAL COMPONETS

BASED UPON THE AVIION 300 SERIES MODEL NUMBER YOUR SYSTEM MAY INCLUDE THE FOLLOWING OPTIONAL COMPONETS:

o MOUSE AND MOUSE PORT

o MASS-STORAGE SUB-SYSTEM. EACH ONE CONTAING ONE OR MORE OF THE FOLLOWING:

150 MB CARTRIDGE TAPE DRIVE

179 MB OR 322 MB WINCHESTER DISK DRIVE, 662 MB DISK

DISKLESS CLIENT

scm> b^ INEN( ) to boot diskless clien

only SCSI

100,200 have no DG/UX

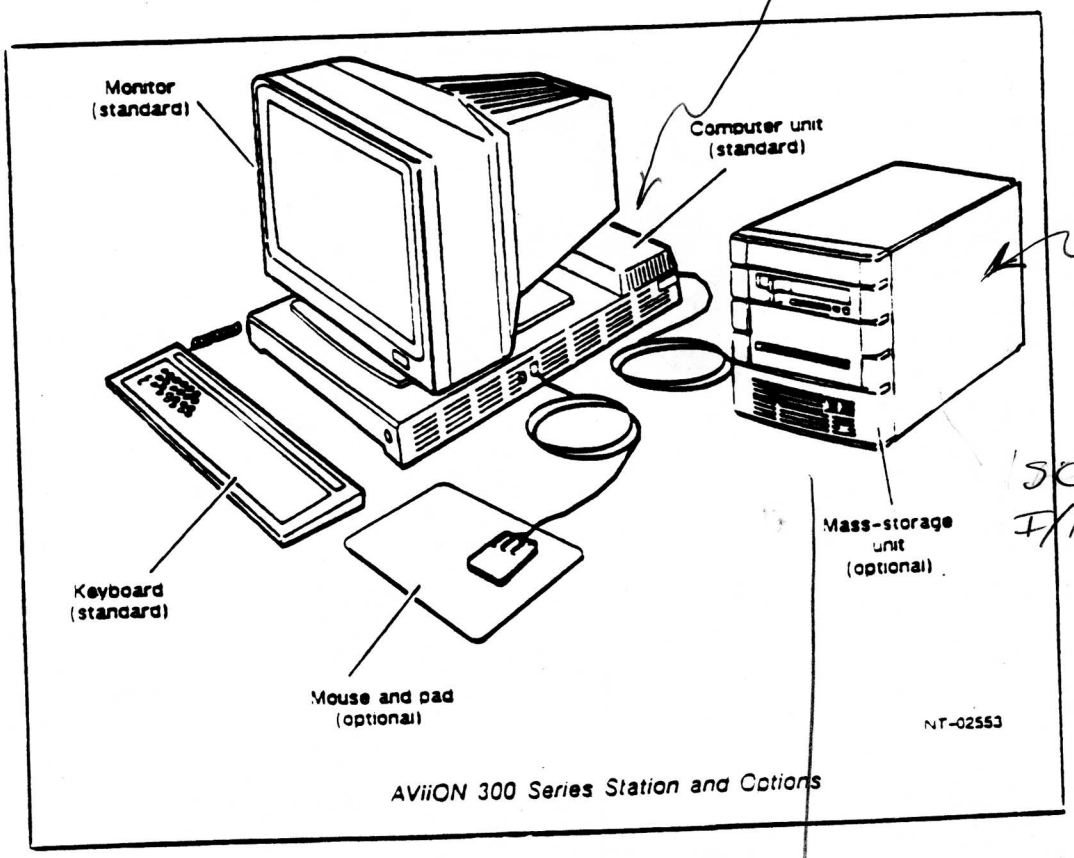
scm>b,1 sd(INSC(0)) root:/dgnx

↑ integrated SCSI controller on system board

sd(INSC(0),0) root:dgnx

CTLR device

SCSI CTLR




AViiON 300 Series Station and Options

up to 4 mass storage devices

SCSI I/F chips

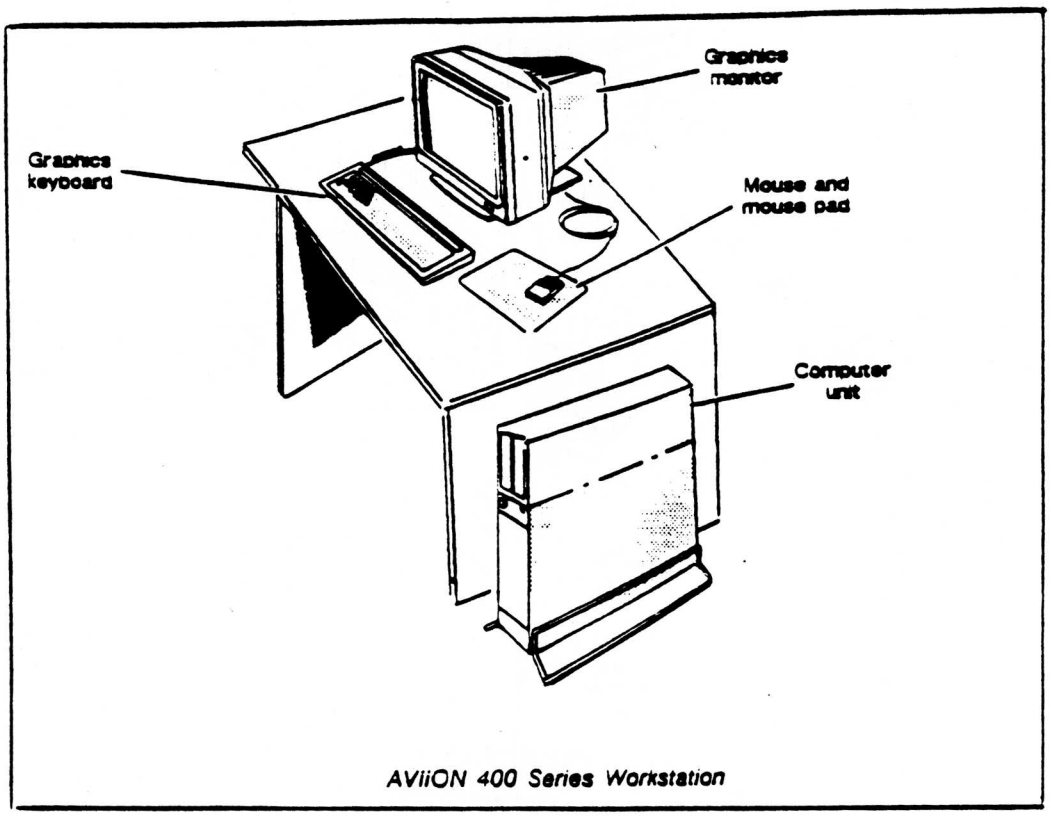
MAVERICK only SCSI devices allowed

1 full height
1 half height (tape drive)

SCUSI supports 7 devices
0-3 for disks
4-6 for mag tape

scm>b,1 st(INSC(0),4)

1-2 default to 0 if no value specified




*AViiON 400 Series Workstation*

SPU, P/S & FANS

# AVIION 400 SERIES STATION AND OPTIONS

THE DESKSIDE COMPUTER INCLUDES THE SYSTEM BOARD, POWER SUPPLY AND FANS, AND INTERNAL STORAGE DEVICES. SOME MODELS MAY INCLUDE ADDICNAL MEMORY, INHANCED GRAPHICS, AND A SECOUND CPU

## BASE UNIT

- o SYSTEM PROCESSOR BOARD, w internal bus
- o POWER SUPPLY, THREE FANS, TIME OF BOOT CLOCK WITH BBU.
- o VME CARD CAGE WITH SLOTS FOR TWO 6U CARDS.

## SYSTEM BOARD

- o 16 OR 20 MHZ MOTOROLA CHIP SET
- o TWO TO EIGHT 4 MB PLUG-IN MEMORY BOARDS. 32 MB MAXIMUM
- o KEYBOAD CONTROLLER
- o LAN CONTROLLER
- o SCSI CONTROLLER
- → o DUART (TWO RS232-C PORTS WITH MODEM CONTROL).
- o PARALLEL PRINTER PORT (CENTRONICS/DATA PRODUCTS COMPATABLE).
- MAIN BUS → o VME BUS INTERFACE9
- o 8 OR 24 BIT GRAPHICS CONTROLLER
- o 24 BIT Z-BUFFER FOR HIGH SPEED GRAPHICS
- o A SECOND PROCESSOR - daughter board

## MASS STORAGE (INTERNAL DEVICES)

map 2 half height

- o FULL HEIGHT 662 MB WINCHESTER DISK
- o FULL HEIGHT 322 MB WINCHESTER DISK
- o 2 GB 8MM CARTRIDGE TAPE DRIVE
- o HALF HEIGHT 150 MB CARTRIDGE TAPE
- o 179 MB WINCHESTER DISK
- o 1.44 MB 3.5 DISKETTE
- o 1.2 MB 5.25 DISKETTE

## MASS STORAGE (EXTERNAL DEVICES)

- o ONE OR TWO PERIPHERL HOUSING UNITS (PHUS)
- o FULL HEIGHT 662 MB WINCHESTER DISK
- o FULL HEIGHT 322 MB WINCHESTER DISK
- o FULL HEIGHT 2 GB 8MM CARTRIDGE TAPE
- o HALF HEIGHT 150 MB CARTRIDGE TAPE
- o 179 MB WINCHESTER DISK
- o 1.44 MB 3.5 DISKETTE
- o 1.32 MB 5.25 DISKETTE

graphics board included for AV4000

6U boards have 2 connectors ⇐ VME option boards

Cannot use 9U boards on AV400

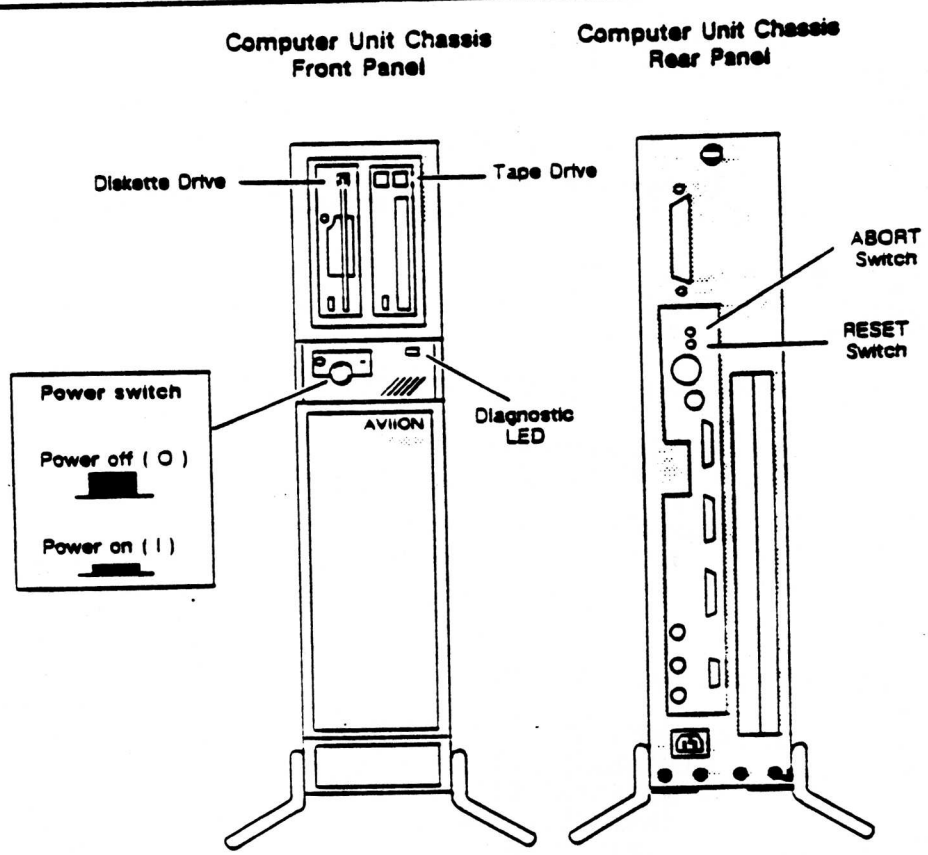



*Figure 1-1 AViiON 3000 and 4000 Series Operator Switches*

# AVIION 3000 SERIES COMPUTER

THE AVIION 3000 SERIES COMPUTER CAN FUNCTION AS A ENTRY LEVEL SERVER IN A CLIENT/SERVER ENVIROMENT.IT CAN ALSO SUPPORT MULTIUSERS IN A TIMESHARE/SERVER ENVIROMENT.THE AVIION 3000 SERIES CURRENTLY CONSISTS OF ONE MODEL THE AVIION 3200.

STANDARD COMPUTER COMPONENTS

- ONE 16 MHZ MOTOROLA PROCESSOR
- 8 MB OF BYTE PARITY MEMORY (TWO 4 MB PLUG-IN MEMORY MODULES
- ONE ASYNCHRONOUS RS 232-C PORT FOR SYSTEM CONSOLE
- ONE ASYNCHRONOUS RS 232-C PORT FOR A MODEM OR DATA TERMINAL DEVICE
- ETHERNET LAN INTERFACE
- SCSI CONTROLLER FOR INTERNAL SCSI DEVICES. MAXIMUM OF FOUR.
- VME BUS INTERFACE – option card, SCCI CTCA plugs into, I/O ONLY

ON SOME MODELS,BOTH OF THE FOLLOWING MASS STORAGE DEVICES

- ONE 150 MB CARTRIDGE TAPE HALF HEIGHT
- ONE SCSI WINCHESTER DISK,EITHER A 322 MB HALF HEIGHT OR A FULL HEIGHT 662 MB DRIVE.
- A ONE SLOT,VME CARD CAGE TO SUPPORT ONE OPTIONAL VME COMMUNICATIONS CONTROLLER.

ON SOME MODELS,ONE OF THE FOLLOWING VME BASED COMMUNICATIONS CONTOLLERS:

- VSC/3,3 LINE SYNCHRONOUS CONTROLLER
- VAC/16, A 16 LINE ASYNCHRONOUS COMMUNICATIONS CONTROLLER.

OPTIONAL COMPUTER COMPONENTS

- ADDIONAL 4 MB MEMORY MODULES UP TO 16 MB MAXIMUM
- 179 MB HALF HEIGHT WINCHESTER DISK
- 322 MB HALF HEIGHT WINCHESTER DISK

REMOVABLE MEDIA

- A SECOND 150 MB CARTRIDGE TAPE
- 1,2 MB 5.25 DISKETTE DRIVE OR A 1.44 MB 3.5 DISKETTE DRIVE
- 600 MB HALF HEIGHT CD ROM DRIVE

ON MODELS WITHOUT A VSC/3 OR A VAC/16 CONTROLLER ONE OF THE FOLLOWING VME BASED COMMUNICATIONS CONTROLLERS:

- VSC/3
- VAC/16
- VLC LAN CONTROLLER

Lead contacts for memory boards good only for 15 or 16 installs/removals

*

*No VDA card supported

↑ VME distributed adapter

to run cluster boxes

1-6

KEYSTONE

# AVIION 4000 SERIES COMPUTER

THE AVIION 4000 SERIES COMPUTER CURRENTLY CONSISTS OF THE FOLLOWING MODELS: 4020,4100,AND THE 4120.

## STANDARD COMPUTER COMPONENTS:

- ONE (AV 4000)OR TWO (AV 4020) 16 MHZ OR ONE (AV 4100) OR TWO (AV 4120) 20 MHZ MOTOROLA PROCESSING UNITS.
- IN THE AV 4000 OR 4100 COMPUTER, 8 MB OF MEMORY USING TWO 4 MB PLUG-IN MEMORY CARDS.IN THE AV 4020 OR 4120 COMPUTERS 16 MB OF MEMORY USING FOUR PLUG-IN 4 MB MEMORY MODULES
- ONE ASYNCHRONOUS RS 232-C PORT FOR THE SYSTEM CONSOLE
- ONE RS 232-C PORT FOR MODEM OR DATA TERMINAL DEVICE
- ONE PARALLEL PRINTER PORT CENTONICS COPATABLE
- ETHERNET LAN INTERFACE
- ONE SCSI INTERFACE CONTROLLER WITH A EXPANSION PORT FOR EXTERNILY CONNECTED SCSI DEVICES.
- A VME BUS INTERFACE
- ONE 150 MB HALF HEIGHT CARTRIDGE TAPE
- ONE SCSI BASED WINCHESTER DISK,EITHER A 322 MB HALF HEIGHT OR A 662 MB FULL HEIGHT.
- A TWO SLOT VME CARD CAGE FOR TWO OPTIONAL VME BASED COMMUNICATIONS CONTROLLERS.

## OPTIONAL COMPUTER COMPONENTS

- ONE OR MORE FOLLOWING COMPONENTS CAN BE ADDED TO THE AV 4000 SERIES COMPUTER.

- A SECOND CPU (16 OR 20 MHZ)
- ADDITIONAL 4 MB MEMORY MODULES UP TO 32MB MAXIMUM.
- 179 MB HALF HEIGHT WINCHESTER DISK
- 332 MB HALF HEIGHT WINCHESTER DISK
- 150 MB HALF HEIGHT CARTRIDGE TAPE
- 1.2 MB 5.25 DISKETTE OR ONE 1.44 MB HALF HEIGHT 3.5 DISKETTE
- 600 MB HALF HEIGHT CD ROM DRIVE

A MAXIMUM OF TWO OF THE FOLLOWING VME BASED COMMUNICATIONS CONTROLLERS:

- ONE VSC/3
- ONE OR TWO VAC/16
- ONE OR TWO VDA/128 ASYNCHRONOUS HOST ADAPTERS
- ONE VLC ETHERNET LAN CONTROLLER

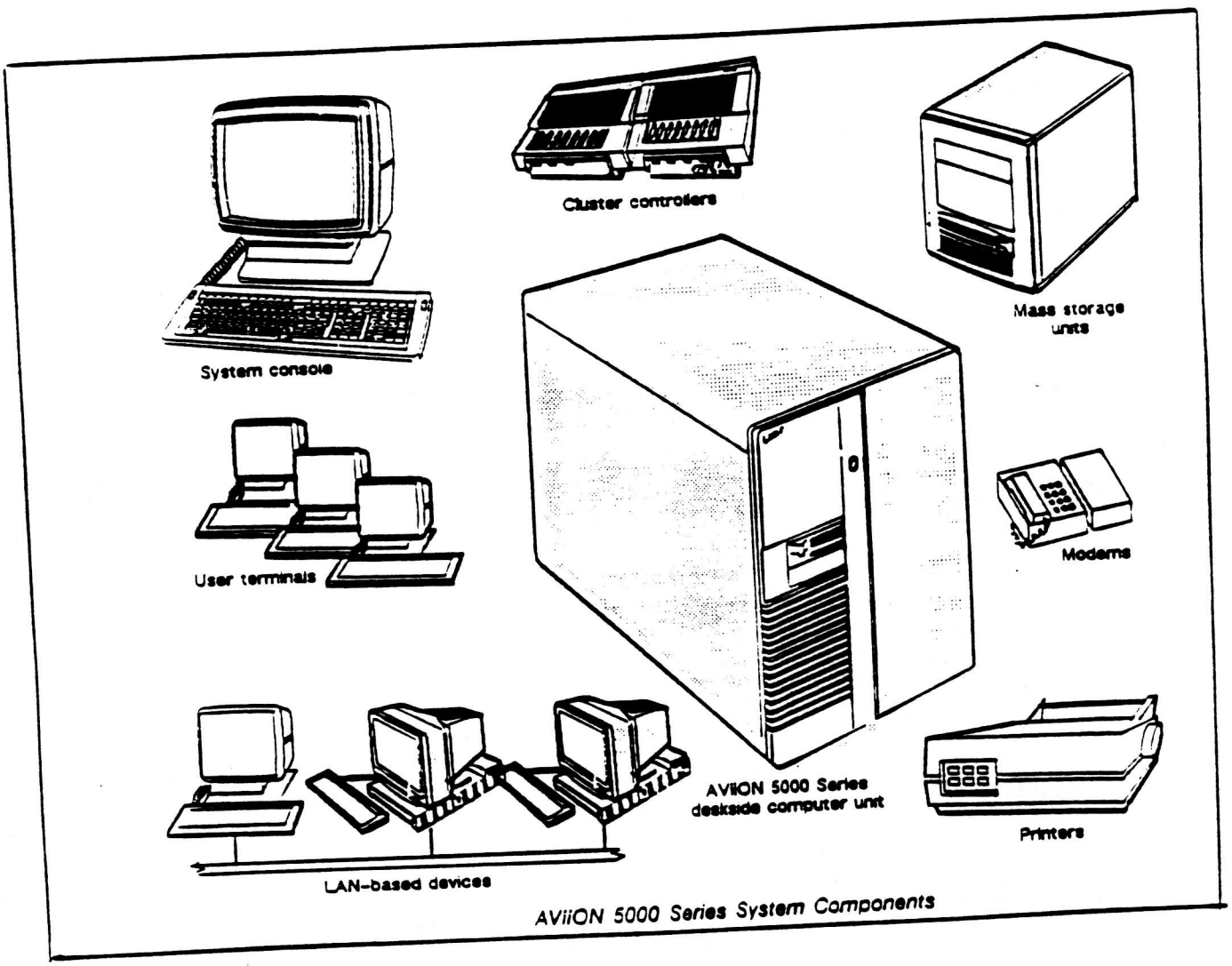
SPEED OF MACHINE / # of 88K CPU Chips

4000 – 16 mHz

4020 - 2 cpu chips

4120 - 20 mHz

* NO GRAPHICS BOARD, USED AS A SERVER
* USUALLY COMES W/ MONOCHROM MONITOR OR D216




*AViiON 5000 Series System Components*

TOPGUN

# AVIION 5000 SERIES COMPUTER

THE AVIION 5000 SERIES COMPUTER IS A MULTIUSER OR SERVER SYSTEM SUPPORTING A VARIETY OF CONFIGURATIONS. THE BASIC DESKSIDE COMPUTER INCLUDES THE SYSTEM BOARD, POWER SUPPLY, VME BUS, ONE SCSI CONTROLLER WITH A EXTERNAL SCSI BUS CONNECTION, A SCSI SCSI CARTRIDGE TAPE, ONE ESDI CONTROLLER, AND ONE ESDI HARD DISK.

## STANDARD COMPONENTS

WITH MEM ON BOARD

- SYSTEM PROCESSOR BOARD, SINGLE OR DUAL, 16 OR 8 MB MEMORY (DUAL 16 ONLY).
- ONE LINE FOR SYSTEM CONSOLE
- ONE PARALLEL PRINTER PORT
- ONE ASYNCHRONOUS OPTON PORT (MODEM)
- ONE SCSI BUS CONTROLLER WITH EXTERNAL BUS PORT
- ONE 150 MB CARTRIDGE TAPE
- ONE ESDI CONTROLLER
- ONE 332 OR 648 MB ESDI WINCHESTER DISK DRIVE
- 720 W POWER SUPPLY
- 10 SLOT VME BACKPANEL

## INTERNAL OPTIONS (MAXIMUM)

- SECOND INTERNAL 150 MB CARTRIDGE TAPE
- SECOND OR THIRD ESDI WINCHESTER DISKS
- FOUR 16,32,OR 48 MB MEMORY EXPANSION BOARDS, 208 MB MAXIMUM
- FOUR VSC/4 CONTROLLERS
- TWO VAC/16 CONTROLLERS for 32 local terminals
- FOUR VDA/128 HOST ADAPTERS
- TWO VLC ETHERNET LAN CONTROLLERS

FOR Cluster boxes, USES SPECIAL COAX, & null modem cables

## EXTERNAL OPTIONS (MAXIMUM)

- MODEL 10565 PERIPHERAL HOUSING UNIT MASS STORAGE SUBSYSTEMS
  THREE HALF HEIGHT SCSI DEVICES PER PHU:
  150 MB CARTRIDGE TAPE
  ONE FULL HEIGHT SCSI DEVICE PER PHU:
  662 MB SCSI WINCHESTER DISK
  322 MB SCSI WINCHESTER DISK
  2 GB ARCHIVEL CARTRIDGE TAPE
  COMBINATION OF ONE FULL HEIGHT AND ONE HALF HEIGHT DEVICE PER PHU.
- FOUR 6586/6587 REEL TO REEL TAPE PER SCSI CONTROLLER
- FOUR SYNCHRONOUS DEVICES PER VSC/4
- 16 ASYNCHRONOUS DEVICES PER VAC/16
- 128 ASYNCHRONOUS DEVICES PER VDA/128

CYPHER GALAXY

MODEL

5100 - 6 slots

5000 - 10 slots

FOR ESDI DISK

scm> b^ cied(0,0) root:/dgux

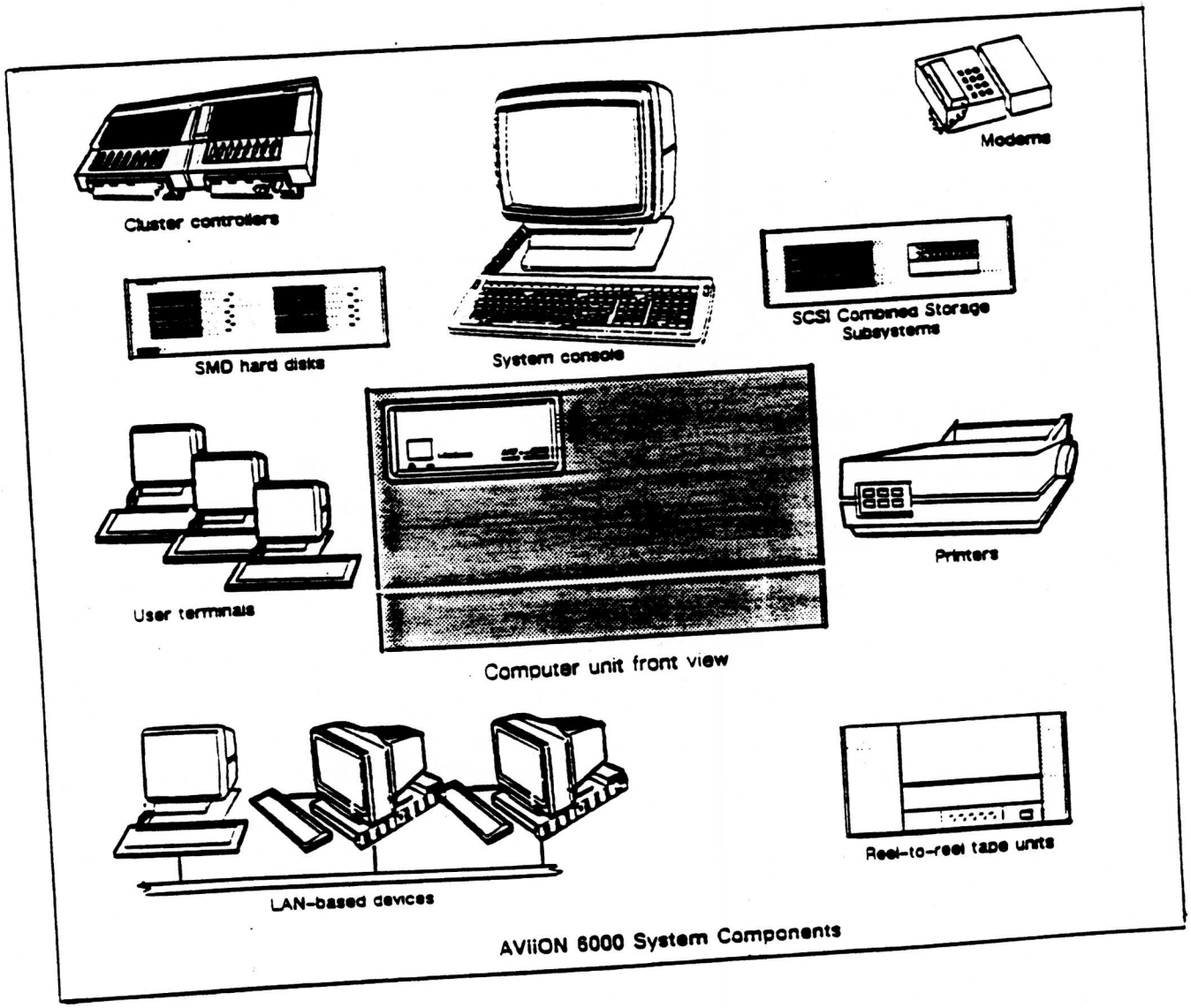
cipher ESDI CTLR

VENDOR

scm> b^ cimd(0,0) root:/dgux

FOR SCSI TAPE

scm> b^ st(cisc(0),4) file 4




AViiON 6000 System Components

RACK MOUNTED

# AVIION 6000 SERIES COMPUTERS

THE AVIION 6000 SERIES COMPUTER IS A MULTIUSER OR SERVER SYSTEM THAT SUPPORTS A WIDE VARIETY OF CONFIGURATIONS.THE BASIC UNIT INCLUDES A 14 INCH HIGH CHASSIS THAT HOUSES THE SYSTEM BOARD,POWER SUPPLY,AND VME BUS.

## STANDARD COMPONENTS

- SYSTEM PROCESSOR BOARD,SINGLE OR DUAL,16 MB OR 8 MB OF MEMORY 208MB MAXIMUM.
- ONE RS 232-C ASYNCHRONOUDS PORT FOR THE SYSTEM CONSOLE
- ONE PARALLEL PRINTER PORT (CENTRONICS OR DATA PRODUCTS).
- ONE RS 232-C ASYNCHRONOUS OPTION PORT (MODEM).

## OPTIONAL COMPONENTS (MAXIMUM)

- FOUR SCSI BUS CONTROLLERS.
  ONE REQUIRED TO SUPPORT 150 MB TAPE
  EACH SUPPORTS UP TO SEVEN EXTERNAL SCSI DISK AND TAPE DEVICES.
- FOUR SMD CONTROLLERS (THREE IF SYSTEM SUPPORTS A VAC/16).
- FOUR VSC/4 CONTROLLERS
- ONE VAC/16 CONTROLLER
- FIVE VDA/128 HOST ADAPTERS (ONE IF SYSTEM INCLUDES A VAC/16).
- TWO VLC ETHERNET LAN CONTROLLERS.

## EXTERNAL OPTIONS (MAXIMUM)

- FOUR 1.2 GB SMD WINCHESTER DISKS PER SMD CONTROLLER
  16 MAX PER SYSTEM
- ONE COMBINED STORAGE SUBSYSTEM (CSS) PER SCSI CONTROLLER;
  MAX OF FOUR SCSI DEVICES PER CSS:
  - 662 MB WINCHESTER DISK
  - 322 MB WINCHESTER DISK
  - TWO 150 MB CARTRIDGE TAPE PER CSS
  - TWO 2 GB CARTRIDGE TAPE PER CSS
- THREE 6586/6587 REEL TO REEL TAPE DRIVES PWER SCSI CONTROLLER.
- FOUR ASYNCHRONOUS DEVICES PER VSC/4 CONTROLLER
  EIGHT MAX PER SYSTEM (6 MAX IF SYSTEM INCLUDES A VAC/16)
- 16 ASYNCHRONOUS DEVICES PER VAC/16 CONTROLLER
- 128 ASYNCHRONOUS DEVICES PER VDA/128 HOST ADAPTER:
  640 MAX PER SYSTEM

# MODULE 2
# SYSTEM CONFIGURATION

)BJECTIVES:

1. LIST THE FEATURES OF THE 88K ARCHITECTURE.

2. IDENTIFY THE BUS STRUCTURE USED ON THE AViion PRODUCTS.

3.CORRECTLY JUMPER AND INSTALL A MEMORY OPTION CARD ON A AViion
;YSTEM.

4. DESCRIBE THE VME BUS GRANT AND REQUEST PRIORITY JUMPERS USED
)N THE AViion PRODUCTS.

5. CORRECTLY JUMPER AND INSTALL A VME OPTION CARD ON A AViion
;YSTEM.

6. CORRECTLY CONFIGURE A SCSI BUS DEVICE OR PHU.

# MOTOROLA 88K ARCHITECTURE

o THE AVIION COMPUTER SYSTEMS ARE BASED UPON MOTOROLA'S 88100 CPU AND SUPPORTING 88200 CMMU'S.

o EACH AVIION SYSTEM RUNS A SET OF REDUCED INSTRUCTIONS CONSISTING OF A TOTAL OF 51 INSTRUCTIONS.THESE INSTRUCTIONS EXECUTE ENTIRLY OUT OF HARDWARE ELIMINATION THE NEED FOR COMPLEX MICROCODE.

o THE CPU IS MADE UP OF FIVE UNITS. THESE ARE THE INTERGER UNIT,FLOATING POINT UNIT,DATA UNIT,INSTRUCTION UNIT,AND FINALLY A REGISTER UNIT.

o ALL INTERGER,BIT FIELD,AND CONTROL REGISTER INSTRUCTIONS ARE EXECUTED BY THE INTERGER UNIT IN ONE MACHINE CYCLE.THIS UNIT CONTAINS 11 GENERAL CONTROL REGISTERS.

o FLOATING POINT INSTRUCTIONS ARE EXECUTED BY THE FLOATING POINT UNIT.THE FPU IS IMPLEMENTED AS TWO PIPELINES ND IS COMPRISED OF 11 CONTROL RTEGISTERS.

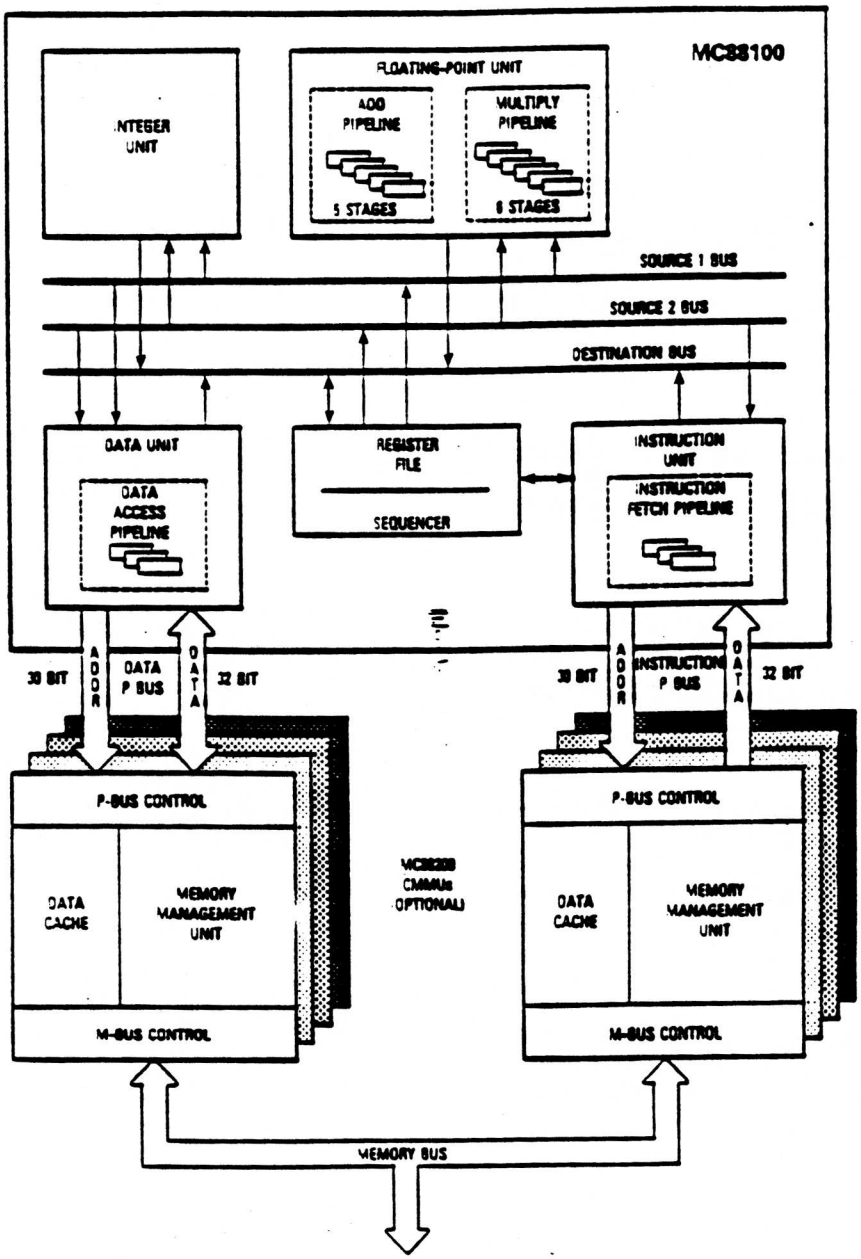
o INSTRUCTIONS THAT ACCESS DATA MEMORY AND CONTROL THE DATA MEMORY INTERFACE PORTION OF THE DATA PBUS ARE EXECUTED BY THE DATA UNIT.

o THE INSTRUCTION UNIT PREFETCHES INSTRUCTIONS FROM MEMORY,PERFORMS THE FIRST STEPS OF INSTRUCTION DECODE,AND PROVIDES INSTRUCTIONS TO THE APPROPRIATE EXECUTION UNIT VIA ENCODED INTERNAL CONTROL SIGNALS.

o THE REGISTER FILE AND SEQUENCER CONTAINS THE GENERAL PURPOSE REGISTERS AND PERFORMS OVERALL INTERNAL CONTROL FUNCTONS.

o 88K ACHITECTURE USES A HARVARD BUS STRUCTURE

o CMMU'S INCORPORATES 16K BYTES OF CACHE MEMORY PLUS CONTROL,MEMORY MANAGEMENT,AND BUS CONTROL LOGIC INTO SINGLE COMPONENT.


MC88100
INTEGER UNIT
FLOATING-POINT UNIT
ADD PIPELINE
3 STAGES
MULTIPLY PIPELINE
6 STAGES
SOURCE 1 BUS
SOURCE 2 BUS
DESTINATION BUS
DATA UNIT
DATA ACCESS PIPELINE
REGISTER FILE
SEQUENCER
INSTRUCTION UNIT
INSTRUCTION FETCH PIPELINE
30 BIT
ADDR
DATA P BUS
DATA
32 BIT
30 BIT
ADDR
INSTRUCTION P BUS
DATA
32 BIT
P-BUS CONTROL
DATA CACHE
MEMORY MANAGEMENT UNIT
M-BUS CONTROL
MC88200 CMMUs (OPTIONAL)
P-BUS CONTROL
DATA CACHE
MEMORY MANAGEMENT UNIT
M-BUS CONTROL
MEMORY BUS

# AVIION SYSTEM BUSSES

o AVIION SYSTEMS ARE COMPRISED OF THE FOLLOWING BUSSES:

VME (VERSA MODULE EUROPA)
PEXBUS (PROCESSOR EXTENDED BUS)
MBUS (MEMORY BUS COMMON)
SBUS (SUBSET BUS)
BBUS (BADBUS)

o VME BUS

ENABLES DATA TRANSFERS BETWEEN THE SYSTEM PCB AND THE VME CONTROLLERS.
40 MB PER SECOND
CARDS ARE FOLLOWED WITH A "U" 9U IS A 15X15 CARD,6U IS A SMALLER CARD WHICH REQUIRES A ADAPTER
9U CARDS HAVE THREE "J" CONNECTORS COMPARED TO TWO FOR THE 6U CARDS.
CONNECTORS J1 AND THE "B" ROWS OF J2 ARE USED FOR THE VME BUS SIGNALS.

o PEXBUS

9U CARDS USE THE PEXBUS TO TRANSFER DATA BETWEEN THE SYSTEM BOARD AND EXPANSION MEMORY. CONNECTOR "J3" AND THE "A AND C" ROWS OF "J2" ARE USED BY THE PEXBUS.

o MBUS

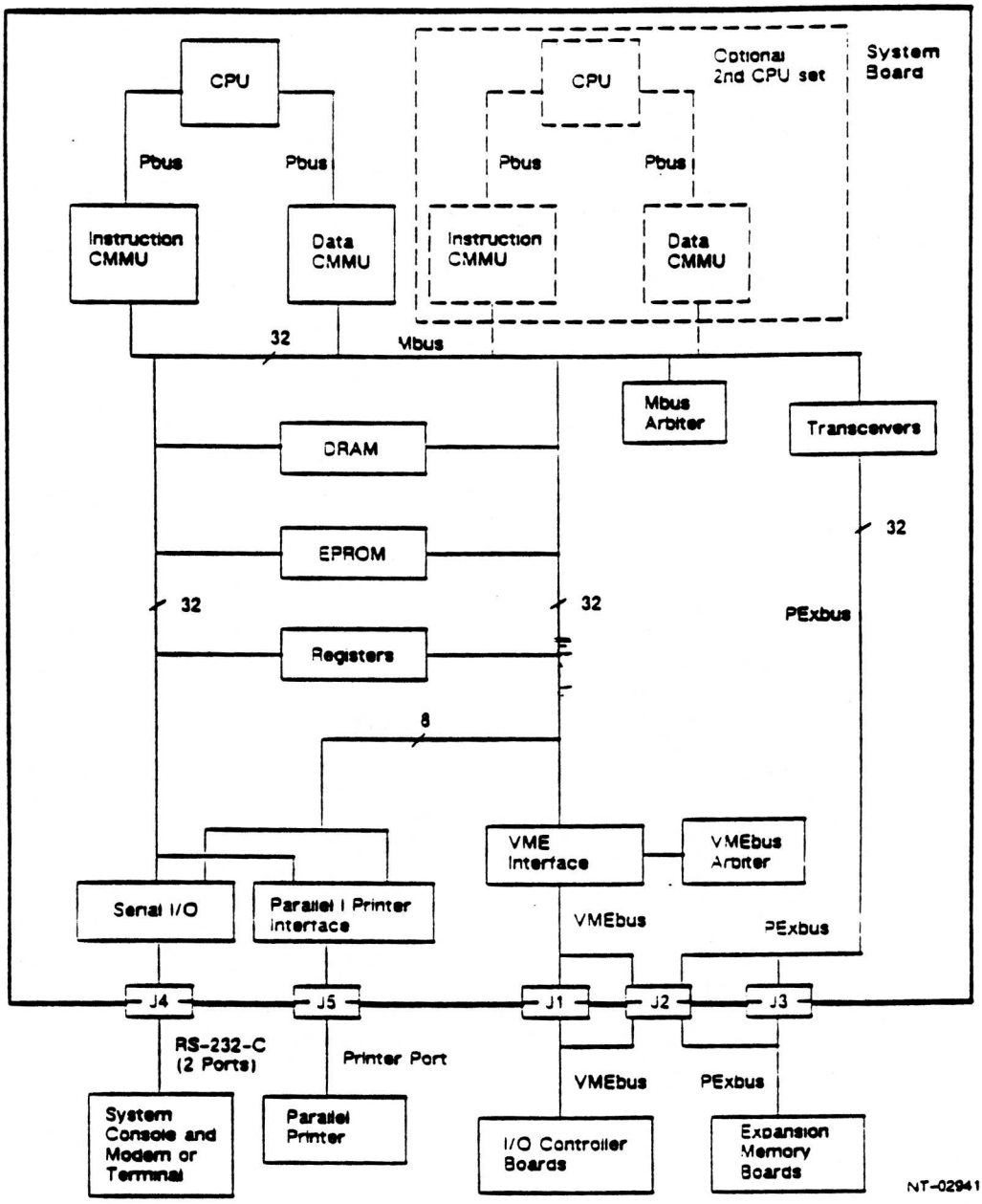
COMMON TO AVIION SYSTEMS THIS BUS IS USED FOR COMMUNICATIONS BETWEEN THE CPU KERNAL AND AND THE ON-BOARD MEMORY SUBSYSTEM.THE GRAPHICS CONTROLLER ALSO USES THE MBUS.

o SBUS

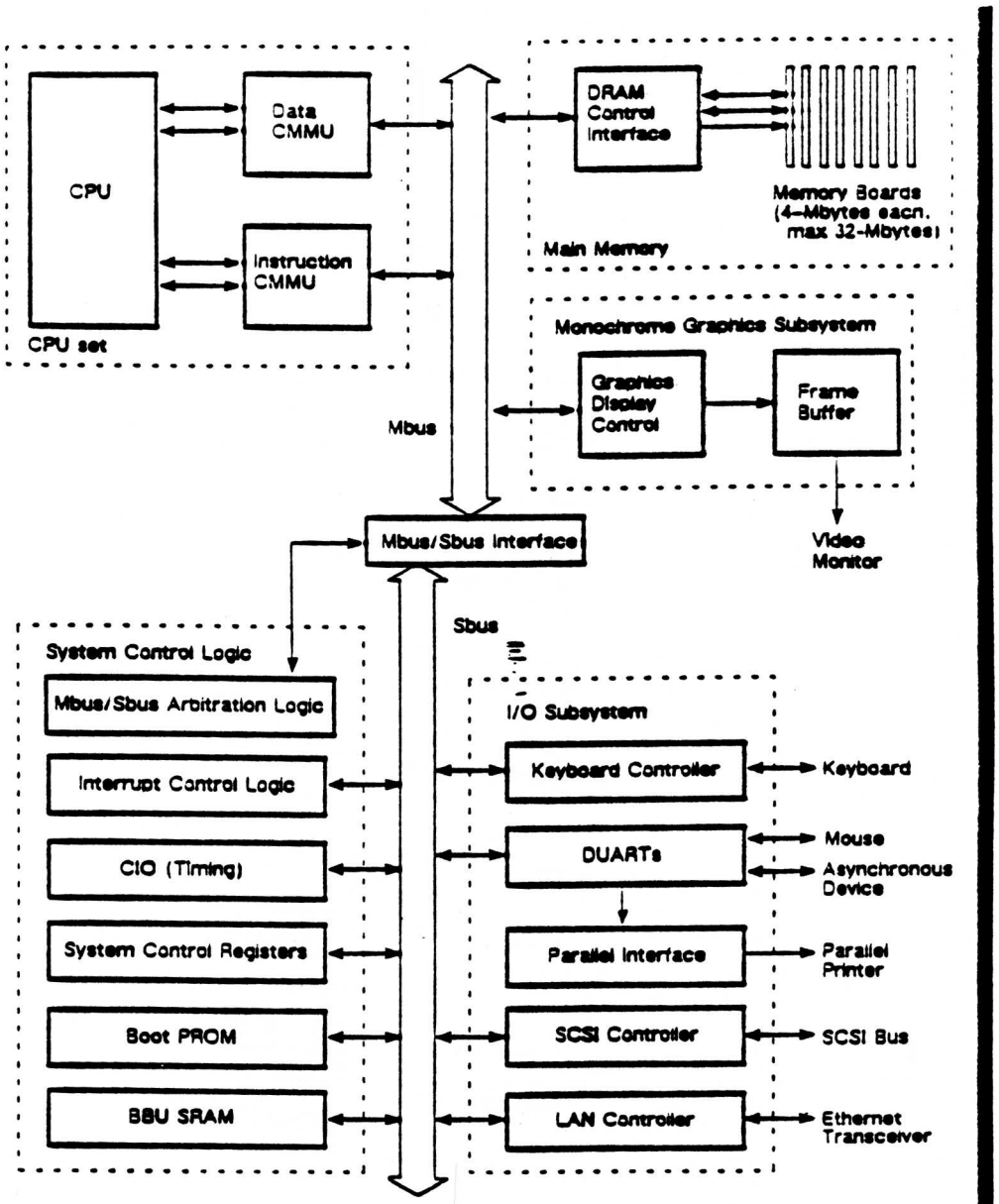
USED BY AVIION SYSTEMS TO ACCOMMODATE SLOWER PERIPHERALS.THE 32 BIT MBUS GETS CONVERTED TO THE 16 BIT SBUS.SOME OF THE DEVICES THAT ACCESS THE SBUS ARE POWER-UP EPROM,PARALLEL/SERIEL I/O INTERFACE,KEYBOARD,MOUSE,SCSI CONTROLLER,AND ETHERNET LAN CONTROLLER.

o BBUS

PROVIDES A INTERFACE WITH THE 88100 AND THE VME INTERFACE.ALSO FURNISHES ON-BOARD COMMUNICATIONS BETWEEN THE MBUS AND THE GLOBAL RESOURSES ON THE SYSTEM BOARD.




*System Board Architecture*




*System Board Architecture – 300 Series*

MEMORY JUMPERING

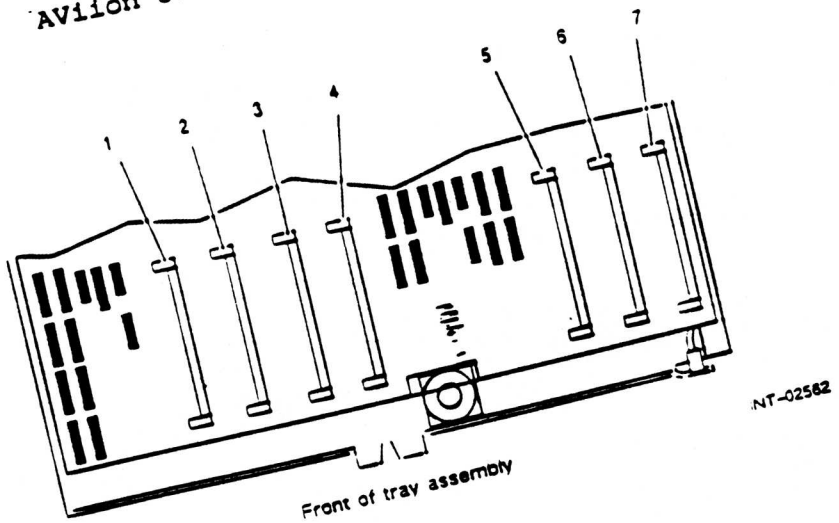
AVilon 300/400 SERIES
AVilon 3000/4000 SERIES

MEMORY BOARDS ARE IN 4 MB INCREMENTS STARTING IN SLOT ONE AND
STALLED IN CONSECUTIVE SLOTS THERAFTER.

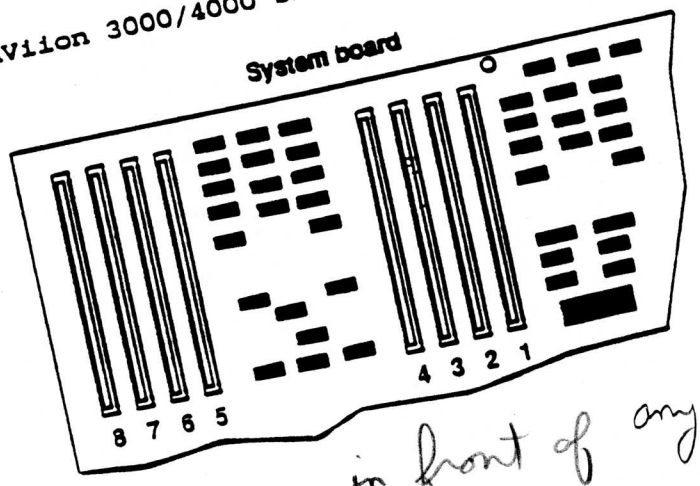
* NEVER LEAVE A MEMORY SLOT OPEN BETWEEN TWO MODULES.

MEMORY IS SIZED ON POWER UP AND SHOULD MATCH YOUR MEMORY THAT WAS
TORED IN NOVRAM AT THE TIME OF THE LAST SUCCESSFUL POWERUP.

AVilon 300 SLOT ASSIGNMENTS




AVilon 3000/4000 SLOT ASSIGNMENTS




* will only see memory in front of any bad board

o MEMORY BOARDS ARE 15 X 15 INCH AND COME IN 16,32,OR 48 MB INCREMENTS.

o MEMORY BOARDS ARE SLOT SPECIFIC (USE PEXBUS IN SLOTS 2-6).

o MUST KNOW HOW MUCH MEMORY RESIDES ON THE SYSYEM BOARD BEFORE YOU INSTALL ANY ADDTIONAL BOARDS.

o IF A MEMORY BOARD IS TO BE INSTALLED IN THE FIRST MEMORY SLOT THE JUMPERS SHOULD BE ARRANGED AS FOLLOWS:

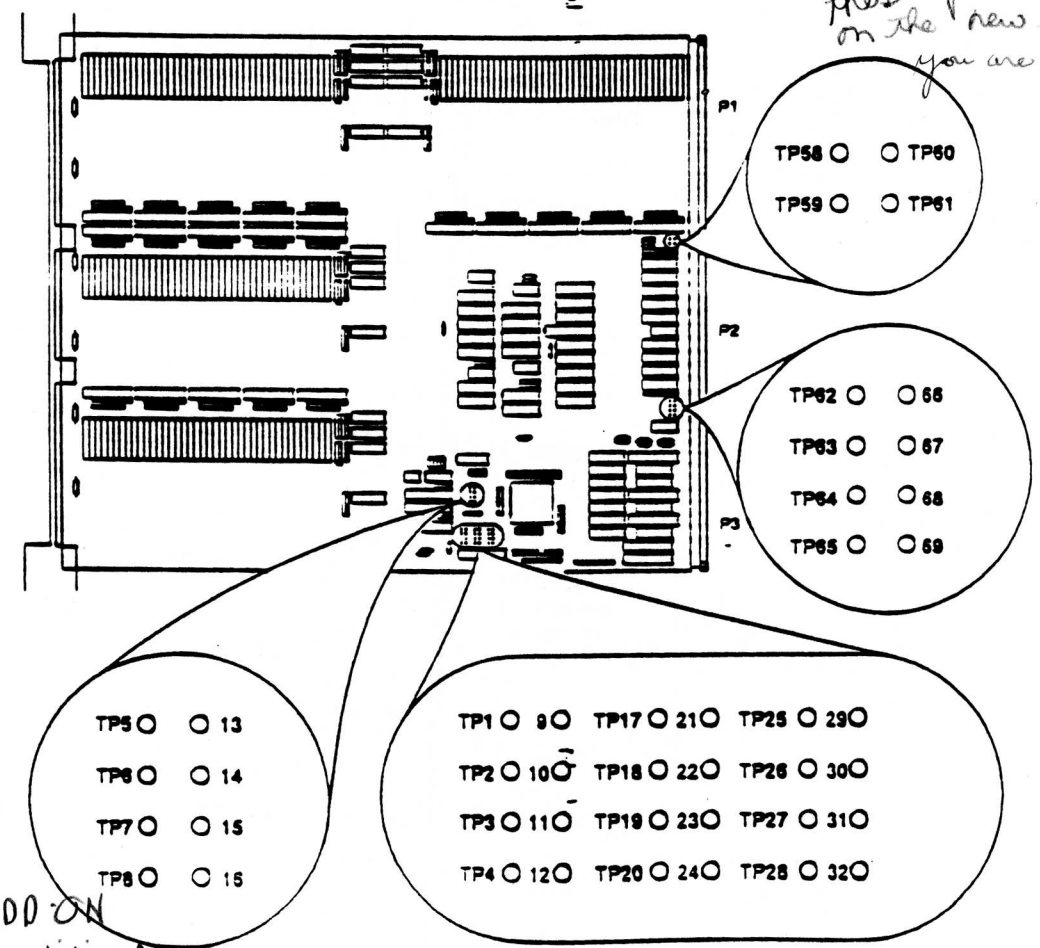
o INSTALLING STARTING ADDRESS JUMPERS ON THE FIRST MEMORY EXPANSION BOARD.FIRST DETERMINE THE AMOUNT OF MEMORY ON THE SYSTEM PCB.(THE SIZE OF THE EXPANSION MEMORY DOESN'T MATTER)

IF THE SYSTEM BOARD HAS 8 MB OF MEMORY,INSTALL A JUMPER OVER PINS TP7/15, TP4/12, TP20/24, AND TP28/32. on new board

IF THE SYSTEM BOARD HAS 16 MB OF MEMORY,INSTALL A JUMPER OVER PINS TP/6/14, TP3/11, TP19/23 AND TP27/31.

EXPANSION MEMORY PCB JUMPER PIN LOCATIONS

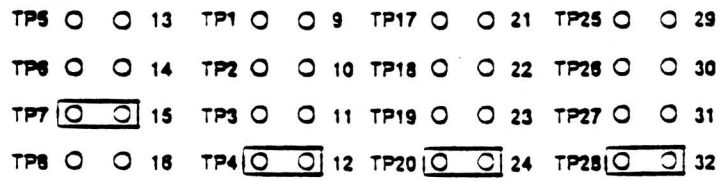
these pins are on the new board you are installing



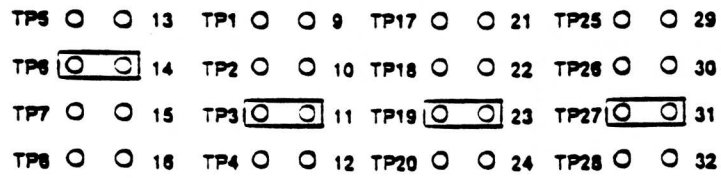

1 procedure - 1ST ADD ON

2nd procedure - any additional memory add-on

INSTALLING STARTING ADDRESS JUMPERS ON THE FIRST MEMORY EXPANSION PCB.




8 MB OF MEMORY ON SYSTEM PCB




16 MB OF MEMORY ON SYSTEM PCB

CD-00861-00-01

slot I.D.

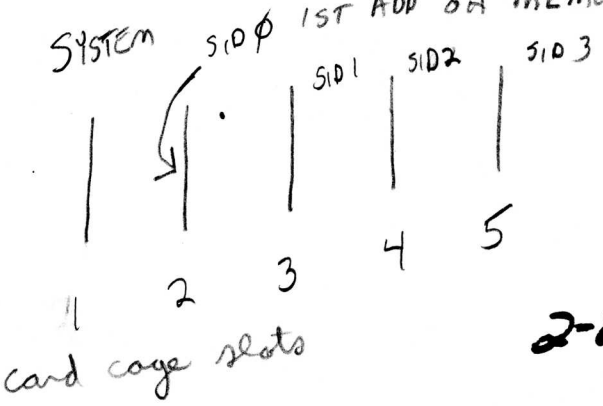
o INSTALLING SID JUMPERS ON THE FIRST MEMORY EXPANSION BOARD. INSTALL A JUMPER OVER PINS TP62/66.

o IF THE MEMORY EXPANSION PCB BEING INSTALLED IS THE SECOND,THIRD,OR FOURTH TO BE INSTALLED,THE JUMPERS SHOULD BE ARRANGED AS FOLLOWS:

DETERMINE THE AMOUNT OF MEMORY PRESENTLY IN THE SYSTEM: (THE MEMORY ON THE SYSTEM BOARD AND ANY OTHER EXPANSION PCB),THE MEMORY SIZE OF THE EXPANSION PCB BEING JUMPERED DOES NOT MATTER.

FIND THE AMOUNT OF MEMORY PRESENLY IN THE SYSTEM IN THE "MEMORY SIZE" COLUMN AND INSTALL JUMPERS OVER THE PINS IN THE "JUMPER PINS" COLUMN.FOR EXAMPLE:IF A THIRD MEMORY EXPANSION PCB IS BEING INSTALLED,AND THE TOTAL MEMORY ON THE SYSTEM PCB,FIRST EXPANSION PCB,AND SECOND EXPANSION PCB IS 88 MB,INSTALL A JUMPER ON PINS TP3/11, TP19/23, TP27/31, TP6/14, AND TP7/15.

before adding new memory



X YOU CAN SKIP A BAD MEMORY SLOT ON AV5000

STARTING ADDRESS JUMPER LOCATION FOR THE SECOND, THIRD, AND FOURTH MEMORY EXPANSION PCBS (1)

PLACE THESE JUMPERS ON NEW MEMORY BOARD TO BE INSTALLED

| Memory Size (MB) | | | | | | Jumper Pins | | |
|---|---|---|---|---|---|---|---|---|
| 8. | 64. | 72. | 128. | 136. | 192 | TP4/12. | TP20/24. | TP28/32 |
| 16. | 24. | 80. | 88. | 144. | 152 | TP3/11. | TP19/23. | TP27/31 |
| 32. | 40. | 96. | 104. | 160. | 168 | TP2/10. | TP18/22. | TP26/30 |
| 48. | 56 | 112. | 120. | 176. | 184 | TP1/9. | TP17/21. | TP25/29 |

STARTING ADDRESS JUMPER LOCATION FOR THE SECOND, THIRD AND FOURTH MEMORY EXPANSION PCBS (2)

| Memory Size (MB) | | | Jumper Pins | | |
|---|---|---|---|---|---|
| | 72. | 136 | TP7/15 | | |
| | 80. | 144 | TP6/14 | | |
| 24. | 88. | 152 | TP6/14. | TP7/15 | |
| 32. | 96. | 160 | TP5/13 | | |
| 40. | 104. | 168 | TP5/13. | TP7/15 | |
| 48. | 112. | 176 | TP5/13. | TP6/14 | |
| 56. | 120. | 184 | TP5/13. | TP6/14. | TP7/15 |
| 64. | 128. | 192 | — | | |

o INSTALLING SID JUMPERS ON THE SECOND, THIRD, OR FOURTH MEMORY EXPANSION PCB. SID NUMBERS 0-3 ALLOW SOFTWARE TO IDENTIFY THE MEMORY EXPANSION PCBS. RELATE THE SID TO THE SLOT LOCATION IN THE CARD CAGE. THAT IS:

SID 0 SHOULD BE ASSIGNED TO THE PCB THAT IS INSTALLED IN CARD CAGE SLOT 2.

SID 1 SHOULD BE ASSIGNED TO THE PCB THAT IS INSTALLED IN SLOT 3.

SID 2 SHOULD BE ASSIGNED TO THE PCB THAT IS INSTALLED IN SLOT 4

SID 3 SHOULD BE ASSIGNED TO THE PCB THAT IS INSTALLED IN SLOT 5

USE THE TABLE BELOW FOR THE SID JUMPERS

| SID Number | Jumper Pins |
|---|---|
| 0 | TP62/66 |
| 1 | TP61/59. TP63/67 |
| 2 | TP60/58. TP64/68 |
| 3 | TP60/58. TP61/59. TP65/69 |

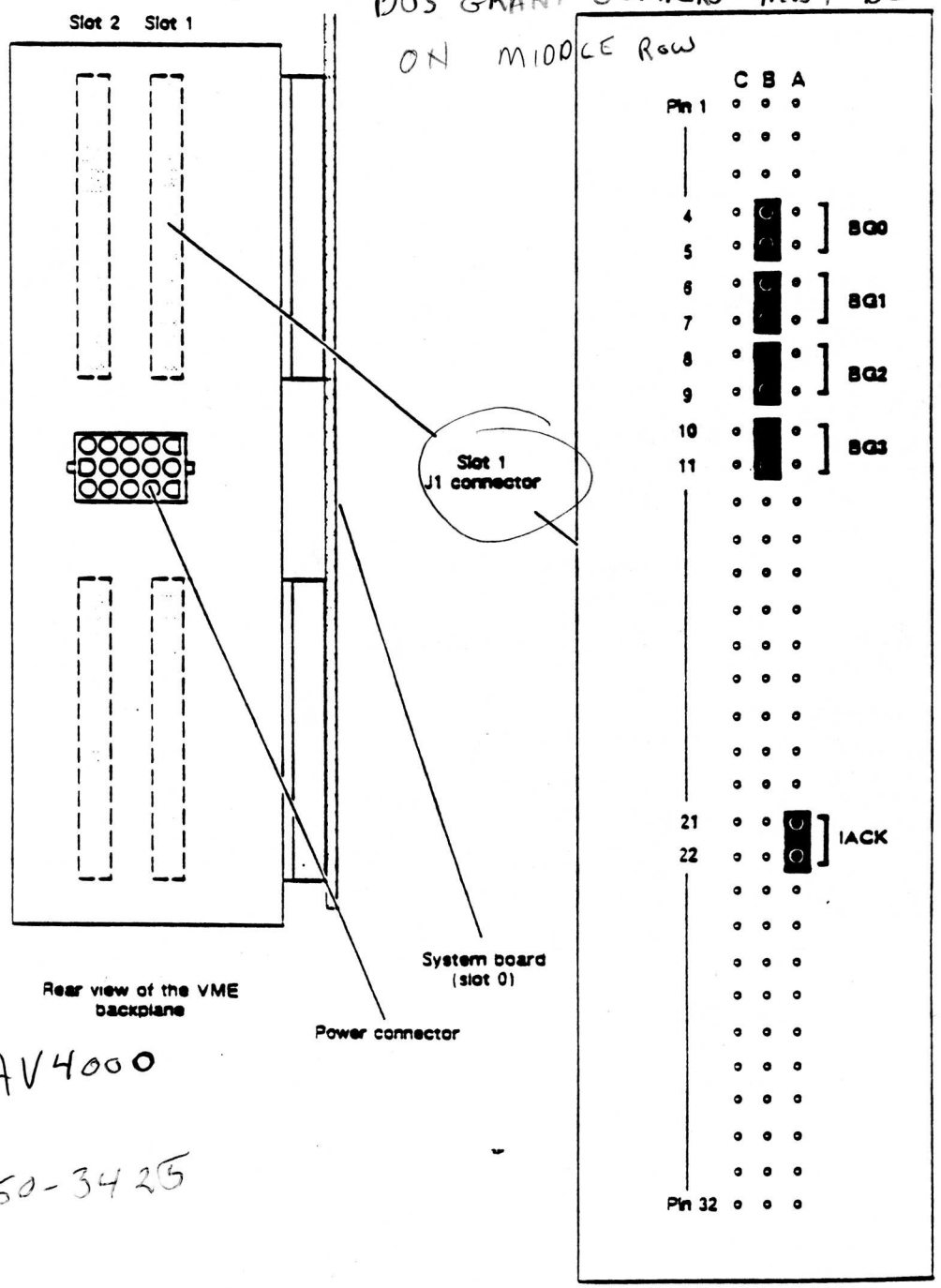
# VME BUS GRANT AND REQUEST LEVELS

- BUS GRANT AND REQUEST LEVELS MUST BE CONFIGURED ON THE SCSI, ESDI OR SMD CONTROLLER BOARD.

- THE AVIION SYSTEMS USE THIS BUS FOR TRANSFERING DATA BETWEEN THE SYSTEM BOARDD AND THE OTHER CONTROLLERS IN THE SYSTEM.

- A BUS GRANT AND REQUEST SCHEME IS USED TO DETERMINE THE BUS ACCESS THAT IS GRANTED TO THE VARIOUS CONTROLLERS.

TO JUMPER OVER AN OPEN SLOT BUS GRANT JUMPERS MUST BE USED ON MIDDLE ROW




AV4000

919-850-3425

*Installing Backplane Terminators*

2-16

VIEWED FROM BACKPLANE

# VME PRIORITY MODES

o THERE ARE THREE PRIORITY MODES THAT THE VME BUS USES IN CONJUNCTION WITH THE BUS GRANT AND REQUEST SIGNALS;

SINGLE
PRIORITY
ROUND ROBIN

o TWO OF THESE ARE JUMPER SELECTABLE, SINGLE AND PRIORITY, THE ROUND ROBIN MODE IS SOFTWARE PROGRAMMABLE. - equal time for all

o THE BACKPLANE OF THE AVIION 5000/6000 CARRIES THESE SIGNALS TO ALL CONTROLLER SLOTS

o THERE ARE FOUR BG/REQ LEVEL SIGNALS; BGO,BG1,BG2,BG3. BG3 IS THE HIGHEST, BGO THE LOWEST.

o JUMPERS MUST BE INSTALLED ON ANY OPEN SLOTS IN ORDER TO PROBAGATE THE SIGNALS.

o SINGLE MODE IS A DAISY CHAIN SCHEME WHERE JUMPERS HAVE BEEEN INSTALLED ON ALL CONTROLLERS IN THE SYSTEM WHICH USES THE VME BUS.THE CONTROLLER WITH THE HIGHEST PRIORITY CLOSEST TO THE SYSTEM BOARD THAT IS REQUESTING THE BUS IS GRANTED ACCESS FIRST.

o PRIORITY MODE IS ALSO A DAISY CHAIN SCHEME EXCEPT THAT INSTEAD OF THE CONTROLLERS HAVING THE SAME BG/REQ LEVEL, THE CONTROLLERS CAN HAVE ANY LEVEL JUMPERED (BGO-BG3). PRIORITY IS GRANTED TO THE CONTROLLER HAVING THE HIGHEST BG/REQ LEVEL AND ITS PROXIMITY TO THE SYSTEM BOARD.

o ROUND ROBIN MODE IS SOFTWARE PROGRAMMABLE,THIS MODE ADJUSTS THE BUS TO CYCLE THROUGH ALL THE LEVELS.IF THE SYSTEM BOARD JUST ACKNOWLEDGED A REQUEST OF BG3 IT WOULD THEN HONOR A REQUEST OF BG2 AND SO ON UNTIL IN CYCLES BACK TO BG3.

o THE BACKPLANE ALSO HAS IACK PRIORITY JUMPERS 1-7.THESE LINES MUST ALSO BE JUMPERD IF A SLOT IS OPEN TO PASS THE SIGNALS ALONG.

o THE TABLE "BOARD SLOT PRIORITY" LISTS THE VME OPTION BOARDS WE SUPPORT IN ORDER OF SUGGESTED SLOT PRIORITIES.

o ALWAYS JUMPER OVER ANY OPEN SLOT, ALWAYS REMOVE ANY JUMPERS WHEN ADDING A OPTION CARD FOR A PARTICULAR SLOT.

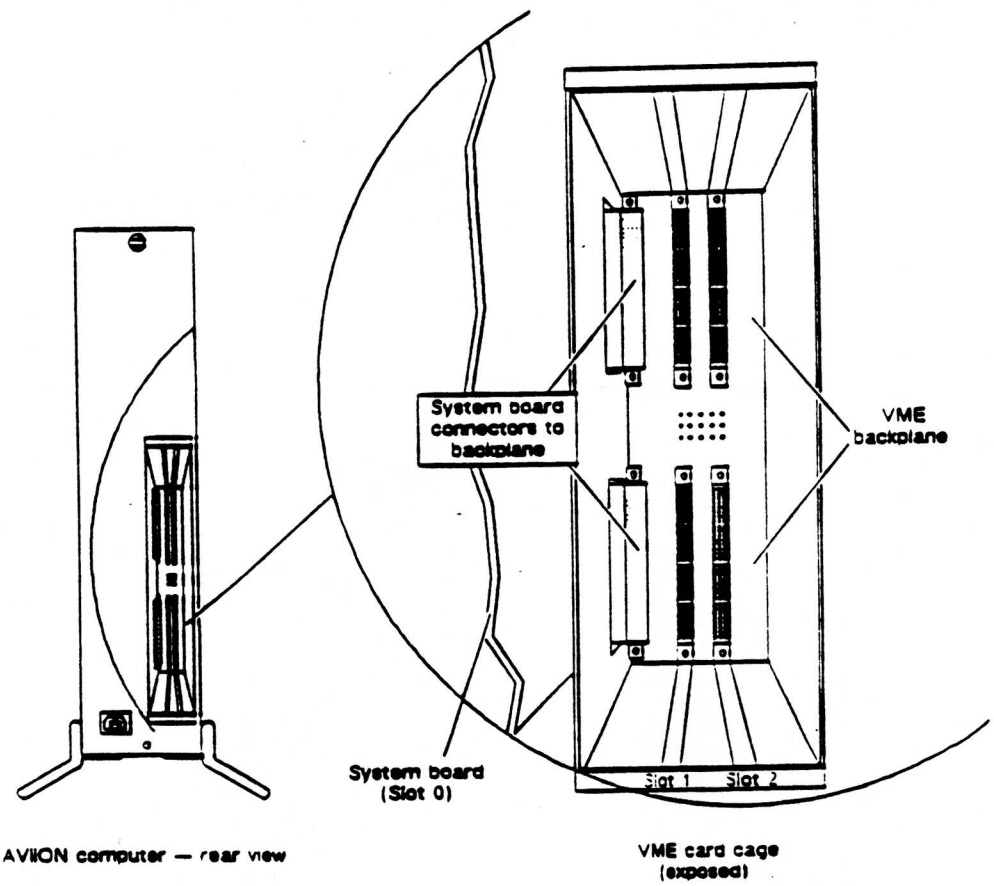
SEE 3-2 Expanding the AV5000

# SLOT ASSIGNMENTS

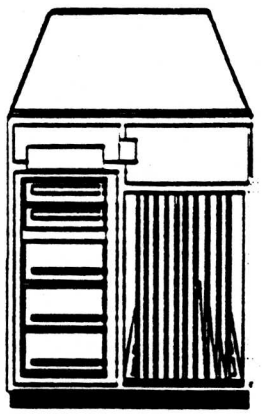
SLOT ASSIGNMENTS ARE AS FOLLOWS: THE SYSTEM BOARD ALWAYS OCCUPIES
IE FIRST SLOT ON THE VME BUS (SLOT 0), THE SLOT CLOSEST TO THE
:STEM BOARD WILL BE SLOT ONE, SLOT,2 IS NEXT ETC.

AVilon 400/400/3000 WILL HAVE SLOTS AS SHOWN BELOW.

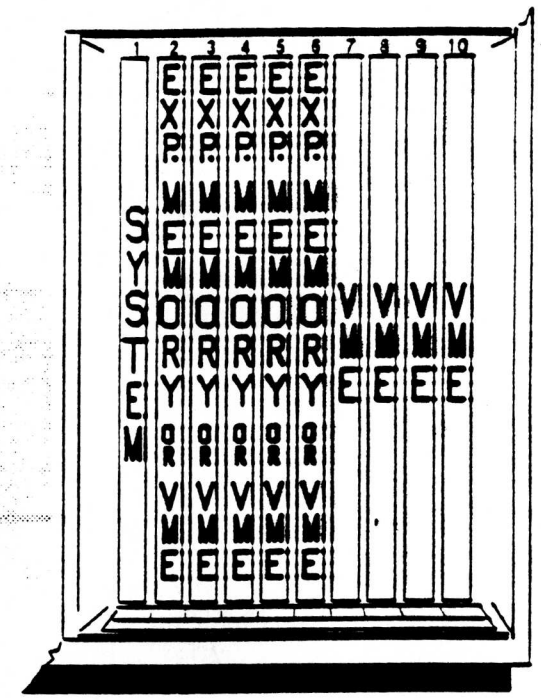
AVilon 5000/6000 HAVE EITHER 6 OR 10 SLOTS FOR THE VME OPTION
\RDS.



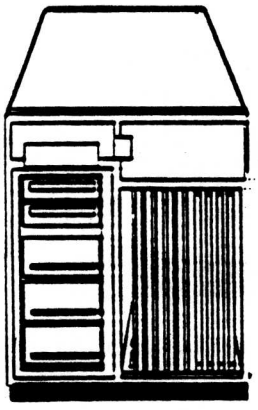

*Board Slots in the VME Card Cage*



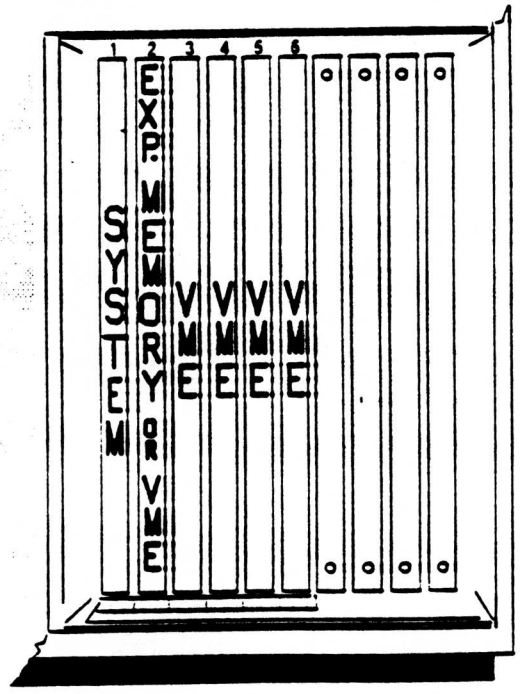
Front view
(front panel removed)




*AViiON 5000 Board Arrangement*

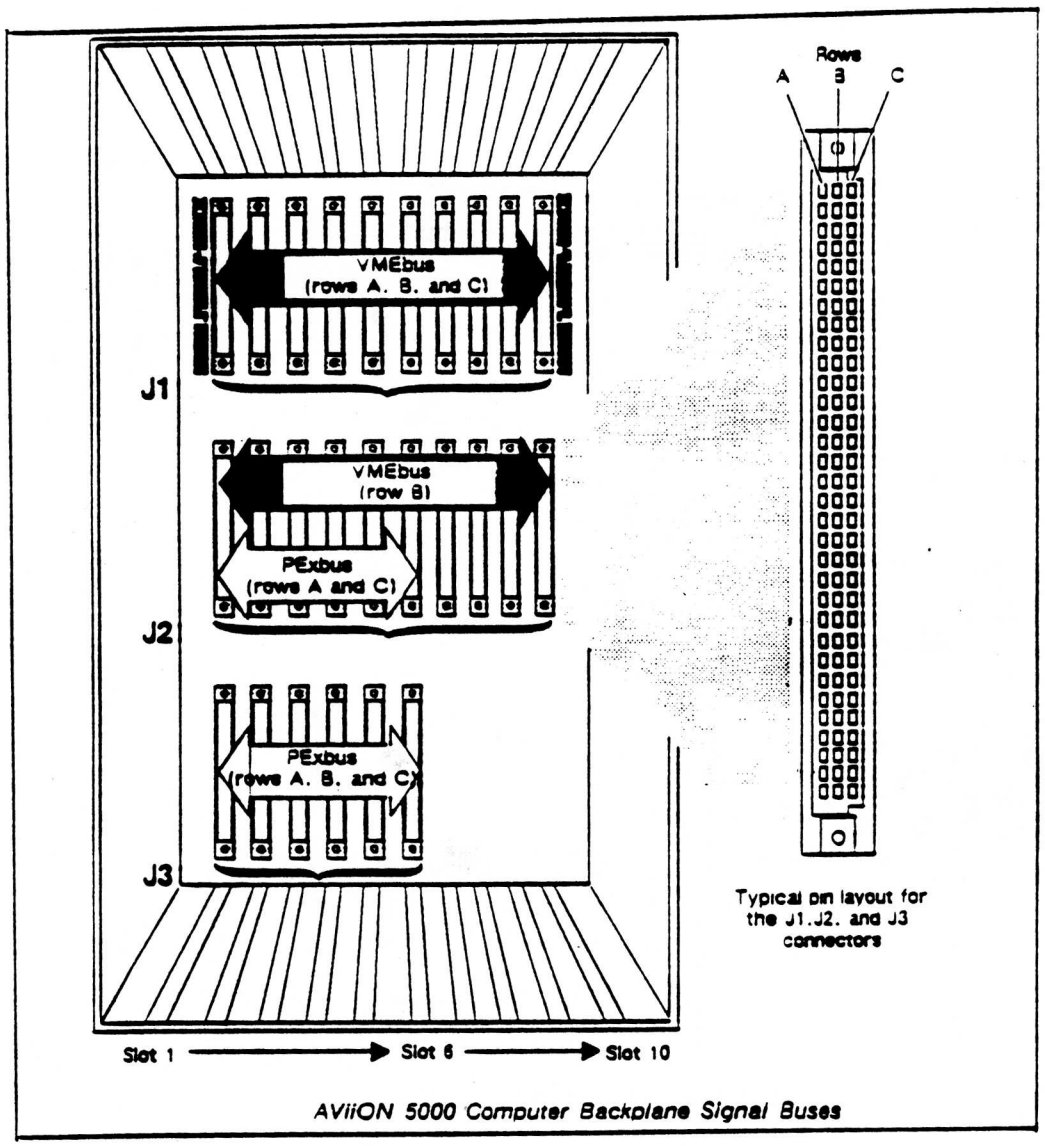


Front view
(front panel removed)



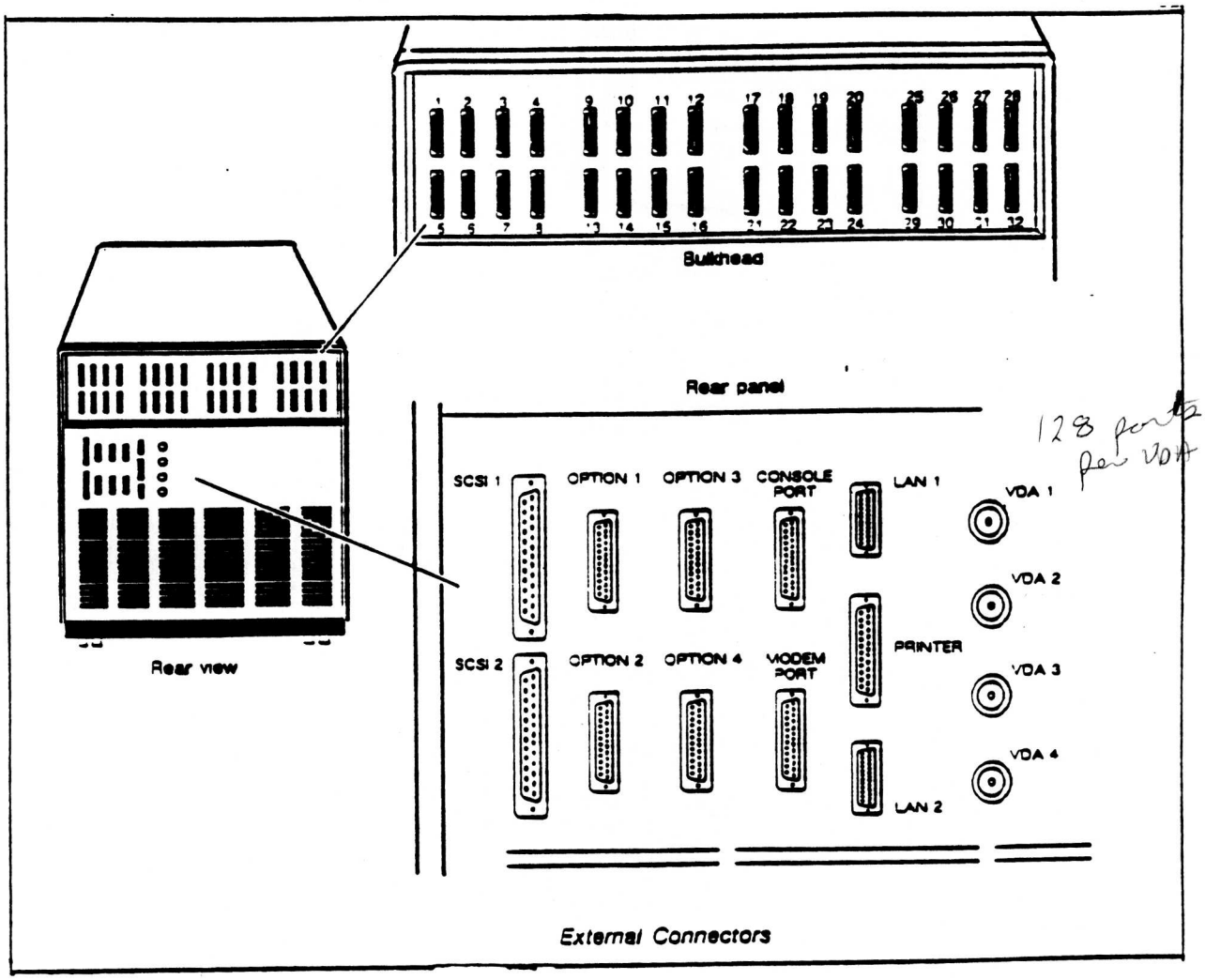

*AViiON 5010 Board Arrangement*

# AViion 5000 SERIES BACKPLANE SIGNAL BUSSES




*AViiON 5000 Computer Backplane Signal Buses*

# AVilon 5000 EXTERNAL CONNECTORS

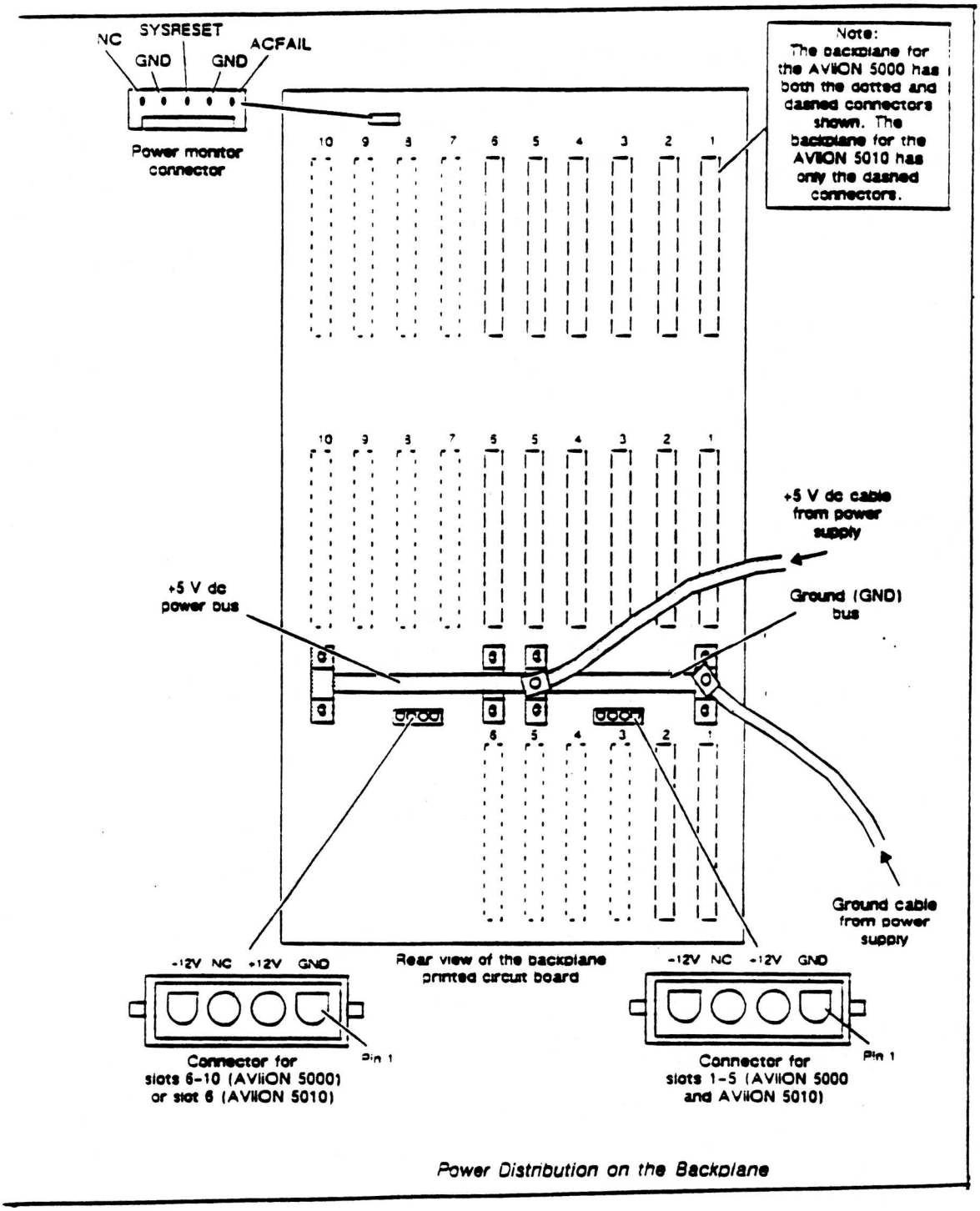



128 ports per VDA

7 devices per SCSI

FFFFF 300 default SCSI

FFFFF 500 additional SCSI address




*Power Distribution on the Backplane*

**Current Requirements for Boards and Drives**

| Board/Drive Name (Model Number) | Current (Amperes) +5 V dc | +12 V dc | -12 V dc |
|---|---|---|---|
| **System Boards** | | | |
| Single CPU/8 Mbytes 25 MHz[1] 20 MHz[2] | 22.00 | .00 | .01 |
| or | | | |
| Single CPU/16 Mbytes 25 MHz[1] 20 MHz[2] | 23.00 | .00 | .01 |
| or | | | |
| Dual CPU/16 Mbytes 25 MHz[1] 20 MHz[2] | 24.00 | .00 | .01 |
| **Expansion Memory Boards** | | | |
| 16 Mbytes (7001) | 7.70 | NA | NA |
| or | | | |
| 32 Mbytes (7002) | 9.00 | NA | NA |
| or | | | |
| 48 Mbytes (7003) | 10.50 | NA | NA |
| **I/O Boards** | | | |
| SCSI Adapter (7407) | 2.60 | NA | NA |
| ESDI Controller (NA)[1] | 4.30 | NA | .50 |
| VDA/128 (7401) | 3.40 | NA | .17 |
| VSC/4 (7404) | 3.40 | 07 | .07 |
| VAC/16 (7400) | 4.50 | .25 | .25 |
| VLC (7405) | 2.80 | .45 | NA |
| **Internal Mass-Storage Drives** | | | |
| SCSI cartridge tape drive (6577-I) | 0.66 | 1.50 | NA |
| ESDI 322 Mbyte disk drive (6442-I)[1] | 2.00 | 2.50[3] | NA |
| ESDI 648 Mbyte disk drive (6555-I)[1] | 2.00 | 2.50[3] | NA |
| SCSI 322 Mbyte disk drive (6491-I)[2] | 2.00 | 2.50[3] | NA |
| SCSI 648 Mbyte disk drive (6554-I)[2] | 2.00 | 2.50[3] | NA |

[1] Available for the AViiON 5000 computer only.

[2] Available for the AViiON 5010 computer only.

[3] Typical current draw shown. Peak current draw during spin up is 4.00 amperes.

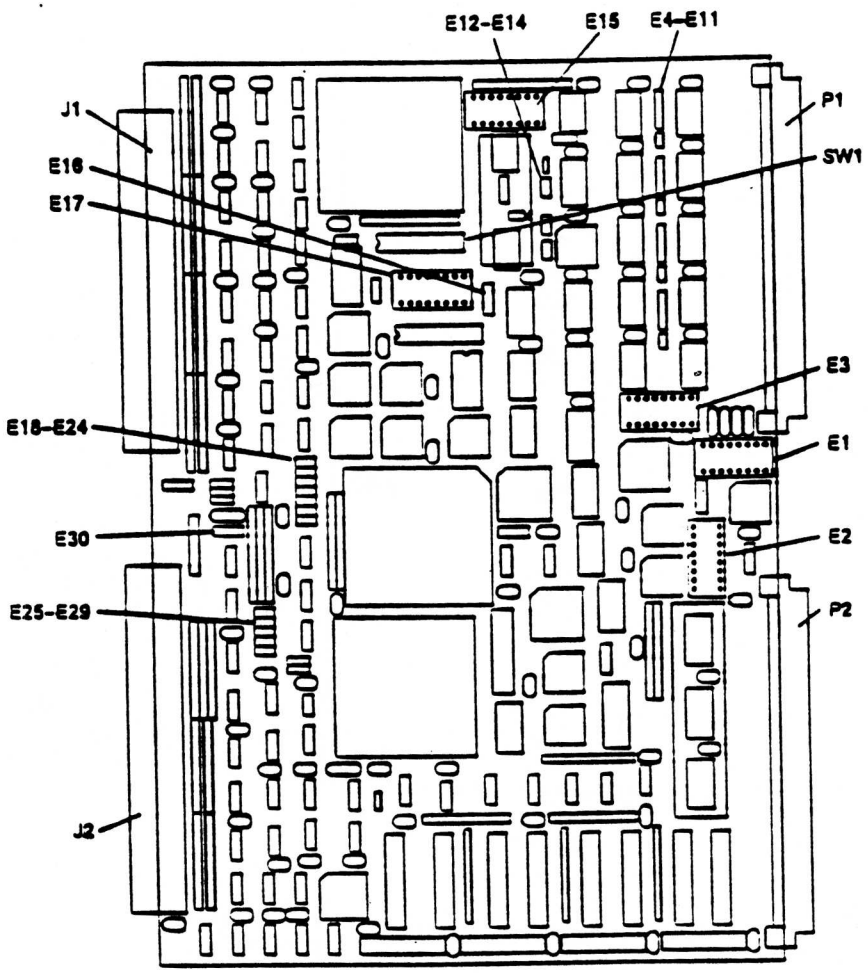
NA = not applicable

# JUMPERING A VAC/16 OPTION CARD

WHEN YOU RECIEVE A VAC/16 CARD FROM US, VERIFY THAT THE DEFUALT UMPERS ARE CORRECT FOR BOARD 0. TO RECONFIGURE THE VAC/16 TO NOTHER NUMBER, LOCATE THE BOARD NUMBER IN THE FOLLOWING TABLE AND EMOVE OR INSTALL THE JUMPERS INDICATED IN THE RECTANGLES.

DGUX ONLY RECOGNIZES ASYCHRONOUS DEVICES AS THE SAME DEVICE NAMES, VDA/128/VAC/16), NEVER JUMPER BOTH BOARDS THE SAME, GIVE THEM NIQUE BOARD NUMBERS.

SEE NEXT PAGE




VAC/16 Jumper, SW1, and Connector Locations

SEE setting up an installing VME BUS OPTIONS 2-5 4/2 expanding the AVS3000

**Jumper Settings for VAC/16 Boards 0–1**

| Jumper | Pins | Board Number 0 | Board Number 1 | Function |
|---|---|---|---|---|
| E1 | 1–2 | In | In | Address bit A23 |
| | 3–4 | In | In | Address bit A22 |
| | 5–6 | In | In | Address bit A21 |
| | 7–8 | In | In | Address bit A20 |
| | 9–10 | In | In | Address bit A19 |
| | 11–12 | In | In | Address bit A18 |
| | 13–14 | In | *Out* | Address bit A17 |
| | 15–16 | In | In | Address bit A16 |
| E2 | 1–2 | In | In | Address bit A31 |
| | 3–4 | Out | Out | Address bit A30 |
| | 5–6 | Out | Out | Address bit A29 |
| | 7–8 | In | In | Address bit A28 |
| | 9–10 | In | In | Address bit A27 |
| | 11–12 | In | In | Address bit A26 |
| | 13–14 | In | In | Address bit A25 |
| | 15–16 | In | In | Address bit A24 |
| E3 | 1–2 | Out | Out | Interrupt request |
| | 3–4 | Out | Out | See Note 1 |
| | 5–6 | Out | Out | See Note 1 |
| | 7–8 | In | In | See Note 1 |
| | 9–10 | Out | Out | See Note 1 |
| | 11–12 | Out | Out | See Note 1 |
| | 13–14 | Out | Out | See Note 1 |
| E4 | 2–3 | In | In | BG 0 primary jumper |
| E5 | 2–3 | In | In | BG 1 primary jumper |
| E6 | 2–3 | In | In | BG 2 primary jumper |
| E7 | 1–2 | In | In | BG 3 (selected level) |
| | 3–4 | In | In | BG 3 (selected level) |
| E8 | 1–2 | Out | Out | Bus Request 0 |
| E9 | 1–2 | Out | Out | Bus Request 1 |
| E10 | 1–2 | Out | Out | Bus Request 2 |
| E11 | 1–2 | In | In | Bus Request 3 (selected level) |
| E12 | 1–2 | Out | Out | Extended addressing |
| E13 | 1–2 | Out | Out | Extended addressing |
| E14 | 1–2 | In | In | DPRAM super space |

(continued)

| Notation | Indicates |
|---|---|
| In | Jumper installed. |
| Out | Jumper removed. |
| *In* or *Out* | Jumpers that you must install (*in*) or remove (*out*) in the field—all other jumpers are factory configured as indicated. |

Note 1: These interrupt jumpers operate with E21, E22, and E23.

**Jumper Settings for VAC/16 Boards 0–1**

| Jumper | Pins | Board Number 0 | Board Number 1 | Function |
|---|---|---|---|---|
| E15 | 1–2 | Out | *In* | Interrupt vector D0 |
| | 3–4 | Out | Out | Interrupt vector D1 |
| | 5–6 | Out | Out | Interrupt vector D2 |
| | 7–8 | Out | Out | Interrupt vector D3 |
| | 9–10 | Out | Out | Interrupt vector D4 |
| | 11–12 | In | In | Interrupt vector D5 |
| | 13–14 | In | In | Interrupt vector D6 |
| | 15–16 | Out | Out | Interrupt vector D7 |
| E16 | 2–3 | In | In | 27256 EPROMS |
| E17 | 1–2 | In | In | Address bit A13; see Note 2 |
| | 3–4 | In | In | Address bit A12; see Note 2 |
| | 5–6 | In | In | Address bit A11; see Note 2 |
| | 7–8 | In | In | Address bit A10; see Note 2 |
| | 9–10 | In | In | Address bit A9; see Note 2 |
| | 11–12 | In | In | Address bit A8; see Note 2 |
| | 13–14 | Out | Out | Unused |
| | 15–16 | Out | Out | Unused |
| E18 | | In | In | Address bit A15 |
| E19 | | In | In | DPRAM program space |
| E20 | | In | In | DPRAM data space |
| E21 | | Out | Out | See Note 3 |
| E22 | | In | In | See Note 3 |
| E23 | | In | In | See Note 3 |
| E24 | | In | In | Address bit A14 |
| E25 | | Out | Out | 12.5 ms RTC |
| E26 | | Out | Out | 25.0 ms RTC |
| E27 | | In | In | 50.0 ms RTC |
| E28 | | Out | Out | 100.0 ms RTC |
| E29 | | Out | Out | SYSFAIL |
| E30 | 2–3 | In | In | DCD termination |

(concluded)

| Notation | Indicates |
|---|---|
| In | Jumper installed. |
| Out | Jumper removed. |
| *In* or *Out* | Jumpers that you must install (*in*) or remove (*out*) in the field—all other jumpers are factory configured as indicated. |

Note 2: These jumpers installed for convenience. They have no meaning unless E12 is in.

Note 3: These interrupt jumpers operate with E3.

Table 2-5 SW1 Switch-Pack Settings for VAC/16 Boards

| Switch No. | Description | Switch Position |
|---|---|---|
| 1 | Reserved | Off |
| 2 | Self Test | On |
| 3 | Self Test | Off |
| 4 | Self Test | Off |
| 5 | Self Test | Off |
| 6 | Reserved | Off |
| 7 | Long word transfer | Off |
| 8 | Reserved | Off |

# AViion SCSI BUS CONFIGURATION RULES

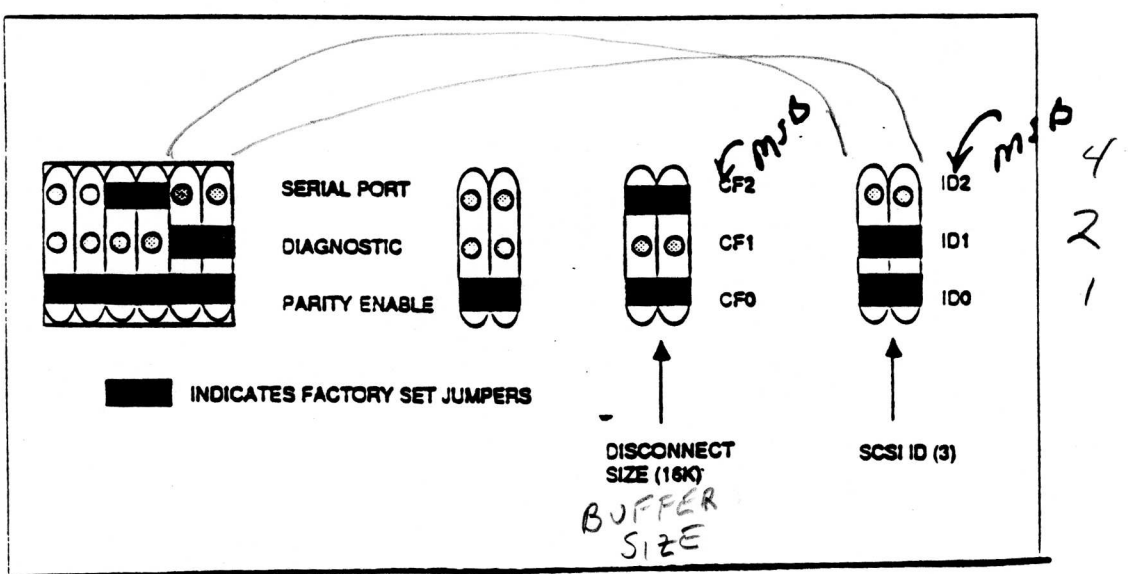
AViion SYSTEMS CAN SUPPORT A NUMBER OF SMALL COMPUTER SYSYEMS INTERFACES (SCSI). THE FOLLOWONG RULES APPLY TO ALL AViion PRODUCTS WITH THE EXCEPTION OF THE AV 3000 SERIES WHICH DOES NOT SUPPORT EXTERNAL SCSI DEVICES.

- THE SCSI BUS CAN SUPPORT UP TO SEVEN SCSI DEVICES PER ADAPTER, THIS WOULD INCLUDE BOTH INTERNAL AS WELL AS EXTERNAL DRIVES.
- THE MAXIMUN LENGTH OF THE BUS MUST NOT EXCEED 6 METERS. ~ 19'
- THE SCSI BUS MUST BE TERMINATED ON THE LAST SCSI DEVICE ON THE BUS. IF THERE ARE NO EXTERNAL DEVICES, TERMINATE THE BUS AT THE REAR OF THE COMPUTER LABELED "SCSI" OR "SCSI 1".
- DEVICE IDENTIFICATION IS PROVIDED THROUGH JUMPERS ON THE SPECIFIC DEVICE, EACH DEVICE ON THE BUS MUST HAVE A UNIQUE ID. FROM 0-6, USE THE TABLE BELOW AS A RECOMMENDED METHOD OF ASSIGNING SCSI IDS..

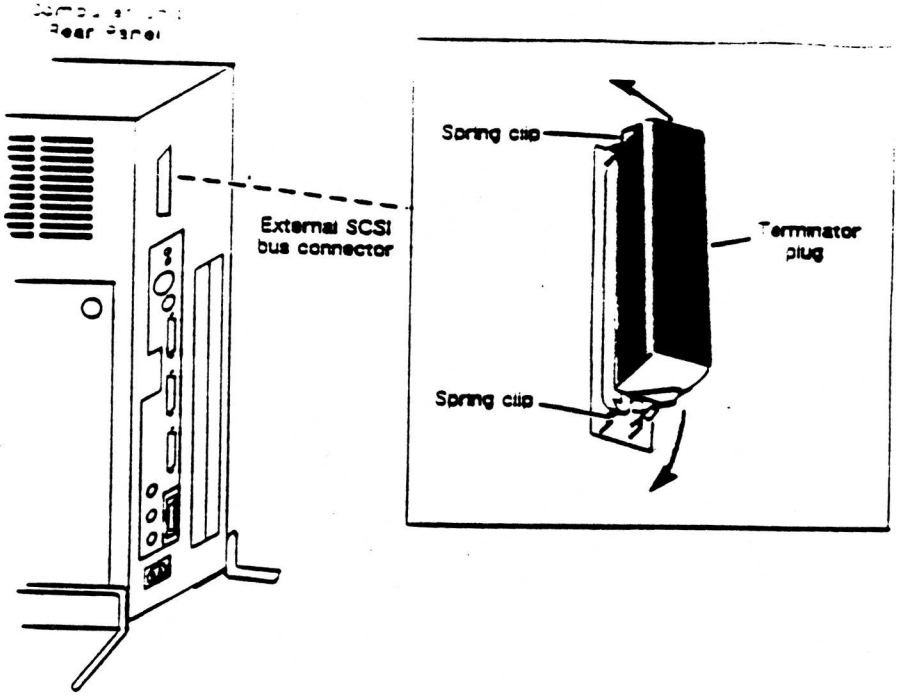
| Device | SCSI Device ID |
|---|---|
| First disk | 0 |
| Second disk | 1 |
| Third disk | 2 |
| Fourth disk | 3 |
| First tape (internal) | 4 (preset) |
| Second tape | 5 |
| Third tape | 6 |

## ASSIGNING SCSI ID THREE TO A QIC 150 MB TAPE

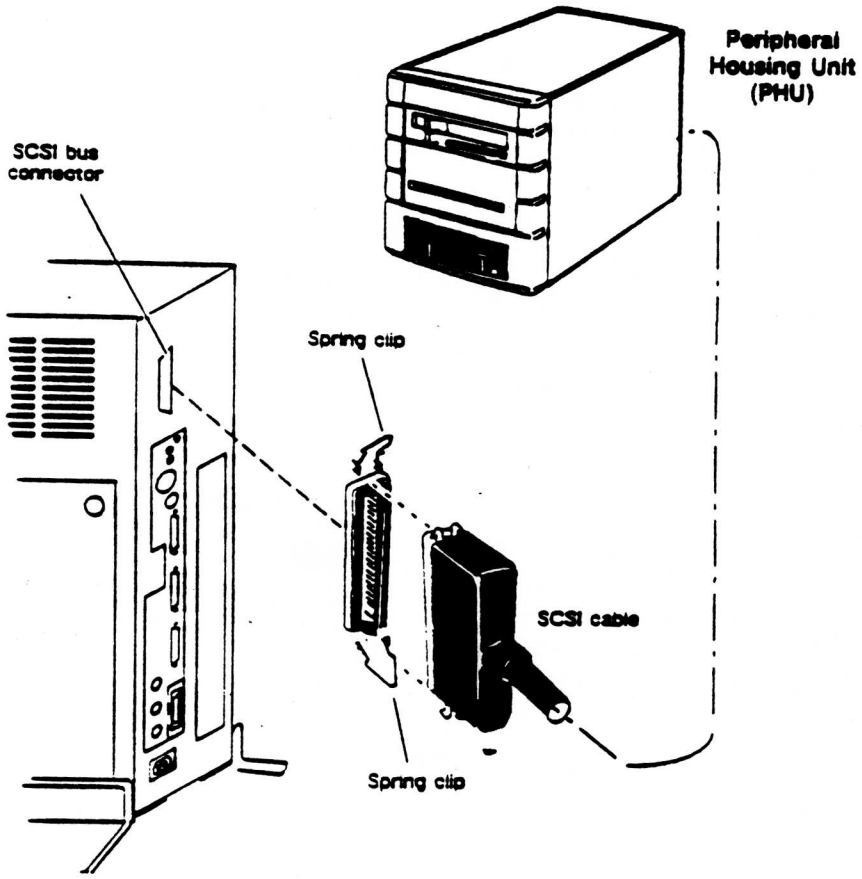
ON TAPE DRIVE




SO AS NOT TO HOG BUS

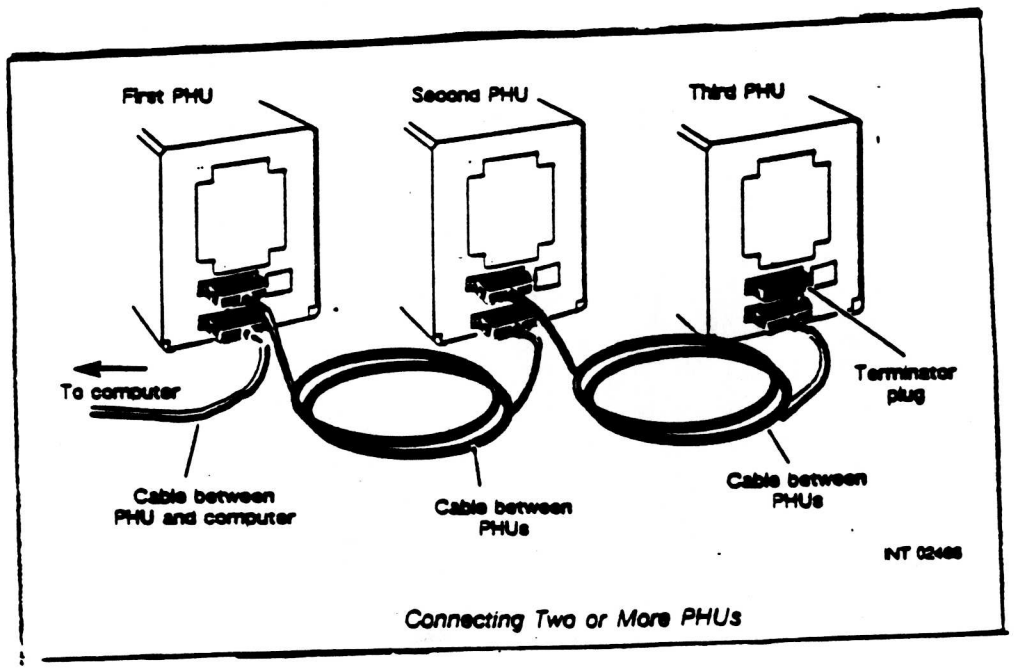



*Removing the AViiON 4000 Series SCSI Bus Terminator*




*Connecting the External SCSI Bus Cable to the Computer Unit Connector*

DAISY CHAIN




*Connecting Two or More PHUs*

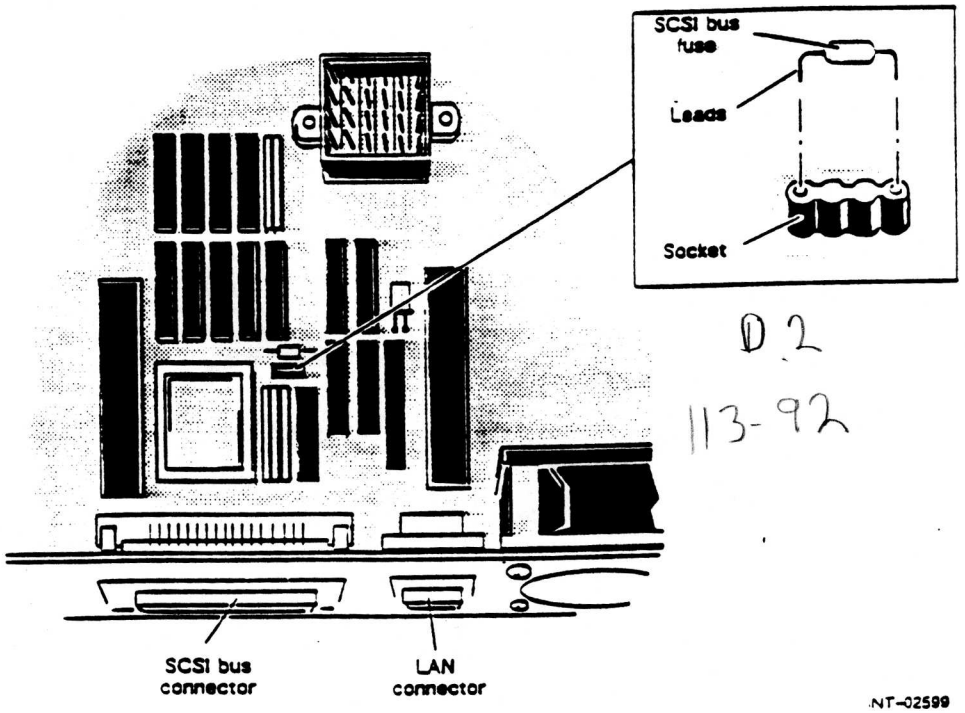
SYSTEM BOARD FUSE AND PROM LOCATIONS

REMEMBER TO ALWAYS USE A ESD STATION WHEN WORKING WITH THE SYSTEM BOARD.

AVilon 300 STATIONS

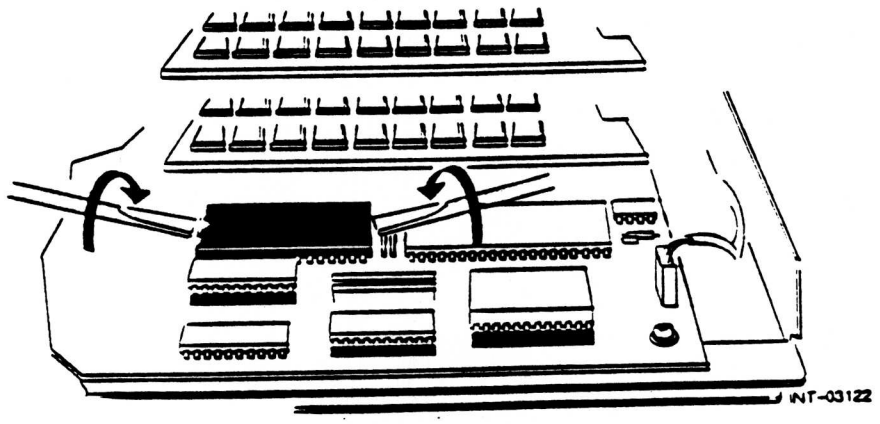
## Replacing the SCSI Bus Fuse

1. With the power supply removed, locate the SCSI bus fuse on the printed circuit board as shown in Figure 5-7.



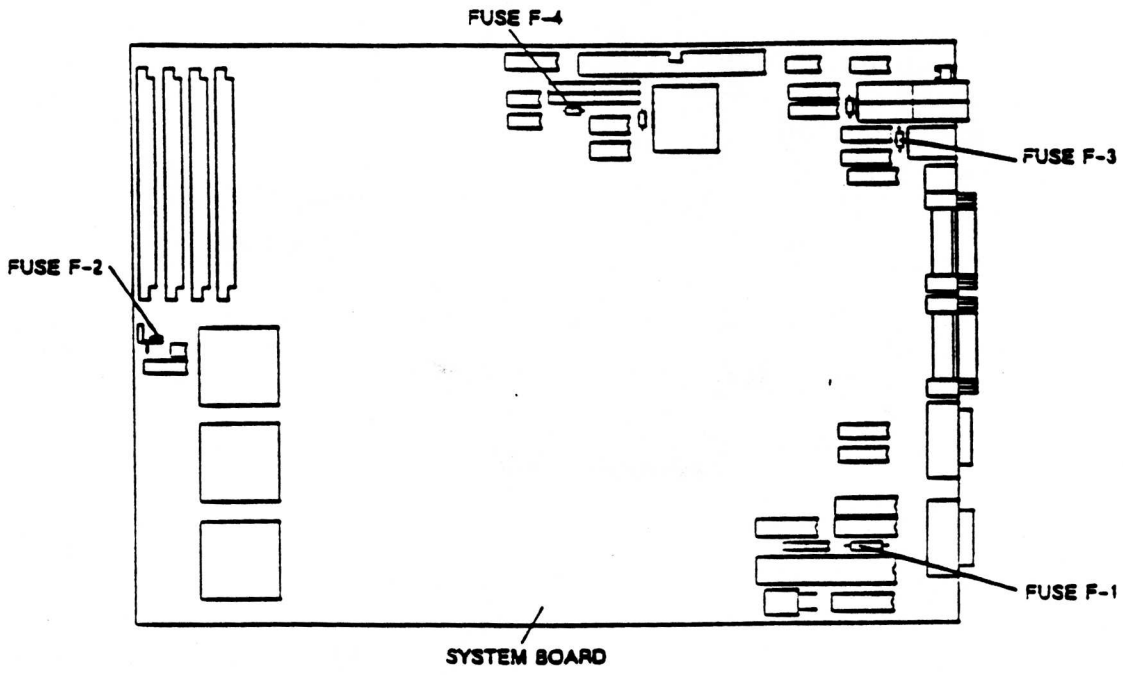

D 2
113-92

*Removing or Installing the SCSI Bus Fuse*

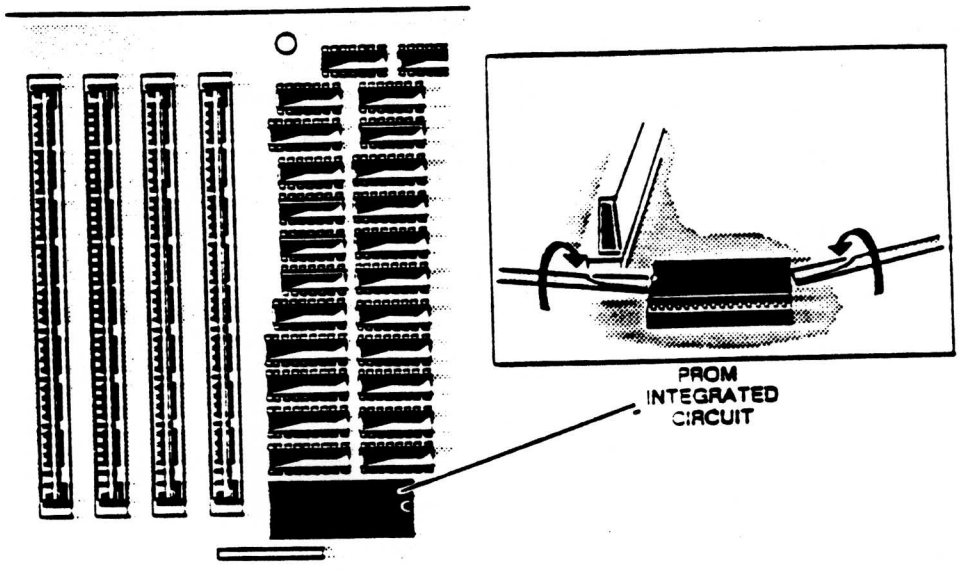



*Removing the PROM Component*

- F-1 ETHERNET LAN BOARD
- F-2 SPEAKER (AV 400 ONLY)
- F-3 KEYBOARD (AV 400 ONLY)
- F-4 SCSI DRIVE UNITS




System Board Pico Fuse Locations




CD-001018-01-01

**Removing the PROM**

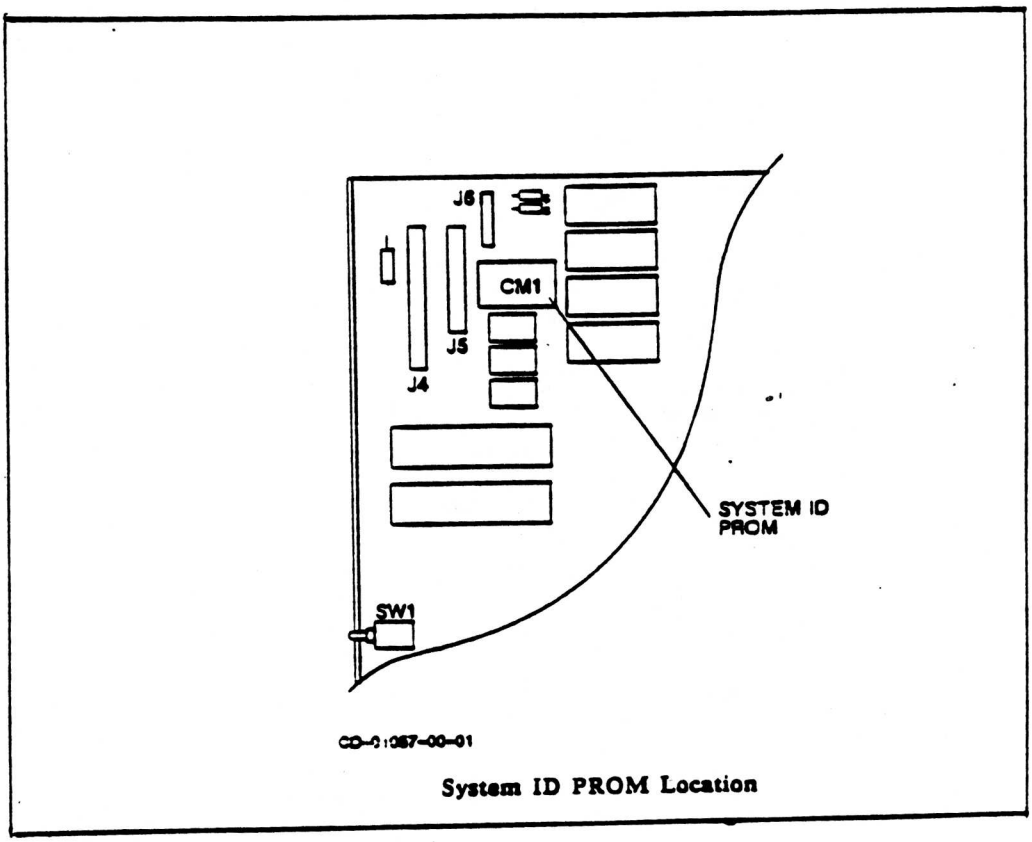
# AVilon 5000/6000 SERIES LEDS/JUMPERS/SWITCHES

HE AVilon 5000/6000 SERIES SYSTEM BOARDS HAVE THREE LEDS ON HEM, THE RED LED WHEN LIGHTED INDICATES A SYSTEM FAILURE. THE YELLOW ED INDICATES A RESET CONDITION, AND THE GREEN LED INDICATES ACTIVITY N THE M-BUS.

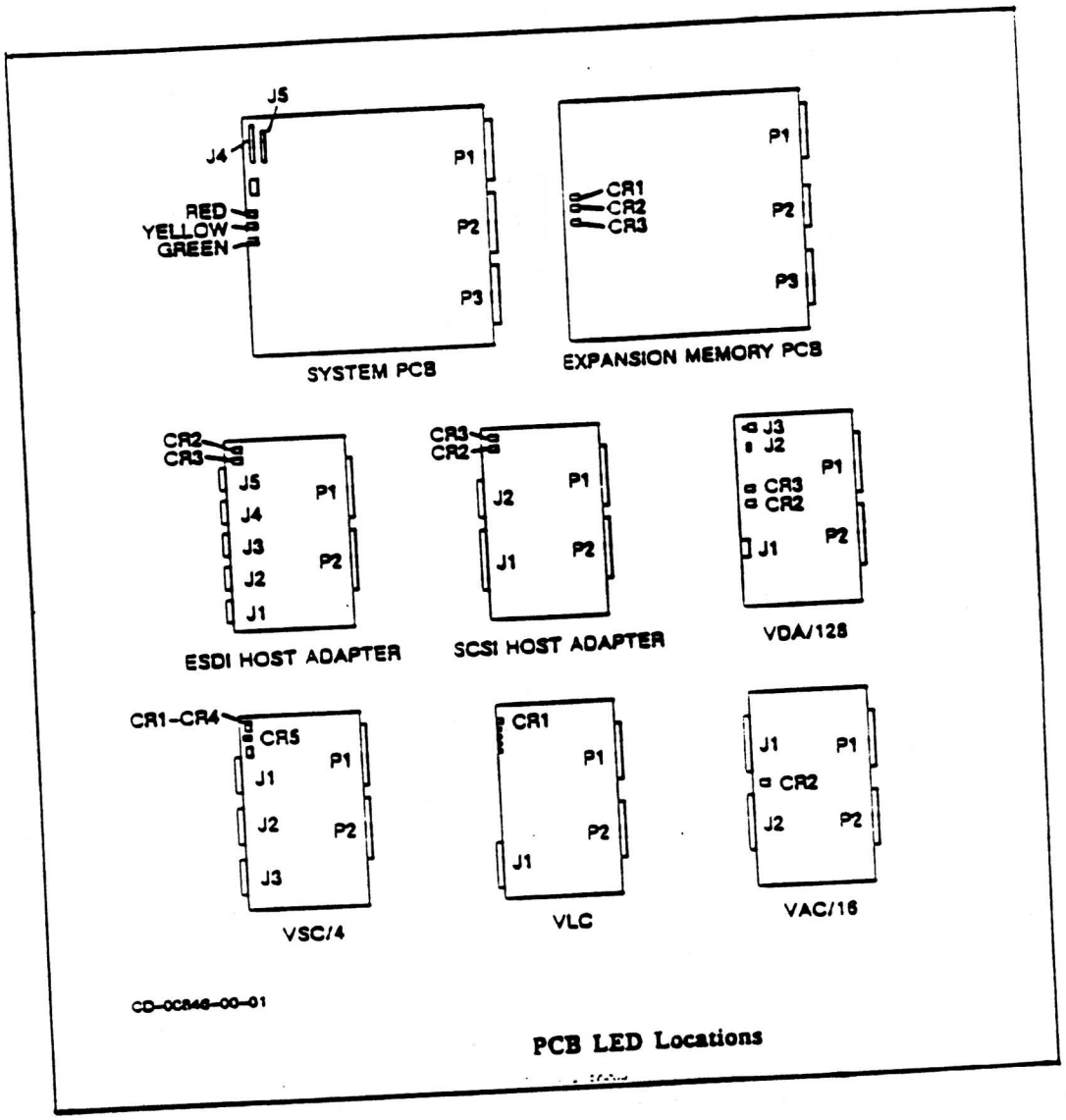
HERE ARE TWO SWITCHES ON THE SYSTEM BOARD. A EIGHT POSITIOON SWITCH S RESERVED FOR FUTURE USE WHEN OPERATING MULTIPLE SYSTEM BOARDS ON HE SAME VME BUS. THE FIVE POSITION SWITCH (BIT 5) MUST BE ACTIVATED N THE BOARD THAT HAS BEEN DESIGNATED THE MASTER.

HE SINGLE JUMPER MUST BE INSTALLED TO RUN DG/UX OPERATING SYSTEM.

OUT FOR MAGIC




System ID PROM Location




**PCB LED Locations**

## PCB LED Interpretation

| PCB | LED | Meaning When Lit |
|---|---|---|
| System | Red<br>Yellow<br>Green | System failure.<br>Indicates a reset condition.<br>Flashes to indicate activity on the CPU M–bus. |
| Memory Expansion | CR1<br>CR2<br><br>CR3 | Lights steady red for hard error.<br>Flashes yellow to indicate read/write access.<br>Flashes green to indicate refresh cycles. |
| VDA/128 Asynchronous Communications Controller | CR2<br><br>CR3 | Tri–color LED blinks red if controller power–up tests fail.<br>Red when VME SYSFAIL signal asserted. |
| ESDI Host Adapter | CR2<br>CR3 | Green for VME bus activity.<br>Yellow for PCB failure. |
| SCSI Host Adapter | CR2<br>CR3 | Green for VME bus activity.<br>Yellow for PCB failure. |
| VAC/16 16–line Asynchronous Communication Multiplexer | CR2 | Tri–color LED blinks amber until self–test passes.<br>Green when self–test passes.<br>Red for PCB failure. |
| VSC/4 Synchronous Communication Controller | CR1<br>thru }<br>CR4<br>CR5 | Blinking red if power–up tests fail.<br><br>Red when VME SYSFAIL signal asserted. |
| VLC IEEE802.3 LAN Controller | CR1 | Red for PCB failure. (Four small LEDs indicate VME bus activity and Ethernet network activity). |

# MODULE 3
# FRU REMOVAL AND REPLACEMENT

OBJECTIVES:

1. IDENTIFY, REMOVE, AND REPLACE THE SYSTEM BOARD, OPTION CARDS, EXPANSION MEMORY BOARDS, POWER SUPPLY, BLOWER UNIT, AND BACKPANEL (OPTIONAL) ON THE AVIION 5000/6000 SERIES COMPUTER.

2. IDENTIFY, REMOVE, AND REPLACE THE INTERNAL PERIPHERAL DEVICES IN THE AVIION 5000/6000 SERIES COMPUTER.

3. IDENTIFY THE CORRECT PROCEDURES FOR REMOVING AND REPLACING THE SYSTEM BOARD, POWER SUPPLY, FAN, AND SPEAKER ON THE AVIION 300/400/4000/3000 SERIES COMPUTER.

REMOVAL AND REPLACEMENT
AVIION 5000 REMOVAL PROCEDURES

***NOTE***

ALWAYS TURN THE POWER OFF AND DISCONNECT THE AC LINE BEFORE REMOVING THE COVERS AND FRUS.

TO GAIN ACCESS TO THE SYSTEM FRUS THE FRONT COVER MUST BE REMOVED.

RELEASE THE CAPTIVE SCREW AT THE BOTTOM OF THE COVER

INSERT THE BLADE OF A SCREWDRIVER IN THE SLOT ON EACH SIDE OF THE TOP COVER AND POP IT OFF.

NEXT,REMOVE THE TOP COVER BY PUSHING DOWN ON IT WHILE SLIDING IT FORWARDABOUT TWO INCHES... NOW LIFT THE COVER OFF...

THE REAR COVER SHOULD NOT HAVE TO BE REMOVED TOTALLY TO GAIN ACCESS TO THE SYSTEM FRUS BECAUSE IT IS HINGED.BUT IF IT MUST BE REMOVED,FIRST DISCONNECT THE CABLES WHICH ARE CONNECTED TO THE PORTS ON THE REAR...

THEN,REMOVE THE SCREWS ON THE RIGHT SIDE OF THE COVER.

SWING THE DOOR OPEN.

NEXT,DISCONNECT THE INTERNAL CABLES...

TO REMOVE THE ASYNCHRONOUS CONNECTOR PANAL YOU MAY HAVE TO DISCONNECT CABLES FROM THE CONNECTORS ON THE REAR OF THE CONNECTOR PANEL BEFORE REMOVING THE PANEL.

NEXT,REMOVE THE SCREWS ON BOTH SIDES OF THE PANEL...

LIFT THE PANEL OFF SLOWLY...DISCONNECT THE 64 PIN CONNECTOR ATTACHED TO THE SPREASDER PANEL.

NOW REMOVE THE THE 9U AND 6U PCBS.

FIRST,REMOVE THE TWO SRCEWS HOLDING THE 9U PCB FRAME TO THE CARD CAGE...

NOW,SQUEEZE THE TWO HANDLES SIMULTANEOUSLY TOWARDS THE CENTEROF THE FRAMEAND SLIDE THE PCB FRAME FAR ENOUGH OUT OF THE CARD CAGE SO THAT THE CLAMP HOLDING THE CABLES AGAINST THE PCB CAN BE REMOVED....

REMOVE THE CLAMP BY LIFTING THE BOTTOM OF IT OUT AND UP.

SLIDE THE PCB OUT SO THAT THE CABLE CONNECTORS CAN BE DISCONNECTD FROM THE PCB...THEN SLIDE THE PCB FRAME COMPLETLY OUT OF THE CARD CAGE...

TO REMOVE A PERIPHERAL DEVICE THE PERIPHERAL CHAMBER MUST BE OPENED BY FIRST REMOVING THE FOUR SCREWS...

PULL THE CHAMBER FORWARD BY THE HANDLE UNTIL IT STOPS IN THE EXTENDED POSITION...

GRASP THE TOP OF THE CHAMBER AND SWING THE TOP OUT AND DOWN UNTIL THE RETAINING ARMS ARE FULLY EXTENDED.

FOR THIS LAB WE WILL REMOVE A DISK DRIVE.THE PROCEDURES FOR REMOVING A TAPE DRIVE ARE SIMILAR.FIRST,DISCONNECT THE CABLE CONNECTORS FROM THE REAR OF THE DRIVE...

AFTER THESE CABLES ARE REMOVED SWING THE CHAMBER BACK UPRIGHT...

NEXT,REMOVE THE SCREWS ON THE FRONT OF THE DRIVE AND SLIDE THE DRIVE OUT OF THE CHAMBER.

## POWER SUPPLY

OPEN THE REAR COVER ...DISCONNECT THE THE POWER SWITCH CABLE AND THE BLOWER ASSEMBLY CABLE FROM CONNECTORS J2 NAD J3 OF THE POWER SUPPLY...

DISCONNECT THE CABLES FROM CONNECTORS J1,P3,AND P4 OF THE POWER SUPPLY...

REMOVE THE TWO PLASTIC SHIELDS;THE VERTICLE SHIELD IS SECURED BY A SINGLE HEX NUT,WHILE THE HORIZONTAL SHIELD IS SECURED BY TWO HEX NUTS...

REMOVE THE HEX NUT AND WASHER SECURING THE BRACKET ON THE LEFT SIDE OF THE MODULE,DISCONNECT THE RED (+5VDC) AND BLACK (+5VDC GROUND)BUSS WIRES CONNECTED TO THE POWER SUPPLY ...

REMOVE SCREWS,LOCKWASHERS,AND WASHERS AT THE TOP AND BOTTOM OF THE SUPPLY AND SLIDE THE UNIT OUT OF THE CHASSIS.

## BLOWER ASSEMBLY

REMOVE THE TOP COVER,DISCONNECT THE CABLE ON THE TOP LEFT OF THE BLOWER ASSEMBLY,REMOVE THE THREE SCREWS ON THE FRONT AND THE TWO SCREWS ON THE RIGHT SIDE AND LIFT THE BLOWER OUT.

THE BACKPLANE WILL BE EASIER TO REMOVE WITH ALL BOARDS AND POWER SUPPLY REMOVED FROM THE SYSTEM.

REMOVE THE 16 SCREWS THAT SECURE THE BACKPLANE TO THE CHASSIS MAKING SURE YOU DON'T LOSE THE WHITE WASHERS THAT ACCOMPANY EACH SCREW, AND REMOVE THE BACKPLANE.

ALIGN THE BACKPLANE AND REPLACE THE SCREWS

ALIGN THE POWER SUPPLY AND SECURE IT TO THE CHASSIS.

CONNECT THE RED AND BLACK CABLES.

MAKE SURE ANY SWITCHES AND JUMPERS ARE CONFIGURED CORRECTLY BEFORE INSTALLING ANY PERIPHERALS.SLIDE THE DEVICE IN THE CHAMBER AND SECURE IT WITH THE SCREWS....

SWING THE CHAMBER OUT AND ATTATCH THE CABLE CONNECTORS ON THE REAR OF THE DEVICE.SWING THE CHAMBER UP AND SECURE WITH THE SCREWS.

SLIDE IN ANY PCBS THAT HAVE BEEN REMOVED MAKING SURE THEY ARE CORRECTLY JUMPERED.SECURE TO THE CARD CAGE WITH THE SCREWS.

TO REPLACE THE SPREADER PANEL,SET THE PANEL IN POSITION ON THE CONNECTOR PANEL...

NEXT,CONNECT THE 64 PIN CABLE CONNECTOR FROM THE ASYNCHRONOUS CONTROLLER TO THE CONNECTOR.

THE ASYNCHRNOUS CONNECTOR PANEL IS REPLACED BY SETTING THE PANEL IN PLACE AND SECURING THE SCREWS ON EACH SIDE OF THE PANEL.

TO REPLACE THE REAR COVER ,POSITION THE COVER AND THEN RECONNECT THE CABLES...

CLOSE THE COVER MAKING SURE NONE OF THE CABLES CONNECTED TO IT ARE BINDING,AND SECURE WITH THE SCREWS.

SLIDE THE TOP COVER ON UNTIL IT IS FLUSH WITH THE FRONT OF THE SIDE COVERS.

REPLACE THE FRONT COVER SO IT OVERLAPS THE THE BASE AND SIDE COVERS,AND PARTIALLY OVERLAPS THE TOP COVER.

# AVTION 300 REMOVAL PROCEDURES

START BY REMOVING THE TOP COVER...FIRST,SET THE POWER SWITCHES OF THE COMPUTER AND MONITOR OFF...DISCONNECT THE POWER CORD FROM THE AC SOURCE AND FROM THE REAR OF THE UNIT.

NEXT,DISCONNECT THE MONITORS AC POWER CORD FROM THE REAR PANEL OF THE UNIT...DISCONNECT THE VIDIO CABLE OR CABLES...REMOVE THE MONITOR FROM THE TOP OF THE UNIT.

DISCONNECT ANY OTHER CABLES THAT MAY BE CONNECTED ON THE REAR OF THE COMPUTER.

LOOSEN THE TWO CAPTIVE SCREWS ON THE REAR...SLIDE THE TOP COVER FORWARD AND OFF.

USE CAUTION WHEN REMOVING THE MEMORY MODULES...SPREAD THE TWO PLASTIC TABSOF THE MODULE CONNECTOR...THE MODULE SHOULD TO A MORE UPRIGHT POSITION...CAREFULLY LIFT THE MODULE OUT.

NEXT ,REMOVE THE POWER SUPPLY...FIRST,PULL UP THE PLASTIC BUTTON ON THE FRONT EDGE OF THE POWER SUPPLY AND UNLOCK IT...

NEXT,UNPLUG THE POWER SUPPLY FRON THE SYSTEM BOARD BY PULLING THE SUPPLY STRAIGHT UP OT DISENGAGE THE CONNECTOR ON THE BOTTOM OF THE SUPPLY...AND THE POWER CONNECTOR ON THE BOTTOM OF THE PCB...LIFT IT OFF THE BACKPANEL HOOKS.

REMOVE THE SYSTEM BOARD BY REMOVING THE SEVEN SCREWS AND LIFTING THE BOARD OUT.

INSTALL THA SYSTEM PCB CAREFULLY INSERTING THE CONNECTORS ON THE BACK OF THE PCB INTO THE OPENINGS ON THE BACKPANEL.

ALIGN THE PCB ON THE MOUNTING POSTS ON THE BOTTOM OF THE TRAY...INSERT THE HEX SCREWS INTO THE THREE I/O CONNECTORS,BUT LEAVE THEM LOOSE...

INSERT THE SCREWS THAT SECURE THE SYSTEM BOARD TO THE STANDOFF POSTS,AND LEAVE LOOSE...

TIGHTEN THE I/O CONNECTOR SCREWS ON THE BACK...TIGHTEN THE SYSTEM BOARD TO THE STANDOFF POSTS ON THE TRAY.

TO REPLACE THE POWER SUPPLY,HOOK THE TWO SLOTS ON THE BACK OF THE SUPPLY INTO THE TWO TABS ON THE REAR OF THE PANEL...

GENTLY PRESS THE FRONT EDGE OF THE SUPPLY DOWN SO THAT THE POWER CONNECTOR IN THE BOTTOM OF THE POWER SUPPLY CONNECTS TO THE CONNECTOR ON THE SYSTEM PCB...

FINALLY,PRESS DOWN ON THE PLASTIC BUTTON ON THE EDGE OF THE POWER SUPPLY SO THAT IT LOCKS THE SUPPLY TO THE METAL TRAY.

TO INSTALL A MEMORY MODULE,SET THE MODULE IN THE MEMORY SLOT NEARLY VERTICAL...THE COMPONENT SIDE OF THE MODULE MUST FACE THE RIGHT SIDE OF THE UNIT...

WHEN THE MODULE IS ALIGNED,PRESS DOWN GENTLYON THE MODULE...KEANING IT TOWARD THE LEFT SIDE OF THE UNIT UNTIL IT SNAPS INTO THE PLASTIC TABS.

MODULE 4

OBJECTIVES;

1.USE THE SYSTEM CONTROL MONITOR TO CHANGE SYSTEM CONFIGURATION PARAMETERS

2. PERFORM THE STEPS NECESSARY TO BOOT THE AVIION SYSTEM DIAGNOSTICS FROM TAPE.

3. IDENTIFY THE SYMPTOMS OF A SUCCESFUL POWERUP SEQUENCE

4. VERIFY PROPER SYSTEMS FUNCTIONALITY AND POWERUP THROUGH THE USE OF AVAILABLE DIAGNOSTICS.

5. IDENTIFY, ISOLATE, AND REPAIR TO THE FRU LEVEL A FAULTY AVIION SYSTEM THROUGH THE USE OF DIAGNOSTICS.

DG REMOTE FE FOR RBOS PASSWORD

DGFE FOR XDIAG

# SYSTEM CONTROL MONITOR

THE SYSTEM CONTROL PROGRAM (SCM)IS YOUR INTERFACE TO THE RISC BASED HARDWARE.IT IS A FIRMWARE MONITOR PROGRAM THAT TEST AND MANAGES THE SYSTEM POWERUP NAD MAINTAIN CONTROL UNTIL THE UNIX KERNAL OR SOME OTHER SOFTWARE TAKES OVER.THE SCM RESUMES CONTROL WHEN YOUR SOFTWARE HALTS.

THE SCM USER INTERFACE CONSIST OF A COMMAND INTERPRETER AND SEVERAL INTERACTIVE MENUS.YOU CAN USE THESE INTERACTIVE MENUES TO CONTROL PROGRAM FLOW,VIEW OR CHANGE SYSTEM PARAMETERS,DEBUG PROGRAMS,OR BOOT SOFTWARE.

## ENTERING SCM

THE SCM CONTROLS POWERUP TESTING AND THEN BRINGS UP YOUR SYSTEM SOFTWARE THROUGH A AUTOMATIC BOOT SEQUENCE.YOU ENTER THE SCM AT POWERUP IF A POWERUP TEST FAILS OR THE AUTO BOOT SEQUENCE FAILS.

THE SCM RUNS WHEN ALL OTHER PROCESSORS ARE HALTED.YOU CAN USE THE SCM TO LOAD,START,MODIFY,CONTROL,OR HALT PROGRAMS BUT YOU CANNOT RUN SOFTWARE IN CONJUNTION WITH THE SCM.

YOU ENTER THE SCM WHENEVER YOU SYSTEM SOFTWARE ENCOUNTERS ONE OF THE FOLLOWING:

OPERATING SYSTEM HALT COMMAND

UNSUPPORTED BREAK POINT OR INTERRUPT

COMMAND BREAK KEYBOARD SEQUENCE

HARDWARE RESET

## THE SCM PROMPT

YOU SEE THE SCM PROMPT WHENEVER ALL PROCESSORS IN YOUR SYSTEM ARE HALTED.THE SCM COMMAND LINE INTERPRETTER EXECUTES COMMANDS YOU ENTER AT THE PROMPT.IN A SINGLE PROCESSOR SYSTEM THE DEFAULT PROMPT APPEARS AS FOLLOWS:

SCM>

IN MULTI PROCESSOR SYSTEMS THE DEFAULT PROMPT DISPLAYS THE NUMBER OF THE ATTACHED PROCESSOR

JP#N/SCM

WHER N IS THE NUMBER OF THE ATTACHED PROCESSOR.

X DIAG WILL NOT RUN THE 2ND CPU
scm> a^1 to get to test 2ND PROCESSOR

1]^[ ]^[ ]^[ to get to scm> if UNIX IS UP

DGUX 4.30 flushes every 30 records to DISK to avoid corrupt UP MACRO

/usr/sbin/init.d/rc.UPDATE ← update/flush to disk

WHEN DO YOU USE THE SCM

YOUR SYSTEM USES THE SCM DEFAULT BOOT PATHS TO BOOT YOUR OPERATING SYSTEM AT EVERY POWERUP AND,OPTIONALLY TO RUN A STAND-ALONE PROGRAM ON A ROUTINE BASIS BEFORE BRINGING UP THE OPERATING SYSTEM.WHENEVER THERE IS A SYSTEM FAULT THAT THE OPERATING SYSTEM CANNOT HANDLE,YOU ENTER THE SCM AUTOMATICALLY.WHEN THIS HAPPENS YOU NEED THE SCM TO RETURN CONTROL TO YOUR OPERATING SYSTEM BY RESUMING OR REBOOTING SYSTEM SOFTWARE.YOU MAY ALSO CHOOSE TO ENTER THE SCM TO CHANGE SYSTEM CONFIGURATION PARAMETERS,SUCH AS BAUD RATE FOR YOUR SYSTEM CONSOLE OR A DEFAULT BOOT PATH.

YOU WILL NEED TO USE THE SCM COMMANDS OR MENUS FOR THE FOLLOWING:

TO RESPOND TO SYSTEM ERRORS

TO BOOT A OPERATING SYSTEM OR STAND-ALONE PROGRAM

TO CHANGE SYSTEM CONFIGURATION PARAMETERS

TO CONTROL PROGRAM FLOW

TO DEBUG PROGRAMS

SCM MENU SUMMARY

YOU CHOOSE WHICH CONFIGURATION PARAMETERS TO VIEW OR CHANGE FROM THE VIEW OR CHANGE SYSTEM CONFIGURATION MENU.TO DISPLAY THE MENU ENTER THE FOLLOWING COMMAND AT THE SCM PROMPT:

SCM> F (NEWLINE)

THE SYSTEM DISPLAYS THE MENU

VIEW OR CHANGE SYSTEM CONFIGURATION

1.CHANGE BOOT PARAMETERS
2.CHANGE CONSOLE PARAMETERS
3.CHANGE SERIAL PORT PARAMETERS
4.CHANGE PRINTER PARAMTERS
5.VIEW MEMORY CONFIGURATION
6.CHANGE TESTING PARAMETERS
7.RETURN TO PREVIOUS MENU

ANY CHANGE YOU MAKE AT THE SCM MENU BECOMES THE NEW DEFAULT IMMEDIATLY.HOWEVER CHANGES ARE NOT IN EFFECT UNTIL YOU RESET OR POWER DOWN THE COMPUTER.ONCE YOU RESET OR POWER UP THE COMPUTER THE CHANGES YOU MAKE BECOME THE CURRENT SYSTEM PARAMETERS.

SCM> h for more options

## STARTING THE POWER UP SELF TEST

TURN ON ALL THE STORAGE DEVICES AND YOUR MONITOR BEFORE POWERING ON THE AVIION COMPUTER.

AFTER APPROXIMATLY 5 SECONDS THE SCREEN WILL DISPLAY THE POWER UP INITIALIZATION MESSAGE IN THE WINDOW.

```
(C) DATA GENERAL CORPORATION 1989,1990
MODEL 400/4000 SERIES
DUAL PROCESSOR
COLOR GRAFICS [N BIT],Z-BUFFER OPTION
FIRMWARE REVISION XX.XX
KEYBOARD LANGUAGE IN U.S. ENGLISH
LOCAL ETHERNET ADDRESS IS 08:00:1B:7F:7F:07
INITIALIZING [16 MEGABYTES]
```

VERIFY THE INITIALIZATION INFORMATION IN THE POWERUP DISPLAY IS CORRECT,IF ANY OF THE MESSAGE DISPLAY INACCURATE INFORMATION,OR IF YOUR SYSTEM DOES NOT FIND COMPONENTS THAT YOU HAVE ORDERED,CALL DATA GENERAL IMMEDIATLY.

AFTER THE HARDWARE IS INITIALIZED,POWERUP TESTS VERIFY COMPONENTS ARE FUNTIONING SUFFICIENTLY TO BRING UP YOUR OPERATING SYSTEM.AS POWERUP TESTING PROGRESSES,EACH CHARACTER IN THE SEQUENCE 0123...ABCDE..Z APPEARS ON THE SRCEEN INDICATING THE SUBTEST HAVE PASSED.ON A WORKSTATION'S DIAGNOSTIC LED AND SPEAKER BEEP TONES SIGNAL THE PROGRESS OF THE TESTS,ONCE THE TESTING IS COMPLETE THE SYSTEM DISPLAYS A "PASSED" MESSAGE ON THE SCREEN.
THE MONITOR SCREEN SHOULD APPEAR AS FOLLOWS:

```
TESTING...
     0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

PASSED
```

IF THE POWERUP TESTING SEQUENCE HANGS OR DISPLAYS A ERROR MESSAGE REFER TO CHAPTER 4 "SOLVING POWERUP PROBLEMS'IN THE SETTING UP AND STARTING AVIION XXXX MANUAL. WHERE XXXX IS THE MODEL OF YOUR SYSTEM.

# AVIION SYSTEMS POWER UP GOALS

FIND ANY FAULTS IN THE BASE SYSTEM,THE KERNAL SYSTEM AND LOAD PATH MUST BE INITIALIZED AND VERIFIED FROM PROM TO THE POINT OF ALLOWING DIAGNOSTIC MEDIA TO LOAD.

REPLACABLE UNIT (RU) CALL-OUTS.
IN CONFIDENCE WITH CUSTOMER,FIELD SERCVICE,AND MANUFACTURING REQUIREMENTS,ALL FAILURE REPORTS WILL ATTEMPT TO ISOLATE TO THE FRU LEVEL.

PERFORM SELF-TEST ON ALL SYSTEM UNITS
ALL UNITS INSTALLED IN THE SYSTEM,STANDARD AND OPTIONAL,MUST BE SIZED AND TESTED.THE LEVEL OF SELF-TEST IS A CHECK FOR HARD FAULTS.THIS DOES NOT INCLUDE I/O DEVICES.

SUPPORT A VIRTUAL CONSOLE
VIRTUAL CONSOLE SUPPORT IS REQUIRED TO ALLOW ACCESS TO ALL REGISTERS AND MEMORY LOCATIONS AND SUPPORT OF PROGRAM LOADING.

INITIALIZE AND VERIFY THE LOAD PATH
ALL FAULTS IN THE BASE SYSTEM WHICH WOULD PREVENT THE BOOTING AND EXECUTION OF DIAGNOSTIC SOFTWARE MUST BE FOUND.FAULTS THAT WOULD CAUSE MALFUNCTION OF THE DIAGNOSTICS COULD CAUSE ERRONEOUS ERROR INDICATIONS.

EASE OF ERROR REPORTING
TO SUPPORT CUSTOMER MODE OPERATION AND OTHER NEEDS OF FIELD SERVICE,EASE OF ERROR REPORTING DURING POWERUP IS REQUIRED

SYSTEM INITIALIZATION
PERFORM THE REQUIRED SYSTEM CONFIGURATION AND INITIALIZATION TO ALLOW THE OPERATING SYSTEM TO BE BOOTED AND RUN.

PROM AND NOVRAM
VIRTUAL CONSOLE PROGRAM (VCP) WHICH INCLUDES;USER INTERFACE MENUS,MINIMAL COMMAND LINE INTERPRETER AND MNEMONIC DEBUGGER.

AUTOMATIC PROGRAM LOAD UTILITIES

BOOT ROUTINES,WHICH ARE REQUIRED DRIVERS FOR LOADING FROM LAN OR SCSI DEVICES.

POWERUP TESTS,ENOUGH TO VERIFY THAT THE DIAGNOSTIC OPERATING SYSTEM CAN BE LOADED

SYSTEM SIZING AND CONFIGURATION

## SCM BOOT COMMAND

THE BOOT COMMAND FIRST RESETS THE SYSTEM BOARD HARDWARE, THEN IT LOADS A BOOTSTRAP PROGRAM FROM A VALID DEVICE YOU SPECIFY IN A OPTIONAL ARGUMENT.

WHEN YOU USE THE BOOT COMMAND WITHOUT A ARGUMENT , THE SCM ATTEMPTS TO BOOT FROM A DEFAULT BOOT PATH. IF THE DEFAULT BOOT PATH IS NOT INITIALIZED, THE SCM TRIES TO FIND A VALID BOOTSTRAP FILE ACCORDING TO A PROBE SEQUENCE SPECIFIC TO YOUR MODEL SYSTEM. ON MOST WORKSTATIONS THE SCM FIRST PROBES FOR A BOOTSTRAP FILE ON THE FIRST SCSI DISK; IF IT CAN'T BOOT FROM THE DISK, IT PROBES FOR A DEVICE ON THE INTERGRATED LAN. FINIALLY, IF THE SCM CANNOT BOOT AUTOMATICALLY, IT DISPLAY A MESSAGE AND RETURNS TO THE SCM PROMPT.

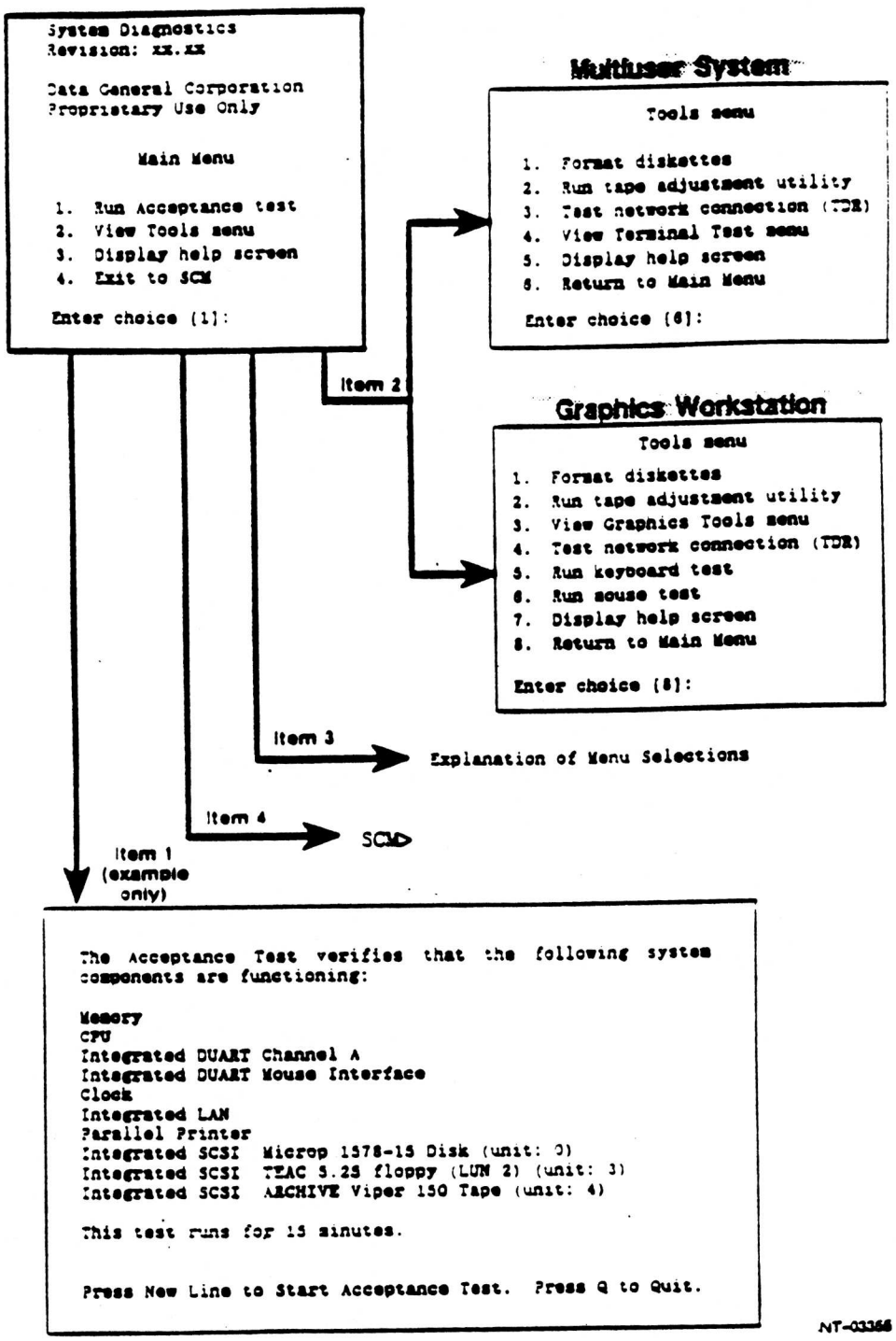
## SCM BOOT EXAMPLES

BOOT [DEV([CONTR],[UNIT],[FILE#])[FILEPATH]

```
SCM> B st(insc(0),4,0)

SCM> B sd(insc())

SCM> B cisc(0,0)
```


System Diagnostics
Revision: xx.xx
Data General Corporation
Proprietary Use Only
Main Menu
1. Run Acceptance test
2. View Tools menu
3. Display help screen
4. Exit to SCM
Enter choice [1]:
Item 2
Multiuser System
Tools menu
1. Format diskettes
2. Run tape adjustment utility
3. Test network connection (TDR)
4. View Terminal Test menu
5. Display help screen
6. Return to Main Menu
Enter choice [6]:
Graphics Workstation
Tools menu
1. Format diskettes
2. Run tape adjustment utility
3. View Graphics Tools menu
4. Test network connection (TDR)
5. Run keyboard test
6. Run mouse test
7. Display help screen
8. Return to Main Menu
Enter choice [8]:
Item 3
Explanation of Menu Selections
Item 4
SCM>
Item 1
(example
only)
The Acceptance Test verifies that the following system components are functioning:
Memory
CPU
Integrated DUART Channel A
Integrated DUART Mouse Interface
Clock
Integrated LAN
Parallel Printer
Integrated SCSI Microp 1578-15 Disk (unit: 0)
Integrated SCSI TEAC 5.25 floppy (LUN 2) (unit: 3)
Integrated SCSI ARCHIVE Viper 150 Tape (unit: 4)
This test runs for 15 minutes.
Press New Line to Start Acceptance Test. Press Q to Quit.
NT-03366

## Multiuser System

```
Tools Menu

1.  Format diskettes
2.  Run tape adjustment utility
3.  Test network connection (TDR)
4.  View Terminal Test menu
5.  Display help screen
6.  Return to Main Menu

Enter choice [6]:
```

Item 4

```
Terminal Test Menu

1.  Start scrolling characters set test
2.  Start lines of characters test
3.  Start keyboard echo test
4.  Start port ID message test
5.  Auto port identification
6.  Terminate a test
7.  Show executing tests
8.  Display help screen
9.  Return to Tools Menu

Enter option: [9]
```

## Graphics Workstation

```
Tools Menu
1.  Format diskettes
2.  Run tape adjustment utility
3.  View Graphics Tools menu
4.  Test network connection (TDR)
5.  Run keyboard test
6.  Run mouse test
7.  Display help screen
8.  Return to Main Menu

Enter choice [8]:
```

Item 3

```
Graphics Tools Menu

1.  Graphic subsystem diagnostic test
2.  Video adjustment BRIGHT pattern
3.  Video adjustment CONTRAST pattern
4.  Video adjustment PARALLEL pattern
5.  Video adjustment REGULATE pattern
6.  Fill screen with CIRCLES pattern
7.  Fill screen/clear screen function
8.  Display help screen
9.  Exit to Tools Menu

Enter option: [9]
```

NT-03356

# AVIION SYSTEM DIAGNOSTICS

AVIION SYSTEM DIAGNOSTICS PROVIDE MENU DRIVEN UTILITIES TO TEST ANY MODEL OF DATA GENERAL'S RISC BASED COMPUTER SYSTEMS.

SYSTEM DIAGNOSTICS TESTS ARE SEPARATE FROM POWERUP TESTS THAT RUN AUTOMATICALLY WHEN YOU POWER YOUR SYSTEM ON.

SYSTEM DIAGNOSTICS FULLY TEST YOUR SYSTEM AND ALL IT'S HARDWARE COMPONENTS.

SYSTEM DIAGNOSTICS CAN ISOLATE HARDWARE FAULTS SO YOU CAN PROVIDE DATA GENERAL WITH THE INFORMATION NECESSARY TO REPLACE DEFECTIVE PARTS.

## WHEN TO USE SYSTEM DIAGNOSTICS

USE SYSTEM DIAGNOSTICS TO ENSURE THAT YOUR HARDWARE IS INSTALLED AND FUNCTIONING PROPERLY AT FIRST INSTALLATION AND WHENEVER YOU ADD OR REPLACE A PART.

AFTER INITIAL INSTALLS YOU CAN RUN DIAGNOSTICS IF YOU SUSPECT A PROBLEM WITH YOUR COMPUTER HARDWARE.

## BOOTING SYSTEM DIAGNOSTICS FROM TAPE

MAKE SURE THE WRITE PROTECTION INDICATOR ON THE CARTRIDGE TAPE POINTS TO "SAFE",INSERT THR CARTRIDGE TAPE INTO THE DRIVE.

PUSH THE TAPE ENTIRLEY INTO THE DRIVE AND SLIDE THE LATCH TO THE RIGHT.

IF YOU ARE RUNNING DG/UX,HALT THE SYSTEM AND RESET AS FOLLOWS:

```
# cd /
# shutdown (nl)
# halt -q (nl)

SCM> R (NL)
```

BOOT THE SYSTEM DIAGNOSTICS BY SPECIFYING THE DEVICE PATH FOR YOUR TAPE DRIVE AS A ARGUMENT TO THE SCM BOOT COMMAND.

WHAT COMMAND YOU TYPE DEPENDS ON THE TYPE OF CONTROLLER FOR YOUR TAPE.THE FOLLOWING EXAMPLE WOULD BOOT TAPE FROM A WORKSTATION:

```
SCM> b st(insc(),4)
```

TO BOOT TAPE FROM A SCSI DEVICE MANAGED BY A VME CONTROLLER TYPE THE FOLLOWING:

```
SCM> b st(cisc(),4)
```

YOUR SYSTEM SHOULD DISPLAY THE FOLLOWING SCREEN

```
                Licensed Material - Property of DGC

                Data General Proprietary Diagnostics

This diagnostic material contains information which is
proprietary and confidential to Data General Corporation (DGC) and
is the exclusive property of DGC. Unless there is a license agree-
ment executed by DGC under which DGC has identified this diagnostic
material and expressly licensed you, this diagnostic material is
provided to you in trust under the "Data and Proprietary Rights"
clause of your agreement with DGC only for use by or on behalf of
DGC (including its subsidiary companies) during the warranty period
and under any contract maintenance period. This diagnostic material,
in whole or in part, is not to be reproduced by any means nor made
available to any third party. You agree to return this diagnostic
material to DGC at the end of the above identified period(s) or
destroy this diagnostic material and, upon request, notify DGC in
writing of such destruction.

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ALL RIGHTS RESERVED
This copyright notice does not constitute or evidence
publication or public disclosure.

Press New Line to proceed.
```

2. When you are ready to clear the screen, press New Line. The system diagnostics begin initializing each system component found. The following screen shows an AViiON 300 series station during initialization. Refer to Appendix A for example screens of VME-based models.

```
System Diagnostics
Revision xx.xx mm/dd/yy hh:mm:ss

Initializing Operating System for System Diagnostics


8192 Kbytes system memory
7258 Kbytes memory available for test
Single CPU System (Motorola 88100 CPU Rev x)
1 Instruction Cache (Motorola 88200 CMMU Rev x)
1 Data Cache (Motorola 88200 CMMU Rev x)
Initializing Virtual Console
Initializing Real Time Clock
Initializing Integrated SCSI
Initializing Parallel Printer
Initializing Monochrome Graphics Controller
Initializing Keyboard
Initializing Duart
Initializing Integrated LAN
```

ONCE THE SYSTEM COMPLETES INITIALIZATION, ACCEPT THE DEFAULT RESPONSES TO THE FOLLOWING QUESTIONS BY PRESSING NEWLINE AT THE PROMPTS:

RUN WITH INSTRUCTION CACHES ON (Y,N) [Y]?

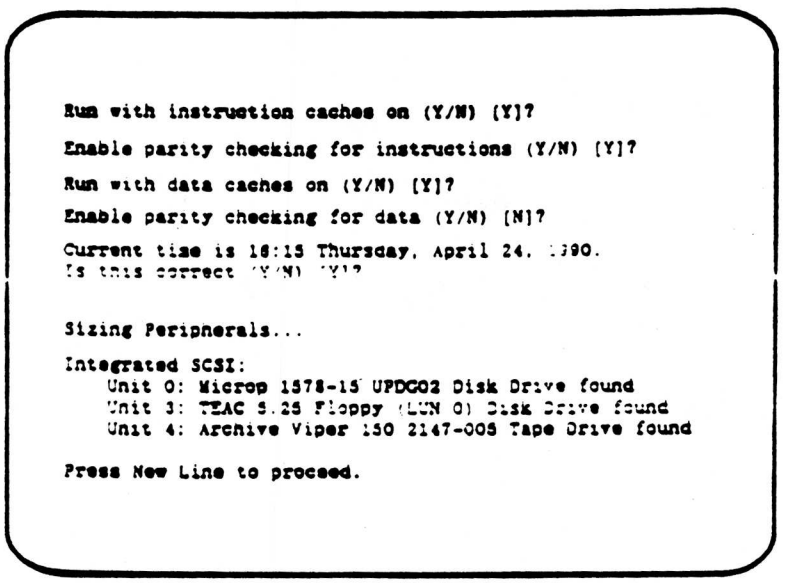
RUN WITH DATA CACHES ON (Y,N) [Y]?

ENABLE PARITY CHECKING FOR DATA (Y,N) [Y]?

VERIFY THE CORRECT TIME AT THE NEXT PROMPT:

CURRENT TIME IS 16:15 THURSDAY, AUGUST 24, 1990.
IS THIS TIME CORRECT? (Y,N) [Y]?

THE SYSTEM WILL NOW LIST THE CONNECTED PERIPHERAL DEVICES, YOUR SCREEN SHOULD LOOK SIMILAR TO THE EXAMPLE BELOW FOR A AVIION 300 WORKSTATION.



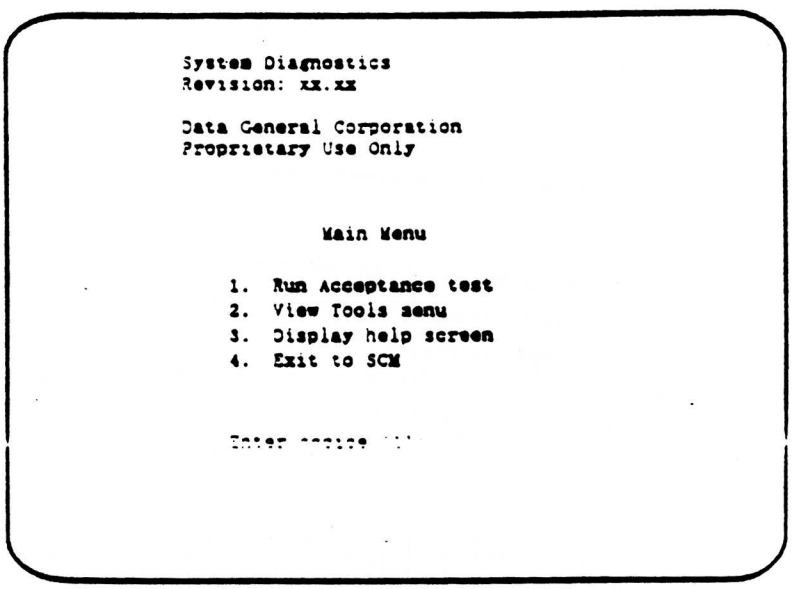
IF A CONFIGURED PERIPHERAL IS MISSING FROM THE SIZING LIST, VERIFY THE FOLLOWING AND TRY AGAIN:

CHECK ALL CABLING IS CONNECTED PROPERLY.

MAKE SURE THE DRIVE ITSELF IS INSTALLED AND JUMPERED CORRECTLY.

MAKE SURE THE DRIVE IS ON-LINE AND READY.

PRESS NEWLINE TO CONTINUE WHEN YOU HAVE MATCHED THE CORRECT SYSTEM CONFIGURATION. THE SCREEN DIPLAYS THE FOLLOWING:



## VERIFYING YOUR AVIION HARDWARE

THE SYSYEM DIAGNOSTICS INCLUDE A 15 MIN. ACCEPTANCE TEST WHICH SIZES,TESTS,AND VERIFIES YOUR COMPUTER HARDWAR COMPONENTS.

RUN THE ACCEPTANCE TEST ANY TIME YOU ADD A NEW COMPONENT OR IF YOU SUSPECT PROBLEMS WITH ANY COMPONENT.

SYSTEN DIAGNOSTICS ARE SELECTED FROM THE MAIN MENU BY PRESSING A "1", "RUN ACCEPTANCE TEST". THE FOLLOWING WILL BE DISPLAYED ON YOUR SCREEN:

SYSTEM DIAGNOSTICS
REVISION XX.XX

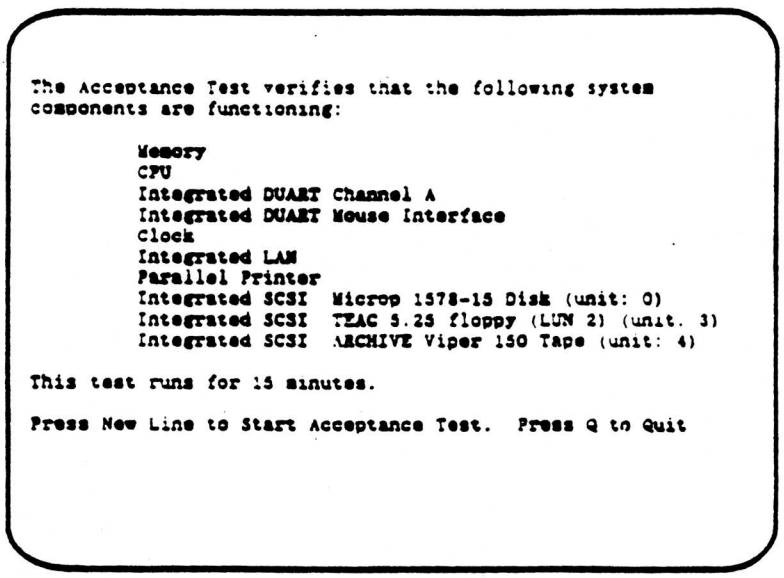
DATA GENERAL CORPORATION
PROPRIETARY USE ONLY

MAIN MENU

1. RUN ACCEPTANCE TEST
2. VIEW TOOLS MENU
3. DISPLAY HELP SCREEN
4. EXIT TO SCM

ENTER CHOICE [1]

SYSTEM DIAGNOSTICS WILL DISPLAY A LIST OF DEVICES IT FOUND DURING INITIALIZATION,THE ACCEPTANCE TEST VERIFIES THESE DEVICES.



NEXT, THE DIAGNOSTICS WILL DISPLAY THE FOLLOWING MESSAGE:

CAUTION: TAPE TEST DESTROYS ALL DATA ON TAPE. PLEASE INSERT WRITE-ENABLED SCRATCH TAPES FOR ALL UNITS TO BE TESTED. PRESS NEWLINE WHEN READY TO PROCEED

INSERT A WRITE-ENABLED TAPE INTO THE DRIVE MAKING SURE THE "SAFE" ARROW IS POINTED AWAY FROM THE WORD "SAFE". IF THE TAPE IN YOUR DRIVE IS NOT WRITE-ENABLED THE SYSTEM DIAGNOSTICS WILL DISPLAY THE FOLLOWING MESSAGE:

MEDIA IN UNIT X IS WRITE PROTECTED.
PLEASE PRESS NEWLINE TO CANCEL THE TAPE TEST OR INSERT A WRITE-ENABLED SCRATCH TAPE AND PRESS NEWLINE TO PROCEED.

WHEN THE ACCEPTANCE TEST BEGINS, THE SYSTEM DIAGNOSTICS DISPLAYS A GENERAL STATUS REPORT SCREEN AS FOLLOWS:

General Status Report

Revision: xx.xx — Total Hard Errors: 0000
Elapsed Time: 00:00:00 — Current time: 09:56:13

| TEST ID | SUBSYSTEM DESCRIPTION | PASS COUNT | SOFT ERRORS | HARD ERRORS | KBYTES READ | KBYTES WRITTEN |
|---|---|---|---|---|---|---|
| 48 | Memory | 0 | 0 | 0 | 0 | 0 |
| 47 | Single CPU | 0 | 0 | 0 | 0 | 0 |
| 46 | Integrated Duart | 0 | 0 | 0 | 0 | 0 |
| 45 | Clock | 0 | 0 | 0 | 0 | 0 |
| 45 | Integrated LAN | 0 | 0 | 0 | 0 | 0 |
| 44 | Integrated SCSI | 0 | 0 | 0 | 0 | 0 |

S - Update General Status Report  Ctrl-D to Stop all Tests

AT THE END OF THE TESTING YOU WILL SEE A FINAL STATUS REPORT SCREEN AS FOLLOWS:

PRESS NEWLINE TO RETURN TO THE MAIN MENU NAD CHOICE "4" FROM THE MAIN MENU TO RETURN TO THE SCM PROMPT.

Final Status Report

Revision: xx.xx — Total Hard Errors: 0000
Elapsed Time: 00:15:00 — Current Time: 10:11:13

| TEST ID | SUBSYSTEM DESCRIPTION | PASS COUNT | SOFT ERRORS | HARD ERRORS | KBYTES READ | KBYTES WRITTEN |
|---|---|---|---|---|---|---|
| * | Memory | 805 | 0 | 0 | 1948 | 1948 |
| * | Single CPU | 1732 | 0 | 0 | 0 | 0 |
| * | Integrated Duart | 932 | 0 | 0 | 90 | 90 |
| * | Clock | 1 | 0 | 0 | 0 | 0 |
| * | Integrated LAN | 615 | 0 | 0 | 11 | 11 |
| * | Integrated SCSI | 107 | 0 | 0 | 23131 | 0 |

Press New Line to Return to Main Menu

## EXITING FROM SYSTEM DIAGNOSTICS

FROM THE MAIN MENU SELECT ITEM 4,EXIT TO SCM>.

TYPE R TO RESET YOUR SYSTEM FROM THE SCM PROMPT

SCM> R

THE SYSTEM DISPLAYS THE FOLLOWING HARDWARE STSTUS VALUES ON YOUR SCREEN

| PSR | XPC | NPC | FPC | DCSH | DMMU | ICSH | IMMU |
|---|---|---|---|---|---|---|---|
| xxxxxxxx | xxxxxxx | xxxxxxx | xxxxxxx | N | N | N | N |

IF YOUR SYSTEM DISPLAYS A "Y" IN ANY OF THE LAST FOUR COLUMNS REPEAT THE RESET COMMAND.

# AViiON Foundations and Operations H615

## Module 5 – TCP/IP Overview and Installation

Introduction:

This module of introduce the student to the TCP/IP family of Communications products, introduce the Internet scheme of addressing and give them sufficient information to successfully install an Aviion system in a networked environment.

Objectives:

Upon completion of this module of instruction, the student will:

- be able to list the products in the "TCP/IP family" of communications products.
- be able to install an Aviion system in a networked environment and verify it's ability to communicate to to other hosts on the network.
- Be able to list the various server processes that must be present on networked machines to provide communications ability.

References:

| | |
|---|---|
| 093-701051-03 | Setting Up and Managing TCP/IP on the DG/UX System |

# What is TCP/IP?

## General:

Transmission control protocol / internet protocol

- TCP and IP are two protocols designed by the U.S. Department of Defense for DARPA (Defense Advanced Research Projects Agency) in 1969. The Project was designated ARPANET.

- The two protocols are designed to work together and to provide a host to host network.

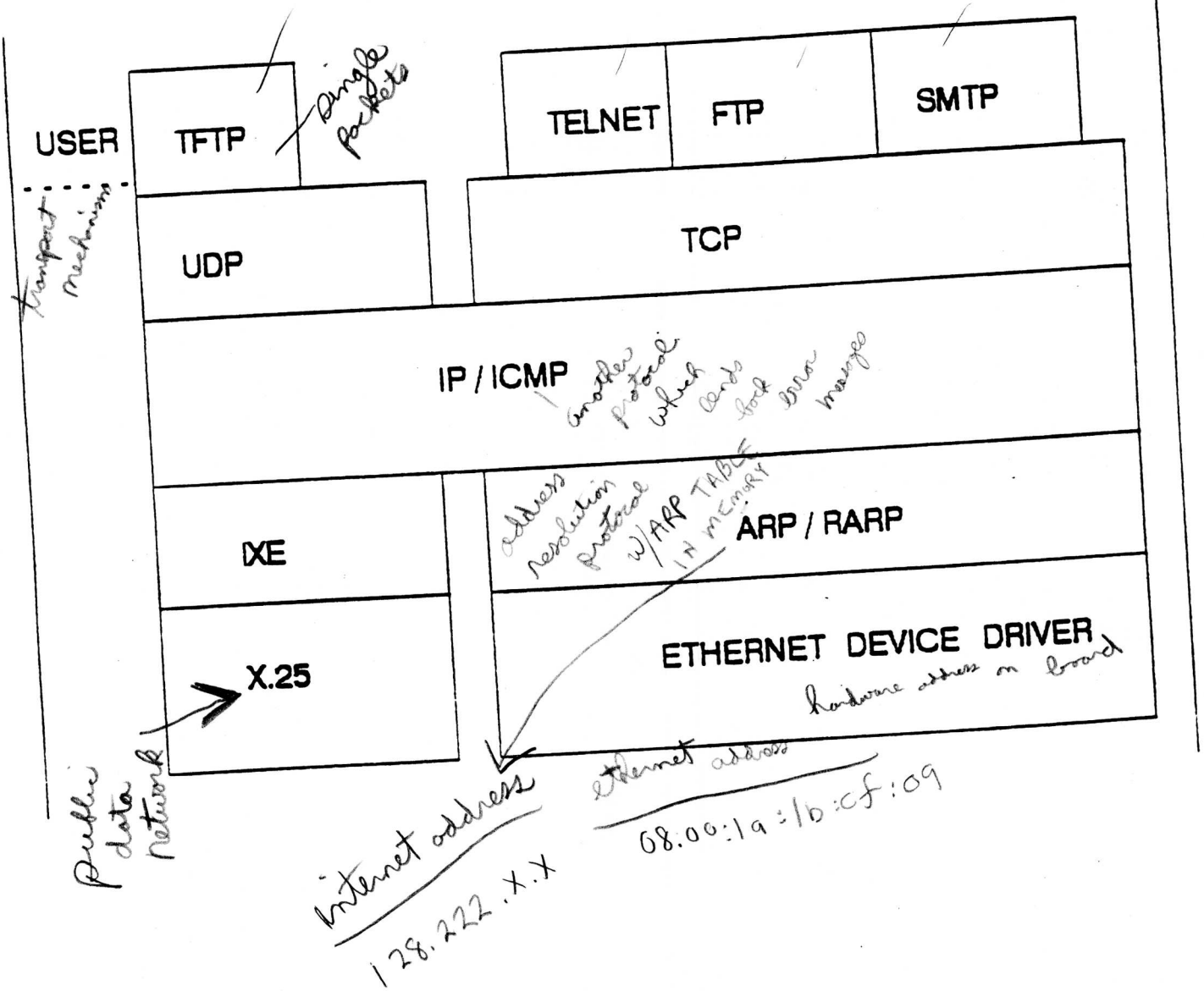
- They are Generally used over Ethernet connections

- Data Generals implementation is based on Berkeley 4.2 with many 4.3 features and changes to make it Mil-Spec compliant.

- The protocols are the industry networking de facto standard

X.25 = long distance

# TCP/IP NETWORK ARCHITECTURE



# TCP/IP

## OSI – Open System Interconnect Model

if not working Then try #rlogin hostname

| Layer | ISO Model | | TCP/IP Implementation | |
|---|---|---|---|---|
| telnet or ftp 7 | Application | live data entry | TFTP | SMTP FTP Telnet |
| 6 | Presentation | compression, encription | | |
| 5 | Session | authentication (password) security | | |
| TCP 4 | Transport | data integrety checksomes | UDP | TCP |
| IP 3 | Network (SOFTWARE) | address schemes | IP | |
| 2 | Datalink | | ETHERNET | |
| ethernet 1 | Physical | specifies levels of IOS | ETHERNET | |

LAN TEST WILL GET you THIS FAR

also uses X.25

## Kernel-Level Protocols

TCP/IP for AViiON Systems contains the following kernel-level protocols:

ARP – Address Resolution Protocol

Used to associate an Internet address with a physical hardware address (Ethernet address). ARP runs only across a single physical network, and runs only over networks that support hardware broadcast, such as Ethernet. For more information about this protocol, see *RFC 826 (An Ethernet Address Resolution Protocol)*.

/etc/ethers on host or server contains matching internet address

RARP – Reverse Address Resolution Protocol

Used by a diskless system at startup to find its Internet address. A diskless client broadcasts a request that contains its Ethernet address, and the server responds by sending the client's Internet address to that Ethernet address. For more information about the protocol, see *RFC 903 (A Reverse Address Resolution Protocol)*.

IP – Internet Protocol

A protocol that provides connectionless delivery of datagrams between hosts. Connectionless service means that the protocol treats each datagram as a separate entity. Each IP datagram contains the addresses of its source and destination, some control information, and the data transmitted. The protocol can deliver packets out of sequence, may drop packets, or may duplicate packets, but IP makes an earnest attempt to deliver packets. IP defines the exact format of data as it travels through a network, but delivery of data is not guaranteed.

ICMP – Internet Control Message Protocol

A partner to IP that handles error and control messages. Gateways and hosts use ICMP to tell the other hosts about problems in delivering the datagrams. ICMP also allows a host to test whether a destination can be reached and whether it is responding.

TCP – Transmission Control Protocol

Ports –

telnetd
11
response to
telnet request

A protocol that defines reliable, stream-oriented, process-to-process communication. TCP is a connection-based protocol; it requires a connection between communicating hosts before it transmits data. After a connection is established, TCP provides a two-way byte stream between communicating processes. Its messages include a protocol port number that allows the sender to distinguish between multiple programs on the remote host. TCP provides a checksum mechanism to guarantee that data has arrived intact. TCP uses IP to transmit information across a network.

UDP – User Datagram Protocol – for smaller packets w/no checks

A protocol that defines datagram-based communication between a process on one host and a process on another host. UDP is a connectionless transport protocol. Its messages include a protocol port number that allows the sender to distinguish between multiple programs on the remote host. Data General's UDP provides a checksum mechanism to guarantee that data has arrived intact. UDP uses IP to transmit information across a network.

## User Commands and User-Level Protocols

TCP/IP contains the following user commands and user-level protocols:

**ftp** — The **ftp** command implements the File Transfer Protocol (FTP). FTP allows you to transfer files from one host to another. FTP uses TCP as the transport level protocol. TCP was discussed earlier in the chapter.

**R commands** — The R commands allow you to obtain information from, to log in to, and to execute commands on a remote host. TCP/IP for AViiON Systems includes the following R commands:

- **rcp** — Allows you to copy files between systems on the network.
- **rlogin** — Allows you to login to another system over the network.
- **rsh (remsh)** — Connects to a specified host and executes a specified command. If you choose SVID compatibility during setup of TCP/IP, the command is **remsh**. If you choose not to be compatible with the SVID during setup, the command is **rsh**.
- **rwho** — Produces a list of all users logged in to all systems on the local network, as long as the systems are running **rwhod**.
- **ruptime** — Shows the status of each machine that is on the local network and running **rwhod**.

Some of the R commands use TCP as the transport level protocol, and some use UDP.

**sendmail** — The **sendmail** command implements the Simple Mail Transfer Protocol (SMTP), which allows the transmission of mail messages. The **sendmail** program uses TCP as the transport level protocol. Chapter 4 discusses how to configure and use **sendmail**.

**telnet** — The **telnet** command implements the TELNET protocol. TELNET allows a user on one host to interact with a remote host as if the terminal is directly connected to the remote host. TELNET uses TCP as the transport level protocol.

**tftp** The **tftp** command implements the Trivial File Transfer Protocol (TFTP). TFTP allows file transfer with minimal capability and overhead. The **tftp** command depends on the UDP protocol, which was discussed earlier in this chapter.

TFTP is also used during a first stage boot with Data General's AViiON stations. The boot program, once it determines its Internet address, uses TFTP to transfer a file that contains the executable image of a second stage boot program. These topics are covered at length in later chapters of this book.

**bftp** The **bftp** command provides the user interface to the Background File Transfer Program, which allows you to transfer files in the background. For more information about BFTP, see *Using TCP/IP on the DG/UX™ System*.

The next chapter provides an overview of network administration. If you have experience with networks, you may skip the next chapter. However, the rest of the manual assumes that you are familiar with the terms introduced in the next chapter, and it uses examples first presented there.

# Internet Addressing

9-5

# 89.0.0.1

network portion host or local portion

NETWORK NUMBERS 001 – 044 are reserved

NETWORK NUMBERS 045 – 126 are availiable

NIC - network information center

DO NOT USE

127.0.0.1 local host - loopback

127.0.0.0

127.255.255.255 - reserved for broadcasting

# telenet local host to check your TCP level software

8 bits

hosts

24 bits

1 3 2

0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

| 0 NETWORK | LOCAL |
|---|---|

1-127

CLASS A

0-15 0-15

| 10 NETWORK | LOCAL (NODE) |
|---|---|

CLASS B 128-191

| 110 NETWORK | LOCAL |
|---|---|

CLASS C 191 →

small companies

128.22.13.X

32 bits total / each field is 8 bits

CLASS A HAS 7 BIT NETWORK NUMBER

000 - 044 ARE ASSIGNED

045 - 126 ARE UNASSIGNED

127 IS RESERVED

CLASS B HAS 14 BIT NETWORK NUMBER

128.001 - 191.254 ARE UNASSIGNED

CLASS C HAS 21 BIT NETWORK NUMBER

192.000.001 - 223.254.254 ARE UNASSIGNED

* can only have 1 open connection between 2 machines @ 1 time

# ARP -a to look at ARP table and available ethernet/internet addresses

**telnet**

**$ telnet**

**telnet>**

**-local (command)**

**-remote mode**

local mode — **telnet> command (address) (port)** → to log on to another system

**telnet> open uwood3** OR 172.222.13.8

**^d** — CLOSE will stop the session

**^]**

**telnet> help (?)**

**$ telnet uwood3**

**telnetd** creates a process for the connection and assigns it to a psuedo-terminal.

1D or EXIT to get out of telnet

Once logged in the other system @ # EXIT to get to telnet> or ^]

telnet >! copy file a file b

telnet >! sh to get to subshell

bye

terminates TELNET local mode and returns you to the shell. any outstanding connections are terminated. (quit)

close

terminates an existing remote connection but keeps you in TELNET local mode.

quit

same as bye

shell

used to create a shell on the local machine, a son of telnet. If a connection exists use the escape character to return to local mode before executing shell.

telnet> shell

telnet> shell [command]

if you have a network connection, and execute a command you will be returned to network connection otherwise to local mode.

![command]

returns you to the shell without terminating telnet. Use the escape character to return to local mode before executing !. if you give it ![command] it will return to any outstanding connection otherwise to local mode. SAME AS SHELL cmd.

hostname(1C) hostname(1C)

NAME
hostname - set or print name of current host system

SYNOPSIS
hostname [ nameofhost ]

DESCRIPTION
The hostname command (without an argument) prints the name of the current host. The superuser can set the nameofhost by specifying an argument. The parameter used at boot time is defined in

/etc/tcpip.params

and is used in

/usr/sbin/init.d/rc.tcpipport

SEE ALSO
gethostname(2)
sethostname(2)

hostid(1C) hostid(1C)

NAME
hostid - set or print identifier of current host system

SYNOPSIS
hostid [ identifier ]

DESCRIPTION
The hostid command (without an argument) prints the identifier of the current host in hexadecimal. This numeric value is expected to be unique across all hosts and is normally set to the host's Internet address. The superuser can set hostid by giving a hexadecimal identifier; this is usually done in the parameter file /etc/tcpip.params.

SEE ALSO
gethostid(2)
sethostid(2)
hostname(1c)

file X fer protocol

this uses TCP/IP

## FTP Commands

**$ftp**

**ftp>**

# FTP takes you to ftp>

**$ftp hostname**

**help ?** — **obtain info on a command, alone lists all with a command name gives info on specified command. Format:**

**ftp> help [command]**

**open** — No response after command connects you to remote system

**use this command to establish a connection. If auto logon is disabled you will have to use the the user coommand. Format:**

**ftp> open uwood3**

**close** — **use this command to close an FTP connection. Format:**

**ftp> close <nl>**

**quit** — **this command closes any connection and returns the user to the shell. If a transfer is in progress it allows it to complete. Format:**

**ftp> quit <nl>**

Quits file in present directory unless a pathname is given

**get(receive)** — from remote mach.

**this command retrieves a file and gives it the name specified. Format:**

**ftp> get remote-filename local-filename**

**put(send)** — **this command stores a local file in a remote directory. Format:**

Only VALID after an open connection has been made!

= ls -lsa

ftp> put local-filename remote-filename

**dir** — this command lists the contents of a remote directory. Specifying a local filename places a copy of the listing in a local file. Format:

ftp> dir remote-dir [local-filename]

**ls** — this command will list only the filenames in a remote. If you don't specify a name the present remote directory is used. If a local filename is specified the listing is placed in there. Format:

ls [remote-dir] [local-file]

**pwd** — this command displays the current remote working directory. Format:

ftp> pwd

**cd** — this command will change your remote working directory. Format:

ftp> cd dir1

**lcd** — this command will change your working directory on the local host. Format:

ftp> lcd dir3

**verbose** — this command turns verbose mode on/off .The default is off. Format:

ftp> verbose

Enhanced Mail System

# Sendmail

Mailx has two modes:

| | |
|---|---|
| Input Mode | creating, editing, sending and tilde escape commands are executed in input mode. |
| command | reading, moving, deleting and responding to mail. |

To enter input mode use the format:

```
mailx   user@system
```

```
mailx chris@uwood1
subject:
```

to leave input mode:

```
^d
~. <nl>
```

Aliases

edit .mailrc

```
alias boaters  kevin barry howard jeff
```

then:

```
$ mailx boaters
```

? or record ? will give all mail commands

To enter command mode type:

$ mailx

to print messages:

| | |
|---|---|
| ? <NL> | print the current message |
| ? p <NL> | print the current message |
| ? p 2 <NL> | print message number 2 |
| ? p username <NL> | print all messages from user |

deleting messages:

| | |
|---|---|
| ? d * | delete all messages |
| ? d :r | delete all messages that have been read |
| ? dp | delete the current message and print the next one |
| ? d username | delete all messages from user |

Saving messages:

mbox
/usr/mail/username

s [msglist] filename  messages saved in filename

msglist values:

| | |
|---|---|
| n | the message number n |
| . | the current message |
| ^ | the first undeleted message in mailbox |
| $ | the last message in mailbox |
| * | all messages |
| m-n | an inclusive range |
| username | all messages from user |

replying to mail:

| | |
|---|---|
| R <NL> | to originator |
| r <NL> | to originator and all recepients |

leaving mailx:

? q <NL>

similar to telenet
will allow a virtual logon of remote system

## R Commands

can be used for security

**rlogin (hostname)**

**login:**

**passwd**

**Developed by Berkeley. You must have a local command running the r user program and a remote host running the r server program. You must also have an account on both machines.**

**users from a different system can be given access to your account by providing a .rhosts file in your home directory which lists users and their systems allowed access:**

| | |
|---|---|
| **uwood3** | **kevin** |
| **vwood1** | **mike** |
| **uwood2** | **tom** |

**/etc/hosts** — **lists recognized systems**

**/etc/hosts.equiv** — **allows users with accounts on two different machines with the same name to share accounts. i.e.:**

**uwood3**
**uwood1**

**rcp** — **this command copies files between the local and remote host in either direction. Format:**

**rcp source-file dest-file**

**remote files must be specified "rhost:path"**

.rhosts (file) can allow other machines access to your files

using -r allows you to copy multiple files and subdirectories to a directory

```
rcp -r source-files  directory
```

to employ metacharacters on the remote system, you must quote them. i.e.:

```
rcp "rhost:/dir/file2*" cumulative
```

if your remote username is different than your local name, use:

```
rhost.rname:path
```

rsh

this command will execute a command on a remote system without having the user log on to the remote system. The command executes and terminates after execution. You can not execute interactive programs with this command. Format:

```
rsh host [-l username] command
```

if your remote username is different than your local username you must use the "-l username" option.

if you wish to use shell redirection symbols at the remote side they must be quoted. i.e.:

```
rsh sys4 cat test1 >> test2 <n1>
```

appends the remote test1 file to the local test2 file.

rsh sys4 cat test1 ">>" test2 <nl>

appends the remote file test1 to the remote file test2

the alternate format:

host [-l username] command

may be used if /etc/hosts file has been added to your PATH.

ruptime

this command gives status about each machine on the local network that is running rwhod. This status is from packets broadcast once a minute by each host.

rwhod is the server program for rwho. Format:

ruptime [-a][-l][-t][-u] — switches

machines for which no status has been reported for 5 minutes are shown as down.

users that are idle for an hour or more are not counted unless the -a option is used.

the listing is sorted by hostname unless the -l, -t or -u options are used. These options specify sorting by load average, uptime or number of users.

must be running rwhod - demon
@ level 3 to be seen

demon answers incoming network queries

rlogin → rlogind
telnet → telnetd
ftp → ftp

ps ax ec | pg

process status

the last three columns in a listing represent load averages for 1, 5, & 15 minutes. The load average is the average number of jobs in the run queue.

rwho

this command displays the names of users logged on to systems on the local network that are running the rwho server. Format:

```
rwho [-a]
```

if no report has been received from a machine for 5 minutes it assumes the machine is down.

rwho reports idle time for users who have not typed into the system for a minute or more and it omits users who have not typed to the system for 1 hour or more unless the -a option is used.

server processes which must be running

## Servers

TCP/IP contains the following server programs. Many of them initiate daemons, which are background processes that perform a system-wide public function. Each of these daemons operates at a specified port and provides service for a user protocol. You specify the port and services in **/etc/services**. User protocols are described later in the chapter.

**inetd** The **inetd** server invokes network servers on demand. It also provides simple TCP-based services of its own. The following daemons are started by **inetd**. For more information, see **inetd**(1M).

**ftpd** The **ftpd** program, which is the File Transfer Protocol (FTP) server (daemon), is invoked by **inetd** when an incoming connection is detected on the specified port. FTP is described later in this chapter. For more information, see **ftpd**(1M).

**telnetd** The **telnetd** program, which is the TELNET server (daemon), is invoked by **inetd** when an incoming connection is detected on the specified port. TELNET is described later in this chapter. For more information, see **telnetd**(1M).

**tftpd** The **tftpd** program, which is the Trivial File Transfer Protocol (TFTP) server (daemon), is invoked by **inetd** when an incoming connection is detected on the specified port. TFTP is described later in this chapter. For more information, see the **tftpd**(1M) manual page.

**rshd, rexecd, rlogind** These are servers (daemons) for **rsh** (which is **remsh** if you choose compliance with the *System V Interface Definition* [SVID], see Chapter 6), **rexec**, and **rlogin**. They are invoked by **inetd** when an incoming connection is detected on the specified port. For more information, see the following manual pages: **rshd**(1M), **rexecd**(1M), **rlogind**(1M).

**named** The domain name server runs as a daemon called **named**. The **named** process listens on a specified port for queries from a domain name resolver or from another name server. It maintains a database that contains information about specified objects. For details, see Chapter 5 of this manual.

run on pending server

**pmtd** This is the server (daemon) for the magnetic tape pseudo device. This server handles local requests to do tape I/O operations on a tape device on a remote host. For more information, see **pmtd**(1M).

**routed** The **routed** server manages network routing tables using the Routing Information Protocol (RIP). For more information, see the **routed**(1M) manual page.

**rwhod** This is the server (daemon) for **rwho** and **ruptime**. For more information, see **rwhod**(1M).

```
#
# Internet server configuration database
#
ftp     stream  tcp     nowait  root    /usr/bin/ftpd           ftpd
telnet  stream  tcp     nowait  root    /usr/bin/telnetd        telnetd
shell   stream  tcp     nowait  root    /usr/bin/rshd           rshd
login   stream  tcp     nowait  root    /usr/bin/rlogind        rlogind
exec    stream  tcp     nowait  root    /usr/bin/rexecd         rexecd
tftp    dgram   udp     wait    root    /usr/bin/tftpd          tftpd
echo    stream  tcp     nowait  root    internal
discard stream  tcp     nowait  root    internal
chargen stream  tcp     nowait  root    internal
daytime stream  tcp     nowait  root    internal
time    stream  tcp     nowait  root    internal
echo    dgram   udp     wait    root    internal
discard dgram   udp     wait    root    internal
chargen dgram   udp     wait    root    internal
daytime dgram   udp     wait    root    internal
time    dgram   udp     wait    root    internal
```

*The inetd.conf.proto File*

*service-name socket-type protocol wait-status uid server-program server-arguments*

Each entry specifies the following information:

- The name of the service, as specified in **/etc/services**
- The socket type used (**stream, datagram,** or **raw**)
- The protocol used, as specified in **/etc/protocols.**
- The wait-status, which is either **nowait** or **wait**
- The user ID that the server should use when it runs
- The pathname of a server process to be invoked by **inetd** to perform the requested service, or the value **internal** when **inetd** itself provides the service
- Server-arguments if a process must be invoked with command-line arguments

In the configuration file, you can separate fields with spaces or tab characters. A # (pound-sign) indicates the beginning of a comment; characters up to the end of the line are not interpreted by routines that search this file.

## Compiling TCP/IP Information

Before setting up the TCP/IP package, you need to gather a variety of information about your system and local network. See your network administrator or *Setting Up and Managing TCP/IP on the DG/UX™ System*. You need to know:

**Internet address** — During network installation, you need to know the Internet address of your own system as well those of other systems on your network. An example Internet address is **128.223.2.1.**

**host name** — This name could be whatever you intend to call your system within your network. Step 1, "Planning Resources and Using DG/UX Conventions" discusses host names.

STUDENT 1-10

**network name** — This is the name of your local network. An example is **sales-net.**

CLASS-NET

**subnet status** — You need to know if your local network is subnetted.

NO

**network mask** — The network mask you use depends on how your local network is subnetted. An example mask is **0xffffff00.**

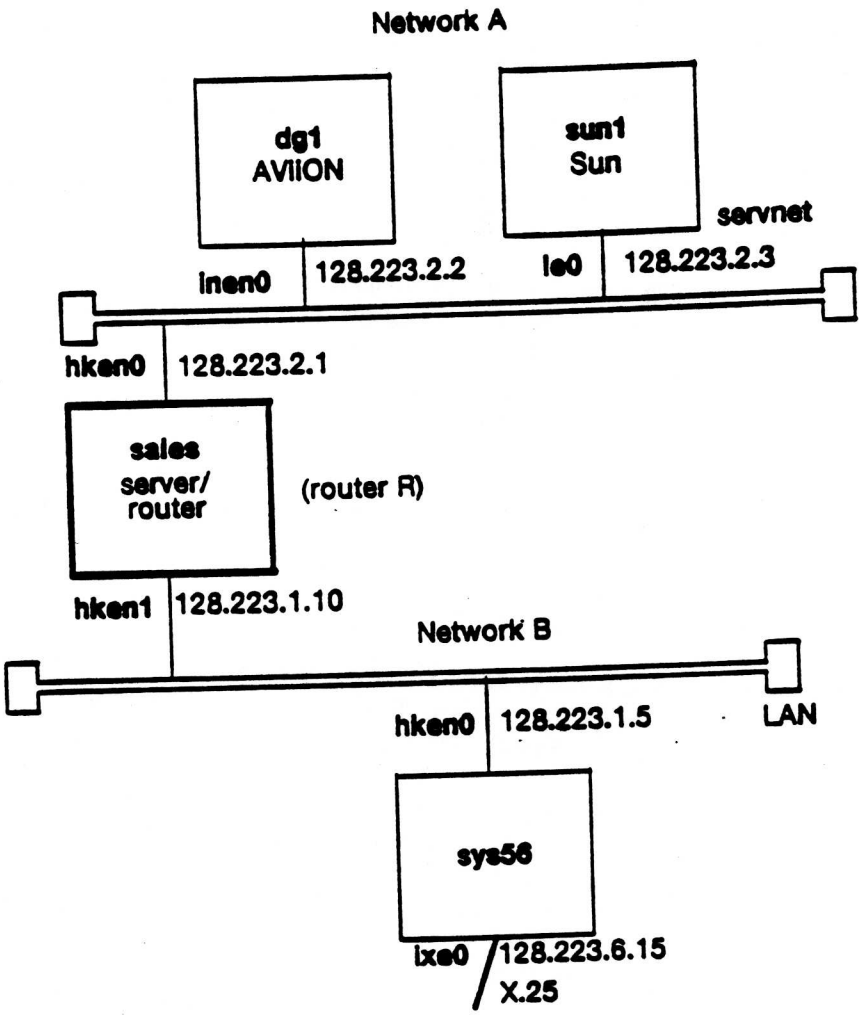
# PONG to see if subnet

#)/sconfig INEN0 UP, STARTED, BROADCAST, RUNNING is what you want

**controller device type** — On a workstation and some servers, your controller device type is **inen.** For servers and workstations that have a Hawk LAN controller, it is **hken.**

**controller device name** — Your controller device name is the same as the type but with a **0** or **1** appended: **hken0** or **inen0.** AViiON 400- and 4000-series systems may have an extra Hawk LAN controller (**hken0**) in addition to the integrated controller (**inen0**). AViiON 5000- and 6000-series systems may have as many as two Hawk LAN controllers (**hken0** and **hken1**).

**broadcast address type** — The broadcast address may be either all zeroes (BSD 4.2 compatible) or all ones (BSD 4.3 compatible).


Network A
dg1
AViiON
sun1
Sun
servnet
inen0
128.223.2.2
le0
128.223.2.3
hken0
128.223.2.1
sales
server/
router
(router R)
hken1
128.223.1.10
Network B
hken0
128.223.1.5
LAN
sys56
ixe0
128.223.6.15
X.25
to 192.5.15.1
Network C

route

/usr/bin/route command dest gateway metric

commands - add, delete

Dynamic routing

icmp redirects

routed manages routing tables

/etc/gateways

proxy arp

does away with explicit routing tables

designed originally for use on one physical network.

notion that routers can act as as a proxy for a system on another network.

arp

```
Usage: arp [-i interface_name] hostname
       arp [-i interface_name] -a
       arp [-i interface_name] -d hostname
       arp [-i interface_name] -s hostname ether_addr [temp] [pub]
       arp [-i interface_name] -f filename
```

```
# arp -i inen0 uwood11

ARP entry for uwood11 found in /dev/inen0:
Hostname    Internet Address     Ethernet address          Status
uwood11     89.0.1.1             00:00:77:00:88:8f       temporary
#
#
```

**NAME**

**gateways** – database for routed

**DESCRIPTION**

When you start **routed**, it reads the **/etc/gateways** file to specify routing gateways. The file consists of a series of lines, each in the following format:

[**net** | **host**] *n1* **gateway** *n2* **metric** *val* [ **passive** | **active** | **external** ]

The **net** or **host** keyword indicates if the route is to a network or specific host.

*n1* is the name of the destination network or host. This may be a symbolic name located in **/etc/networks** or **/etc/hosts**, or an Internet address specified in "dot" notation; see inet(3n).

*n2* is the name or address of the gateway to which messages should be forwarded.

*val* is a metric indicating the hop count to the destination host or network.

One of the keywords **passive**, **active** or **external** indicates if the gateway should be treated as passive or active or whether the gateway is external to the scope of the **routed** protocol.

Gateways specified in **/etc/gateways** should be marked passive if they are not expected to exchange routing information, while gateways marked active should be willing to exchange routing information (that is, they should have a **routed** process running on the machine). Passive gateways are maintained in the routing tables forever and information regarding their existence is included in any routing information transmitted. Active gateways are treated equally to network interfaces. Routing information is distributed to the gateway and if no routing information is received for a period of the time, the associated route is deleted. External gateways are also passive, but are not placed in the kernel routing table nor are they included in routing updates. The function of external entries is to inform **routed** that another routing process will install such a route, and that alternate routes to that destination should not be installed. Such entries are only required when both routers may learn of routes to the same destination.

**FILES**

**/etc/gateways**

**SEE ALSO**

**routed**(1M)

```
                Software Release Management

 1 addrelease       Add a software release area
 2 delrelease       Delete a software release area
 3 lsrelease        List information about software releases
 4 loadpackage      Load software packages into a software release area
 5 setuppackage     Set up packages in a software release area
 6 makesrv          Create the initial /srv directory tree
 7 lstoc            List the table of contents from a release tape

Enter a number, a name, the initial part of a name,
? or <number>? for HELP, ^ to GO BACK, q to QUIT:
```

```
                    Network Management

 1 addhost        Add an entry to the hosts file
 2 delhost        Delete an entry from the hosts file
 3 modhost        Modify an entry in the hosts file
 4 lshost         List entries in the hosts file
 5 addnetwork     Add an entry to the networks file
 6 delnetwork     Delete an entry from the networks file
 7 modnetwork     Modify an entry in the networks file
 8 lsnetwork      List entries in the networks file
 9 addether       Add an entry to the ethers file
10 delether       Delete an entry from the ethers file
11 modether       Modify an entry in the ethers file
12 lsether        List entries in the ethers file
13 nfsparams      Set boot time parameters for NFS and YP
14 tcpipparams    Set boot time parameters for TCP/IP

Enter a number, a name, the initial part of a name,
? or <number>? for HELP, ^ to GO BACK, q to QUIT:
```

class_net

# Setting Up Software Packages with sysadm

Next, we execute setuppackage:

```
# sysadm setuppackage ↵

Running subcommand `setuppackage' from menu `releasemgmt',
Software Release Management

Release Name? [PRIMARY] ↵

The following packages have setup scripts that have not been run:

X11        nfs        tcpip        YP
X11.lg
```

**Setting Up TCP/IP**

must supply names of all hosts all reside in /etc/HOSTS

```
Package Name? [all] tcpip ↵

Processing setup scripts for package tcpip.
Set up package tcpip in usr? [yes] ↵

            Setting up package: tcpip

In revisions of the DG/UX operating system before 4.00,
the restricted shell command was named rsetsh
and the remote shell command was named rsh.
To be compatible with the System V Interface Definition (SVID),
the restricted shell command must be named rsh and
the remote shell command must have a different name.
To be SVID-compliant, Data General names the remote shell rsmsh.

You are prompted to choose whether or not the names of
the remote and restricted shells comply with the SVID.

If You Choose      The Result Is

   y               The restricted shell is named /bin/rsh
                   The remote shell is named /usr/bin/rsmsh

   n (default)     The restricted shell is named /bin/rsetsh
                   The remote shell is named /usr/bin/rsh.
Do you want names to comply with the System V Interface Definition? [n] y ↵
Restricted Shell is named /bin/rsh
Remote Shell is named /usr/bin/rsmsh

Remote Commands Installation Complete

Press NEWLINE when ready to continue... ↵
Setup package tcpip in MY_HOST root? [yes] ↵

            Setting up package: tcpip

Creating links for initialization scripts...Please Wait

File: /srv/release/PRIMARY/root/MY_HOST/etc/hosts has been created from prototype file.
File: /srv/release/PRIMARY/root/MY_HOST/etc/networks has been created from prototype file.
File: /srv/release/PRIMARY/root/MY_HOST/etc/services has been created from prototype file.
File: /srv/release/PRIMARY/root/MY_HOST/etc/protocols has been created from prototype file.
File: /srv/release/PRIMARY/root/MY_HOST/etc/ethers has been created from prototype file.
File: /srv/release/PRIMARY/root/MY_HOST/etc/tcpip.params has been created from prototype file.

Press NEWLINE when ready to continue... ↵
```

y

```
Do you want support for loop interface? (y) ↵

Updating /srv/release/PRIMARY/root/MY_HOST/etc/hosts and
/srv/release/PRIMARY/root/MY_HOST/etc/networks files...Please Wait.

NOTE: Any entries encountered containing conflicting information
      will be deleted from the offending file.

The following lines have been removed from file
"/srv/release/PRIMARY/root/MY_HOST/etc/hosts"
— Begin Remove List —
127.0.0.1       localhost
— End of Remove List —

The entry "127.0.0.1  localhost" has been added
to file "srv/release/PRIMARY/root/MY_HOST/etc/hosts"

Updating "/srv/release/PRIMARY/root/MY_HOST/etc/tcpip.params"
...Please wait...

IMPORTANT NOTE: You MUST have a "loop" entry specified in
your system configuration file.  Consult the help menu or the
system(4) man page for more information.

Local Loopback Environment Installation Complete

Press NEWLINE when ready to continue... ↵

The following queries refer to the host being installed

Enter host Internet address: 128.223.75.10 ↵
[128.223.75.10] Correct ? [y] ↵

Enter host name: avionl ↵
[avionl] Correct ? [y] ↵

Enter network name: sales_net ↵
[sales_net] Correct ? [y] ↵

Is "sales_net" a subnetted network? [n] y ↵

Enter the network mask: 0xffffff00 ↵
[0xffffff00] Correct ? [y] ↵

Calculating network address...please wait...

Updating /srv/release/PRIMARY/root/MY_HOST/etc/hosts and
/srv/release/PRIMARY/root/MY_HOST/etc/networks files...please wait

NOTE: Any entries encountered containing conflicting information
      will be deleted from the offending file.

The entry "128.223.75.10     avionl" has been added to
"/srv/release/PRIMARY/root/MY_HOST/etc/hosts"
The entry "128.223.75     sales_net" has been added to
"/srv/release/PRIMARY/root/MY_HOST/etc/networks"

Enter controller device name: inen0 ↵
[inen0] Correct ? [y] ↵

There are two variations of Broadcast addresses.  A BSD 4.2
compatible broadcast address has a host portion of all
zeros.  A BSD 4.3 compatible broadcast address has a host
portion of all ones.

Calculating network portion of broadcast address...please wait...
```

host

STUDENT 2

CLASS_NET

hken always on AV5000
inen always on Maverick/AV400/AV4000

```
#
127.0.0.1          localhost
#
128.10.0.2       csnet-purdue purdue-rvax rvax
128.11.0.2       bbn-cvax cvax
128.16.9.2       ucl-tg
.
.
.
128.4.0.5        dcn5 dcn-11c
128.5.32.5       ford-wd15
```

*The /etc/hosts.proto File*

```
#
# Internet networks
#
loopback-net     127              software-loopback-net
#
bbn-pr-temp      1
sf-pr-1-temp     2
bbn-rcc          3
satnet           4
demo-pr-1-temp   5
sf-pr-2-temp     6
bbn-net          8
bragg-pr-temp    9
arpanet          10
.
.
.
rutgers          128.6
.
.
.
nyu-net          192.5.15
```

*The /etc/networks.proto File*

```
#       /*****************************************************************
#       * Copyright (C) Data General Corporation, 1985 - 1988           *
#       * All Rights Reserved.                                          *
#       * Licensed Material-Property of Data General Corporation.       *
#       *****************************************************************/
#
#           /*************************************************
#           * This software is made available solely pursuant *
#           * to the terms of a DGC license                   *
#           * agreement which governs its use.                *
#           *************************************************/
#
#       Data General SCCS ID @(#)protocols      3.1
#
# Internet (IP) protocols
#
ip      0       IP      # internet protocol, pseudo protocol number
icmp    1       ICMP    # internet control message protocol
ggp     3       GGP     # gateway-gateway protocol
tcp     6       TCP     # transmission control protocol
pup     12      PUP     # PARC universal packet protocol
udp     17      UDP     # user datagram protocol
```

```
#       /*************************************************************
#       * Copyright (C) Data General Corporation, 1985 - 1988       *
#       * All Rights Reserved.                                      *
#       * Licensed Material-Property of Data General Corporation.   *
#       *************************************************************/
#
#           /*****************************************************
#           * This software is made available solely pursuant    *
#           * to the terms of a DGC license                      *
#           * agreement which governs its use.                   *
#           *****************************************************/
#
#       Data General SCCS ID @(#)services       3.1
#
# Network services, Internet style
#
echo            7/udp
echo            7/tcp
discard         9/udp           # sink null
discard         9/tcp           # sink null
systat          11/tcp
daytime         13/udp
daytime         13/tcp
netstat         15/tcp
generator       19/tcp          # character generator
chargen         19/udp          # character generator
chargen         19/tcp          # character generator
ftp             21/tcp
telnet          23/tcp
smtp            25/tcp          mail
time            37/udp          timserver
time            37/tcp          timserver
time            37/tcp          timserver
name            42/tcp          nameserver
whois           43/tcp          nicname
mtp             57/tcp                          # deprecated
hostnames       101/tcp         hostname        # usually from sri-nic
#
# Host specific functions
#
tftp            69/udp
rje             77/tcp
finger          79/tcp
link            87/tcp          ttylink
supdup          95/tcp
ingreslock      1524/tcp
#
# UNIX specific services


#
exec            512/tcp
login           513/tcp
shell           514/tcp         cmd             # no passwords used
printer         515/tcp         spooler         # experimental
efs             520/tcp                         # for LucasFilm
courier         530/tcp         rpc             # experimental
connect         540/tcp         rcon            # local-echo remote login
biff            512/udp         comsat
who             513/udp         whod
syslog          514/udp
talk            517/udp
route           520/udp         router routed   # 521 also
new-rwho        550/udp         new-who         # experimental
rmonitor        560/udp         rmonitord       # experimental
monitor         561/udp                         # experimental
#
#       Sun NFS Services
#
sunrpc          111/udp
sunrpc          111/tcp
```

# cd /usr/relegs

* PANIC CODES

# ls -l

anything that ends in .rn is a release file

.sl = files loaded

To load TCP/IP

INIT 1

SYSADM LOAD PACKAGE

SYSADM SETUP PACKAGE

load only TCP/IP

class-net

```
Do you want the host portion of the broadcast address to be all ones? (y)

Calculating broadcast address...please wait...

Updating /srv/release/PRIMARY/root/MY_HOST/etc/tcpip.params...
please wait...

IMPORTANT NOTE: You MUST have a "inet" entry specified in
your system configuration file.  Consult the help menu or the
system(4) man page for more information.

Local Environment Installation Complete.

Press NEWLINE when ready to continue.

The following queries refer to DK configuration.

Would you like to configure any DK interfaces? (n)

DK Configuration Complete

Press NEWLINE when ready to continue.

Would you like to add a remote host entry? (y)

The following refers to other hosts on this network

Enter host Internet address: 128.223.33.1

Enter host name: goober

The entry "128.223.33.1    goober" has been added to the file
/srv/release/PRIMARY/root/MY_HOST/etc/hosts.

Do you want to add another remote host entry? (n)

Do you want to edit the
/srv/release/PRIMARY/root/MY_HOST/etc/protocols file? (n)

Press NEWLINE when ready to continue.

Do you want to edit the

srv/release/PRIMARY/root/MY_HOST/etc/services file? (n)

Network Environment Installation Complete

Press NEWLINE when ready to continue.

Enter FTP login directory (/var/ftp):
(/var/ftp) Correct ? (y)

Modifying ftp password entry in
/srv/release/PRIMARY/root/MY_HOST/etc/passwd

Directory: /var/ftp exists
Directory: /var/ftp/bin exists
Directory: /var/ftp/etc exists
File "/usr/bin/ls" has been copied to "/var/ftp/bin/ls"
File "/usr/bin/pwd" has been copied to "/var/ftp/bin/pwd"
File "/srv/release/PRIMARY/root/MY_HOST/etc/group" has been
copied to "/var/ftp/etc/group"

FTP Installation Complete

Press NEWLINE when ready to continue.
```

```
File: /srv/release/PRIMARY/root/MY_HOST/etc/hosts.equiv has been
created from prototype file

Warning:  The following query may produce a security breach in your
system.  An entry in the
/srv/release/PRIMARY/root/MY_HOST/etc/hosts.equiv file allows a
user from the specified remote host having the same user name to remotely
login to your host WITHOUT having to enter a password.  Caution should
be exercised when adding entries to this file.

Do you wish to add a host to the
/srv/release/PRIMARY/root/MY_HOST/etc/hosts.equiv file? [n]  )
File "/srv/release/PRIMARY/root/MY_HOST/etc/ptmxrtab" created from
prototype.
File "/srv/release/PRIMARY/root/MY_HOST/etc/pttmpstab" created from
prototype.

Remote Commands Installation Complete

Press NEWLINE when ready to continue.  )

"/srv/release/PRIMARY/root/MY_HOST/etc/sendmail.cf" created from
"/srv/release/PRIMARY/root/MY_HOST/etc/arpaproto.cf"

Do you need to customize ruleset 0? [n]  )

Modifying mail passwd entry in
/srv/release/PRIMARY/root/MY_HOST/etc/passwd.

Do you want to use sendmail as the mailx router? [y]  )

File "/srv/release/PRIMARY/root/MY_HOST/var/mailx/mailx.rc has
been created.

The entry "set sendmail=/usr/lib/sendmail" has been added to file
"/srv/release/PRIMARY/root/MY_HOST/var/mailx/mailx.rc"

File "/srv/release/PRIMARY/root/MY_HOST/etc/aliases" created from
prototype file.

Do you want to edit the
/srv/release/PRIMARY/root/MY_HOST/etc/aliases file? [n]  )

Executing /usr/bin/newaliases...please wait

3 aliases, longest 11 bytes, 53 bytes total
```

```
Sendmail Installation Complete

Press NEWLINE when ready to continue... ↵

The Domain Name System provides a means to distribute
management of host information.  It can be used in
place of or in conjunction with Yellow Pages and/or
the /etc/hosts file.

To install and run the domain name server on your
machine you must have data bases set up for the name
server.  Chapter 5 of Setting Up and Managing DG/UX
TCP/IP explains in detail the domain name system and
the requirements to run this service.  Please read
this chapter before attempting to set up the domain
name service on your system.

The answers to the following questions will be used
to partially configure your system for domain name
service access.  The only files that will be edited
are /etc/resolv.conf, /etc/named.boot, and
/etc/svcorder.  If you do not want to edit these file
at this time, answer no to the first question.

Do you want to partially configure for domain name service? [n] ↵

Partial Domain Name Server Installation Complete

Press NEWLINE when ready to continue... ↵
Deleting obsolete files...Please wait...

setuppackage is finished
#
```

## Setting Up ONC/NFS

```
# sysadm setuppackage ↵

Running subcommand `setuppackage' from menu `[illegible]',
Software Release Management

Release Name? [PRIMARY] ↵

The following packages have setup scripts that have not been run:

     X11       X11.lg       nfs       YP

Package Name? [all] nfs ↵
Processing setup scripts for package nfs.
Set up package nfs in usr? [yes] ↵

             Setting up package: nfs

Set up package nfs in MY_HOST root? [yes] ↵

             Setting up package: nfs

Setting up the rc#.d directory links.
Remove links in /srv/release/PRIMARY/root/MY_HOST/etc/rc#.d
+.....................................................................
Link from /usr/sbin/init.d to /srv/release/PRIMARY/root/MY_HOST/etc
+.....................................................................

That completes the automated portion of the NFS configuration

setuppackage is finished.
#
```

# Building a Custom Kernel

```
# sysadm newdgux ↵

Running subcommand 'newdgux' from menu 'sysmgmt',
SYSTEM CONFIGURATION MANAGEMENT

System Name? (aviion) ↵

System File /usr/src/uts/aviion/Build/system.aviion does not exist.
Create the system file? (yes) ↵
Editor? (vi) ↵

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```

/usr/src/uts/aviion/build/system.WAYNE

```
# scsiid = "@(#) 88K 1990 system.dgux.proto     94.5"


#-------------------------------------------------------------
#
# Prototype fragment of system configuration for:
#
# (Product Name):       DG/UX
# (Release):            4.30
#
#
# This prototype is provided to assist you in creating your
# customized system configuration file.
# This file consists of system file entries pertaining to this
# product.  Include this fragment in your customized system file
# and edit it to reflect your system's configuration.
# See this product's master file (in /usr/etc/master.d) for more details.
#
#-------------------------------------------------------------


#-------------------------------------------------------------
# Devices:
#
# List all devices and pseudo-devices in this section, one entry per
# line.  Typical configurations for several typical configurations
# have been provided below; delete entries that do not apply to your
# system and add to the list any devices your system has that are not
# already listed.
#
#

##### Typical AViiON 300 series workstation configuration:

# Note that your system can have a second duart() or an lp() controller,
# but not both!

    kbd()               # — keyboard
    grfx()              # — graphics display
    sd(insc(),*)        # — all SCSI disks on integrated SCSI adapter
    st(insc(),*)        # — all SCSI tapes on integrated SCSI adapter
    insn()              # — integrated Ethernet controller
    duart()             # — integrated Duart terminal line controller
#   duart(1)             # — second Duart (if present on system)
    lp()                # — integrated printer controller (if present)
```

```
    ptc()               # — pseudo-terminal controller device
    pts()               # — pseudo-terminal slave device
    pmt()               # — pseudo-magtape device
    log()               # — Streams logger pseudo-device
    prf()               # — profiler pseudo-device


##### Typical AViiON 400 series workstation configuration:

#   kbd()               # — keyboard
#   grfx()              # — graphics display
#   sd(insc(),*)        # — all SCSI disk drives on integrated SCSI adapter
#   st(insc(),*)        # — all SCSI tape drives on integrated SCSI adapter
#   inen()              # — integrated Ethernet controller
#   duart()             # — integrated Duart terminal line controller
#   duart(1)            # — second Duart
#   lp()                # — integrated line printer controller
#
#   ptc()               # — pseudo-terminal controller device
#   pts()               # — pseudo-terminal slave device
#   pmt()               # — pseudo-magtape device
#   log()               # — Streams logger pseudo-device
#   prf()               # — profiler pseudo-device



##### Typical AViiON 4000 series server configuration:

#   sd(insc(),*)        # — all SCSI disk drives on integrated SCSI adapter
#   st(insc(),*)        # — all SCSI tape drives on integrated SCSI adapter
#   sd(cisc(),*)        # — all SCSI disk drives on Ciprico SCSI adapter
#   st(cisc(),*)        # — all SCSI tape drives on Ciprico SCSI adapter
#   cird()              # — Ciprico Rimfire or SMD disk controller
#
#   inen()              # — integrated Ethernet controller
#   hken()              # — Interphase VME Ethernet controller
#   sysc()              # — Systech terminal line controller
#   duart()             # — integrated Duart terminal line controller
#   duart(1)            # — second Duart
#   lp()                # — integrated line printer controller
#
#   ptc()               # — pseudo-terminal controller device
#   pts()               # — pseudo-terminal slave device
#   pmt()               # — pseudo-magtape device
#   log()               # — Streams logger pseudo-device
#   prf()               # — profiler pseudo-device


##### Typical AViiON 5000 or 6000 series server configuration:

#   cird()              # — Ciprico Rimfire or SMD disk controller
#   sd(cisc(),*)        # — all SCSI disk drives on Ciprico SCSI adapter
#   st(cisc(),*)        # — all SCSI tape drives on Ciprico SCSI adapter
#   sysc()              # — Systech terminal line controller
#   duart()             # — integrated Duart terminal line controller
#   hken(0)             # — 1st Interphase VME Ethernet controller
#   hken(1)             # — 2nd Interphase VME Ethernet controller
#   lp()                # — integrated line printer controller
#
#   ptc()               # — pseudo-terminal controller device
#   pts()               # — pseudo-terminal slave device
#   pmt()               # — pseudo-magtape device
#   log()               # — Streams logger pseudo-device
#   prf()               # — profiler pseudo-device
#
#
#-------------------------------------------------------
```

```
#-----------------------------------------------------------
# Protocols:
#
# List all protocols in this section, one entry per line.
# Each entry consists of the name of a protocol you want to
# configure into your system.
#
# You should not have to specify any additional protocols in order to
# use this product.
#
#
#   Protocol Name
#   -------------
#

#
#-----------------------------------------------------------


#-----------------------------------------------------------
# STREAMS Modules:
#
# List all explicit STREAMS modules in this section, one entry per line.
# Each entry consists of the name of a streams module you want to
# configure into your system and that has not already been implicitly
# configured because of protocols you have specified.
#




# It is recommended that you specify the Transport Provider Interface
# STREAMS modules, timod and tirdwr.
#
#
#   STREAMS Module Name
#   -------------------
#
    timod
    tirdwr
#
#-----------------------------------------------------------


#-----------------------------------------------------------
# Tuneable Configuration Parameters:
#
# List all configuration parameters you wish to override in this
# section, one entry per line.
# The default values from the master file will be used unless
# explicitly overridden in this file.
#
# Each entry consists of the name of a parameter you want to
# override, followed by the value you wish to assign to it.
# If you list just the name of the parameter but not a value for it,
# its Implied Value from the master file will be used.
#
# You should set the TZ variable to accurately reflect your timezone
# (300 minutes west of GMT is USA Eastern time).
#
# You should set the MAXUP variable to the maximum number of processes
# that each user will be allowed to run simultaneously.  This number
# should be at least 64 for workstations.
#
# You should set the NODE variable to control your nodename for uname(1)
# and uucp(1), but not more than 255 characters.
#
# You should set the DUMP variable to the name of the tape device (in
# DG/UX Common Device Specification Format) that will be the default
# device to take dumps in case of system emergencies.  For diskless
# workstations, the DUMP variable should be set to the network device
# used to boot the machine.
```

```
#
# If your system is a diskless workstation, you should set the
# PERCENTNFS variable to 100 in order to get the best possible NFS
# performance.
#
# If either your system's root file system or its swap file will be
# mounted over NFS (a diskless workstation will NFS-mount both, a
# dataless workstation will NFS-mount only the root), you must set
# the NETBOOTDEV variable to the name of the network device (in DG/UX
# Common Device Specification Format) that will be used in booting
# over the network.
#
# If your system's root file system will be mounted over NFS (as will
# be done on both diskless and dataless workstations), you must set the
# ROOTFSTYPE variable to NETWORK_ROOT.
#
# If your system's swap file will be mounted over NFS (as will be done
# on diskless workstations), you must set the SWAPDEVTYPE variable to
# NETWORK_SWAP.
#
#
#   Parameter Name              Value
#   --------------              -----
#
    TZ                          300
    MAXUP                       64
    NODE                        "avilion1"

    DUMP                        "st(insc(),4)"
### DUMP                        "insn()"




### PERCENTNFS                  100
### NETBOOTDEV                  "insn()"
### ROOTFSTYPE                  NETWORK_ROOT
### SWAPDEVTYPE                 NETWORK_SWAP

#
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# acsmid = "@(#) 88K 1990 system.nfs.proto      94.2"


#-------------------------------------------------------------
#
# Prototype fragment of system configuration for:
#
# (Product Name):       NFS
# (Release):            4.30
#
#
# This prototype is provided to assist you in creating your
# customized system configuration file.
# This file consists of system file entries pertaining to this
# product.  Include this fragment in your customized system file
# and edit it to reflect your system's configuration.
# See this product's master file (in /usr/etc/master.d) for more details.
#
#-------------------------------------------------------------
```

```
#-----------------------------------------------------------
# Devices:
#
# List all devices in this section, one entry per line.
# The string is the name of the device.
# Note that some pseudo-devices have no device code at
# all, so none should be listed.
# Any other text on a line will be ignored.
#
#
#   Device Name
#   -----------
#
    plm()               # -- network lock manager pseudo-device
#
#-----------------------------------------------------------


#-----------------------------------------------------------
# Protocols:
#
# List all protocols in this section, one entry per line.
# Each entry consists of the name of a protocol you want to
# configure into your system.
#
# You will not need to specify any additional protocols to use this
# product.
#
#
#   Protocol Name
#   -------------
#

#
#-----------------------------------------------------------


#-----------------------------------------------------------
# STREAMS Modules:
#
# List all explicit STREAMS modules in this section, one entry per line.
# Each entry consists of the name of a streams module you want to
# configure into your system and that has not already been implicitly
# configured because of protocols you have specified.
#
# You will not need to specify any additional STREAMS modules
# to use this product.
#
#
#   STREAMS Module Name
#   -------------------
#

#
#-----------------------------------------------------------
```

```
#-----------------------------------------------------------------
# Tuneable Configuration Parameters:

# List all configuration parameters you wish to override in this
# section, one entry per line.
# Each entry consists of the name of a parameter you want to
# override, followed by the value you wish to assign to it.
# If you list just the name of the parameter but not a value for it,
# its Implied Value from the master file will be used.

# To use NFS, you must specify the NFS variable so that its implied
# value will be used.


#   Parameter Name              Value
#   --------------              -----

    NFS

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# scsid = "@(#) 88K    tcpip   90.1"


#-----------------------------------------------------------------
#
# Prototype fragment of system configuration for:

# (Product Name):       TCP/IP
# (Release):            4.30


# This prototype is provided to assist you in creating your
# customized system configuration file.
# This file consists of system file entries pertaining to this
# product.  Include this fragment in your customized system file
# and edit it to reflect your system's configuration.
# See this product's master file (in /usr/etc/master.d) for more details.

#-----------------------------------------------------------------


#-----------------------------------------------------------------
# Devices:

# List all devices and pseudo-devices in this section, one entry per




# line.  Verify typical configurations for both workstations and
# server systems. You will need at least one LAN controller
# (inen or hlan). (see the DG/UX system.proto file for these)



# The protocol engines are Streams multiplexing drivers

        ip()
        tcp()
        udp()

# It is also recommended that you include the loopback pseudo-device.

    loop()

#-----------------------------------------------------------------
```

```
#--------------------------------------------------------------------
# Protocols:

# List all protocols in this section, one entry per line.
# Each entry consists of the name of a protocol you want to
# configure into your system.

# You will need the tcp, ip, udp and icmp protocols.


#   Protocol Name
#   -------------


        ipprotp_ip
        ipprotp_tcp
        ipprotp_udp
        ipprotp_icmp


#--------------------------------------------------------------------


#--------------------------------------------------------------------
# STREAMS Modules:

# List all explicit STREAMS modules in this section, one entry per line.
# Each entry consists of the name of a streams module you want to
# configure into your system and that has not already been implicitly
# configured because of protocols you have specified.


#   STREAMS Module Name
#   -------------------

        echar
        arp
        sockys
        netlog


#--------------------------------------------------------------------


#--------------------------------------------------------------------
# Tuneable Configuration Parameters:

# List all configuration parameters you wish to override in this
# section, one entry per line.
# Each entry consists of the name of a parameter you want to
```

```
# override, followed by the value you wish to assign to it.
# If you list just the name of the parameter but not a value for it,
# its Implied Value from the master file will be used.
#
:wq ↵
```

**Installing the New Kernel**

```
Ready to Configure a Kernel? [yes] ↵

sysadm will now run config on /usr/src/uts/aviion/Build/system.aviion

Config succeeded.

sysadm will now attempt to build a kernel.
Building...
The build succeeded.

Install the New Kernel? [no] y ↵
For a Diskless Client of this Host? [no] ↵
Kernel Pathname? [/dgux.aviion] ↵   WAYNE

The new kernel has been copied to /dgux.aviion.
Link /dgux to the New Kernel? [yes] ↵

The new kernel will not take effect until you shutdown and reboot.
To do this, quit sysadm, and say:

  cd /
  /etc/shutdown
  /etc/halt -q

Until you do this, a few commands which depend on the symbol table
in /dgux (such as the kernel profiler and netstat) may not work correctly.
This should not cause any serious difficulties.

#
```

**Bringing Down the System**

```
# cd / ↵
# /etc/shutdown -g0 -y ↵
  ...
# halt -q ↵
```

# AViiON Foundations and Operations H615

## Module 6 – NFS Overview and Installation

Introduction:

This module of introduce the student to the Network File System product availiable on the Aviion platform. This module will give the student sufficient information to successfully install NFS on Aviion system and to obtain remote resources from another machine on the network.

Objectives:

Upon completion of this module of instruction, the student will:

- be able to state what steps are necessary to perform for an NFS "server" to make resources availiable.
- be able to state what steps are necessary to perform for an NFS "client" to access resources across the network.
- install NFS on an Aviion system and and verify it's ability to make resources availiable to other machines and also for it to access remote resources across the network.
- Be able to list the various server processes that must be present on networked machines to provide communications ability.

References:

093–701049– Managing NFS and it's Facilities on the DG/UX System

Network File System

- an Industry Standard interface that Provides transparent remote access to shared filesystems

- allows heterogeneous systems to share files. Designed to be: machine
  operating system
  network architecture
  and transport protocol
  - independent

- Developed by Sun Microsystems.
  part of Sun's ONC (Open Network Computing)
  (based on Sun 2.00)

- DG/UX NFS supported over Local Area Networks
  (ethernet and 802.3)

ADVANTAGES

- hardware savings

- performance benefits

- less downtime

NFS
---

SERVERS

- machines that export filesystems that remote machines may mount

CLIENTS

- machines that obtain resources from server machines

- a machine may be a server and a client at the same time

**RPC**

**XDR**

mount
(umount)

- /etc/mount -ato

-a Mount all filesystems described in /etc/fstab.

-t The next argument is the filesystem type

-o The next argument is a string that specifies mount options. Valid options are:

| | |
|---|---|
| ro | - read only |
| rw | - read write (default) |
| hard | - hard mount |
| soft | - soft mount |

```
mount uwood:/udd /udd1

mount -at nfs

mount -o soft uwood3:/fortran /project
```

/etc/fstab

- mount table referenced during system initialization

```
#
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# terms of a DGC license agreement which governs its use.
#
# This is a prototype for the file /etc/fstab.  Use sysadm to maintain this
# file to conform to the configuration of your system.
# Comment lines are allowed, but blank lines are not.
#
# Local filesystems:
#
/dev/dsk/root           /               dg/ux rw d 0
/dev/dsk/swap           swap_area       swap  sw x 0
#
/dev/dsk/usr /usr dg/ux rw d 1
/dev/dsk/tmp /tmp dg/ux rw w 1
uwood11:/dev/dsk/usr  /usr1  nfs,soft rw d 1
```

NAME

exports, xtab - directories to export to NFS clients

SYNOPSIS

/etc/exports

/etc/xtab

DESCRIPTION

The /etc/exports file contains entries for directories that can be exported to NFS clients. This file is read automatically by the exportfs(8) command. If you change this file, you must run exportfs(8) for the changes to affect the daemon's operation.

Only when this file is present at boot time does the rc.local script execute exportfs(8) and start the NFS file-system daemon, nfsd(8).

The /etc/xtab file contains entries for directories that are currently exported. This file should only be accessed by programs using getexportent (see exportent(3)). (Use the -u option of exportfs to remove entries from this file).

An entry for a directory consists of a line of the following form:

directory -option[,option ]...

directory is the pathname of a directory (or file).

option is one of

ro Export the directory read-only. If not specified, the directory is exported read-write.

rw=hostnames[:hostname]...
Export the directory read-mostly. Read-mostly means read-only to most machines, but read-write to those specified. If not specified, the directory is exported read-write to all.

anon=uid
If a request comes from an unknown user, use uid as the effective user ID. Note: root users (uid 0) are always considered unknown by the NFS server, unless they are included in the root option below. The default






value for this option is -2. Setting anon to -1 disables anonymous access. Note: by default secure NFS will accept insecure requests as anonymous, and those wishing for extra security can disable this feature by setting anon to -1.

root=hostnames[:hostname]...
Give root access only to the root users from a specified host|Aoe. The default is for no hosts to be granted root access.

accessxD(_=client[:client]...
Give mount access to each client listed. A client can either be a hostname, or a netgroup (see netgroup(5)). Each client in the list is first checked for in the netgroup database, and then the hosts database. The default value allows any machine to mount the given directory.

secure
Require clients to use a more secure protocol when accessing the directory.

A `#' (pound-sign) anywhere in the file indicates a comment that extends to the end of the line.

EXAMPLE

```
/usr         -access=clients                # export to my clients
/usr/local                                  # export to the world
/usr2        -access=hermes:zip:tutorial    # export to only these machines
/usr/dgux    -root=hermes:zip               # give root access only to these
/usr/new     -anon=0                        # give all machines root access
/usr/bin     -ro
/usr/stuff   -access=zip,anon=-3,ro         # several options on one line
```

FILES

/etc/exports
/etc/xtab
/etc/hosts
/etc/netgroup

SEE ALSO

exportent(3), hosts(5), netgroup(5), exportfs(8), nfsd(8)

WARNINGS

You cannot export either a parent directory or a subdirectory






of an exported directory that is within the same filesystem. It would be illegal, for instance, to export both /usr and /usr/local if both directories resided on the same disk partition.

mountd

- /usr/etc/mountd

server that answers NFS filesystem mount requests

portmap

- /usr/etc/portmap

server that converts RPC program numbers into DARPA protocol port numbers.

nfsd

- /usr/etc/nfsd [nservers]

starts the server daemons that handle client filesystem requests on the server.

/usr/etc/biod

- starts asynchronous block I/O daemons on an NFS client

Yellow Pages (YP)

- a replicated data lookup facility.
- part of Sun's ONC (Open Network Computing)
- provides clients with a read only access to a set of maps
- ensures consistency

Master server

Slave server

Client

domain

| | |
|---|---|
| passwd.byname | obtain passwd entries indexed by username |
| passwd.byuid | obtain passwd entries indexed by user ID |
| group.byname | obtain group entries by name |
| group.bygid | obtain group entries by group id |
| hosts.byname | translate hostname to internet address |
| hosts.byaddr | Translate Internet address to hostname |
| networks.byaddr | translate network internet number to name |
| networks.byname | translate network name to internet number |
| protocols.byname | translate protocol name to internet protocol number |
| protocols.bynumber | translate internet protocol number to protocol name |
| services.byname | translate internet service names to port numbers |
| netgroup.byhost | obtain netgroup entries by hostname |
| netgroup.byuser | obtain netgroup entries by username |
| ethers.byhost | translate ethernet address to internet address |
| ethers.byaddr | translate hostname to ethernet address |
| ypmaps | list of YP maps in the domain and hostnames of their master servers indexed by map name |
| ypservers | List of YP servers in the domain |
| bootparams | lists root and swap files for diskless client |
| mail.aliases | translate alias entries to mail addresses for users and groups |
| rpc.bynumber | lists rpc programs by rpc program number |

ypcat

- ypcat keyword -keyword is a map name

-d to specify a domain other than the default. "domainname"

returns passwords for the default domain name.

ypcat passwd

| | |
|---|---|
| passwd | passwd.byname |
| group | group.byname |
| hosts | hosts.byaddr |
| networks | networks.byaddr |
| services | services.byname |
| protocols | protocols.bynumber |
| netgroup | netgroup |

ypserv

the YP server, must be running on each server.
- looks up database information in it's local maps
- keeps the maps consistent

ypbind

the YP binder daemon, must be running on all machines, servers and clients. It binds a client to a server in a particular domaine. Originates from the client.

it keeps a record of:

- domaine name
- the internet address of the YP server
- the port number where server is listening

binding done:

at initialization
if a server fails
if an unbound domain is called

yppoll

/usr/etc/yp/yppoll [-h hostname] [-d domainname] mapname

asks a ypserv server process for information about one map.

-h specifies the hostname on which the ypserv process is running. (default is local)

-d specifies an alternate domainname for the YP

ypwhich

tells you which YP server a client is currently using

## Local and Global YP Database files

before setting up the first time make sure that the following files are complete and up to date on the Master:

/etc/passwd

/etc/hosts

/etc/group

/etc/networks

/etc/protocols

/etc/services

/etc/netgroup

/etc/ethers

/etc/bootparams

/etc/netmasks

/.rhosts

/etc/hosts.equiv

/etc/aliases

/etc/rpc

**YP Files**

**Local Files:**

/etc/passwd

```
+ca: : : : :Chris Anderson:/usr/chris:/bin/csh
```

/etc/passwd entry.

```
+ca:

+ca::100:101:Chris Anderson:/usr/chris:/bin/csh:
 ca::100:101:Chris Anderson:/usr/chris:/bin/csh:
```

/etc/group

format:

```
groupname:encrytedpasswd:gid:user1,user2
```

**Global Files:**

/etc/services

It contains a list translating Internet service names, host specific function names and Unix specific function names to port numbers. i.e.:

```
ftp             21/tcp
netstat         15/tcp
```

/etc/protocols

contains a listing of Internet Protocol numbers

| | | | |
|---|---|---|---|
| ip | 0 | IP | internet protocol |
| icmp | 1 | ICMP | internet control message protocol |
| ggp | 3 | GGP | gateway to gateway protocol |
| tcp | 6 | TCP | transmission control protocol |
| pup | 12 | PUP | PARC universal packet protocol |
| udp | 17 | UDP | user datagram protocol |

/etc/networks

format:

```
        woodstock           89
```

/etc/netgroup

The netgroup map defines network wide groups, which are used for permission checking for remote mounts, logins and remote shells. format:

groupname member1, member2, member3

shifta ( , , )

/etc/hosts

format:

89.0.0.3 uwood3

**Special Files**

/etc/hosts.equiv

format:

hostname
uwood3

+ (anyone

+@netgroup or -
+@shifta

each of the names to the right of the @ sign are treated as a group name defined in the global netgroup map.

.rhosts

If there are + or - entries whose arguments are netgroups, the YP netgroup map is consulted; otherwise YP is unused. Controls superuser access via rlogin or rsh. It's format is identical hosts.equiv.

dbm format -

/usr/etc/yp/hostname/hosts.byname.dir
/usr/etc/yp/hostname/hosts,byname.pag

makedbm -

**makedbm [-i yp_input_file] [-o yp_output_name] [-d yp_domain_name] [-m yp_master_name] infile outfile**

makedbm [ -u dbmfilename ]

-i create a special entry with the key YP-INPUT-FILE

-o create a special entry with the key YP_OUTPUT_NAME

-d create a special entry with the key YP_DOMAIN_NAME

-m create a special entry with the key YP_MASTER_NAME

-u undo a dbm file. That is print out a dbm file one entry per line, with a single space separating keys from values.

cd /usr/etc/yp
**makedbm mymap.asc** uwood3/mymap

```
cd /usr/etc/yp/domainname
makedbm -u map.name    >    map.tmp
vi    map.tmp
makedbm    map.tmp       map.name
```

ypmake

```
make -f Makefile
rebuilds the YP database for everything out of date and then
executes a yppush
```

```
make passwd
```

```
makefile
DIR = /usr/etc/yp/src
NOPUSH = ""
DOM = `domainname`
```

```
make -e          - must be used for these variables to take
                   effect.
```

yppush

```
/usr/etc/yp/yppush [ -h hostname] [-d domainname] mapname
```

```
-h               specifies the hostname on which the ypserv
                 process is running. (default is local)

-d               specifies an alternate domainname for the YP
```

NAME

yppasswd - change your network password in the Yellow Pages

SYNOPSIS

yppasswd [ name ]

DESCRIPTION

yppasswd changes (or installs) a network password associated with the user name (your own name by default) in the Yellow Pages. The Yellow Pages password may be different from the one on your own machine.

yppasswd prompts for the old Yellow Pages password, and then for the new one. You must type in the old password correctly for the change to take effect. The new password must be typed twice, to forestall mistakes.

New passwords must be at least four characters long, if they use a sufficiently rich alphabet, and at least six characters long if monocase. These rules are relaxed if you are insistent enough. Only the owner of the name or the super-user may change a password; in either case you must prove you know the old password.

The Yellow Pages password daemon, yppasswdd(8C) must be running on your YP server in order for the new password to take effect.

SEE ALSO

passwd(1), ypfiles(5), yppasswdd(8C)

BUGS

The update protocol passes all the information to the server in one RPC call, without ever looking at it. Thus if you type in your old password incorrectly, you will not be notified until after you have entered your new password.

ypinit

/usr/etc/yp/ypinit -m [-s master_name]

automatically constructs required YP maps for a server, some from text files in /etc. Sets up master YP servers and slave YP servers for the first time.

-m indicates a that the local host is to be the YP master

-s set up a slave database

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Module 7 – TCP/IP Troubleshooting

ntroduction:

This module of instruction will discuss techniques to troubleshoot TCP/IP network problems and introduce tools availiable to an administrator.

Objectives:

Upon completion of this module of instruction, the student will:

- Be able to list the various files used during network initialization to bring the network up.
- be able to use a troubleshooting methodology to isolate problems.
- be familiar with various commands and utilities availiable to assist in problem determination.

References:

| | |
|---|---|
| 093-701051-03 | Setting Up and Managing TCP/IP on the DG/UX System |

Problem Determination:

- ISOLATE

When

Where

What Function

# Problem Determination:

## – On installation

1. Record any error messages.

2. Read release notice and retry installation

3. Had Diagnostics been run on the System before loading Operating System.

4. Rev level of hardware.

5. What Software Release

```
usr/release
-lia
 1094
'5 :rwxr-xr-x   2 bin      bin          512 Nov 13 16:42 .
: drwxr-xr-x  19 bin      bin          512 Nov 13 16:49 ..
83 -r--r--r--   1 root     other       6270 Jul 17 09:03 DTK_2.10.fl
84 -rw-r--r--   1 bin      bin        52886 Jul 27 12:47 DTK_2.10.rn
14 -r--r--r--   1 bin      bin        13517 Jul 12 15:11 STR_form
79 -rw-r--r--   1 root     daemon     25526 Jul 13 11:52 X11_4.10.fl
78 -rw-r--r--   1 bin      bin        31169 Jul 26 14:58 X11_4.10.rn
80 -rw-r--r--   1 437       200       13268 Jul 20 16:26 avx30_1.6.rn
75 -rw-r--r--   1 bin      bin        13423 Jul 27 14:38 cs_usr_pkg_4.10.avx
15 -r--r--r--   1 bin      bin        84691 Jul 14 15:57 dgux.fl
73 -rw-r--r--   1 bin      bin        43808 Jul 27 16:29 dgux.rn
74 -rw-r--r--   1 bin      bin       132314 Jul 28 10:23 dgux_4.10.panic
76 -rw-rw-r--   1 bin      bin          584 Jul 19 15:47 gcc_1.35.12.fl
77 -rw-rw-r--   1 bin      bin        28285 Jul 26 17:41 gcc_1.35.12.rn
93 -rw-r--r--   1 bin      bin         9656 Jul 26 23:25 nc_usr_pkg_4.10
94 -rw-r--r--   1 bin      bin        37609 Jul 27 16:04 nfs.rn
86 -rw-r--r--   1 bin      bin        38718 Jul 27 16:47 tcpip_4.10.rn
87 -rw-r--r--   1 root     other       3311 Jul 21 09:39 tcpip_4.10.tl
88 -rw-r--r--   1 root     other      13636 Jul 11 16:44 tcpip_str_form
```

6. What run level is the system at?

7. Are the necessary filesystems mounted?

- Errors on a running system

1. Was there an error message?

2. Is the system at the proper run level?

3. Try #telnet localhost, OK
   #telnet internet#

4. Is the LAN intact.

5. was the controller started properly

NAME

ping - Network debugging

SYNOPSIS

/usr/bin/ping host [ timeout ]

DESCRIPTION

The ping command tests whether a node on an Internet network is up and working, though the upper layers of TCP/IP need not be up. This program sends an ICMP echo packet to host using a RAW socket interface, expecting the required ICMP response. If the ICMP packet is sent and received correctly, then a message is printed saying that host is alive. If there are errors locating host, creating the socket, sending the message, or receiving the message, an error message is printed.

The ping continues testing the network until timeout seconds have elapsed or until an answer is received. The default timeout is 20 seconds. The host argument can be a name or an Internet address.

EXAMPLE

```
ping bucky
bucky is alive (This line is returned.)
```

SEE ALSO

ruptime(1c)

cable/connection/remote host is OK

IP level is OK, but software levels above may not be OK

- next try rlogin

you can ping yourself

```
# ls -lia

total 234
 65516 drwxr-xr-x   2 bin      bin          512 Jul 20 14:37 .
    16 drwxr-xr-x   4 bin      bin         2048 Jul 20 16:48 ..
 69896 -rwxr--r--   1 root     sys         1748 Jul 14 11:03 chk.date
 69888 -rwxr--r--   1 root     sys        10172 Jul 14 11:03 chk.devlink
 69889 -rwxr--r--   1 root     sys         3524 Jul 20 13:01 chk.system
 69890 -rwxr--r--   1 root     sys         6242 Jul 14 11:03 functions.h
 69891 -rwxr--r--   1 root     sys         1870 Jul 14 11:03 messages.h
 69892 -rwxr--r--   1 root     sys         1693 Jul 14 11:03 rc.account
 69893 -rwxr--r--   1 root     sys         1666 Jul 14 11:03 rc.cron
 69898 -rwxr--r--   1 root     sys         3255 Jul 14 11:03 rc.links
 69899 -rwxr--r--   1 root     sys         1812 Jul 14 11:03 rc.localfs
 69900 -rwxr--r--   1 root     sys         2460 Jul 20 13:02 rc.lpsched
 69909 -rwxr--r--   1 root     sys         2291 Jul 14 09:18 rc.nfsfs
 69910 -rwxr--r--   1 root     sys         2298 Jul 20 13:08 rc.nfsserv
 69901 -rwxr--r--   1 root     sys         1860 Jul 14 11:03 rc.preserve
 69902 -rwxr--r--   1 root     sys         1022 Jul 20 13:02 rc.setup
 69895 -rwxr--r--   1 root     sys         1455 Jul 14 11:03 rc.syacs
 69894 -rwxr--r--   1 root     sys         1413 Jul 14 11:03 rc.syslogd
 69907 -rwxr-xr-x   1 bin      bin         4144 Jun 15 13:45 rc.tcpipport
 69908 -rwxr-xr-x   1 bin      bin         2384 Jun 15 13:45 rc.tcpipserv
 69903 -rwxr--r--   1 root     sys         1519 Jul 14 11:03 rc.update
 69904 -rwxr--r--   1 root     sys         1032 Jul 14 11:03 rc.usrproc
 69911 -rwxr--r--   1 root     sys         3958 Jul 14 09:18 rc.ypserv
 69897 -rwxr-xr-x   1 bin      bin        47522 Jul 14 11:03 set_boot_time
```

Scripts to start TCP

su

```
% su ↵
Password: (enter the superuser password)
# /usr/sbin/init.d/rc.nfsserv stop ↵ (only if running NFS)
# /usr/sbin/init.d/rc.ypserv stop ↵ (only if running YP)
# /usr/sbin/init.d/rc.tcpipserv stop ↵
# /usr/sbin/init.d/rc.tcpipport stop ↵
# /usr/sbin/init.d/rc.tcpipport start ↵
# /usr/sbin/init.d/rc.tcpipserv start ↵
# /usr/sbin/init.d/rc.ypserv start ↵ (only if running YP)
# /usr/sbin/init.d/rc.nfsserv start ↵ (only if running NFS)
```

#PATH=$PATH:.:

includes PWD into executable commands in ENV

— netinit — protocol stack was built

# ifconfig "your host name" (in loopback OK)

# ifconfig ineth0

## NAME

netinit - Build a network protocol stack

## SYNOPSIS

**/usr/bin/netinit** *input_directives_file*

or

**/usr/bin/netinit**

where:

*input_directives_file* contains a sequence of directives

## DESCRIPTION

Use the **netinit** command to build the TCP/IP protocol stack. The **netinit** replaces the **ifinit** command.

Building the protocol stack involves opening new Streams to the drivers that TCP/IP uses, pushing appropriate protocol modules, and linking together the appropriate drivers. When you use **netinit**, you start a non-active controller. You must build the TCP/IP protocol stack before you use an interface to transmit and receive packets. Run **netinit** as a daemon that builds and configures an arbitrary Streams stack. The daemon is driven by an *input_directives_file* composed of many individual **netinit** directives. The file may be delivered to **netinit** in a file through the command line or it may be read from standard input. All **netinit** output is directed to standard error. The **netinit** command uses standard Streams linkages throughout.

### netinit Directives

A **netinit** directive is a sequence of ASCII words delimited by spaces, the first of which is the keyword. You separate directives with newlines. Directives emulate function calls. Each directive is interpreted and executed as soon as it is read from the standard input. The result of executing a directive is returned as an ASCII status string through standard error. The string "OK" is returned when no errors occur during execution of the directive. Appropriate negative acknowledgements are returned under error conditions.

### The Directive Vocabulary

The directive primitives are closely involved with Streams operations such as the I_LINK ioctl. This section focuses on the nature of the *input_directives_file*. It is beyond the scope of this manual page to explain Streams functionality.

The **netinit** command recognizes the following keywords: **AS, OPEN, CLOSE, PUSH, POP, LINK, UNLINK** and **RUN**. When using these keywords, case is not important.

Use the **OPEN** keyword as follows

**OPEN** *device*

or

**OPEN** *device* **AS** *name*

This opens the Streams driver with pathname *device*. The **netinit** program retains the file descriptor for use in processing subsequent directives that refer to the given device. If the optional **AS** clause is supplied, subsequent

**netinit** directives may refer to the opened device using the supplied *name* rather than the device pathname.

Use the **CLOSE** keyword as follows:

**CLOSE** *device*

If the program has an open Stream to the named *device*, it is closed.

Use the **PUSH** keyword as follows:

**PUSH** *device module*

This pushes the specified Streams *module* onto the open Stream to the named *device*. An error occurs if the *module* or the *device* does not exist, or if there is not an open Stream to the device.

Use the **POP** keyword as follows:

**POP** *device*

This pops the *module* associated with the named *device* that is nearest the Stream head from the Stream. An error occurs if there is no open Stream to the named *device*, or if no modules are in the Stream.

Use the **LINK** keyword as follows:

**LINK** *mux_device lower_device*

The open Stream to *lower_device* is linked beneath the *mux_device*. An error occurs if there are not open Streams to both the *mux_device* and the lower_device, or if the *mux_device* is not a Streams multiplexing driver.

Use the **UNLINK** keyword as follows:

**UNLINK** *mux_device lower_device*

Unlink the *lower_device* from under the *mux_device*. An error occurs if *lower_device* does not specify a device linked under a Streams multiplexing driver specified by *mux_device*.

Use the **RUN** keyword as follows:

**RUN** *program_name* [*arglist*] [**<** *input_device*] [**>** *output_device*]

You must specify a pathname to an executable file as the *program_name*. The optional *arglist* is passed to the *program_name*; the input and output device specifications, if specified, must refer to open Streams.

Use the **RENAME** keyword as follows:

**RENAME** *mux_device lower_device* **AS** *label*

This verifies that the *lower_device* has been linked under a *mux_device*, and that the multiplexor device has not been linked. It then causes the *mux_device* to assign the string *label* to the lower stream identified by *lower_device*.

## EXAMPLES

The following example shows a typical *input_directives_file* that builds a TCP/IP stack containing a loopback and an inen network device.

```
open /dev/ip as ip
open /dev/loop0 as loop0
link ip loop0
rename ip loop0 as loop0
run ifconfig loop0 localhost broadcast 127.255.255.255 netmask 0xff000000
open /dev/inen0 as inen0
push inen0 ether arp
link ip inen0
rename ip inen0 as inen0
run ifconfig inen0 mav33 broadcast 128.222.8.255 netmask 0xFFFFFF00
```

**SEE ALSO**

**ifconfig**(1m), **inen**(7), **hken**(7), *STREAMS Programmer's Guide for the DG/UX™ System*.

NAME

ifconfig – configure DG/UX System network interface

SYNOPSIS

ifconfig dev [ host [netmask val] [broadcast addr] ] | [start|stop]

DESCRIPTION

The /usr/bin/ifconfig command controls a network interface for the TCP/IP protocol stack. It assigns an address to a network interface, configures the network interface parameters, and

stops and restarts message passing for that interface. You must use ifconfig when you bring an interface up to define its network address; you can also use it later to redefine an interface address.

The dev option is a string that specifies the name and the unit number of the network interface, such as inen0. The host argument to the option is either a hostname found in the host database (/etc/hosts) or an Internet address expressed in the Internet standard dot notation.

Use the netmask option with address assignment to specify a network mask to use for subnetting. The netmask val is a 32-bit number that identifies which bits of the host's Internet address indicate the subnet number. The broadcast option, which you also can use with address assignment, changes the IP broadcast addr for the given interface to the specified value.

You can change the dev address, the broadcast addr, and the netmask val only if the interface is stopped.

The key words start|stop represent the following:

start: Enables sending and receiving messages.

stop: Disables sending and receiving messages.

If you omit the optional arguments, ifconfig displays the current configuration for the specified network interface.

If the interface is capable of broadcasting, and the broadcast command line option is not supplied, ifconfig uses the default broadcast address for the interface. If the netmask command line option is not supplied, the default network mask for the address is used. The default will disable subnetting at the interface.

Only the superuser can change the configuration of a network interface.

EXAMPLES

```
ifconfig inen0 128.0.0.31
ifconfig inen0 hostB broadcast 128.0.0.0
ifconfig inen0 128.5.1.31 broadcast 128.5.1.0 netmask
0xffffff00
```

The first example assigns Internet address 128.0.0.31 to interface inen0 with the default broadcast address. The second example maps hostname hostB to an Internet address given in /etc/hosts and associates that address with interface inen0. It also sets the IP broadcast address to be 128.0.0.0. The third example assigns the Internet address 128.5.1.31 to the interface inen0, sets the network mask to 0xffffff00 so that the high-order 24 bits of the address will be used as the Internet network number (network 128.5, subnet 1), and sets the broadcast address so that its host number part is all zeroes.

DIAGNOSTICS

The system displays messages when the specified interface does not exist, when the requested address is unknown, when the user invoking ifconfig is not the superuser, and when the broadcast value is not satisfactory. For example, the only acceptable broadcast values for unsubnetted class B addresses are:

```
255.255.255.255
net-number.255.255
0.0.0.0
net-number.0.0
```

FLAGS

All of the following flags should be present for a working interface:

| | |
|---|---|
| RUNNING | LAN controller is working. It was activated either by the ifinit(1M) command or by another protocol stack using the same LAN controller. |
| ATTACHED | The TCP/IP protocol stack was successfully built by the ifinit command. |
| STARTED | Interface enabled for sending and receiving data. It is adjusted with ifconfig start\|stop |
| UP | Interface is STARTED, ATTACHED, and RUNNING |
| BROADCAST | Interface has capability to broadcast |

```
#
#
#       /*************************************************************
#       * Copyright (C) Data General Corporation, 1985 - 1988       *
#       *                  All Rights Reserved.                     *
#       * Licensed Material-Property of Data General Corporation.   *
#       *************************************************************/
#
#       /*************************************************************
#       * This software is made available solely pursuant to the    *
#       * terms of a DGC license agreement which governs its use.   *
#       *************************************************************/
#
#ident "@(#)tcpip.params        8.1"
#
#-------------------------------------------------------------------------
#
#       Example:        The following arbitrary information will be used
#                       in examples through out this file in an attempt
#                       to further clarify the use of specific parameters.
#
#                       For our purpose let's suppose we have a hosts
#                       named "mav-31" whose internet address is
#                       "128.222.8.31" and is to be configured on device
#                       "inen0".
#
#                       Thus, our consolidated information is as follows:
#
#                       hostname:               mav-31
#                       internet address:       128.222.8.31
#                       interface device:       inen0
#
#-------------------------------------------------------------------------

#########################################################################
#
#                       rc.netport Parameters
#
#########################################################################

#-------------------------------------------------------------------------
#
# Command:      hostname
#
# Parameters:   hostname_ARG
#
# Definition:   This is simply a symbolic name you assign to your host.
#
# Example:      hostname_ARG="mav-31"
#

#-------------------------------------------------------------------------

hostname_ARG="uwood12"  STUDENT 2

#-------------------------------------------------------------------------
#
# Command:      hostid
#
# Parameters:   hostid_ARG
#
# Definition:   This is the id of the local host specified in the hostname_ARG
#               parameter.  The host id is a hex number formed by the
#               concatenation of the hexadecimal representation of the local
#               host's internet address.
#
# Example:      Assuming our internet address is 128.222.8.31 . By converting ea
ch
#               field to hex we get 80.DE.08.1f.  The hex number we get from
#               concatenating these four fields is 0x80DE081f.
#
#               hostid_ARG="0x80DE081f"
#
#-------------------------------------------------------------------------

hostid_ARG="59000102"
```

```
-----------------------------------------------------------------------

 Command:       security

 Parameters:    security_ARG

 Definition:    Parameters for the security command.

 Example:       See the security(1M) man page for more information.

-----------------------------------------------------------------------

ecurity_ARG="-i -n"

:#############################################################################
:
:                       rc.netboards Parameters
:
:#############################################################################

#-----------------------------------------------------------------------
#
# Command:      ifconfig
#
# Parameters:   HOSTNAMES
#               DEVICES




#               BROADCAST_ADDRESSES
#               NETMASKS
#
# Definition:   Each of these parameters are ordered lists or "arrays".
#               The parameter values MUST be separated by white space.
#
#               HOSTNAMES:      The name of the hosts associated
#                               with a device to be configured.  This name
#                               MUST be defined in the /etc/hosts file
#                               for ifconfig to function properly.
#
#               DEVICES:        The name of the device to be configured.
#                               The device name MUST be an entry in
#                               the /dev directory.
#
#               BROADCAST_ADDRESSES: This is the broadcast address to be
#                               assigned to the configured interface.
#
#               NETMASKS:       This is the subnetwork mask to be assigned
#                               to the configured interface.
#
# Example:      Assumptions:
#                       Our host is named "mav-31".
#                       We are assigning this name to device "inen0".
#                       We have already defined the local loopback interface.
#
#               HOSTNAMES="localhost  mav-31"
#               DEVICES="loop0  inen0"
#               BROADCAST_ADDRESSES="127.255.255.255  128.222.8.255"
#               NETMASKS="0xff000000  0xffffff00"
#
#               NOTE: IMPORTANT!!!
#               Although we don't care what the broadcast address and the
#               netmask are we MUST explicitly fill in the parameters
#               with the defaults because the lists ARE ORDERED.  In
#               this example we explicitly set the broadcast address and
#               network mask.  Actually, the any parameter value for
#               HOSTNAMES, BROADCAST_ADDRESSES, or NETMASK may be expressed
#               in internet dot notation, hex format, or symbolic name.
#               Any symbolic name used MUST be defined in the /etc/hosts
#               file for the name to be resolved correctly.  The use of
#               symbolic name reference is recommended.
#
#               It should be noted that the local loop back device does not
#               have broadcast or subnet capabilities.  However, we must
#               create "dummy" entries as fillers to maintain array order.
#
#-----------------------------------------------------------------------
```

VARIABLES

/etc/host file

```
HOSTNAMES="localhost uwood12"
DEVICES="loop0 inen0"
BROADCAST_ADDRESSES="127.255.255.255 89.255.255.255"
NETMASKS="0xff000000 0xff000000"

#------------------------------------------------------------------------
#
# Command:       route
#
# Parameters:    ROUTE_TYPES
#                ROUTE_DESTINATIONS
#                ROUTE_GATEWAYS
#                ROUTE_METRICS
#
# Definition:    Each of these parameters are ordered lists or "arrays".
#                The parameter values MUST be separated by white space.
#
#                ROUTE_TYPES:     This indicates whether the destination address
#                                 is a host or network.
#
#                ROUTE_DESTINATIONS: The host or network name specifying the
#                                 destination of the route.
#
#                ROUTE_GATEWAYS: Specifies the name of the interface or
#                                 gateway through which traffic is routed.
#
#                ROUTE_METRICS:   This parameter takes on either a zero or
#                                 non-zero value.  A zero value implies an
#                                 interface route.  A non-zero value implies a
#                                 gateway route.
#
# Example:       Assumptions:
#                        We wish to route all traffic for 128.222.3.0 network to
#                        our gateway machine whose address is 128.222.8.50
#                        on our network.  The 128.222.3.0 network is on a
#                        different physical network.
#
#                ROUTE_TYPES="net"
#                ROUTE_DESTINATIONS="128.222.3.0"
#                ROUTE_GATEWAYS="128.222.8.50"
#                ROUTE_METRICS="1"
#
#                NOTE: IMPORTANT!!!  Any parameter value for
#                ROUTE_DESTINATIONS or ROUTE_GATEWAYS may be expressed
#                in internet dot notation, hex format, or symbolic name.
#                Any symbolic name used MUST be defined in the /etc/hosts
#                or /etc/networks files for the name to be resolved correctly.
#                The use of symbolic name reference is recommended.
#
#------------------------------------------------------------------------



ROUTE_TYPES=""
ROUTE_DESTINATIONS=""
ROUTE_GATEWAYS=""
ROUTE_METRICS=""

##############################################################################
#
#                          rc.netserv Parameters
#
##############################################################################
```

/etc/tcpip-parameters

---

Command: <any-network-daemon>

Parameters: <any-network_daemon>_ARG

Definition: Provides parameters for any specified network daemon.

Example:

Assume we are providing parameters for the simple mail transfer protocol daemon named "smtp". We simply create the entry by appending _ARG to the name and fill in the parameters.

smtp_ARG="-q30m"

---

tp_ARG="-q30m"

Daemons to be started/stopped by rc.tcpipserv:

CPIPSERV_DAEMONS="smtp inetd rwhod"

```
# cat /etc/nfs.params
#
#
#       /*************************************************************
#       * Copyright (C) Data General Corporation, 1985 - 1988       *
#       *                  All Rights Reserved.                     *
#       * Licensed Material-Property of Data General Corporation.   *
#       *************************************************************/
#
#       /*************************************************************
#       * This software is made available solely pursuant to the    *
#       * terms of a DGC license agreement which governs its use.   *
#       *************************************************************/
#
# SWhat: <@(#) nfs.params.proto,v       1.7> S
#


#
# /etc/nfs.params
#


#
#   The parameters for nfs/yp must be setup for your particular
#   system. Two kinds of variables in the /etc/nfs.params file
#   control the way NFS and YP will be invoked and initialized
#   each time you change to an appropriate run level with init.
#
#   These variables are either _START arguments which determine
#   the services made available automatically, or _ARG variables
#   which set the parameters used by the services/demons when
#   they're started.
#
#   Each variable has a description of its purpose and a
#   recommended default value. See the Network File System Guide
#   for information specific to each service/demon.



#############################################################################
# REQUIRED  YP  VALUES

   # IF you are using YP, THEN you MUST set the domainname_ARG
   # There is NO default for this argument
   # Running YP with no domainname is an ERROR causing YP to FAIL.

domainname_ARG="topgun"
```

```
   # You must indicate whether this is a YP master, server or client.

   # Masters maintain yp map sources and supply yp map info to others.
   # Servers supply yp map info to other yp hosts on demand.
   # A client consumes yp services without supplying any.

   # Set the ypserv_START to reflect the status of your host.

                # the default value is: ypserv_START="CLIENT"
                # any value other than "MASTER" "SERVER" "CLIENT"
                # is equivalent to the default, which turns YP OFF!
                # IF you are a MASTER, set to: ypserv_START="MASTER"
                # IF you are a SERVER, set to: ypserv_START="SERVER"
                # IF you are a CLIENT, set to: ypserv_START="CLIENT"
                # a good default value is: ypserv_START="CLIENT"
ypserv_START="CLIENT"



   # indicate whether this host is passwd master so yppasswdd demon
   # will start. See the nfs/yp manual for information on yppasswdd

   # if this host is master for the yp passwd map, set yppasswdd_ARG
   # to "/etc/yp/src/passwd -m passwd" (or appropriate value).
   # IF THIS IS NOT THE yppasswd MASTER, set yppasswdd_ARG to ""

yppasswdd_ARG=""



#########################################################################
# OPTIONAL NFS  VALUES

   # nfsserv starts the demons associated with NFS services
   #   (portmap, rwalld rusers, mountd, nfsd, biod).
   # nfsfs mounts remote nfs file systems listed in /etc/fstab

   # IF you intend to mount remote nfs file systems THEN
   #   nfsserv_START and nfsfs_START must both be true

               # the default value is: nfsserv_START="true"
               # any value other than "false" equals the default
nfsserv_START="true"

               # the default value is: nfsfs_START="true"
               # any value other than "false" equals the default
nfsfs_START="true"
```

```
   # number of biod demons to be started is based on the amount
   # of network (nfs) traffic. See the manual for details.

                # default value is: biod_ARG="4"
biod_ARG="4"

                # default value is: nfsd_ARG="4"
nfsd_ARG="4"

   # remote locking demons

                # default value is: lockd_ARG=""
lockd_ARG=""

                # default value is: statd_ARG=""
statd_ARG=""

                # default value is: lockd_sleep_ARG="45"
lockd_sleep_ARG="45"
```

NAME

showmount - show all remote mounts

SYNOPSIS

/usr/etc/showmount [ -ade ] [ host ]

DESCRIPTION

showmount lists all the clients that have remotely mounted a filesystem from host. This information is maintained by the mountd(8C) server on host, and is saved across crashes in the file /etc/rmtab. The default value for host is the value returned by hostname(1).

OPTIONS

-a Print all remote mounts in the format

hostname:directory

where hostname is the name of the client, and directory is the root of the file system that has been mounted.

-d List directories that have been remotely mounted by clients.

-e Print the list of exported file systems.

FILES

/etc/rmtab

SEE ALSO

hostname(1), exports(5), exports(5), mountd(8C)

BUGS

If a client crashes, its entry will not be removed from the list until it reboots and executes `umount -a'.

nfstat

- /usr/etc/nfstat -csnr

displays statistical information about the NFS and remote procrdure call (RPC) interfaces to the kernel

-c display client information

-s display server information

-n display NFS information for both client and server

-r display RPC information for both client and server

default with no options is: nfsstat -csnr

i.e.

```
Server rpc:
 calls badcalls nullrec badlen xdrcall
 4     0        0       0      0

server nfs
 calls      badcalls
 0          0

 null  getattr  setattr root  lookup  readlink  read
 0 0%  0 0%     0 0%    0 0%  0 0%    0 0%      0 0%

 wrcache write  create  remove rename link      symlink
 0 0%    0 0%   0 0%    0 0%   0 0%   0 0%      0 0%

 mkdir   rmdir  readdir fsstat
 0 0%    0 0%   0 0%    0 0%


 Client rpc:
 calls   badcalls       retrans badix timeout   wait    newcred
 225     0              0       0     0         0       0

 Client nfs:
 calls   badcalls       nclget  nclsleep
 225     0              225     0

 null    getattr        setattr root  lookup    readlink read
 0 0%    51 22%         3 1%    0 0%  150 66%   0 0%     6 2%

 wrcache write          create  remove rename   link     symlink
 0 0%    6 2%           0 0%    0 0%   0 0%     0 0%     0 0%

 mkdir   rmdir  readdir  fsstat
 0 0%    0 0%   8 3%     1  0%
```

Version 2 mnemonics

```
null      do nothing
getattr   get get file attributes
setattr   set file attributes
root      obsolete function
```

```
lookup      lookup filename
readlink    read from symbolic link
read        read from file
writecache  obsolete function
write       write to file
create      create file
remove      remove file
rename      rename
link        create link to file
symlink     create symbolic link
mkdir       create a directory
rmdir       remove a directory
readdir     remove read from a file
statfs      get filesystem attributes
```

rpcinfo

- /usr/etc/rpcinfo -p [host]
  /usr/etc/rpcinfo -u host program-number version-number
  /usr/etc/rpcinfo -t host program-number version-number

rpcinfo makes an RPC call to an RPC server and reports what it finds

rpcinfo -p gives the program numbers to use with rpcinfo -u and -t.

program number are:

| | |
|---|---|
| 100002 | rusersd |
| 100004 | ypserv |
| 100005 | mountd |
| 100007 | ypbind |
| 100008 | rwalld |
| 100009 | yppasswd |

-p probe the portmapper on [host] and print a list of all registered RPC programs. Default hostname(1) if no argument supplied.

-u Make an RPC call to procedure 0 version # of program #, using UDP and report whether a response was received.

-t make an RPC call to procedure 0 of version # of program #, using TCP and report if a response was received.

NAME

spray - spray packets

SYNOPSIS

/usr/etc/spray host [ -c count ] [ -d delay ] [ -i ] [ -l length ] host

DESCRIPTION

spray sends a one-way stream of packets to host using RPC, and reports how many were received, as well as the the transfer rate. The host argument can be either a name or an internet address.

OPTIONS

-c count

Specify how many packets to send. The default value of count is the numbers of packets required to make the total stream size 100000 bytes.

-d delay

Specify how may microseconds to pause between sending each packet. The default is 0.

-i Use ICMP echo packets rather than RPC. Since ICMP automatically echos, this creates a two way stream.

-l length

The length parameter is the numbers of bytes in the ethernet packet that holds the RPC call message. Since the data is encoded using XDR, and XDR only deals with 32 bit quantities, not all values of length are possible, and spray rounds up to the nearest possible value. When length is greater than 1514, then the RPC call can no longer be encapsulated in one Ethernet packet, so the length field no longer has a simple correspondence to Ethernet packet size. The default value of length is 86 bytes (the size of the RPC and UDP headers)

SEE ALSO

icmp(4P), ping(8C), sprayd(8C)

NAME

netstat - Show status for DG/UX network parameters

SYNOPSIS

netstat [ -Aainsrt ] [ interval ] [ system [ core ] ]

DESCRIPTION

The netstat command symbolically displays the contents of various network-related data structures. The options are as follows:

-A The address of any associated protocol control blocks (used for debugging).

-a The state of all sockets; normally, sockets used by server processes are not shown.

-i The state of interfaces that have been auto-configured (interfaces statically configured into a system but not located at boot time are not shown).

-n Network addresses as numbers (normally, netstat interprets addresses and tries to display them symbolically).

-s Per-protocol statistics.

-r The routing tables.

-t Shows the local and remote addresses, send and receive queue sizes (in bytes), protocol, and (optionally) the internal state of the protocol for active sockets. This is the default display.

The arguments system and core allow substitutes for the defaults /dgux and /dev/kmem.

If an interval is specified, netstat continuously displays information related to packet traffic on the configured network interfaces. The netstat command pauses the number of seconds indicated by interval before refreshing the screen.

The arguments system and core allow substitutes for the defaults /dgux and /dev/kmem.

If an interval is specified, netstat continuously displays information related to packet traffic on the configured network interfaces. The netstat command pauses the number of seconds indicated by interval before refreshing the screen.

If a socket's address specifies a network but no specific host address, address formats are displayed in the form host-port or






network-port. When the host and network addresses are specified, they are displayed symbolically according to the databases /etc/hosts and /etc/networks, respectively. If a symbolic name for an address is unknown, or if the -n option is specified, the address is printed in the Internet dot format. Unspecified or wildcard addresses and ports appear as *-.

The interface display provides a table of cumulative statistics on packets transferred, errors, and collisions. The network address (currently Internet-specific) of the interface and the maximum transmission unit (mtu) are also displayed.

The routing table display indicates the available routes and their status. Each route consists of a destination host or network and a gateway to use in forwarding packets. The flags field shows the state of the route (U if up), and whether the route is to a gateway (G). Direct routes are created for each interface attached to the local host. The refcnt field gives the current number of active uses of the route. Connection-oriented protocols normally hold on to a single route during a connection; protocols without connections obtain a route, then discard it. The use field provides a count of the number of packets sent using that route. The interface entry indicates the network interface used for the route.

When invoked with an interval argument, netstat displays a running count of statistics related to network interfaces. This display shows two columns: one for all interfaces, and one for the interface with the most traffic since the system was last rebooted. The first line of each screen of information contains a summary of activity since the system was last rebooted. Subsequent lines of output show values accumulated over the preceding interval.

SEE ALSO

hosts(4), networks(4), protocols(4), services(4)

need routing tables in memory.
If 2 networks are in 1 machine

% netstat -r -n

Routing tables

| Destination | Gateway | Flags | Interface |
|---|---|---|---|
| 127.0.0 | 127.0.0.1 | U | loop0 |
| 128.223.1 | 128.223.2.1 | UG | inen0 |
| 128.223.2 | 128.223.2.2 | U | inen0 |
| 128.223.3.5 | 128.223.2.1 | UGH | inen0 |

## *netstat -s*

```
udp:
        8 bad header checksums
        0 incomplete headers
        0 bad data length fields
tcp:
        4 bad header checksums
        0 bad header offset fields
        0 incomplete headers
icmp:
        205 calls to icmp_error
        0 errors not generated 'cuz old message too short
        0 errors not generated 'cuz old message was icmp
        Output histogram:
                echo reply: 6
                destination unreachable: 205
                time stamp reply: 1327
                address mask reply: 1
        0 messages with bad code fields
        0 messages < minimum length
        0 bad checksums
        6 messages with bad length
        1334 message responses generated
        Input histogram:
                echo reply: 4
                destination unreachable: 75103
                source quench: 5
                routing redirect: 416
                echo: 6
                time exceeded: 13
                time stamp: 1327
                address mask request: 1
ip:
        0 bad header checksums
        13 with size smaller than minimum
        0 with data size < data length
        0 with header length < data size
        0 with data length < header length
```

## netstat -i

some collisions are OK

but XCIEVER or CLR

| Name | Mtu | Network | Address | Ipkts | Ierrs | Opkts | Oerrs | Colls |
|---|---|---|---|---|---|---|---|---|
| hme1 | 1500 | 128.223.1.0 | sales | 1037544 | 3 | 910644 | 0 | 46406 |
| hme0 | 1500 | 128.223.2.0 | sales-alt | 311546 | 0 | 134806 | 0 | 3809 |
| lo0 | 1500 | 127.0.0.0 | localhost | 398 | 0 | 398 | 0 | 0 |

local loopback

## *netstat 10*

updated every 10 seconds

| input | (hme1) | output | | | input | (Total) | output | |
|---|---|---|---|---|---|---|---|---|
| packets | errs | packets | errs | colls | packets | errs | packets | errs | colls |
| 312165 | 0 | 134962 | 0 | 3811 | 1353318 | 3 | 1049158 | 0 | 50606 |
| 19 | 0 | 1 | 0 | 0 | 49 | 0 | 31 | 0 | 0 |
| 16 | 0 | 16 | 0 | 0 | 93 | 0 | 88 | 0 | 0 |
| 11 | 0 | 11 | 0 | 0 | 132 | 0 | 134 | 0 | 12 |
| 18 | 0 | 19 | 0 | 9 | 108 | 0 | 74 | 0 | 17 |
| 4 | 0 | 94 | 0 | 24 | 182 | 0 | 171 | 0 | 24 |
| 12 | 0 | 81 | 0 | 9 | 159 | 0 | 146 | 0 | 9 |
| 22 | 0 | 2 | 0 | 0 | 63 | 0 | 41 | 0 | 0 |
| 5 | 0 | 15 | 0 | 0 | 54 | 0 | 55 | 0 | 10 |
| 14 | 0 | 10 | 0 | 0 | 116 | 0 | 98 | 0 | 2 |
| 27 | 0 | 11 | 0 | 8 | 125 | 0 | 99 | 0 | 9 |
| 12 | 0 | 0 | 0 | 0 | 68 | 0 | 59 | 0 | 0 |
| 25 | 0 | 1 | 0 | 0 | 48 | 0 | 36 | 0 | 8 |
| 21 | 0 | 3 | 0 | 8 | 71 | 0 | 50 | 0 | 8 |
| 5 | 0 | 4 | 0 | 0 | 61 | 0 | 93 | 0 | 0 |

*netstat -a*

```
Active connections (including servers)
Proto Recv-Q Send-Q  Local Address          Foreign Address        (state)
udp        0      0  sales-alt-53           *.*
udp        0      0  sales-53               *.*
udp        0      0  localhost-53           *.*
udp        0      0  *.53                   *.*
udp        0      0  *.echo                 *.*
udp        0      0  *.ftp                  *.*
udp        0      0  *.715                  *.*
udp        0      0  *.route                *.*
udp        0      0  *.syslog               *.*
udp        0      0  *.993                  *.*
udp        0      0  *.sunrpc               *.*
tcp        0      0  sales-alt-login        dgl-1021               ESTABLISHED
tcp        0      0  sales-alt-login        sun1-1022              ESTABLISHED
tcp        0      0  sales-telnet           sys02-2977             ESTABLISHED
tcp        0      0  sales-alt-1048         dgl-XV11               ESTABLISHED
tcp        0      0  sales-1043             sys56-nntp             ESTABLISHED
tcp        0      0  *.1034                 *.*                    LISTEN
tcp        0      0  *.53                   *.*                    LISTEN
tcp        0      0  *.time                 *.*                    LISTEN
tcp        0      0  *.daytime              *.*                    LISTEN
tcp        0      0  *.chargen              *.*                    LISTEN
tcp        0      0  *.discard              *.*                    LISTEN
tcp        0      0  *.echo                 *.*                    LISTEN
tcp        0      0  *.exec                 *.*                    LISTEN
tcp        0      0  *.login                *.*                    LISTEN
tcp        0      0  *.shell                *.*                    LISTEN
tcp        0      0  *.telnet               *.*                    LISTEN
tcp        0      0  *.ftp                  *.*                    LISTEN
tcp        0      0  *.smtp                 *.*                    LISTEN
tcp        0      0  *.656                  *.*                    LISTEN
tcp        0      0  *.649                  *.*                    LISTEN
tcp        0      0  *.629                  *.*                    LISTEN
tcp        0      0  *.1024                 *.*                    LISTEN
tcp        0      0  *.994                  *.*                    LISTEN
tcp        0      0  *.sunrpc               *.*                    LISTEN
```

AME
arp - address resolution display and control

YNOPSIS
```
/usr/bin/arp [ -i dev ] -a
/usr/bin/arp [ -i dev ] host
/usr/bin/arp [ -i dev ] -d host
/usr/bin/arp [ -i dev ] -s host ether_addr [ temp ] [ pub ]
/usr/bin/arp [ -i dev ] -f file
```

ESCRIPTION
The arp program displays and modifies the Internet-to-Ethernet address translation tables used by the Address Resolution Protocol arp(6P) and the Reverse Address Resolution Protocol rarp(6P).

When you use the -a option, the program displays all of the current ARP entries by reading the internal kernel tables (using the appropriate ioctl calls). When you use this option, you do not have to specify the name of a host or of a file.

With host as the argument, the program displays the current ARP entry for that host. You may specify the host by name or by number, using Internet standard dot notation.

With the -d option, a superuser may delete an entry for the host named host.

Use the -s option to create an ARP entry for the host named host with the Ethernet address ether_addr. The Ethernet address is specified as six hexadecimal bytes separated by colons. The resulting ARP entry is permanent unless the word temp is specified on the command line. If the word pub is specified, the entry will be "published"; that is, this system will act as an ARP server, responding to requests for host even though the host address is not its own. Only a superuser may set a new entry in the table.

The -f option causes the file named file to be read and multiple entries to be set in the ARP tables. Only the superuser may use this option. Entries in the file should be of the following form:

```
host ether_addr [ temp ] [ pub ]
```

# arp -a
# arp -s

with argument meanings as described above.

If you specify the -i option, only the ARP table for the interface named dev will be searched.

FTP

ftp> debug

Allows the user to see

ftp protocols commands listed as they execute

```
FTP user (version 4.0 6/28/88) ready.
ftp>
ftp> Verbose mode off.

ftp> Verbose mode on.

ftp> Debugging on (debug=1).

ftp> Connected to uwocd3.
220 uwocd3 FTP server (version 4.0 6/28/88) ready.
Name (uwocd3:root): ---> USER root
331 Password required for root.
Password (uwocd3: root): ---> PASS root1
230 User root logged in. No account needed.

ftp> ---> XPWD
251 "/" is current directory.

ftp> ---> PORT 89,0,0,5,4,21
200 PORT command okay.
---> NLST -lia
150 Opening data connection for /bin/ls (89.0.0.5,1045) (0 bytes).
before ftp_recv_data
filedes in = 6, out = 1
total 7820
     2 drwxr-xr-x  11 root     sys          1024 Jun  9 16:50 .
     2 drwxr-xr-x  11 root     sys          1024 Jun  9 16:50 ..
   266 -rw-rw-rw-   1 root     other          70 Dec 29 15:24 .editreadrc
   492 -rwxr-xr--   1 root     root          100 May 12 13:44 .profile
   275 -rwxr-xr-x   1 root     other           0 Mar  2 15:08 a.out
   102 drwxr-xr-x   2 bin      bin          1024 Dec 29 07:24 bin
   160 drwxr-xr-x   8 root     sys          3072 Dec 31  1969 dev
   204 -rwxr-xr-x   1 root     other      770096 May 12 11:08 dgux
     3 -rwxr-xr-x   1 root     other      767322 Jan 27 14:14 dgux.old
   269 -rwxr-xr-x   1 root     other      767322 Dec 31  1969 dguxmv7800
   274 -rwxr-xr-x   1 root     other      770096 May 12 11:08 dguxmv8000
     4 drwxrwxr-x  13 root     root         2560 Jun 12 09:15 etc
   270 -rwxr--r--   1 root     other          23 Jan 25 13:45 go
   273 -rw-rw-rw-   1 root     other         139 Feb 10 15:28 go12fromwd5
   281 -rw-rw-rw-   1 root     other           0 Jun  9 15:57 hostupdate
   146 drwxr-xr-x   2 bin      bin           512 Dec 29 07:26 lib
    32 -r------r--   1 root     root      442416 Jan  6 10:52 mv7800.mcf
   268 -r------r--   1 root     other     442416 Jan  6 10:53 mv7800.mcf1
   267 drwxrwxrwx   2 root     other          0 Dec 29 15:35 nfstst
   277 -rw-rw-rw-   1 root     other          0 May 17 16:07 serb
   494 -rwxr--r--   1 root     sys         3455 Dec 29 09:42 shutdown
   222 -rwxr-xr-x   1 root     other         54 Jan  6 10:48 space
   100 drwxr-xr-x   2 bin      bin          512 Dec 28 13:45 stand
   279 -rwx------   1 root     other          0 May 18 11:21 test
   205 drwxrwxrwx   5 root     root        2048 Jun 12 13:40 tmp
   282 -rw-rw-rw-   1 root     other       1031 Jun  9 16:20 tmpaddr
   283 -rw-rw-rw-   1 root     other       1247 Jun  9 16:33 tmpbyname
   271 -r--r--r--   1 root     other         11 Feb  2 13:30 tmpusrspoollocksL
   278 -rwx------   1 root     other         70 May 18 11:29 u
   264 drwxrwxrwx  26 root     root        2048 May 24 10:39 udd
   161 drwxr-xr-x  22 bin      bin          512 Mar 23 13:13 usr
   272 -rw-rw-rw-   1 root     other         75 Feb 10 13:27 wasHere
after ftp_recv_data

226 Transfer complete.
2232 bytes received in 13.799 seconds (0.16 Kbytes/s)
```

The FTP user program interprets the three-digit number to determine how it should respond. The text message is displayed for the user. Because the message is server-dependent, it may be different for different servers. The numbers, however, should have consistent meaning for all servers.

Each digit in the number provides special information. The first digit indicates whether the response is an error message, a positive acknowledgement, or a request for more information. If the first digit indicates an error message, the second and third digits describe the type of error that occurred.

The DG/UX TCP/IP FTP user program displays the number and text sent from the server program. It recognizes and responds to the first digit only. The first digit can be one of the following:

1yz Indicates a positive preliminary reply. The requested command is being initiated and you should wait for another reply before issuing a new command.

2yz Indicates a positive completion. The requested command has been successfully completed. You can issue a new command.

3yz Indicates a positive intermediate reply. The command has been accepted but is waiting for more information. You should send another command providing the information needed.

4yz Indicates a transient negative completion reply. The command was not accepted, but the error is temporary and you can re-issue the command in exactly the same form.

5yz Indicates a permanent negative completion reply. The command was not accepted and the requested action did not take place. You should not re-issue the command until you correct the problem (for example, correct the spelling of an invalid command).

If the first digit indicates an error, you can check the second and third digits for more specific information. These digits can be helpful if you are not using the DG/UX TCP/IP server. The second digit indicates one of the following categories:

*x0z* Indicates an error in syntax, a command that does not fit any functional category, an unimplemented command, or an unnecessary command.

*x1z* Indicates a reply to a request for information, such as **help** or **status**.

*x2z* Indicates a reply to the command and data connections.

*x3z* Indicates a reply to the login process and accounting procedures.

*x4z* Indicates an unspecified reply.

*x5z* Indicates the status of the server file system as it relates to the requested transfer or other file system action.

The third digit fine tunes the meaning of the category indicated by the second digit. It distinguishes replies grouped in the same category.

Table A-1 lists and describes the error messages that the DG/UX TCP/IP server can return.

**Table A-1 FTP Server Error Messages**

| Error | What It Means |
|---|---|
| `421 Timeout (`*number* `seconds): closing control connection` | The timeout parameter (–t option for ftp server) value is too small. Increase the parameter or set it to 0 – no timeout. |
| `425 Can't create data socket (`*dest-address*`, `*dest-port*`): relevant-message` | FTP is unable to open data connection for file transfer. Any of the socket related calls could have failed. |
| `451 Error in server: Out of memory` | The malloc function call failed. |
| `451 Error in server: Unknown state in scanner` | The yylex function has detected an unknown token. This indicates bad data on the command connection. |
| `500 Command not understood` | The wrong argument type or wrong number of arguments has been passed to the server. |
| `502` *command-name* `command not implemented` | The specified command is not implemented on the remote server. |
| `502 Invalid TYPE` | Only ASCII, EBCDIC, Image and Local Byte are allowed. |
| `502 Invalid STRU` | Only File, Record, and Page structures are allowed. |
| `502 Invalid MODE` | Only Stream, Block, and Compressed modes are allowed. |
| `503 Bad sequence of commands; RNFR ignored` | The RNFR (rename from) server command was not followed by an RNTO (rename to) server command. |
| `503 RNFR failed -- RNTO not accepted` | The RNTO (rename to) command is not accepted because the RNFR (rename from) command failed. |
| `503 Login with USER first` | You tried to invoke the PASS command before invoking the USER command. |

**Table A-1 FTP Server Error Messages**

| Error | What It Means |
|---|---|
| `504 STAT command does not accept parameters` | Foreign server implementation does not allow any parameters to be sent to STAT (status) command. |
| `530 Login incorrect` | You didn't give a password or you gave an incorrect password. |
| `530 User` *username* `unknown` | The *username* provided as an argument to user command was not found in /etc/passwd file. |
| `530 Please login with USER and PASS` | You tried to access the remote system without executing the login sequence first. |
| `540 Command` *cmd-name* not accepted during transfer | The FTP server received a command that cannot be executed in the middle of an interrupted data transfer. |

(concluded)

**Table A-2 FTP Server Error Messages**

| Error | What It Means |
|---|---|
| `541 Invalid combination of transfer parameters` | The transfer parameters are set in one of the following combinations:<br><br>type ascii structure page<br>type ebcdic structure page<br>type binary structure page<br>mode block structure page<br>mode compress structure page |
| `542 Cannot position file for recovery` | The file position from which the transfer should continue was specified incorrectly. |
| `543 Error on write` | FTP server detected an error while writing to a file or socket. |

**Table A-2 FTP Server Error Messages**

| Error | What it Means |
|---|---|
| `543 Unexpected EOF` | Server found a premature End of File delimiter while reading from the socket. |
| `543 Wrong escape sequence` | Server found an incorrect escape sequence while receiving a file in Record structure and Stream mode. |
| `543 Page is not multiple of logical byte` | The page size defined for Page structure is not a multiple of the logical byte size. |
| `544 EOR not changed, string too long` | The string chosen as the End of Record delimiter for file storage exceeds 10 characters. |
| `544 Byte size must be multiple of 8` | Logical byte size does not accept values that are not multiples of 8. |
| `550` *filename*`: not a plain file` | You tried to transfer a character or block device file. |
| `550` *filename* | Either the file cannot be opened or cannot be accessed. |
| `550 Can't set guest privileges` | The root directory cannot be changed to your home directory on the remote system. |

If you receive an error message or error number you can search the file

/usr/include/sys/errno.h

for a text string that matches or for the error number and it's corresponding text. If the error begins with a leading 0 change it to decimal since error's are listed in decimal in the file

NAME

ruptime - show host status of local machines

SYNOPSIS

```
ruptime [ -a ] [ -r ] [ -t | -u | -l ]
```

DESCRIPTION

Use the ruptime(1C) command to display a status line for each machine that is on the local network and running rwhod(1C). These lines are formed from packets broadcast once every three minutes by each host running rwhod on the network.

Machines for which no status report has been received for eleven minutes are shown as being down.

Users who are idle an hour or more are not counted unless the -a flag is given.

Normally, the listing is sorted alphabetically by hostname. The -l, -r, -t, and -u flags specify sorting by load average, reverse sort, uptime, and number of users, respectively.

EXAMPLES

In the following example, the last three columns represent load averages for the intervals 1, 5, and 15 minutes. The load average is the average number of jobs in the run queue. It is a relative indication of how busy the systems are.

```
$ ruptime <NL>
sys14     up   10:46,  4 users, load  0.04,  0.03,  0.04
sys16   down    1:14
sys10     up 1+02:11,  1 user,  load  2.40,  2.52,  2.43
$
```

Shows the host status of the machines on the local area network.

NAME

rwho - who's logged in on local machines

SYNOPSIS

```
rwho [ -a ]
```

DESCRIPTION

The rwho command produces output similar to who(1), but for all machines that are on the local network and running rwhod(1M). If no report has been received from a machine for eleven minutes, rwho assumes the machine is down and provides no information on its users.

If users haven't typed to the system for a minute or more, then rwho reports this idle time. However, if users haven't typed to the system for an hour or more, rwho doesn't display their status unless you use the -a flag.

Command line flags other than -a are ignored.

EXAMPLES

```
$ rwho -a <NL>

jones    sys10:tty00   Dec 17 08:07
wilson   sys04:tty03   Dec 17 08:02   2:15
smith    sys08:tty25   Dec 17 07:01
brown    sys02:tty15   Dec 17 08:03    :14
```

Displays users who are logged in on machines that are on the local area network and running rwhod, including those who have not typed to the system in an hour or more.

FILES

```
/var/spool/rwho/whod.*
```

SEE ALSO

ruptime(1C), rwhod(1M)

BUGS

The rwho command becomes unwieldy when the number of machines on the local net is large.

APPENDIX A

AViion 300/400 MEMORY BOARD ADDRESS RANGES

| | | Hex | Dec | Oct | range |
|---|---|---|---|---|---|
| Board 0 | Lower | 0 | 0 | 0 | 0-4MB |
| | Upper | 3FFFFF | 4194303 | 17777777 | |
| Board 1 | Lower | 400000 | 4194304 | 20000000 | 4-8MB |
| | Upper | 7FFFFF | 8388607 | 37777777 | |
| Board 2 | Lower | 800000 | 8388608 | 40000000 | 8-12MB |
| | Upper | BFFFFF | 12582911 | 57777777 | |
| Board 3 | Lower | C00000 | 12582912 | 60000000 | 12-16MB |
| | Upper | FFFFFF | 16777215 | 77777777 | |
| Board 4 | Lower | 1000000 | 16777216 | 100000000 | 16-20MB |
| | Upper | 13FFFFF | 20971519 | 117777777 | |
| Board 5 | Lower | 1400000 | 20971520 | 120000000 | 20-24MB |
| | Upper | 17FFFFF | 25165823 | 137777777 | |
| Board 6 | Lower | 1800000 | 25165824 | 140000000 | 24-28MB |
| | Upper | 1BFFFFF | 29360127 | 157777777 | |

Lower=Lowest mem adress on board
Upper=Highest adress on board

MISC.

COLOR SYSTEMS MUST BE RUNNING DG/UX 4.11 OR BETTER

MONO SYSTEMS RUN DG/UX REV 4.10, CAN RUN 4.11 IF IT FINDS"hardware_type" IN THE ROOT DIRECTORY. - READ RELEASE NOTICE FOR UD1 TAPE.

PARALLEL PRINTER IS NOT SUPPORTED UNTILL DG/UX 4.20

THE FCO 900681 CUT IN DATE WAS FOR BEFORE FISCAL WEEK 4989 THIS DATE CODE CAN BE FOUND ON THE SYSBD NEAR THE PT# AROUND THE EDGE OF THE P/S

CNTL C TAKES YOU TO THE SCM (VIRTUAL CONSOLE) OR YOU CAN HIT THE RESET BOTTON ON RIGHT SIDE NEAR MOUSE

ASYNC TEST PLUG PT# IS 5-22188 USED FOR ASYNC PORT. REV 2 OF RBOS WILL NOT TEST THE MODEM CONTROLL SIGNALS.

TO FIND OUT WHAT PATCH LEVEL THE DGUX SYSTEM IS DO THE FOLLOWING COMMAND "cd /usr/src/uts/aviion/lb" "sum sc.a" if value is 55009 150 sc.a then its 4.20.00.20, if its 19504 136 sc.a then its rev 4.20 unpatched.

# APPENDIX B

## AViion 5000 SERIES COMPUTER SYSTEMS
## MODELS G70034-G70036, G70040-G70042, G70078-G70080, G700104-G700106

**Model Numbers**

| AV SYSTEM | MODEL NUMBER | CPU SPEED/ SINGLE OR DUAL CPU | NO. OF CARD CAGE SLOTS | SYSTEM PCB MEMORY | STORAGE DEVICES STANDARD |
|---|---|---|---|---|---|
| AV5010 | G70104 | 20MHz/Single | 6 | 8 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 322 MB SCSI Disk Drive |
| AV5010 | G70105 | 20MHz/Single | 6 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 322 MB SCSI Disk Drive |
| AV5010 | G70106 | 20MHz/Single | 6 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 662 MB SCSI Disk Drive |
| AV5100 | G70034 | 20MHz/Single | 10 | 8 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 322 MB ESDI Disk Drive |
| AV5100 | G70040 | 20MHz/Single | 10 | 8 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 648 MB ESDI Disk Drive |
| AV5100 | G70035 | 20MHz/Single | 10 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 322 MB ESDI Disk Drive |
| AV5100 | G70041 | 20MHz/Single | 10 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 648 MB ESDI Disk Drive |
| AV5120 | G70036 | 20MHz/Dual | 10 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 322 MB ESDI Disk Drive |
| AV5120 | G70042 | 20MHz/Dual | 10 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 648 MB ESDI Disk Drive |
| AV5200 | G70078 | 25MHz/Single | 10 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 322 MB ESDI Disk Drive |
| AV5200 | G70079 | 25MHz/Single | 10 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 648 MB ESDI Disk Drive |
| AV5220 | G70080 | 25MHz/Dual | 10 | 16 MB | 1 150 MB SCSI QIC Cartridge Tape Drive, 1 648 MB ESDI Disk Drive |

## Performance Specifications

| Item | Specification |
|---|---|
| CPU clock rate:<br><br>CMMU cache memory: | 20 MHz (AV5010, AV5100, AV5120)<br>25 MHz (AV5200, AV5220)<br>32 KB (AV5010, AV5100, AV5200)<br>64 KB (AV5120, AV5220) |
| Available I/O ports: | 2 SCSI, 2 LAN, printer, console, modem,<br>32 asynchronous, 4 terminal server, 4 synchronous |
| Maximum Internal Storage: | 2 half-height 5 1/4-inch SCSI devices and 3 full-height<br>5 1/4-inch ESDI devices (AV5010 uses only SCSI devices) |
| PCB capacity<br><br>AV5100, AV5120,<br>AV5200, AV5220:<br><br>AV5010: | <br><br>10 (System PCB, up to 4 memory expansion PCBs, up to 9 VME I/O controllers)<br><br>6 (System PCB, 1 memory expansion PCB, up to 5 VME I/O controllers) |
| Power supply rating: | 750 watts. |

AV5000 Series Computer Systems FRUs (Continued)

| DG PART NUMBER | DESCRIPTION |
|---|---|
| 005-034968 | 322 MB ESDI Disk Drive |
| 005-030147 | 648 MB ESDI Disk Drive |
| 005-030105 | 322 MB SCSI Disk Drive |
| 005-030138 | 662 MB SCSI Disk Drive |
| 005-030140 | 150 MB QIC SCSI Tape Drive |
| 005-034990 | Cable, Asynchronous Terminal, 4.6 m (15.0 ft) |
| 005-034991 | Cable, Asynchronous Terminal, 7.6 m (25.0 ft) |
| 005-034992 | Cable, System Console, 4.6 m (15.0 ft) |
| 005-034993 | Cable, System Console, 7.6 m (25.0 ft) |
| 005-034994 | VDC/8P Distributed Asynchronous Communication Cluster Controller with Printer Port |
| 005-035573 | Cable, Centronics Printer, 4.6 m (15.0 ft) |
| 005-035574 | Cable, Centronics Printer, 7.6 m (25.0 ft) |
| 005-035575 | Cable, Data Products Printer, 4.6 m (15.0 ft) |
| 005-035576 | Cable, Data Products Printer, 7.6 m (25.0 ft) |
| 005-036263 | PEXbus Terminator (P2) |
| 005-036264 | PEXbus Terminator (P3) |
| 005-036290 | Dual 25 MHz CPU with 16 MB (AV5200) |
| 005-036291 | Single 25 MHz CPU with 16 MB (AV5220) |
| 109-000809 | Power Cord, 240V Australia |
| 109-000810 | Power Cord, 220V Switzerland |
| 109-000811 | Power Cord, 220V Italy |
| 109-000812 | Power Cord, 220V Austria |
| 109-000813 | Power Cord, 240V United Kindom |
| 109-000815 | Power Cord, 220V Denmark |
| 109-000821 | Power Cord, 100/120V United States |
| 115-000587 | Blower |
| 111-001316 | "T" connector |
| 111-003081 | 93 Ohm Coaxial Terminator |
| 113-000019 | Fuse; 15A, 250V, 3AB |
| 113-000122 | Fuse; 6A, 250V, 3AG |
| 118-004336 | Cartridge Tape |

## AV5000 Series Computer Systems FRUs

| DG PART NUMBER | DESCRIPTION |
|---|---|
| 005-034213 | 120V Chassis (AV5100, AV5120, AV5200, AV5220) |
| 005-036798 | 120V Chassis (AV5010) |
| 005-032885 | Dual 20MHz CPU with 16 MB (AV5120) |
| 005-033334 | SCSI Terminator |
| 005-033384 | ESDI Host Adapter |
| 005-033386 | SCSI Host Adapter |
| 005-033490 | 48 MB Expansion Memory |
| 005-034105 | Single 20MHz CPU with 8 MB (AV5010, AV5100) |
| 005-034114 | Power Supply, 100V, 750W |
| 005-034115 | Power Supply, 120V, 750W |
| 005-034116 | Power Supply, 220V, 750W |
| 005-034190 | ESDI Internal Cable |
| 005-034192 | SCSI Internal Cable (AV5100, AV5120, AV5200, AV5220) |
| 005-036779 | SCSI Internal Cable (AV5010) |
| 005-034193 | Internal Cable, VAC/16 |
| 005-034194 | Internal Cable, VSC/4 (1st, 2nd, and 3rd line) |
| 005-023094 | Internal Cable, VSC/4 (4th line) |
| 005-034195 | Internal Cable, VLC |
| 005-034196 | Serial Printer Internal Cable |
| 005-034198 | Disk/Tape Power Cable |
| 005-034200 | +12Vdc to Backpanel Cable |
| 005-034201 | +5Vdc to Backpanel Cable |
| 005-034202 | Blower Cable, 100/120V |
| 005-034203 | Blower Cable, 220/240V |
| 005-034204 | VAC/16 16-line Asynchronous Communicaton Multiplexer |
| 005-034205 | Spreader Panel (2 per VAC/16) |
| 005-034206 | VSC/4 Synchronous Communication Controller |
| 005-034207 | VDA/128 Asynchronous Communication Controller |
| 005-034209 | VLC IEEE 802.3 LAN Controller |
| 005-034211 | VDC/16 Distributed Asynchronous Communication Cluster Controller |
| 005-034212 | Single 20MHz CPU with 16 MB (AV5010, AV5100) |
| 005-034246 | Coaxial Cable, Cluster Controller, 7.6 m (25.0 ft) |
| 005-034247 | Coaxial Cable, Cluster Controller, 15.2 m (50.0 ft) |
| 005-034248 | Coaxial Cable, Cluster Controller, 30.5 m (100.0 ft) |
| 005-034255 | Cable, System Console, 3.0 m (10.0 ft) |
| 005-034256 | Cable, Asynchronous Terminal, 3.0 m (10.0 ft) |
| 005-034395 | Backplane (AV5100, AV5120, AV5200, AV5220) |
| 005-036778 | Backplane (AV5010) |
| 005-034396 | 240V Chassis (AV5100, AV5120, AV5200, AV5220) |
| 005-036799 | 240V Chassis (AV5010) |
| 005-034397 | 32 MB Expansion Memory |
| 005-034398 | 16 MB Expansion Memory |
| 005-034949 | SCSI External Cable |

MODEL NUMBERS

| MODEL NUMBER | DESCRIPTION |
|---|---|
| | AV5100 |
| G70034 | CPU/8MB Mem; Model 6442-I, 322MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70035 | CPU/16MB Mem; Model 6442-I, 322MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70041 | CPU/16MB Mem; Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| | AV5120 |
| G70036 | Dual CPU/16MB Mem; Model 6442-I, 322MB 5.25" ESDI Disk Add-on, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70042 | Dual CPU/16MB Mem; Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| | AV6100 |
| E70043 | CPU/16MB Mem; Model 6542-A, 2-1GB SMD Disk Drive w/Rack Mount; Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| 0045 | CPU/16MB Mem; Model 6443-A, CSS Add-on Support Chassis w/322MB Disk; 2 Model 6491-M, 322MB 5.25" Disk Add-on Kit for CSS; Model 6577-M, 150MB 5.25" QIC Cartridge Tape -CSS |
| E70047 | CPU/16MB Mem; Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit;Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| | AV6120 |
| E70044 | Dual CPU/16MB Mem; Model 6542-A, 2-1GB SMD Disk Drive w/Rack Mount; Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| E70046 | Dual CPU/16MB Mem; Model 6443-A CSS Add-on Support Chassis w/322MB Disk; 2 Model 6491-M, 322MB 5.25" Disk Add-in Kit for CSS; Model 6577-M, 150MB 5.25" QIC Cartridge Tape -CSS |
| E70048 | Dual CPU/16MB Mem; Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit; Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| | AV5010 |
| G70104 | CPU/8MB Mem: Model 6491-I, 322MB FH 5.25" SCSI Disk, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70105 | CPU/16MB MEM; Model 6491-I, 322MB FH 5.25" SCSI Disk, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70106 | CPU/16MB Mem; Model 6554-I, 662MB FH 5.25" SCSI Disk, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |

| | |
|---|---|
| | **AV5200** |
| )78 | **CPU/25MHz,16MB, Model 6442-I, 322MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape** |
| )79 | **CPU/25MHz,16MB, Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape** |
| | **AV5220** |
| 080 | **Dual CPU/25MHz, 16MB, Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape** |
| | **AV6200** |
| 081 | **CPU/25MHz, 8MB, Chassis** |
| )082 | **CPU/25MHz, 16MB, Chassis** |
| )084 | **CPU/25MHz, 16MB, Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape** |
| )086 | **CPU/25MHz, 16MB, Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape** |
| )088 | **CPU/25MHz, 16MB, Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit;Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape** |
| | **AV6220** |
| 0083 | **Dual CPU/25MHz, 16MB, Chassis** |
| '0085 | **Dual CPU/25MHz, 16MB; Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape** |
| 70087 | **Dual CPU/25MHz, 16MB; Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape** |
| 70089 | **Dual CPU/25MHz, 16MB, Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit;Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape** |
| 001 | **16MB Expansion Memory** |
| 002 | **32MB Expansion Memory** |
| '003 | **48MB Expansion Memory** |
| '400 | **VAC/16 for integrated systems** |
| 7401 | **VDA/128** |

| | |
|---|---|
| 7402 | VDC/8P |
| 7403 | VDC/16 |
| 7404 | VSC/4 |
| 7404-V | VSC/4 (Rackmount only) |
| 7405 | VLC |
| 7406 | VAC/16 (Rackmount only) |
| 7407 | VME SCSI Controller (add-on) |
| 7407-V | VME SCSI Controller (Rackmount only) |
| 7408 | SMD Controller (Rackmount only) |
| 7409 | Adapter Card Kit (6U to 9U) |
| 6443-A | CSS Add-on support chassis w/322mb Disk (Rackmount only) |
| -41 | 1.2GB Disk w/Smd Controller (Rackmount only) |
| 541-A | 1.2GB Disk w/tray and rack kit (Rackmount only) |
| 6541-K | 1.2GB Smd Disk -Add-on (Rackmount only) |
| 6542 | Dual 1.2GB Smd Drives w/controller (Rackmount only) |
| 6542-A | Dual 1.2GB Smd Drive w/rack mount (Rackmount only) |
| 6544 | SCSI Controller (Office only) |
| 6555-I | 648MB 5.25" ESDI Disk (add-on) (Office only) |
| 6577-I | Add-on 150MB Cartridge (int) (Office only) |
| 6577-A | CSS Support Chassis w/150mb QIC Cart Tape (Rackmount only) |
| 6554-M | 648MB 5.25" SCSI Disk Add-on |
| 6442-I | Add-on 322MB ESDI disk (int) (Office only) |
| | |
| 6587-A | 1600bpi Reel-to-Reel (table) |
| 6586 | 1600bpi Reel-to-Reel (rack) |

| | |
|---|---|
| 1-I | 662MB FH 5.25" SCSI Disk (Entry Office only) |
| 1-I | 322MB FH 5.25" SCSI Disk (Entry Office only) |
| 565 | Peripheral Housing Unit |
| 77-E | 150MB Cartridge for PHU |
| 01 | PHU w/ 322MB disk |
| 02 | PHU w/ 150MB cartridge |
| 04 | PHU w/ 322MB disk,150MB cart |

**Related Documents**

| Manual Number | Title |
|---|---|
| 014-000793 | Ethernet/Thin-Ethernet Local Area Networks Installation Guide |
| 014-001806 | Setting Up and Starting AViiON Series Systems |
| 015-000355 | Expanding the AViiON Series Systems |
| 015-000915 | Product Specification Guide |
| 015-000916 | Site Planning Guide |
| 043-000102 | Product Service Guide |
| 043-000075 | AViiON System Diagnostics Field Guide |
| 043-003203 | Installation, Repair, and Maintenance Manual, Peripheral Enclosure, Model 10565 |
| 043-002016 | Product Information Package, 150 MB Cartridge Tape Drive, Models 6536 and 6577-A |
| 043-002015 | Product Information Package, 1600 BPI SCSI Reel-to-Reel Tape Drive, Models E6586, E6586-A, E6587, and E6587-A |
| 043-003715 | Product Information Package, Winchester 5 1/4-inch Disk Family |
| 014-001802 | Using the System Control Monitor |
| 015-001863 | Using AViiON System Diagnostics |

APPENDIX C

AViion 5100/5120 AViion 5200/5220 AViion 5010
AViion 6100/6120 AViion 6200/6220

MODELS G70043,G70044,G70045,G70046,G70047,G70048
G700104,G700105,G700106,G70078,G70079,G70080
E70081,E70082,E70083,E70084,E70085,E70086
E70087,E70088,E70089,E70034,E70035
E70036,E70041,E70042

| PART NUMBER | DESCRIPTION<br><br>OFFICE PACKAGE UNIQUE +<br>RACK MOUNT COMMON |
|---|---|
| 005.034105 | SINGLE PROC.W/8MB 20MHZ |
| 005.034212 | SINGLE PROC.W/16MB 20MHZ |
| 005.032885 | DUAL PROC. W/16MB 20MHZ |
| 005.036292 | SINGLE PROC.W/8MB 25MHZ |
| 005.036291 | SINGLE PROC.W/16MB 25MHZ |
| 005.036290 | DUAL PROC. W/16MB 25MHZ |
| 005.034398 | 16MB EXPANSION MEMORY |
| 005.034397 | 32MB EXPANSION MEMORY |
| 005.033490 | 48MB EXPANSION MEMORY |
| 005.033386 | SCSI CONTROLLER |
| 005.033384 | ESDI CONTROLLER |
| 005.034192 | SCSI INTERNAL CABLE |
| 005.033334 | SCSI TERMINATOR |
| 005.034190 | ESDI INTERNAL CABLE |
| 005.034196 | SER/PRINTER INT CABLE |
| 005.034198 | DISK POWER CABLE |
| 005.034199 | TAPE POWER CABLE |
| 005.034201 | +12V TO BCKPNL CABLE |
| 005.034200 | +5V TO BCKPNL CABLE |
| 005.034114 | POWER SUPPLY 100V 750W |
| 005.034115 | POWER SUPPLY 120V 750W |
| 005.034116 | POWER SUPPLY 220V 750W |
| 005.034395 | BACKPANEL 10 SLOT |
| 005.034204 | ASYNC CONTROLLER /16 |
| 005.034193 | 16 ASYNC INTERNAL CABLE |
| 005.034205 | 8-CONNECT PANEL ASYNC |
| 005.034206 | SYNC CONTROLLER |
| 005.034194 | SYNC INTERNAL CABLE |
| 005.034207 | TERM SERVER HOST ADAPTER |
| 005.034209 | LAN (NON INTELLIGENT) |
| 005.034195 | LAN INTERNAL CABLE |
| 118.5943 | 8-PORT CLUSTER CONT BOX |
| 118.4850 | 16-PORT CLUSTR CONT BOX |
| 005.034202 | BLOWER CABLE 100/120V |
| 005.034203 | BLOWER CABLE 220/240V |
| 115.587 | BLOWER |
| 109-821 | POWER CORD 100/120V U.S. |
| 109-813 | PWR CD 240V U.K. |
| 109-809 | PWR CD 240V AUSTRALIA |
| 109-812 | PWR CD 220V AUSTRIA |
| 109-811 | PWR CD 220V ITALY |
| 109-815 | PWR CD 220V DENMARK |
| 109-810 | PWR CD 220V SWITZERLAND |

| PART NUMBER | DESCRIPTION<br><br>OFFICE PACKAGE UNIQUE +<br>RACK MOUNT COMMON |
|---|---|
| 109-681 | PWR CD 220/240V |
| 109-996 | PWR CD 120/60 |
| 005.034948 | AC HARNESS |
| 005.034246 | BLKHD TO CLUSTER 25 FT |
| 005.034247 | BLKHD TO CLUSTER 50FT |
| 005.034248 | BLKHD TO CLUSTER 100FT |
| 005.034255 | ASYNC CONSOLE CABLE 10FT |
| 005.034992 | ASYNC CONSOLE CABLE 15FT |
| 005.034993 | ASYNC CONSOLE CABLE 25FT |
| 005.034256 | ASYNC FROM CLUSTER 10FT |
| 005.034990 | ASYNC FROM CLUSTER 15FT |
| 005.034991 | ASYNC FROM CLUSTER 25FT |
| 005.035573 | PRT (CENT) EXT CABLE 15F |
| 005.035574 | PRT (CENT) EXT CBL 25FT |
| 005.035575 | PRT (DP) EXT CABLE 15FT |
| 005.035576 | PRT (DP) EXT CBL 25FT |
| 005.036778 | BACKPANEL 6 SLOT |
| 005.036779 | SCSI INTERNAL CABLE |
| 111-1316 | T-CONNECTOR |
| 111-3081 | COAX TERMINATOR |

| PART NUMBER | DESCRIPTION<br><br>AV 6100/6120 |
|---|---|
| 005.034438 | SMD CONTROLLER |
| 005.035548 | SCSI INTERNAL CABLE |
| 005.034446 | SMD INTERNAL CABLE |
| 005.035541 | SYS CONSOLE INT CABLE |
| 005.035545 | B/P TO P/S HARNESS |
| 005.035537 | AC/LOGIC HARNESS |
| 005.035552 | MOUNTING KIT |
| 005.034493 | POWER SUPPLY |
| 005.036263 | PEX BUS TERMINATOR (P2) |
| 005.036264 | PEX BUS TERMINATOR (P3) |
| 005.035553 | FAN MODULE ASSY 120/240 |
| 005.035536 | AC HARNESS (SWITCH) |
| 005.035549 | 16 ASYNC INTERNAL CABLE |
| 005.035550 | SYNC INTERNAL CABLE |
| 005.036279 | SYNC INT CBL (4TH LINE) |

ODEL NUMBERS

| MODEL NUMBER | DESCRIPTION |
|---|---|
| | AV5100 |
| G70034 | CPU/8MB Mem; Model 6442-I, 322MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70035 | CPU/16MB Mem; Model 6442-I, 322MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70041 | CPU/16MB Mem; Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| | AV5120 |
| G70036 | Dual CPU/16MB Mem; Model 6442-I, 322MB 5.25" ESDI Disk Add-on, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70042 | Dual CPU/16MB Mem; Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| | AV6100 |
| E70043 | CPU/16MB Mem; Model 6542-A, 2-1GB SMD Disk Drive w/Rack Mount; Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| 045 | CPU/16MB Mem; Model 6443-A, CSS Add-on Support Chassis w/322MB Disk; 2 Model 6491-M, 322MB 5.25" Disk Add-on Kit for CSS; Model 6577-M, 150MB 5.25" QIC Cartridge Tape -CSS |
| E70047 | CPU/16MB Mem; Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit;Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| | AV6120 |
| E70044 | Dual CPU/16MB Mem; Model 6542-A, 2-1GB SMD Disk Drive w/Rack Mount; Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| E70046 | Dual CPU/16MB Mem; Model 6443-A CSS Add-on Support Chassis w/322MB Disk; 2 Model 6491-M, 322MB 5.25" Disk Add-in Kit for CSS; Model 6577-M, 150MB 5.25" QIC Cartridge Tape -CSS |
| E70048 | Dual CPU/16MB Mem; Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit; Model 6577-A, CSS Support Chassis w/150MB QIC Cart Tape |
| | AV5010 |
| G70104 | CPU/8MB Mem: Model 6491-I, 322MB FH 5.25" SCSI Disk, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70105 | CPU/16MB MEM; Model 6491-I, 322MB FH 5.25" SCSI Disk, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| G70106 | CPU/16MB Mem; Model 6554-I, 662MB FH 5.25" SCSI Disk, Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |

| | |
|---|---|
| | AV5200 |
| 78 | CPU/25MHz,16MB, Model 6442-I, 322MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| 79 | CPU/25MHz,16MB, Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| | AV5220 |
| 80 | Dual CPU/25MHz, 16MB, Model 6555-I, 648MB 5.25" ESDI Disk Add-on; Model 6577-I, 150MB 5.25" 1/4" Cartridge Tape |
| | AV6200 |
| 081 | CPU/25MHz, 8MB, Chassis |
| 082 | CPU/25MHz, 16MB, Chassis |
| 084 | CPU/25MHz, 16MB, Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape |
| 086 | CPU/25MHz, 16MB, Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape |
| 0088 | CPU/25MHz, 16MB, Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit;Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape |
| | AV6220 |
| 0083 | Dual CPU/25MHz, 16MB, Chassis |
| 0085 | Dual CPU/25MHz, 16MB; Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape |
| 0087 | Dual CPU/25MHz, 16MB; Model 6541-A, 2GB SMD Disk Drive w/Rack Mount; Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape |
| 70089 | Dual CPU/25MHz, 16MB, Model 6554-M, 648MB 5.25" SCSI Disk Add-on Kit;Model 6577-M, CSS Support Chassis w/150MB QIC Cart Tape |
| 001 | 16MB Expansion Memory |
| 002 | 32MB Expansion Memory |
| 003 | 48MB Expansion Memory |
| 400 | VAC/16 for integrated systems |
| 401 | VDA/128 |

| | |
|---|---|
| 7402 | VDC/8P |
| 7403 | VDC/16 |
| 7404 | VSC/4 |
| 7404-V | VSC/4 (Rackmount only) |
| 7405 | VLC |
| 7406 | VAC/16 (Rackmount only) |
| 7407 | VME SCSI Controller (add-on) |
| 7407-V | VME SCSI Controller (Rackmount only) |
| 7408 | SMD Controller (Rackmount only) |
| 7409 | Adapter Card Kit (6U to 9U) |
| 6443-A | CSS Add-on support chassis w/322mb Disk (Rackmount only) |
| [illegible]1 | 1.2GB Disk w/Smd Controller (Rackmount only) |
| [illegible]1-A | 1.2GB Disk w/tray and rack kit (Rackmount only) |
| 6541-K | 1.2GB Smd Disk -Add-on (Rackmount only) |
| 6542 | Dual 1.2GB Smd Drives w/controller (Rackmount only) |
| 6542-A | Dual 1.2GB Smd Drive w/rack mount (Rackmount only) |
| 6544 | SCSI Controller (Office only) |
| 6555-I | 648MB 5.25" ESDI Disk (add-on) (Office only) |
| 6577-I | Add-on 150MB Cartridge (int) (Office only) |
| 6577-A | CSS Support Chassis w/150mb QIC Cart Tape (Rackmount only) |
| 6554-M | 648MB 5.25" SCSI Disk Add-on |
| 6442-I | Add-on 322MB ESDI disk (int) (Office only) |
| 6587-A | 1600bpi Reel-to-Reel (table) |
| 6586 | 1600bpi Reel-to-Reel (rack) |

| | |
|---|---|
| 54-I | 662MB FH 5.25" SCSI Disk (Entry Office only) |
| 91-I | 322MB FH 5.25" SCSI Disk (Entry Office only) |
| 0565 | Peripheral Housing Unit |
| 577-E | 150MB Cartridge for PHU |
| 601 | PHU w/ 322MB disk |
| 602 | PHU w/ 150MB cartridge |
| 604 | PHU w/ 322MB disk,150MB cart |

**Related Documents**

| Manual Number | Title |
|---|---|
| 014-000793 | Ethernet/Thin-Ethernet Local Area Networks Installation Guide |
| 014-001806 | Setting Up and Starting AViiON Series Systems |
| 015-000355 | Expanding the AViiON Series Systems |
| 015-000915 | Product Specification Guide |
| 015-000916 | Site Planning Guide |
| 043-000102 | Product Service Guide |
| 043-000075 | AViiON System Diagnostics Field Guide |
| 043-003203 | Installation, Repair, and Maintenance Manual, Peripheral Enclosure, Model 10565 |
| 043-002016 | Product Information Package, 150 MB Cartridge Tape Drive, Models 6536 and 6577-A |
| 043-002015 | Product Information Package, 1600 BPI SCSI Reel-to-Reel Tape Drive, Models E6586, E6586-A, E6587, and E6587-A |
| 043-003715 | Product Information Package, Winchester 5 1/4-inch Disk Family |
| 014-001802 | Using the System Control Monitor |
| 015-001863 | Using AViiON System Diagnostics |

APPENDIX D

AViion 400 SERIES STATIONS
AViion 3000 AND 4000 SERIES SERVERS

MODELS 70063-70073,7206,7208,70133-70138
70142-3,70145-6,70132,70136,70138,701XX

| PART NUMBER | DESCRIPTION |
|---|---|
| 005-030105 | ASSY 322MB 5.25" FH DISK |
| 005-030138 | ASSY 663MB 5.25" FH DISK |
| 005-030139 | ASSY 180MB 5.25" HH DISK |
| 005-033334 | ASSY SINGLE PORT TERMINAT |
| 005-033889 | ASSY 4MB 100NS MODULE |
| 005-034266 | ASSY 16MHZ SYSTEM PCB |
| 005-034267 | ASSY 16MHZ 2ND CPU PCB |
| 005-034268 | ASSY GRAPHICS 24 BIT |
| 005-034269 | ASSY GRAPHICS 8 BIT |
| 005-034270 | ASSY Z BUFFER PCB |
| 005-034272 | ASSY BACKPANEL PCB |
| 005-035145 | ASSY EXTENDER CA - MOUSE |
| 005-035146 | ASSY EXTENDER CA - KEYBD |
| 005-035712 | ASSY 20MHZ SYSTEM PCB |
| 005-035713 | ASSY 20MHZ 2ND CPU PCB |
| 005-035750 | ASSY CHASSIS |
| 005-035751 | ASSY FAN MODULE |
| 005-035752 | ASSY MTG KIT 1/2 HEIGHT |
| 005-035753 | ASSY MTG KIT FULL HEIGHT |
| 005-035755 | ASSY MTG KIT SCSI PCB CA |
| 005-035757 | ASSY HARNESS A/C |
| 005-035758 | ASSY HARNESS FAN MODULE |
| 005-035759 | ASSY HARNESS D/C P/S BKP |
| 005-035761 | ASSY HARNESS D/C PERIP/CH |
| 005-035762 | ASSY CABLE I/O |
| 005-035763 | ASSY HARNESS SPKR & LED |
| 005-035855 | ASSY BNC CABLE |
| 005-036553 | ASSY POWER SUPPLY |
| 005-037014 | 16 PORT VME ASYNC CTLR |
| 005-037015 | VME DISTRIBUTION ADPTR |
| 005-037016 | 3 PORT VME ASYNC CTLR |
| 005-037017 | VME IEEE 802.3 LAN CTLR |
| 005-037019 | JUNCTION ASSY |
| 005-037108 | ASSY 332MB 5.25" HH DISK |
| 100-010142 | ASSY PROM FOR AV400 AND AV4000 16 MHZ |
| 100-010971 | ASSY PROM/AV3000 16 MHZ |
| 109-000809 | PWR CRD 240V 50HTZ (AUST) |
| 109-000810 | PWR CRD 220V 50HTZ (SWIT) |

| PART NUMBER | DESCRIPTION |
|---|---|
| 109-000811 | PWR CRD 220V 50HTZ (ITAL) |
| 109-000812 | PWR CRD 220V 50HTZ (AUST) |
| 109-000813 | PWR CRD 240V 50HTZ (UK) |
| 109-000815 | PWR CRD 220V 50HTZ (DENM) |
| 109-000996 | PWR CRD 100/120V 50/60HTZ |
| 110-000787 | AC POWER SWITCH |
| 111-002256 | AC POWER CONNECTOR |
| 113-000092 | PICO FUSE |
| 113-000200 | 12A FUSE (FOR 5V POWER) |
| 115-000354 | ASSY FAN |
| 118-003796 | 101-KEY KEYBD U.S. FONT |
| 118-004337 | ASSY 150MB CTG TAPE DR |
| 118-004640 | ASSY 8MM 5.25" TAPE DRIVE |
| 118-004658 | 19" COLOR MONITOR 230V |
| 118-004659 | 19" COLOR MONITOR 120V |
| 118-004673 | 102-KEY KEYBOARD (GERMAN) |
| 118-004674 | 102-KEY KEYBOARD (FRENCH) |
| 118-004675 | 102-KEY KEYBOARD (U.K.) |
| 118-004676 | 102-KEY KEYBOARD (SWEDISH |
| 118-004752 | 102-KEY KEYBOARD (KANJI) |
| 118-004754 | ASSY 3.5" 1.44MB FLOPPY |
| 118-004883 | ASSY MOUSE |
| 118-004898 | ASSY CD-ROM DISK DRIVE |
| 118-004969 | 102-KEY KEYBOARD (SPANISH |
| 118-004971 | 102-KEY KEYBOARD (ITALIAN |
| 118-004972 | 102-KEY KEYBOARD (SWISS) |
| 118-005427 | ASSY 5.25" 1.2MB FLOPPY |

Table 1-1. Packaged System Computer Models

| MODEL | CLOCK RATE | DISK DRIVE | MEMORY |
|---|---|---|---|
| 70135 AV 4000 | 16 MHz | 322 MB | 8 MB |
| 70137 AV 4000 | 16 MHz | 662 MB | 8 MB |
| 70139* AV 4020 | 32 MHz | 662 MB | 16 MB |

*This model has dual 16 MHz CPUs.

| DGC PART NO. | DESCRIPTION |
|---|---|
| 014-001802 | Using the AVION System Control Monitor |
| 014-001809 | MC88100 Users Guide |
| 014-001808 | MC88200 Users Guide |
| 014-001815 | HPS VMEbus Host Adapters Technical Manual |
| 014-001816 | VMEbus Data Communications Processor (DCP) Tech. Manual |
| 014-001817 | HPS VMEbus Sixteen-Channel Multiplexer Tech. Manual |
| 014-001818 | V/Ethernet 3207 Hawk High Performance VME Ethernet Communications Controller |
| 014-001858 | Setting Up and Starting AVION 400 Series Systems |
| 014-001859 | Expanding and Maintaining AVION 400 Series Systems |
| 014-001865 | Technical Notice AVION 4000 Series Systems |
| 014-001867/ 043-003732 | Setting Up and Installing VMEbus Option Boards in AV Systems |
| 015-000915 | Product Specification Guide |
| 015-000916 | Site Planning Guide |
| 043-000075 | AVION System Diagnostics Field Guide |
| 093-701052 | Installing and Managing the DG/UX™ System |

**Table 1-2. Optional Equipment**

| MODEL | DESCRIPTION |
|---|---|
| 7000-K | 4.0 MB, Expansion Memory Module |
| 7012-K | 8.0 MB Memory (Available with Initial Purchase, Only) |
| 7006-K | Second 16 MHz CPU |
| 6539-F | 179 MB, Half-Height, Disk Drive |
| 6491-F | 322 MB, Full-Height, Disk Drive |
| 6554-F | 640 MB, Full-Height, Disk Drive |
| G6577-F | 150 MB, Half-Height, Cartridge Tape Drive |
| G6563-J | 1.2 MB, 5.25-inch, Half-Height Diskette Drive with SCSI Adapter for for PHU |
| G6562-J | 1.44 MB, 3.5-inch, Half-Height Diskette Drive with SCSI Adapter for for PHU |
| G6563-JX | 1.2 MB, 5.25-inch, Half-Height Diskette Drive without SCSI Adapter |
| G6562-JX | 1.44 MB, 3.5-inch, Half-Height Diskette Drive without SCSI Adapter |
| G6491-J | 322 MB, 5.25-inch, Full-Height Disk Drive for PHU |
| G6539-J | 179 MB, 5.25-inch, Half-Height Disk Drive for PHU |
| G6554-J | 662 MB, 5.25-inch, Full-Height Disk Drive for PHU |
| G6577-J | 150 MB, Half-Height, QIC Cartridge Tape Drive for PHU |
| G6591-J | 2 GB, 8 mm, Full-Height Tape Drive |
| 6586 | Stand-Alone, Reel-to-Reel Tape Drive (9 track, 1600 bps) |
| 6587 | Stand-Alone, Reel-to-Reel Tape Drive (9 track, 1600 bps) |
| 7600 | VME Backpanel with Two 6U VME Slots |
| 7601 | Chassis, Including Power Supply, Cables, without VME Backpanel |
| 70072 | 16 MHz System Board with 8 MB Memory |
| 7411-K | VAC/16 16-Line Asynchronous Multiplexer PCB with Two Junction Boxes |
| 7401-K | VDA/128 Asynchronous Communication Controller PCB |
| 7413-K | VSC/3 Synchronous Communications Controller PCB |
| 7405-K | VLC IEEE 802.3 LAN Controller PCB |
| 7402-K | 8 Port VME Cluster |
| 7403-K | 16 Port VME Cluster |

Table 1–4. Field Replaceable Units (FRUs)

| DG PART NO. | DESCRIPTION |
|---|---|
| 005–034268 | 16 MHz System Board |
| 005–035750 | Complete Chassis |
| 005–036553 | Power Supply Assembly |
| 005–034967 | Power Supply PCB |
| 005–033889 | 4 MB Memory Module |
| 113–000092 | Pico Fuse (System Board) |
| 113–000200 | 12A Fuse (for 5V DC Power) |
| 110–000787 | AC Power Switch |
| 110–002258 | AC Power Connector |
| 005–035763 | Speaker and LED Harness Assembly |
| 005–035757 | A/C Harness Assembly |
| 005–035759 | D/C Harness Assembly |
| 005–035751 | Fan Module |
| 005–035758 | Fan Harness Assembly |
| 115–000354 | DC Fan (3 Required) |
| 005–035762 | Peripheral I/O Cable Assembly |
| 005–035761 | Peripheral DC Harness |
| 005–033334 | SCSI Terminator |
| 005–030139 | 179 MB Disk Drive with Mounting Kit |
| 005–030105 | 322 MB Disk Drive with Mounting Kit |
| 005–030138 | 662 MB Disk Drive with Mounting Kit |
| 005–035753 | Mounting Kit for Full–Height Drives |
| 005–035752 | Mounting Kit for Half–Height Drives |
| 005–035755 | SCSI Adapter PCB Kit with Cables and Mounting Hardware |
| 118–005427 | 1.2 MB 5.25–inch Diskette Drive |
| 118–004754 | 1.44 MB 3.50–inch Diskette Drive |
| 005–030140 | 150 MB Half–Height Cart. Tape Drive with Mounting Kit |
| 005–030156 | 2 GB Backup–Tape Drive with Mounting Kit |
| 005–034267 | 16 MHz Second CPU |
| 005–034272 | VME Backpanel |
| 005–037014 | VAC/16 16–Line Asynchronous Communication Multiplexer PCB with two Junction Boxes |
| 005–007819 | VDA/128 Asynchronous Communication Controller PCB |
| 005–037016 | VSC/3 Synchronous Communications Controller PCB |
| 005–037017 | VLC IEEE 802.3 LAN Controller PCB |
| 118–005943 | 8 Port VME Cluster |
| 118–004850 | 16 Port VME Cluster |
| **Power Cords** | |
| 109–000996 | 100V/120V 50/60 Hz (No Power Suffix – U.S., Japan) |
| 109–000813 | 240V 50 Hz (Power Suffix 5 – U.K., Hong Kong) |
| 109–000809 | 240V 50 Hz (Power Suffix 6 – Australia, New Zealand) |
| 109–000812 | 220V 50 Hz (Power Suffix 7 – France, Germany) |
| 109–000811 | 220V 50 Hz (Power Suffix 8 – Italy) |
| 109–000815 | 220V 50 Hz (Power Suffix 9 – Denmark, Greenland) |
| 109–000810 | 220V 50 Hz (Power Suffix 0 – Switzerland, Italy) |

Table 1–4. Field Replaceable Units (FRUs) (Continued)

| DG PART NO. | DESCRIPTION |
|---|---|
| Communication Cables | |
| 005–033791 | Ethernet Cable 5.0 m (16.4 ft) Teflon |
| 005–033787 | Ethernet Cable 20.0 m (66.2 ft) Teflon |
| 005–033766 | Ethernet Cable 5.0 m (16.4 ft) PVC |
| 005–037742 | Ethernet Cable 20.0 m (66.2 ft) PVC |
| 005–033776 | RS–232 Cable 15.2 m (50.0 ft) |
| 005–013325 | RS–232 Cable 1.5 m (5.0 ft) (Serial) |
| 005–033703 | RS–232 Cable 4.5 m (15.0 ft) |
| 005–033788 | RS–232 Cable 7.6 m (25.0 ft) (Serial) |
| 005–033783 | RS–422 Cable 7.6 m (25.0 ft) |
| 005–033743 | RS–422 Cable 15.2 m (50.0 ft) |
| 005–033745 | RS–422 Cable 30.5 m (100.0 ft) |
| 005–020907 | RS–422 Cable 91.4 m (300.0 ft) |
| 005–020908 | RS–422 Cable 152.4 m (500.0 ft) |
| 005–033775 | Modem Cable |
| 005–011433 | Modem Cable |
| 005–033000 | SCSI Cable 1.5 m (5.0 ft) (CPU to (PHU) |
| 005–033001 | SCSI Cable 3.0 m (10.0 ft) (CPU to PHU) |
| 005–033345 | SCSI Cable 4.57 m (15.0 ft) (CPU to PHU) |
| 005–033003 | SCSI Cable 0.4 m (1.3 Ft (PHU to PHU) |
| 005–033004 | SCSI Cable 1.5 m (5.0 ft) (PHU to PHU) |
| 005–033005 | SCSI Cable 3.0 m (10.0 ft) (PHU to PHU) |

# APPENDIX E

## AVilon 300 SERIES STATIONS

**Table 1-1 Customer Replaceable Units and Part Numbers**

| CRU | Part Number |
|---|---|
| **Power cord (computer unit)** | |
| 100/120 V ac | 109-000249 |
| 240 V ac (Australia) | 109-000812 |
| 240 V ac (Austria) | 109-000809 |
| 240 V ac (Denmark) | 109-000815 |
| 240 V ac (Italy) | 109-000811 |
| 240 V ac (Switzerland) | 109-000810 |
| 240 V ac (U.K) | 109-000813 |
| **Power cord (monitor)** | 109-001253 |
| **Power supply** | 005-034141 |
| **SCSI bus fuse** | 113-000092 |
| **SCSI bus cable** | |
| 5 ft | 005-033000 |
| 10 ft | 005-033001 |
| 15 ft | 005-033335 |
| **Speaker assembly** | 005-034420 |
| **System board assembly** | |
| Monochrome | |
| 16 MHz | 005-035579 |
| 16 MHz with Kanji character set support | 005-035580 |
| 20 MHz | 005-035583 |
| 20 MHz with Kanji character set support | 005-035584 |

| CRU | Part Number |
|---|---|
| **System board assembly** | |
| Color | |
| 16 MHz | 005-035581 |
| 20 MHz | 005-035585 |
| **Terminal or serial printer cable** | |
| EIA RS-232-C (5 ft) | 005-013325 |
| EIA RS-232-C (15 ft) | 005-033703 |
| EIA RS-232-C (25 ft) | 005-033788 |
| EIA RS-232-C (50 ft) | 005-033776 |
| **Terminal or serial printer cable** | |
| EIA RS-422 (25 ft) | 005-033783 |
| EIA RS-422 (50 ft) | 005-033743 |
| EIA RS-422 (100 ft) | 005-033745 |
| EIA RS-422 (300 ft) | 005-020907 |
| EIA RS-422 (500 ft) | 005-020908 |

Table 1-1 Customer Replaceable Units and Part Numbers

| CRU | Part Number | CRU | Part Number |
|---|---|---|---|
| **Fan assembly** | 005-034418 | **Memory module** | 005-033889 |
| **Housing** | 002-038729 | **Modem cable** 25 ft | 005-033775 |
| **Keyboards** | | **Monitors** | |
| 102-key (French) | 118-004674 | Monochrome | |
| 102-key (German) | 118-004673 | 100/120 V ac | 118-004654 |
| 102-key (Italian) | 118-004971 | 220/240 V ac | 118-004653 |
| 102-key (Katakana) | 118-004752 | Color | |
| 102-key (Spanish) | 118-004969 | 100/120 V ac | 118-004659 |
| 102-key (Swedish) | 118-004676 | 220/240 V ac | 118-004658 |
| 102-key (Swiss) | 118-004972 | **Monitor cables** | |
| 102-key (U.K.) | 118-004675 | Monochrome | 005-034410 |
| 101-key (U.S) | 118-003796 | Color | 005-034408 |
| **LAN cable** | | **Mouse** | 118-004883 |
| IEEE 802.3 16.4 ft Teflon® | 005-033791 | **Parallel printer cable** | 005-023915 |
| IEEE 802.3 16.4 ft PVC | 005-033766 | | |
| IEEE 802.3 65.6 ft Teflon | 005-033787 | | |
| Ethernet 65.6 ft Teflon | 005-33742 | | |

# AViion 5000 CONFIGURATION LAB

ECTIVES;

UPON COMPLETION OF THIS LAB YOU WILL BE ABLE TO:

1. CORRECTLY CALCULATE YOUR POWER REQUIREMENTS FOR A AViion 5000 SERIES COMPUTER

2. INSTALL SYSTEM BOARD AND OPTION BOARDS ACCORDING TO THE CORRECT SLOT POSITION IN THE CHASSIS.

3. JUMPER ANY EXPANSION MEMORY OR VME OPTION BOARD FOR THE CORRECT ADDRESS AND BG/R LEVEL.

4. LOCATE THE CORRECT PART NUMBERS FOR ANY FRU IN YOUR SYSTEM.

REFERENCES:

(014-1850) EXPANDING THE AViion 5000 SERIES SYSTEM
(014-1867) SETTING UP AND INSTALLING VME OPTIONS IN AViion SYSTEMS

OR THE PURPOSE OF THIS LAB YOUR SYSTEM WILL CONTAIN THE FOLLOWING
OMPONENTS;

| UANITY | TYPE |
|---|---|
| 1 | 25MHZ SYSTEM BOARD W/16 MB OF MEMORY |
| 2 | MEMORY EXPANSION BOARDS (48MB) (16MB) |
| 2 | SCSI ADAPTER BOARDS |
| 1 | ESDI ADAPTER BOARD |
| 2 | VME VAC/16 OPTION BOARDS |
| 1 | VME VLC LAN OPTION BOARD |

TOTAL 9 BOARDS

MASS STORAGE DEVICES

INTERNAL DEVICES

| | |
|---|---|
| 1 | SCSI 150 MB TAPE DRIVE |
| 1 | ESDI 322 MB WINI DISK DRIVE |

EXTERNAL DEVICES

| | |
|---|---|
| 1 | SCSI 150 MB TAPE DRIVE |
| 1 | SCSI 648 MB WINI DISK DRIVE |

USE THE TABLE BELOW TO CALCULATE YOUR SYSTEMS POWER CONSUMPTION.

1) WHAT IS THE TOTAL AMOUNT OF POWER (WATTS) CONSUMED IN THIS CONFIGURATION?

2) WHAT IS THE TOTAL AMPERAGE ON EACH OF THE FOLLOWING LINES?

+5V +12V -12V

| Slot No. | Board Name/Drive Name | Current (Amperes) +5 V dc | +12 V dc | -12 V dc |
|---|---|---|---|---|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |
| 5 | _____ | _____ | _____ | _____ |
| 6 | _____ | _____ | _____ | _____ |
| 7 | _____ | _____ | _____ | _____ |
| 8 | _____ | _____ | _____ | _____ |
| 9 | _____ | _____ | _____ | _____ |
| 10 | _____ | _____ | _____ | _____ |
| | SCSI cartridge tape drive 1 | _____ | _____ | _____ |
| | SCSI cartridge tape drive 2 | _____ | _____ | _____ |
| | ESDI[1] or SCSI[2] hard disk drive 1 | _____ | _____ | _____ |
| | ESDI[1] or SCSI[2] hard disk drive 2 | _____ | _____ | _____ |
| | ESDI[1] or SCSI[2] hard disk drive 3 | _____ | _____ | _____ |

**Power Supply Limits**

**Amperage:**

+ 5 V Total (do not exceed 105.0 amps max.) = _____

+12 V Total (do not exceed 17.0 amps max.) = _____

-12 V Total (do not exceed 4.0 amps max.) = _____

**Wattage:**

+ 5 V wattage total = _____ = 5 V X _____ A

+12 V wattage total = _____ = 12 V X _____ A

-12 V wattage total = _____ = 12 V X _____ A

Total power (750 watts max.) = _____

(670 watts total for the 100 V ac power supply)

[1] Available on the AViiON 5000 computer only.
[2] Available on the AViiON 5010 computer only.

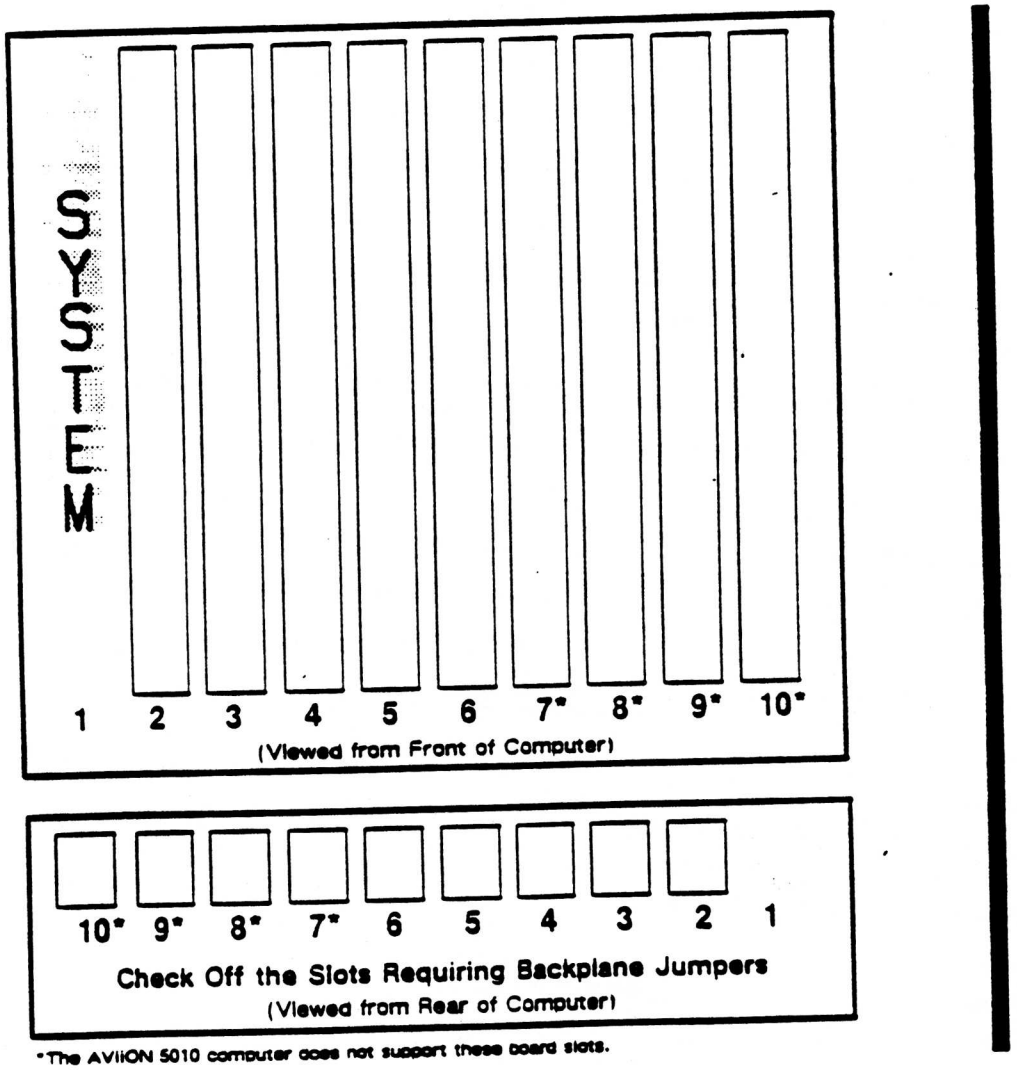
# SLOT ASSIGNMENTS AND PRIORITIES

ASSUME THAT ALL VME OPTION CARDS WILL HAVE A BG/R LEVEL OF THREE
FOR THIS EXERCISE, USE THE CHART BELOW TO CONFIGURE YOUR SYSTEM.
WRITE THE BOARDS NAME IN THE APPROPIATE SLOT ALONG WITH IT'S PART
NUMBER. ALSO, ANSWER THE FOLLOWING QUESTIONS.

1) WHAT VME OPTION CARD HAS THE HIGHEST PRIORITY ON THE VME BUS?

2) WHAT IS THE PART NUMBER FOR A 16 MB EXPANSION MEMORY BOARD

3) WHAT BACKPANEL SLOTS, IF ANY, WILL HAVE BG/R AND IACK JUMPERS ON THEM?




*The AViiON 5010 computer does not support these board slots.

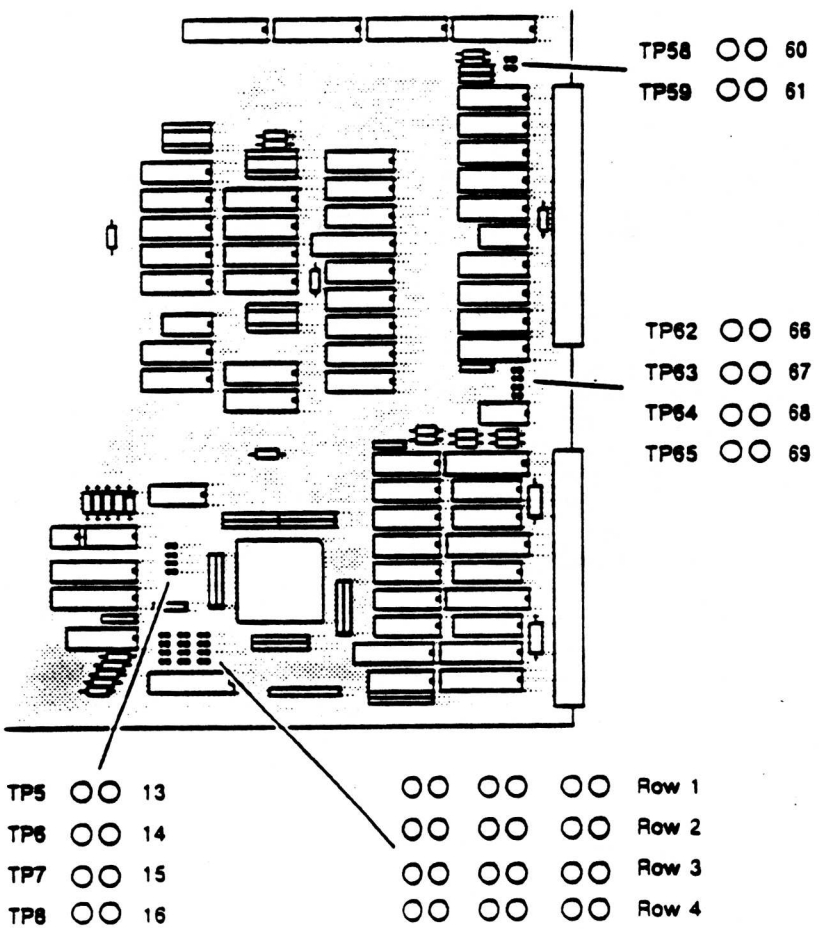
# EXPANSION MEMORY JUMPERING

IF THE SYSTEM BOARD HAS A TOTAL OF 16 MB OF MEMORY ON IT, YOU HAVE A ADDITIONAL TWO EXPANSION BOARDS TO ADD. ANSWER THE QUESTION BELOW FOR ADDING EXPANSION MEMORY BOARDS.

WHAT JUMPERS WILL YOU INSERT FOR THE FIRST EXPANSION BOARD AND WHAT WILL THE TOTAL AMOUNT OF MEMORY BE AFTER THE INSTALL? DON'T FORGET TO GIVE THE BOARD A ID.

USE THE CHART BELOW TO RECORD YOUR ANSWERS BY DRAWING A JUMPER FOR THE CORRECT PINS.

## EXPANSION BOARD 1

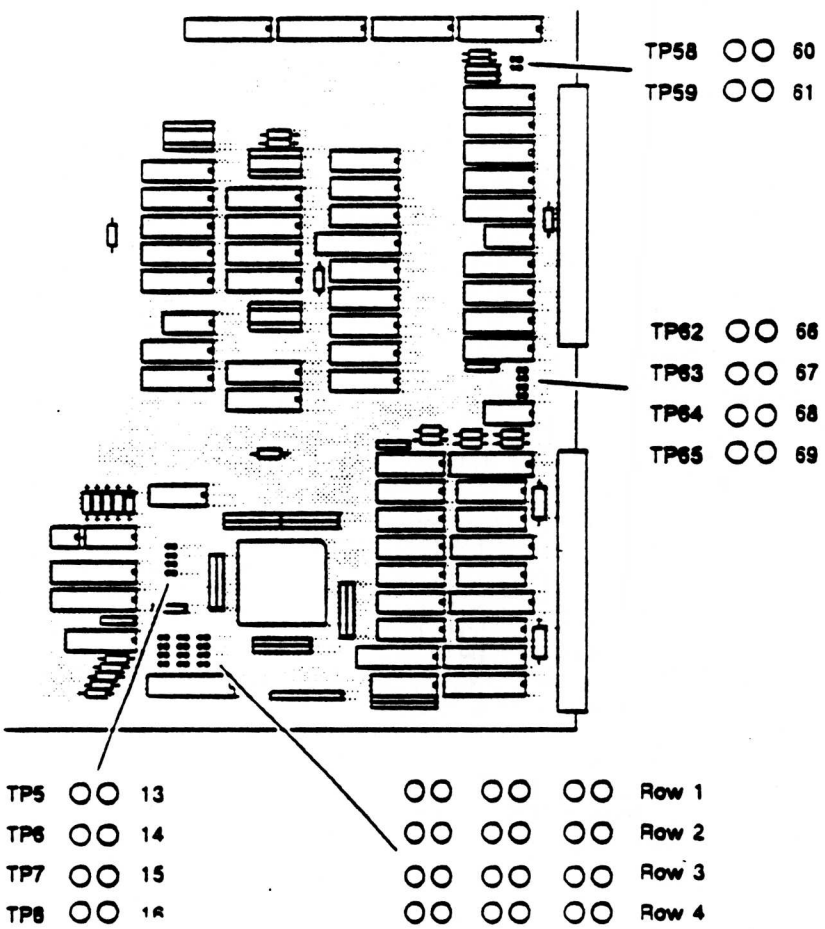



*Jumpers on the Expansion Memory Board*

## EXPANSION MEMORY BOARD 2

;AT JUMPERS WILL BE INSERTED ON BOARD 2? WHAT WILL THE TOTAL
'STEM MEMORY BE?

;AT BACKPANEL SLOT SHOULD CONTAIN MEMORY TERMINATORS?




*Jumpers on the Expansion Memory Board*

# VME OPTION BOARD JUMPERS

IOU HAVE IN YOUR SYSTEM TWO VAC/16 OPTION CARDS, LIST THE CORRECT JUMPER SETTINGS FOR THE FIRST VAC/16 THAT REFLECT ITS ADDRESS AND ALSO BG/R LEVELS.

WHAT WOULD THE CORRECT ADDRESS SETTING BE FOR THE SECOND VAC/16 TO BE SIZED BY DIAGNOSTICS?

LIST THE CORRECT SWITCH SETTINGS FOR A VLC BOARD 0. WHAT ADDRESS WOULD THE DIAGNOSTICS EXPECT TO FIND IT AT?

LIST ONLY THE SWITCHES THAT ARE "OFF"

SW 1

SW 2

SW 3

# MASS STORAGE DEVICES

OUR FIRST SCSI ADAPTER BOARD HAS COME CONFIGURED FOR A ADDRESS OF FFFFF300", INSTALL THE SECOND SCSI ADAPTER BY JUMPERING THE ORRECT ADDRESS LINES USING A "OUT" TO INDICATE A "1" AND A "IN" TO NDICATE A "0" FOR THE APPROPRIATE LINE BELOW;

A15 A14 A13 A12 A11 A10 A9 A8

HAT PORT ON THE BACK WOULD YOU USE TO CONNECT A PHU TO THE SECOND CSI ADAPTER?

HERE SHOULD THE SCSI BUS TERMINATOR BE PLACED?

IRCLE THE CORRECT ADDRESS FOR THE ESDI ADAPTER TO BE FOUND IN YOUR YSTEM

fffff100 fffffb00 fffffd00 ffffef00

HAT IS THWE CORRECT SYNTAX TO BOOT FROM YOUR SECOND 150 MB TAPE OUSED IN THE PHU?

# SCM LAB

E FOLLOWING LAB WILL FAMILARIZE YOU WITH THE COMMANDS AND MENUS SED WITH THE SCM PROMPT.

1> POWER ON YOUR PERIPHERALS FIRST,THEN POWER ON YOUR AVIION PROCESSOR.

2> MAKE SURE YOUR SYSTEM POWERS UP CORRECTLY,IF YOU DETECT A FAILURE NOTIFY THE INSTRUCTOR.

3> FROM THE SCM PROMPT TYPE IN "HELP" TO DISPLAY A LIST OF COMMANDS USED FOR THE SCM.MOST OF THESE COMMANDS ARE USED TO DEBUG PROGRAMS,HOWEVER,THE FOLLOWING ONES YOU SHOULD BE FAMILAR WITH;

BOOT
START/CONTINUE
FORMAT

"BOOT" WILL BE USED TO LOAD DIAGNOSTICS OR YOUR OPERATING SYSTEM FROM THE SCM PROMPT.

"START" CAN USED TO START A PROGRAM THAT RESIDES IN MEMORY.CONTINUE ALSO CONTINUES PROGRAM EXECUTION AT THE CURRENT PC VALUE.

"FORMAT" IS USED TO CHANGE SYSTEM CONFIGURATION PARAMETERS.

4> ENTER A "FORMAT" COMMAND TO "VIEW OR CHANGE SYSTEM CONFIGURATION ARAMETERS".

5> TYPE "1" "CHANGE BOOT PARAMETERS" AND ANOTHER "1"TO "CHANGE SYSTEM BOOT DEVICE".

THE SYSTEM DISPLAYS THE DEFAULT SYSTEM BOOT PATH IN BRACKETS,FOLLOWED BY A PROMPT TO CHANGE THE CURRENT BOOT PATH.

```
SYSTEM BOOT PATH = [ ]
DO YOU WANT TO CHANGE MODIFY THE SYSTEM BOOT PATH? [N]
```

NOTE: THE SYSTEM BOOT PATH IS NOT INITIALIZED WHEN THE BRACKETS ARE EMPTY.

6> A NEWLINE KEEPS THE CURRENT DEFAULT, ANSWER [Y] TO DISPLAY THE FOLLOWING

```
ENTER NEW SYSTEM BOOT PATH ->
```

7> TYPE IN THE NAME; sd(insc(),0)root:/dgux

THE SCM WILL BOOT THE FILE DGUX AT EVERY POWERUP.

> AFTER YOU SPECIFY THE DEFAULT BOOT PATH THE SCM WILL DISPLAY THE
EW DEFAULT IN BRACKETS,FOLLOWED BY A PROMPT TO CHANGE THE CURRENT
YSTEM BOOT PATH AGAIN.TAKE THE DEFAULT [N].

HE SYSTEM PROMPTS YOU TO BOOT FROM THE CURRENT SYSTEM BOOT PATH

DO YOU WANT TO BOOT? [N]

> PRESS NEWLINE TO RETURN TO THE "CHANGE BOOT PARAMETERS" MENU
ITHOUT BOOTING THE DEVICE.

OTE: TYPING A [Y] WOULD BOOT THE DEVICE.

## CHANGING THE DIAGNOSTIC BOOT PATH

HE DIAGNOSTIC BOOT PATH YOU SPECIFY IS THE PATH THE SYSTEM WILL
SE AT POWERUP TO BOOT A FILE OR DIAGNOSTIC PROGRAM BEFORE YOUR
YSTEM BOOT PATH IS PROBED.

0> TYPE A "2" FROM THE MENU TO SELECT "CHANGE DIAGNOSTIC BOOT
ATH" THE SYSTEM DISPLAYS THE CURRENT DEFAULT IN BRACKETS,FOLLOWED
Y A PROMPT TO CHANGE THE CURRENT BOOT PATH AS FOLLOWS;

DIAGNOSTIC BOOT PATH= [ ]
DO YOU WANT TO MODIFY THE DIAGNOSTIC BOOT PATH? [N]

1> PRESS NEWLINE TO KEEP THE CURRENT BOOT PATH AND RETURN TO THE
"CHANGE BOOT PARAMETERS" MENU,OR A [Y] TO CHOOSE A NEW PATH

ODIFY YOUR DIAGNOSTIC BOOT PATH TO REFLECT THE FOLLOWING;

2> ENTER NEW DIAGNOSTIC BOOT PATH -> st(insc(),4)

IF YOU CHOOSE TO BOOT A DIAGNOSTIC FILE FROM DISK ENTER THE
FOLLOWING;

cied()usr:/stand/diags [AV5000/6000
sd(insc())usr:/stand/diags [av300/400]

THE SCM WILL BOOT THE FILE DIAGS FROM THE DISK AT POWERUP UNTIL YOU
CHANGE THE BOOT PATH AGAIN.

13> INSERT A DIAGNOSTIC TAPE IN THE DRIVE,POWER OFF THE PROCESSOR
AND THEN POWER IT BACK ON NOTING THE BOOT PATH THAT IS USED AFTER
POWERUP.

USE THE FOLLOWING SUMMARY MENU SUMMARY TO GO THROUGH THE REMAINING OPTIONS AVAILABLE FOR THE SCM MENU. WHEN YOU FEEL COMFORTABLE USING THE MENU YOU HAVE CONCLUDED THE SCM LAB.

REFER TO THE FOLLOWING PAGES IN THE "USING THE SYSTEM CONTROL PROGRAM" MANUAL FOR THE REMAINING PORTIONS OF THE LAB. PGS.2-8 TO PGS. 2-18.

## SUMMARY OF SCM MENUS

THE SCM DISPLAYS THE "VIEW OR CHANGE SYSTEM CONFIGURATION MENU WHEN YOU ENTER THE "FORMAT" COMMAND AT THE SCM PROMPT.

```
SCM> F

        VIEW OR CHANGE SYSTEM CONFIGURATION

             1. CHANGE BOOT PARAMETERS
             2. CHANGE CONSOLE PARAMETERS
             3. CHANGE SERIEL PORT PARAMETERS
             4. CHANGE PRINTER PARAMETERS
             5. VIEW MEMORY CONFIGURATION
             6. CHANGE TESTING PARAMETERS
             7. RETURN TO PREVIOUS SCREEN
```

```
        CHANGE BOOT PARAMETERS (1)

        1. CHANGE SYSTEM BOOT PATH
        2. CHANGE DIAGNOSTIC BOOT PATH
        3. CHANGE DATA TRANSFER MODE [BLOCK]
        4. RETURN TO PREVIOUS SCREEN
```

```
      CHANGE CONSOLE PARAMETERS (2)

        1. CHANGE BAUD RATE [9600]
        2. CHANGE CHARACTER LENGTH [8 BIT, NO PARITY]
        3. CHANGE CHARATER CODE SET [ANSI]
        4. CHANGE FLOW CONTROL [ENABLED]
        5. CHANGE CONSOLE LANGUAGE [US ENGLISH]
        6. RETURN TO PREVIOUS SCREEN
```

CHANGE BAUD RATE

1. 300
2. 600
3. 1200
4. 2400
5. 4800
6. 9600
7. 19200
8. RETURN TO PREVIOUS SCREEN
   CURRENT DEFAULT IS [9600]

ENTER CHOICE(S) ->

CHANGE SERIEL PORT PARAMETERS (3)

1. CHANGE BAUD RATE
2. CHANGE CHARACTER LENGTH [8 BIT, NO PARITY]
3. RETURN TO PREVIOUS SCREEN

CHANGE PRINTER PARAMETERS (4)

1. CHANGE PRINTER TYPE [CENTRONICS]
2. RETURN TO PREVIOUS SCREEN

VIEW MEMORY CONFIGURATION (5)

MEMORY SIZE IS A 8 MBYTES
TOP OF MEMORY = XXXXXX HEX.
MEMORY MODULE 0 CONTAINS 4 MBYTES
MEMORY MODULE 1 CONTAINS 4 MBYTES
MEMORY MODULE 2 NOT PRESENT
MEMORY MODULE 3 NOT PRESENT
MEMORY MODULE 4 NOT PRESENT
MEMORY MODULE 5 NOT PRESENT
MEMORY MODULE 6 NOT PRESENT

PRESS ANY KEY TO CONTINUE

CHANGE TESTING PARAMETERS (6)

| ECW BIT | FUNCTION | STATE |
|---|---|---|
| 0 | RESERVED | DISABLED |
| 1 | LOOP ON ERROR | DISABLED |
| 2 | OUTPUT OT CONSOLE | ENABLED |
| 3 | PERCENT FAILURE | DISABLED |
| 4 | PRINT PASS MESSAGE | ENABLED |
| 5 | OUTPUT TO PRINTER | DISABLED |
| 6 | DISASSEMBLER | ENABLED |
| 7 | PRINT SUBTEST MESSAGE | ENABLED |
| 8 | REPORTALL | DISABLED |
| 9 | HALT ON ERROR | DISABLED |
| 10 | ENABLE ERROR LOGGING | DISABLED |
| 11 | CONTINUE ON EXCEPTION | DISABLED |
| 12 | RESERVED | DISABLED |
| 13 | PAGE MODE | DISABLED |
| 14 | RESERVED | DISABLED |
| 15 | RESERVED | DISABLED |
| 16 | RESERVED | DISABLED |
| 17 | RESERVED | DISABLED |
| 18 | RESERVED | DISABLED |
| 19 | RESERVED | DISABLED |
| 20-31 | RESERVED | DISABLED |

SELECT BIT(S) TO TOGGLE ->

AVIION PRODUCT INFORMATION PACKAGES

43-3723 - AVIION 300 SERIES STATIONS

43-3722 - AVIION 5000 SERIES COMPUTERS

43-3724 - AVIION 6000 SERIES COMPUTERS

43-3727 - AVIION 400 SERIES STATIONS

43-3729 - AVIION 3000/4000 SERIES COMPUTERS

# AVIION SYSTEMS POWER UP GOALS

ND ANY FAULTS IN THE BASE SYSTEM,THE KERNAL SYSTEM AND LOAD PATH
JST BE INITIALIZED AND VERIFIED FROM PROM TO THE POINT OF ALLOWING
DIAGNOSTIC MEDIA TO LOAD.

REPLACABLE UNIT (RU) CALL-OUTS.
IN CONFIDENCE WITH CUSTOMER,FIELD SERCVICE,AND MANUFACTURING
REQUIREMENTS,ALL FAILURE REPORTS WILL ATTEMPT TO ISOLATE TO THE FRU
LEVEL.

PERFORM SELF-TEST ON ALL SYSTEM UNITS
ALL UNITS INSTALLED IN THE SYSTEM,STANDARD AND OPTIONAL,MUST BE
SIZED AND TESTED.THE LEVEL OF SELF-TEST IS A CHECK FOR HARD
FAULTS.THIS DOES NOT INCLUDE I/O DEVICES.

SUPPORT A VIRTUAL CONSOLE
VIRTUAL CONSOLE SUPPORT IS REQUIRED TO ALLOW ACCESS TO ALL
REGISTERS AND MEMORY LOCATIONS AND SUPPORT OF PROGRAM LOADING.

INITIALIZE AND VERIFY THE LOAD PATH
ALL FAULTS IN THE BASE SYSTEM WHICH WOULD PREVENT THE BOOTING AND
EXECUTION OF DIAGNOSTIC SOFTWARE MUST BE FOUND.FAULTS THAT WOULD
CAUSE MALFUNCTION OF THE DIAGNOSTICS COULD CAUSE ERRONEOUS ERROR
INDICATIONS.

EASE OF ERROR REPORTING
TO SUPPORT CUSTOMER MODE OPERATION AND OTHER NEEDS OF FIELD
ERVICE,EASE OF ERROR REPORTING DURING POWERUP IS REQUIRED

SYSTEM INITIALIZATION
PERFORM THE REQUIRED SYSTEM CONFIGURATION AND INITIALIZATION TO
ALLOW THE OPERATING SYSTEM TO BE BOOTED AND RUN.

PROM AND NOVRAM
VIRTUAL CONSOLE PROGRAM (VCP) WHICH INCLUDES;USER INTERFACE
MENUS,MINIMAL COMMAND LINE INTERPRETER AND MNEMONIC DEBUGGER.

AUTOMATIC PROGRAM LOAD UTILITIES

BOOT ROUTINES,WHICH ARE REQUIRED DRIVERS FOR LOADING FROM LAN OR
SCSI DEVICES.

POWERUP TESTS;ENOUGH TO VERIFY THAT THE DIAGNOSTIC OPERATING SYSTEM
CAN BE LOADED

SYSTEM SIZING AND CONFIGURATION

**Table 3–3 Integrated Devices**

| Mnemonic | Device Type | Parameters | | |
|---|---|---|---|---|
| | | cntrl | unit | file# |
| inen | Integrated Ethernet controller | N/A | N/A | N/A |
| insc | Integrated SCSI controller | N/A | N/A | N/A |
| sd | SCSI disk | insc( ) | SCSI ID[1] | 0 |
| st | SCSI tape | insc( ) | SCSI ID[1] | Tape file number |

[1] An integer 0 through 6, determined by configuration jumpers.

NOTE: If you have a computer with an integrated SCSI bus, arguments in Table 3–3 apply. If your computer has a primary VME bus, arguments in Table 3–4 apply.

**Table 3–4 VME Devices**

| Mnemonic | Device Type | Parameters | | |
|---|---|---|---|---|
| | | cntrl | unit | file# |
| sd | SCSI disk | SCSI adapter cisc( ) | SCSI ID[1] | 0 |
| st | SCSI tape | SCSI adapter cisc( ) | SCSI ID[1] | Tape file number |
| cisc | Ciprico SCSI adapter | Adapter number or VME address | 0 | 0 |
| cied | Ciprico ESDI disk | Controller number or VME address | Unit number[2] | 0 |
| cimd | Ciprico SMD disk | Controller number or VME address | Unit number[2] | 0 |
| hken | Interphase Hawk Ethernet | 0 | 0 | 0 |

[1] An integer 0 through 6, determined by configuration jumpers.
[2] An integer 0 through 3, assigned to differentiate devices on the same disk controller.

Booting on esdi drive on AV5000

Scm> b cied(0,0) root:/dgux

This section contains some examples of valid boot device specifications for standard devices.

| | |
|---|---|
| First disk on first integrated SCSI controller | **sd(insc(0),0 )** |
| Second disk on first integrated SCSI controller | **sd(insc(0),1)** |
| Third disk on first integrated SCSI controller | **sd(insc(0),2)** |
| Fourth disk on first integrated SCSI controller | **sd(insc(0),3)** |
| First tape drive on first integrated SCSI controller | **st(insc(0),4)** |
| Second tape drive on first integrated SCSI controller | **st(insc(0),5)** |
| Third tape drive on first integrated SCSI controller | **st(insc(0),6)** |
| First server responding on integrated Ethernet LAN | **inen( )** |
| First disk on first Ciprico ESDI or SMD controller | **cied(0,0)** or **cimd(0,0)** |
| Second disk on first Ciprico ESDI or SMD controller | **cied(0,1)** or **cimd(0,1)** |
| Third disk on first ESDI or SMD Ciprico controller | **cied(0,2)** or **cimd(0,2)** |
| Fourth disk on first ESDI or SMD Ciprico controller | **cied(0,3)** or **cimd(0,3)** |
| First disk on third Ciprico ESDI or SMD controller | **cied(3,0)** or **cimd(3,0)** |
| Second disk on third Ciprico ESDI or SMD controller | **cied(3,1)** or **cimd(3,1)** |
| Third disk on third Ciprico ESDI or SMD controller | **cied(3,2)** or **cimd(3,2)** |
| Fourth disk on third Ciprico ESDI or SMD controller | **cied(3,3)** or **cimd(3,3)** |
| First SCSI disk on second Ciprico SCSI adapter | **sd(cisc(1),0)** |
| Second SCSI disk on second Ciprico SCSI adapter | **sd(cisc(1),1)** |
| Third SCSI disk on second Ciprico SCSI adapter | **sd(cisc(1),2)** |
| Fourth SCSI disk on second Ciprico SCSI adapter | **sd(cisc(1),3)** |
| First SCSI tape drive on first Ciprico SCSI adapter | **st(cisc( ),4)** |
| Second SCSI tape drive on first Ciprico SCSI adapter | **st(cisc( ),5)** |
| Third SCSI tape drive on first Ciprico SCSI adapter | **st(cisc( ),6)** |
| First server responding on first VME Ethernet LAN | **hken(0)** |
| First server responding on second VME Ethernet LAN | **hken(1)** |

# TCP/IP LAB

his lab will get you started by having you install TCP/IP. You will hen determine whether you have successfully installed the network by ying to communicate to another system and yoy will finish this lab / using several troubleshooting commands.

. Pair up with another student and obtain a TCP/IP tape from your instructor. You have been given a Unix starter system, bring it up to run level 1. before installing the TCP/IP product

   - make necessary entries for every student in the class in your /etc/passwd file,
   - make each a home directory and
   - make any filesystems you wish on your local pack.

. Choose an internet network addressing scheme for your network and hosts, i.e. internet address of 89.0.0.X, where 89 is the network address and X is the number of the your system in lab. (System numbers should be on the top of the machine. If not ask the instructor for your machine number). For a system name use classX (again, X being the number of your machine and class in lower case. We will use "ClassX" for the node name of your system in the System file ). Use "Avilon" for the network name.

3. Be sure the DG/UX tape is loaded and run "sysadm loadpackage".

4. Run "sysadm settuppackage" for TCP/IP, and answer the questions from the setup script as they appear, when in doubt take the default answer.

5. Select a host portion of all one's for the broadcast address and select "remsh" , the new SVID compatible name, for the remote shell command and rsh for restricted shell). Ask your instructor if in doubt.option

6. Answer the questions for each of the TCP/IP install steps dealing with network setup, ftp, the r commands and sendmail.
Do not add any hosts.equiv entries at this time or customize ruleset 0. Use "mailx" as the frontend to sendmail.

Run "sysadm newdgux" which can be found from the main menu under "sysmgmt". Select the "system.aviion" system file and "vi" as the the editor.

After the first "Tuneable Configuration Parameters" portion a new portion that begins :

"Prototype fragment of system configuration for:

(Product Name): TCP/IP

(Release): 4.xx "

should be present. If not contact your instructor

be sure that your system file contains loop( ) and either hken( ) for a AV5100, AV6100 or inen( ) for an AV300, AV400. Also check to be sure that entries for "ptc" and "pts" exist in the file. There should be a Devices section that contains ip( ), tcp( ) and udp( ). Under the protocols section the following lines should appear:

ipproto_ip
ipproto_tcp
ipproto_udp
ipproto_icmp

the streams section should contain:

ether
arp
socsys
netlog

exit the file with shifted zz and Rebuild the kernel, install and link it to /dgux. When done shut the system down (shutdown -g0 -y) and then reboot under the new kernel. Bring the system up to run level 3.

From the command line type in "ifconfig interface name" (hken0). What does this show you? Are these values what you set them up to be?

3. From the prompt enter "rwho". What does the -a option do?

). While on the remote host type in "netstat -i" from the command line. Notice the various columns including "Ierrs", "Opkts", "Oerrs" and Collis".

). Enter "netstat 10"

1. enter "ps -e", find the pid number of netstat and do "kill (pid#)" from the command line. Next enter "netstat -s" and examine the output this generates.

2. Use "netstat -a" to show connections are presently established.

3 Log off the remote system and close the outstanding rlogin session.

.4. From the command line type in "arp -a" . What information does this provide?

:5. Remove one of the entries from the arp table by entering "arp -d (host)" .

26. Renter this line manually in the arp table by becoming root and entering "arp -i (hken0 or inen0) -s systemname ethernet-address"

Try changing several of these values by manually running the "ifconfig" command from the command line.

After you've changed several of them return them to what you had originally set them up to be. Type in "ps -e|pg" what communication processes are running.

From the command line type "ping hostname". What does it do?

On the command line type "pong hostname", what does this produce?

Type "telnet" on the command line .You should now find yourself in Telnet local mode. Type Help and view the help facility available.

Connecting to a Remote Host:

Open a connection to the host "localhost" by typing "open localhost" at the ">telnet" prompt. When the logon banner appears, log on with the same username/password pair that you initially used. Type who and see what terminal you are on. Type "hostid", when the prompt returns type "hostname". What hostid is returned? Type bye and return to the local shell.

Execute the Telnet program again. Open the Internet address 127.0.0.1 but this time type "telnet 127.0.0.1 from the command line. Log on with your same username/password. What hostid and hostname are returned from this internet number?

try to open a connection using the name of another system. Type "hostid" and "hostname" again.

Close the connection by logging off and quit out of telnet. From the command line type in "rlogin (hostname) to the same host and log in.

At the prompt enter "ruptime", what does this show you? How many users are there on the system?

Run the command again with the -a option, what does this option do? Run the command with the -l option. Run it again with the the -t option and finally with the -u option.

# NFS LAB

is lab will have you install the NFS package and then verify it's stallation by mounting resources from another system. You will nish this lab by executing several troubleshooting commands.

Pair up with another student and obtain a DG/UX tape from your instructor. You have been given a Unix starter system, bring it up to run level 1.

Be sure the DG/UX tape is loaded and run "sysadm loadpackage". (or if the NFS package has already been loaded precede to the next step)

. Run "sysadm settuppackage" for NFS, and answer the questions from the setup script as they appear, when in doubt take the default answer.

. Run "sysadm newdgux" which can be found from the main menu under sysmgmt". Select the "system.aviion" system file and "vi" as the the editor.

After the "Tuneable Configuration Parameters" portion for TCP/IP there should be a new portion that begins :

"Prototype fragment of system configuration for:

(Product Name): NFS

(Release): 4.xx "

If not contact your instructor

be sure that your system file contains plm() and NFS

5. Exit the "vi" session by entering shifted zz. Rebuild the kernel, install and link it to /dgux.

run "sysadm diskmgmt" from the command line. Examine the amount of space on your disk by choosing "physical disk management" and then\ selecting item 3. "Display a Physical Disk's Layout".

If sufficient space exists, create another logical disk 10,000 blocks in size name after your system. Use the "sysadm Logical Disk Management Menu" and select option 1 "Create a Logical Disk".

After creating this logical disk make a file system on it by entering the "sysadm File Management Menu" and selecting option 1. "Make a File System". Do not specify any flags or options.

Return to the main "sysadm" menu and select "File System management", select 1. "addfsys". In response to the questions, make it writeable, dump cycle [d], Export "yes".

You will be asked for the directory mount point, make it the name of your system in the root directory. i.e. /systemname. You will be told it doesn't exist and be asked if you want to create it. Answer yes.

Use "sysadm addfsys" to add the name of the other teams filesystem mount it on a directory called "remote". Follow the prompts but this time instead of answering yes to "Is this a local file system?" , answer no.

Give it the name of the remote system and the name of the remote mount directory. Remember, it should be /systemname. Answer "no" to the question "hard mount?".

The system will advise you if the directory "/remote" does not exist, answer "yes" to have it created.

The system will next try to contact the remote system but will fail since we are not at run level 3.

When done shut the system down (shutdown -g0 -y) and then reboot under the new kernel. Bring the system up to run level 3. and verify that the remote filesystem is mounted by typing in "mount". There should be a line indicating that the remote system is mounted. Which line is it?

- Cat the /etc/fstab file and find the line that indicates that a remote mount should be performed.

- "cd" into the "/remote" directory and cat a file. Create one of your own.

3. At the shell prompt, enter "ps -e|pg" check that nfsd, biod and the portmap daemon are present.

4. Enter "showmount -d "yourhostname". What does it show?

5. Execute "showmount -e yourhostname" and notice the different info this produces. What does it show?

6. Finally try "showmount -a"

7. "cat" /etc/exports. What is in this file?

8. "cat" /etc/xtab. what is in this file? What is the difference between the two.

9. Enter "exportfs" at the prompt. What does this show you? What command is it similar to?

10. Edit the /etc/xtab and remove all entries. Then run the exportfs command with the -va option. What did this do?

11. Enter "rpcinfo -p (name of your nfs server system)" at the shell prompt. Notice the print out it gives. What are these items?

12. Ask the root user on the NFS remote server system to kill all nfsd processes on his machine. Then enter "rpcinfo -u (server name) (program number for nfsd). What is the response?