



DAP 500

Installation Manual
for
VAX/VMS Systems

man018.01
(preliminary edition)

30 March 1988

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Preface

Introduction

This manual describes what is involved in installing an AMT DAP system onto a Digital Equipment Corporation (DEC) VAX or MicroVAX host.

This preliminary edition of the manual is primarily concerned with the installation of the DAP base software on the VAX host. As the hardware needed in the VAX to interface to the DAP is likely to be fitted by DEC engineers, and the DAP will come already fitted with an appropriate interface for the VAX, only passing mention is made in this edition of the hardware aspects of the installation. The next edition of this manual will cover the installation of the hardware in more detail.

Documentation

Various manuals, one AMT and five DEC, are referred to from time to time in this manual. Listed below are those manuals, with their order numbers:

AMT documentation

<i>DAP 500: Program Development Under VAX/VMS</i>	man004.02
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DEC documentation

<i>Guide to VAX/VMS Software Installation</i>	AA-Y514B-TE
<i>System Generation Utility Reference</i>	AA-Z433A-TE
<i>VAX/VMS System Manager's Reference</i>	AA-Y507B-TE
<i>VMS System Messages and Recovery Procedures Reference</i>	AA-Z800B-TE
<i>Writing a Device Driver for VAX/VMS</i>	AA-Y511B-TE

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Chapter 1

Software installation

1.1 Introduction

This chapter tells you how to install DAP 500 software on a VAX computer running under the VMS operating system, or on a MicroVAX machine running under MicroVMS. The same procedure is used to install DAP software to run DAP 500 series hardware systems or to run the DAP 500 series simulator system. The chapter is intended for system managers.

Installing a DAP hardware system involves the actual installation of the AMT-supplied black boxes and the running of some hardware installation software (covered in chapter 2 in this manual). As you follow the software installation procedure you will create various files which are needed in the hardware installation, so carry out the procedure described in this chapter before you follow the hardware procedure described in chapter 2.

The software installation is described step by step. The procedure is basically self-explanatory, the system will prompt you with questions and give you instructions as and when to mount the required volume(s) of the set of AMT media supplied with the installation kit.

To run a DAP-and-VAX system, you need the following versions of the relevant software:

VAX operating system and version: VAX/VMS Version 4.4 or higher;
MicroVMS Version 4.4 or higher

DAP software version: DAP 500 Software Version 2.1 or higher

The details of the installation refer to several terms which differ between VAX and MicroVAX systems. The manual is written with reference to installation on a VAX system but applies equally to a MicroVAX; if you are running a MicroVAX system the equivalent terms are shown below:

<i>VAX term</i>	<i>MicroVAX term</i>
VMS	MicroVMS
UNIBUS	Q-BUS
DR11-W	DRV11-WA

For more information on installing DAP 500 software on VAX/VMS systems see the DEC manuals

-Guide to VAX/VMS Software Installation and VAX/VMS System Manager's Reference.

1.2 Preparing to install DAP 500 software

The bill of materials supplied with your AMT DAP installation kit specifies the contents of your media kit - please check the contents of the kit against the list in the bill of materials, and let your AMT representative know if there is any discrepancy.

For details of how to mount the distribution media, see the DEC manual *Guide to VAX/VMS Software Installation* relevant to your particular VAX system.

1.3 Installation procedure requirements

Before you can install DAP 500 software you will require the following:

- SETPRV privileges, or CMKRN, WORLD and SYSPRV privileges
- A minimum of 5000 blocks of free disc space during the installation, and 3000 blocks of disc space after installation.
- 2M bytes of physical memory

The installation procedure takes about:

- 20 minutes (TK50 kits)
- 15 minutes (magnetic tape kits)

1.4 Using VMSINSTAL

VMSINSTAL is a command procedure that carries out the installation of the DAP 500 software. The installation is described in detail in the next section in this chapter. The parameters to the VMSINSTAL command are:

- The product(s) to be installed. This parameter consists of a list of the names of the products on a particular volume to be installed, separated by commas. Normally installation of all products on (each) distribution volume(s) will be required and the wildcard character * can be specified as the parameter to select all the products.

In line with DIGITAL's standards, AMT VAX-host product names end with a 3 digit version number. For example, the product name for version 2.1 of the DAP 500 base system software is 'DAPBASE021'.

The product names supplied on your distribution media are listed in the bill of materials

- Device name. Device names have the form *ddd**n*: where *ddd* is the device code and *n* is the unit number. The device name MUA0: is used in the examples in this document.

If you do not supply these parameters, **VMSINSTAL** will prompt you for them.

Before beginning the installation you should read Chapter 5 of the DEC manual *Guide to VAX/VMS Software Installation*, which explains the procedure to be followed before executing the command **VMSINSTAL**. If you have not satisfied all the conditions required to begin the installation when you invoke **VMSINSTAL**, you will receive warning messages explaining the problem and will be given the chance to abandon the installation so that you can put things right.

NOTE:

AMT cannot guarantee successful installation of DAP 500 software if DIGITAL's guidelines are not followed.

1.5 Installing DAP 500 software

This section describes the steps involved in the installation procedure and provides explanatory notes. The exact messages produced by **VMSINSTAL** will vary, depending on the distribution medium and software version being installed. The example below assumes that the distribution medium is TK50 cartridge tape and that the DAP 500 software version is 2.1.

If you press <Control-Y> during the installation, all files created up to that point will be deleted and the installation will be abandoned. If you wish to restart the installation procedure after pressing <Control-Y> you must return to step 2.

The installation procedure does not automatically purge files that are replaced during the installation unless you ask for this to be done.

The files to be replaced reside in directories **SYSS\$SYSTEM**, **SYSS\$MANAGER**, **SYSS\$HELP**, **SYSS\$SYSROOT** and **SYSS\$LIBRARY**; their replacements constitute the release of the DAP 500 software (a full list of files created or modified by this installation procedure is given in section 1.7 in this chapter). **AMT** recommends purging, and during the installation procedure you will be asked whether you would like purging to be done. If at that stage you press the return key, the files will be purged; if you type *NO*, then press Return, the files will not be purged (see step 3 below).

1.5.1 Typographic conventions used in this manual

Text output by the computer:

VMSINSTAL procedure done at *hh:mm*

where the italics give an indication of the output – in this case the time, stated as, perhaps, 17:44.

Text to be entered by you is shown in *ITALIC CAPITALS*:

\$ *SYSTEM* **RET**

with your required input being prefaced by the usual system prompt, **\$**. If you have to press the Return key, this is shown by **RET**.

<Control-Z>

means press the Z key, while you are holding down the Ctrl key.

Comments in the manual by way of explanation:

are basically in lower case italics. Capitals are normally only used to start sentences.

1.5.2 Steps needed to install the software

Step 1 Login to the system manager's account

Username: SYSTEM

Password:

Step 2 Invoke VMSINSTAL.

```
$ @SYSS$UPDATE:VMSINSTAL * MUA0: 
```

The above command invokes VMSINSTAL and requests that all products (selected by *) are installed from the medium on device MUA0.

VAX/VMS Software Product Installation Procedure V4.5

It is dd-mm-yyyy at hh:mm.

Enter a question mark (?) at any time for help.

Are you satisfied with the backup of your system disk [YES]? Y

Step 3 Insert the installation kit volume.

The next screen request asks you to mount the first distribution volume in the appropriate place (if the order in which volumes have to be mounted is significant, it will be clearly stated on the media labels - the order is not significant for tape media). In this example the software being installed is assumed to be the basic DAP 500 software version 2.1, DAPBASE021.

Please mount the first volume of the set on MUA0:

Are you ready? Y

%MOUNT-I-MOUNTED, AMT021 mounted on _MUA0:

The following products will be processed:

DAPBASE V2.1

Beginning installation of DAPBASE V2.1 at hh:mm

%VMSINSTAL-I-RESTORE, Restoring product saveset A...

Do you want to purge files replaced by this installation [YES]? Y

The installation will create a system directory DAP_TESTS which is used by the engineers' test program DAPET; if you have not installed a previous version of the software before, the following message will be generated by VMSINSTAL:

%VMSINSTAL-I-SYSDIR, This product creates system directory [DAP_TESTS]

The DAP device driver (DAPDRIVER.EXE) is not an executable program in the usual sense and its installation generates the following message:

%LINK-W-USRTFR, Image VMI\$ROOT:[SYSUPD.DAPBASE021]DAPDRIVER.EXE;1 has no user transfer address

%VMSINSTAL-I-MOVEFILES, Files will now be moved to their target directories...

Installation of DAPBASE V2.1 completed at hh:mm

VMSINSTAL procedure done at hh:mm

Step 4 Install other products, if required

The installation of the product(s) on the first volume is now complete. If there are other volumes in the distribution set, they should be installed now, repeating steps 2 and 3 as necessary. Otherwise you should logout:

\$ LOGOUT

SYSTEM logged out at dd-mm-yyyy hh:mm:ss.ss

AMT recommends that once the installation is complete, you should log out of the system manager's account, even if you intend to continue using it, as a new DCL command table will have been created, and changes will have been made to the logical name tables during the installation. Similarly, any users who were logged in during the installation should log out and log in again before they attempt to use the installed software.

1.6 Trouble Shooting

If the installation procedure fails it may be due to incorrect system parameters, in which case an appropriate message will be displayed. A description of these error messages is given in the DEC manuals *VAX/VMS System Messages and Recovery Procedures Reference*, and *Guide to VAX/VMS Software Installation*. The action you will have to take will be clear from the screen message you will get.

If the installation fails for any other reason please contact your AMT Representative.

To restart the installation procedure return to step 2.

1.7 Files affected by or introduced during installation

The installation of DAP 500 software introduces or modifies the following files and libraries:

SYSS\$MANAGER:	DAPBOOT.COM	[new]
	DAPBOOT.LOG	[new]
	DAPCONNECT.COM	[new]
SYSS\$HELP:	DANALYSE.HLB	[new]
	DAPET.HLB	[new]
	HELPLIB.HLB	[modified]
	PSAMHELP.HLB	[new]
SYSS\$SHARE:	DAPRTSLIB.EXE	[new]
SYSS\$LIBRARY:	APALDEF.TLB	[new]
	DAPFDEF.TLB	[new]
	DAPSYS.DLB	[new]
	DCLTABLES.EXE	[modified]
	GRALIB.DLB	[new]
	GSLIB.DLB	[new]
	IMAGELIB.OLB	[modified]
SYSS\$SYSTEM:	DANALYSE.EXE	[new]
	DAPBOOT.EXE	[new]
	DAPDRIVER.EXE	[new]
	DAPET.EXE	[new]
	DAPHCUCP.HCU	[new]
	DAPMCUCP.DEX	[new]
	DAPMONITOR.EXE	[new]
	DAPMSGSG.HCU	[new]
	DAPRESET.EXE	[new]
	DAPSIM.500.EXE	[new]
	DASSEMBLE.EXE	[new]
	DFORTRAN.EXE	[new]
	DLIBRARY.EXE	[new]
	DLINK.EXE	[new]
	DOPTIONS.EXE	[new]

Software installation FILES AFFECTED BY OR INTRODUCED DURING INSTALLATION

SYSSYSROOT:	DAP.TESTS.DIR	[new]
	[.DAP.TESTS]EPERMISSIONS.	[new]
	[.DAP.TESTS]MCUTEST.	[new]
	[.DAP.TESTS]MESSAGE.INDEX	[new]
	[.DAP.TESTS]MESSAGE.TEXT	[new]
	[.DAP.TESTS]PERMISSIONS.	[new]
	[.DAP.TESTS]PETEST.	[new]
	[.DAP.TESTS]STORTEST.	[new]

FILES AFFECTED BY OR INTRODUCED DURING INSTALLATION Software installation

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2012





1. The first part of the document
 2. The second part of the document
 3. The third part of the document
 4. The fourth part of the document
 5. The fifth part of the document

Chapter 2

Hardware installation

2.1 Introduction

This chapter tells you how to install DAP 500 hardware on a VAX system running VMS, or on a MicroVAX system running MicroVMS. The chapter also describes the software modifications required to the VMS operating system to enable the DAP interface to function.

2.2 Overview of hardware configuration

This section presents an overview of the hardware configuration process; the next section goes through an actual configuration, giving the various commands you have to type in to carry out the process, and the various responses you get from the VAX. As mentioned earlier in this manual, you should have installed the DAP software by the time you come to install the DAP hardware (details of software installation are in chapter 1).

The DAP hardware will be connected to the host computer via two DR11-W interface cards, one in the DAP and one in the VAX. The DR11-W card in the DAP will normally have been installed by AMT, however if you are going to install it yourself you should contact your AMT representative for details of the link settings, and so on. No further mention will be made in this manual of the DR11-W fitted in the DAP; any reference to a DR11-W will be to the DR11-W in the VAX for the DAP interface.

The DR11-W card in the host should only be installed by DIGITAL engineers. It will be connected to a UNIBUS and should also come with a cabinet kit. The kit provides an external socket connection to which the cables from the DAP can be connected (instead of their being connected directly to the DR11-W card itself).

The DR11-W card is a standard DEC device and VMS will have the corresponding standard device driver (XADRIVER) available for use. However, the DAP interface requires a different, AMT-supplied, device driver (DAPDRIVER). You must tell VMS to use this special device driver; VMS also needs to know where the DR11-W is to be located on the UNIBUS address map. Section 2.2.1 below explains how to calculate the addresses needed by VMS to locate the DR11-W on the UNIBUS and the changes that need to be made to the DR11-W card itself. The software changes

required in the VMS device driver tables are explained in section 2.2.2.

2.2.1 CSR and vector addresses for the DR11-W

Two pieces of information are required by VMS to specify where the DR11-W is located on the UNIBUS address map: the control and status register address (CSR), and the interrupt vector address. For some devices, there are fixed values for these two addresses, which are defined by DIGITAL. For other devices (including the DR11-W) the values may vary, and they are called *floating* addresses. The base address for floating CSR space is 760010_8 and for floating vectors is 300_8 .

The VMS utility **SYSGEN** (described in the DEC manual *System Generation Utility Reference*) provides you with an auto-configuration facility which is invoked when you boot VMS. During this boot process each standard DIGITAL device is assigned a fixed or floating CSR and vector in a predefined order. You must *not* use this facility to install the DR11-W for the DAP, as it would result in the standard DIGITAL DR11-W device driver being used. In order to use the AMT-supplied device driver you must specify the CSR and vector addresses at fixed locations. To specify fixed addresses you must:

- Alter the DIP (dual in-line package) switches on the DR11-W board to reflect the addresses chosen
- Change the VMS system configuration (through the **SYSGEN** utility)

Changing the DIP switches must be carried out by a DIGITAL engineer. He will need information about the current system configuration, which you can find using the **SYSGEN** utility, as described in the example (see section 2.3 below).

DIGITAL have reserved certain UNIBUS addresses for non-DIGITAL-supplied devices, addresses from 764100_8 to 767776_8 . The DR11-W you will use to connect the DAP into the VAX system should be located at one of the free CSR addresses in this range. Which address you use depends on what other devices (if any) are installed on your VAX, and how you want to allocate CSR addresses in the available range. You are recommended to use the next free address which falls on a 64-byte boundary (CSR addresses must fall on at least an 8-byte boundary). See section 2.3 for more details of how to select a suitable CSR address.

You must also select a suitable vector address for the DAP DR11-W from the addresses allocated to the devices already installed. User-selectable floating vector addresses are in the range 300_8 to 777_8 , and you should choose the next free floating vector address above the highest one currently in use at the moment. Again, section 2.3 tells you how to find out the highest address currently in use. The **SYSGEN** Device Table, which can be found in the DEC manual *System Generation Utility Reference*, defines how many vectors are used by each device; most devices use 1 or 2 vectors.

You calculate the first free vector as follows. If the last vector used is X and the device at X uses Y vectors, then the next free vector is at $X + 4Y$. You must then round this address up to the next valid alignment level for the DR11-W device; AMT recommend that the DR11-W is aligned on an 8 byte boundary address.

Once the new CSR and vector addresses have been selected, the system should be shut down and the DIGITAL engineer should modify the DIP switch settings on the DR11-W card to the new

values. The system can then be rebooted and the configuration changes described in section 2.2.2 can be made.

2.2.2 Connecting the DAP device driver

VMS needs to be told where the DR11-W device is located on the UNIBUS address map (and on which UNIBUS, if there is more than one of them). You give VMS this information by using the **SYSGEN** utility. AMT supply a command file (**DAPCONNECT.COM**) which invokes **SYSGEN** and connects the DAP device driver to the system. **DAPCONNECT.COM** will probably need to be altered to reflect the CSR and vector addresses you chose for your system (AMT have entered 764100₈ and 310₈ respectively in the supplied **DAPCONNECT.COM**).

Also, the controller to which the DR11-W is connected must be specified in **DAPCONNECT.COM**. This controller must be the UNIBUS adaptor and it can be specified either by its nexus number or generic name. The nexus number for each adaptor on the system can be found from the **SYSGEN** display generated by the **SHOW/CONFIGURE** command (see the example in section 2.3). The generic name can be found using the **SYSGEN** command **SHOW/ADAPTOR**. The nexus number or generic name must be specified in the **DAPCONNECT.COM** file (the file supplied by AMT contains the name **UB0**). Table 2.1 (which also appears in the 'Loading a Device Driver' chapter of the DEC manual *Writing a Device Driver for VAX/VMS*) gives the nexuses for the UNIBUS adaptors on various VAX processors.

UNIBUS Adaptor	VAX-11/725 VAX-11/730	VAX-11/750	VAX-11/780 VAX-11/782 VAX-11/785 VAX 8600 VAX 8650	MicroVAX I MicroVAX II
0	3	8	3	0
1	-	9	4	-
2	-	-	5	-
3	-	-	6	-

Table 2.1: Conventional Nexus Assignments

2.2.3 AMT-Supplied DAPCONNECT.COM

The contents of the AMT-supplied **DAPCONNECT.COM** file is listed below:

```
$ set process/priv=cmkrnl
$ run sys$system:sysgen
connect dapa0/adaptor=ub0/csr=%o764100/vector=%o310/driver=dapdriver
connect dapa1
connect dapa2
connect dapa3
connect dapa4
connect dapa5
connect dapa6
```

```
connect dapa7
connect dapa8
$ write sys$output "DAP device driver loaded"
```

Note that the CSR and vector numbers are specified in octal using the '%' prefix. A total of 9 DAP devices are specified – but note that this does not imply 9 physical DAPs can be connected to the host; only one DAP can be attached. The first device is used by the AMT run-time system but all the others are available for user programs.

When the interface routine **DAPCON** is called from the host (see the AMT manual *DAP 500: Program Development Under VAX/VMS* (man004)); the routine will attempt to allocate one of the DAP devices. If a DAP device is free, it will be allocated but the process will not start until the DAP itself is free – at the moment only one process can be running in the DAP at any time.

This means that up to 7 DAP jobs can be queueing. If another call is then made to **DAPCON**, before the next job in the queue is started, the call will fail and the message:

```
No device available
```

will be output on the VAX screen.

If a job cannot obtain the DAP immediately (but is allocated a DAP device) the message:

```
Awaiting DAP resources
```

will be output on the VAX screen; when the job gains access to the DAP the message:

```
Acquired DAP resources
```

is then output on the screen.

DAP jobs that are in the queue are processed on a first-come first-served basis.

You can connect up to 31 DAP devices, but until multi-programming is implemented by AMT on the DAP there is probably little point in having so many! If more (or less) DAP devices are required, you can alter **DAPCONNECT.COM** as necessary.

2.3 Example

To calculate the new CSR and vector addresses for the DR11-W card you should proceed as follows.

2.3.1 Typographic conventions used

Text output by the computer:

```
SYSGEN>
```

Text to be entered by you is shown in *ITALIC CAPITALS*:

```
$ SET DEFAULT SYS$SYSTEM
```

with your required input being prefaced by the system prompt \$. If you have to press the Return key, this is shown by **RET**.

<Control-Z>

means press the Z key, while you are holding down the Ctrl key.

Comments in the manual by way of explanation:

are basically in lower case italics. Capitals are normally only used to start sentences.

2.3.2 Steps needed to configure the hardware

Step 1 Login to the system manager's account

```
RET
Username: SYSTEM RET
Password: RET
```

Step 2 Set the default directory to SYS\$SYSTEM

```
$ SET DEFAULT SYS$SYSTEM RET
```

Step 3 Run the SYSGEN utility

```
$ RUN SYSGEN RET
SYSGEN>
```

You can now use SYSGEN to examine the CSR and vector addresses currently used by devices on your system:

```
SYSGEN> SHOW/CONFIGURE RET
```

System CSR and Vectors on 23-MAR-1988 17:11:52.40

```
Name: PUA Units: 1 Nexus:0 (UBA) CSR: 772150 Vector1: 774 Vector2: 000
Name: PTA Units: 1 Nexus:0 (UBA) CSR: 774500 Vector1: 260 Vector2: 000
Name: XQA Units: 1 Nexus:0 (UBA) CSR: 774440 Vector1: 120 Vector2: 000
Name: TTA Units: 4 Nexus:0 (UBA) CSR: 760100 Vector1: 300 Vector2: 304
Name: VCA Units: 1 Nexus:0 (UBA) CSR: 777200 Vector1: 320 Vector2: 324
```

In the above example, there are no devices in the UNIBUS address range reserved for non-DIGITAL-supplied devices (that is, no CSRs in the range 764100₈ to 767776₈). Therefore you can allocate the DR11-W card to CSR 764100₈. The highest interrupt vector address specified by vector 1 is 320₈ (the 774₈ address is used for a system device) and the next free vector is 330₈. In fact there is a gap at vector 310₈ in this case and either vector could be used – the rest of this example assumes 330₈ is used.

The generic name for each adaptor on the system can be found by:

```
SYSGEN> SHOW/ADAPTOR RET
```

which will produce the screen output:

```
CPU Type: MicroVAX II
Nexus      Generic Name or Description
  0         UB0
```

The above screen output shows that the system is a MicroVAX II with a single UNIBUS adaptor having generic name UB0.

Step 4 Carry out the software changes

Exit from SYSGEN (by typing <control-Z>), and set the default directory to the system manager's directory:

```
SYSGEN> ↑Z
$ SET DEFAULT SYS$MANAGER RET
```

You should now edit the DAPCONNECT.COM file to reflect the changes needed. In this example we will assume that the adaptor is UNIBUS UB0, the CSR is 764100₈ and the interrupt vector is 330₈. Therefore you must change the DAPCONNECT.COM file so that the third line reads:

```
connect dapa0/adapter=ub0/csr=%o764100/vector=%o330/driver=dapdriver
```

and the line:

```
$ @SYS$MANAGER:DAPCONNECT.COM
```

must be added to SYS\$MANAGER:SYSTARTUP.COM, the system startup file.

Step 5 Carry out the hardware changes

The system should now be shutdown:

```
$ RUN SYS$SYSTEM:SHUTDOWN RET
```

⋮

The machine should now be closed down completely and switched off. The DIGITAL engineer can then make the required changes to the DIP switches on the DR11-W card, and install the card.

You can then connect the DAP cables to the sockets for the DR11-W in the cabinet kit which the DIGITAL engineer has fitted. Note that the sockets at each end are labelled J1 and J2. The cables must cross over, that is, J1 on the DAP connects to J2 on the VAX and vice versa.

Step 6 Check the configuration

The VAX can now be powered up.

NOTE: If the adaptor, CSR or interrupt vectors have been incorrectly specified in DAPCONNECT.COM, and DAPCONNECT.COM has been invoked in the system start-up file, error messages will appear from SYSGEN during the VMS boot-up sequence. These messages should not prevent VMS booting but indicate that the DAPCONNECT.COM must be modified before the DAP can be used (see section 2.4 below).

Login again to the system manager's account and re-enter the SYSGEN utility:

```

[RET]
Username: SYSTEM [RET]
Password: [RET]

$ SET DEFAULT SYSS$SYSTEM [RET]
$ RUN SYSGEN [RET]
SYSGEN>
SYSGEN> SHOW/CONFIGURE [RET]

```

System CSR and Vectors on 23-MAR-1988 17:11:52.40

```

Name: PUA Units: 1 Nexus:0 (UBA) CSR: 772150 Vector1: 774 Vector2: 000
Name: PTA Units: 1 Nexus:0 (UBA) CSR: 774500 Vector1: 260 Vector2: 000
Name: XQA Units: 1 Nexus:0 (UBA) CSR: 774440 Vector1: 120 Vector2: 000
Name: TTA Units: 4 Nexus:0 (UBA) CSR: 760100 Vector1: 300 Vector2: 304
Name: VCA Units: 1 Nexus:0 (UBA) CSR: 777200 Vector1: 320 Vector2: 324
Name: DAPA Units: 9 Nexus:0 (UBA) CSR: 764100 Vector1: 330 Vector2: 000

```

If all is well the configuration will now contain the extra entry referring to DAPA.

Turn on the DAP and wait for it to complete its self tests as indicated on its front panel. Once these are complete, the DAP can be booted by running the DAPBOOT.COM command file in the system manager's account:

```

$ SET DEFAULT SYSS$MANAGER [RET]
$ @DAPBOOT [RET]

```

Messages from DAPBOOT will indicate the progress of the DAP initialisation and should look something like this (the last 4 lines will always be present if the process is successful):

```
Dapboot invoked Thu Mar 24 17:28:08 1988

Dap last powered up: Thu Mar 24 17:27:20 1988
Dap last powered down: Thu Mar 24 17:27:14 1988

DAP confidence tests successfully completed
Message server successfully loaded
MCUCP successfully loaded
HCUCP successfully loaded

$
```

2.4 Trouble Shooting

Several things may be wrong if the installation has not proceeded satisfactorily. This section describes possible errors and their cure.

- 1 Errors appear during the execution of DAPCONNECT.COM when the system is booting, probably caused by one of:
 - The adaptor name is incorrect
 - The CSR is invalid or already in use
 - The interrupt vector is invalid or already in use

What to do:

- Check the adaptor name, CSR and vector addresses as described in section 2.2 above and the example in section 2.3. Make sure that the correct values are in the DAPCONNECT.COM file
- 2 The DAPA device does not appear in the SYSGEN display generated by the SHOW/CONFIGURE command, probably caused by one of the following:
 - The DAPCONNECT.COM file has not been executed
 - The DIP switches on the DR11-W are set incorrectly

What to do:

- If DAPCONNECT.COM has not been included in the system startup command file it can be executed directly by entering:


```
$ @SYS$MANAGER:DAPCONNECT RET
```
- Check that the DIP switch settings match the CSR and vector addresses specified in the DAPCONNECT.COM command file

3 DAPBOOT fails repeatedly, probably caused by one of:

- The DAP is not turned on or not connected to the VAX
- The cabling between the DAP and VAX is incorrect

What to do:

- Check that the DAP is on and connected to the VAX
- Check the cables between the DAP and VAX – make sure that they are crossed J1 ↔ J2
- Use the **SYSGEN** command **SHOW/UNIBUS** to examine the state of the UNIBUS. **SYSGEN** will display all UNIBUS addresses which give an output when they are addressed. The output value corresponding to the CSR for the DAP device should be FFE0 (hex); if it is not, then the cables between the DAP and VAX are probably connected wrongly.

Note: the SHOW/UNIBUS command should be used with caution as it can corrupt the normal action of software using the UNIBUS. For this reason it should only be used during system debugging and not when the system is running a production service

If you have any problems which you cannot resolve during the installation please contact your AMT Representative.

1. Check the power supply.
2. Check the connections.
3. Check the settings.

Chapter 3

VAX/VMS-DAP system management

3.1 Introduction

This chapter describes the routine operations that must be performed by the DAP system manager. These operations are:

- Starting up and closing down the DAP
- Monitoring the DAP error log
- Authorising DAP users
- Identifying possible hardware faults

3.2 Starting up and closing down the DAP

3.2.1 Booting the DAP

Before DAP programs can be executed, the DAP must be powered up and have completed its self tests (as indicated on the DAP front panel display). The DAP system software must then be downloaded from the VAX. This process is carried out by the AMT-supplied program **DAPBOOT**.

DAPBOOT is controlled by the command file **DAPBOOT.COM**, which was placed in the **SY\$MANAGER** directory during the DAP software installation. **DAPBOOT.COM** offers 3 functions. You can use it to:

- Start the DAP system software
- Stop the DAP system software
- Stop and restart the DAP system software

Associated with the DAPBOOT.COM file are two executable programs, DAPBOOT.EXE and DAPMONITOR.EXE. The first of these loads the DAP system software into the DAP, the second runs continuously, and monitors the communications between the VAX and the DAP. The DAPMONITOR program is run as a detached process by DAPBOOT.COM, with the process name DAPBOOT. Until DAPBOOT is running, no user DAP jobs can be executed. The VMS command:

```
$ SHOW SYSTEM
```

can be used to examine the list of currently-running processes (the typographical conventions used in chapters 1 and 2 are used in this chapter; see pages 3 or 12 for details). In order to run DAPBOOT.COM your process will require the privileges:

DETACH, OPER and WORLD

In general, this means that ordinary DAP users cannot use DAPBOOT.COM.

3.2.2 Starting the DAP system software

To load the DAP system software initially, you should proceed as follows.

- Login to the system manager's account
- Enter the command:

```
$ @SYS$MANAGER:DAPBOOT
```

As the command is being processed, several messages will be displayed on the VAX screen, similar to:

```
Dapboot invoked Thu Mar 24 17:28:08 1988

Dap last powered up: Thu Mar 24 17:27:20 1988
Dap last powered down: Thu Mar 24 17:27:14 1988

DAP confidence tests successfully completed
Message server successfully loaded
MCUCP successfully loaded
HCUCP successfully loaded
```

```
%RUN-S-PROC_ID, identification of created process is nnnnnnnn
```

where nnnnnnnn is a hexadecimal value allocated to the process by VMS.

Other messages may appear, relating to information being written to the DAP log file, DAPBOOT.LOG (see section 3.3).

After the HCUCP program has been loaded, DAPBOOT.COM will detach the DAPMONITOR program and finish. It is then possible for authorised DAP users to run DAP programs. You, as system manager, can now log out without affecting DAP processing.

3.2.3 Stopping the DAP system software

If the **DAPBOOT** process is running as a detached process, you can stop it as follows:

- Login to the system manager's account
- Enter the command:

```
$ @SYS$MANAGER:DAPBOOT STOP
```

Once this command completes, no further user DAP jobs can be executed. In general you only need to stop the **DAPBOOT** process if the VAX or DAP are to be shut down, or the DAP engineers' test software is to be run (see section 3.5).

3.2.4 Restarting the DAP system software

If the **DAPBOOT** process is running as a detached process, and the DAP has been turned off and on again without **DAPBOOT** being stopped, then you should execute the **DAPBOOT.COM** file with the parameter **RESTART**; the running **DAPBOOT** process will be stopped and then be restarted automatically.

3.3 Monitoring the DAP error log

The **DAPBOOT** and **DAPMONITOR** programs which are executed by **DAPBOOT.COM**, both write to the DAP error log file, **DAPBOOT.LOG**, which can be found in the directory **SYS\$MANAGER**. File **DAPBOOT.LOG** will contain a record of every time the DAP system software is loaded; the file will also contain diagnostic information if a fault develops on the DAP. The file can be examined using the VMS **TYPE** command and occasionally be either printed or deleted or both, to prevent it using up disc space. In particular, if a DAP fault occurs the log should be kept for study by AMT representatives.

3.4 Authorising DAP users

The DAP can be used by anyone having the **TMPMBX** privilege. For the current release of DAP software however, the additional privilege **SYSLCK** is required. Having to have this extra permission is a temporary requirement which will be removed at a later release of the DAP software.

In order to give a user **SYSLCK** privilege you should proceed as follows:

- Login to the system manager's account
- Set the default directory to **SYS\$SYSTEM** using the command:

```
$ SET DEFAULT SYS$SYSTEM
```

- Run the **AUTHORIZE** program by typing:

```
$ RUN AUTHORIZE
```

- For each DAP user, modify the user authorization file with the **AUTHORIZE** command **MODIFY**, as follows:

```
UAF> MODIFY DAPUSER/PRIVILEGES=SYSLCK/DEFPRIVILEGES=SYSLCK
```

where **DAPUSER** is the username of the DAP user. When the permissions of all relevant users have been modified, you can exit from **AUTHORIZE** by typing <Control-Z>.

3.5 Identifying DAP hardware faults

If a hardware fault should develop on the DAP and the DAP cannot be booted correctly, **DAP-BOOT** will report that the confidence tests or the loading of part of the system software has failed. In this case you should contact your AMT representative immediately. You may be asked to help in diagnosing the fault by running the DAP engineers' test program **DAPET**, which is supplied as a standard part of the DAP system software.

In order to use **DAPET**, you need to introduce it as a foreign command. To do this, proceed as follows:

- Login to the system manager's account
- Enter the command:

```
$ DAPET ::= $SYS$SYSTEM:DAPET
```

- Run **DAPET**, by giving the command:

```
$ DAPET
```

DAPET will then prompt you for input; you should enter the command **AUTO**, which will run all the engineers' tests in turn. The results should be noted and reported to your AMT representative who may then ask you to carry out further tests.