

PICTURE SYSTEM DIAGNOSTICS INSTALLATION  
UNDER THE RSX-11M OPERATING SYSTEM

1. INTRODUCTION

This section describes the procedure for installing Picture System 2 and Multi Picture System diagnostic tasks under Mapped or Unmapped RSX-11M. The reader is assumed to have a working knowledge of basic RSX-11M operator commands and the file maintenance and task-building utilities (PIP, FLX, and TKB).

2. OVERVIEW

The Picture System Diagnostics are distributed as task (TSK) files under UIC [220, 15] for Unmapped, and UIC [220,14] for Mapped RSX-11M. An Unmapped system with diagnostics must be available to the Evans & Sutherland Field Service Engineer during initial installation of the Picture System, and also on subsequent occasions as required for maintenance.

The diagnostics available under Mapped RSX-11M are a subset of those available for the Unmapped System, as the Mapped diagnostic task may neither initiate Direct Memory Access (DMA) nor enable Picture System interrupts. However, many useful operations may be performed with the Mapped diagnostics. They are provided in order to minimize the occasions when the customer's Mapped System must be shut down in order to diagnose the Picture System.

The available distribution media are DOS formatted 800 bpi magnetic tape and RL01 and RK05 disk pack as RSX-11M volumes. Indirect command file [220,14]DIAGN.COMD facilitates installation of the diagnostics.

3. STORAGE DEVICE AND UIC's

The Mapped and Unmapped tasks require a total of either approximately 3700. blocks if transferred from an RSX-11M volume or 5200. blocks if copied from magtape. If the System Disk does not have sufficient space for storage of the diagnostics, an auxiliary storage device must be selected. In the case of RK05 and RL01 disk packs, the distribution medium may be treated as the storage device; however, a back-up copy should be maintained.

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In order to avoid name conflicts, the user must select two distinct User Identification Codes (UICs) for storage of the Mapped and Unmapped tasks. If an attempt is made to run a task under the wrong operating system, such as an Unmapped task under the Mapped System, the following error message will occur:

INS--FILE NOT TASK IMAGE

#### 4. INSTALLATION OF UNMAPPED DIAGNOSTIC TASKS

The Unmapped tasks are task-built to run in partition PAR14K on an Unmapped Baseline RSX-11M System. Installing them consists simply of using PIP or FLX, which copies them onto the storage device. The command file DIAGN.COMD may be used to perform the copy operation, as explained in paragraphs 5.1 through 5.1.2. If only Unmapped tasks are to be copied, it is equally convenient to perform the copy operation without benefit of DIAGN.COMD. Paragraphs 4.1 and 4.2 show how the files may be copied from magtape or disk pack without using DIAGN.COMD.

##### 4.1 COPYING UNMAPPED DIAGNOSTIC TASKS FROM MAGTAPE

The following is a sample command sequence which will cause the diagnostic tasks to be read from magtape:

```
>LOA MT: or >LOA MM: (if necessary)
>SET /UIC=[uuu,uuu]
>UFD XXn:[uuu,uuu] (if necessary)
>FLX or >RUN $FLX
FLX>XXn:[uuu,uuu]/RS/CO/BL:58.=MXn:[220,15]*./D0
FLX>^Z
```

Where:

XXn: is the selected storage device

[uuu,uuu] is the selected UIC for unmapped tasks

MXn: is the device code for the drive containing the distribution magtape, typically MTO: or MMO:

The Unmapped Picture System Diagnostics are now ready to run. Operation of the diagnostics is explained in the Picture System 2 Diagnostics Manual.

#### 4.2 COPYING UNMAPPED DIAGNOSTIC TASKS FROM DISK PACK

The following is a sample command sequence which will cause the diagnostic tasks to be read from disk pack:

```
>LOA DK: or >LOA DL: (if necessary)
>ALL DDn:
>MOU DDn:/OVR
>SET /UIC=[uuu,uuu]
>UFD XXn:[uuu,uuu] (if necessary)
>PIP or >RUN $PIP
PIP>XXn:[uuu,uuu]=DDn:[220,15]*.*
PIP>^Z
```

Where:

XXn: is the selected storage device.

[uuu,uuu] is the selected storage UIC for unmapped tasks

DDn: is the device code for the drive containing the distribution disk pack, such as DK0: or DL1:

The Unmapped Diagnostic Tasks are now ready to run.

#### 5. PICTURE SYSTEM MAPPED DIAGNOSTIC TASKS

The Picture System interface registers, which normally occupy Unibus addresses 767660 through 767670, are accessed by the Mapped Diagnostics through a Common Block or Device Partition named PSDEV0. Normally, PSDEV0 occupies the address range 767600 through 767676. File DIAGN.COMD facilitates generation and installation of the common block and partition. The operation of DIAGN.COMD is described in paragraphs 5.1 through 5.1.3. Information pertinent to non-standard usage of PSDEV0 is contained in paragraph 5.3.

Some mapped diagnostics, such as QSD020, contain phases which attempt to initiate a DMA transfer, which is illegal under the Mapped System. If such phases are mistakenly executed by the diagnostic user, the task will be terminated after issuing the following error message:

DMA ERROR; R5=XXXXX

### 5.1 INSTALLATION OF MAPPED AND UNMAPPED TASKS AND PSDEV0 BY DIAGN.COMD

The following is a sample command string which will cause the DIAGN.COMD file to execute.

These operations can only be performed under a privileged account:

>LOA DD: or >LOA MX: (if necessary)

>LOA XX: (if necessary)

>UFD XXn:[uuu,uuu] (if necessary)

>UFD XXn:[mmm,mmm] (if necessary)

>SET /UIC=[mmm,mmm]

For Magtape:

>FLX or >RUN \$FLX

FLX>XXn:[mmm,mmm] /RS=MXn:[220,14]DIAGN.COMD/D0

For Disk Pack:

>PIP or RUN \$PIP

PIP>XXn:[mmm,mmm] =DDn:[220,14]DIAGN.COMD

Where:

XXn: is the selected storage device

[mmm,mmm] is the selected storage UIC for mapped tasks

[uuu,uuu] is the selected UIC for unmapped tasks

MXn: is the magtape distribution

DDn: is the disk pack distribution

The command file may now be started:

```
>@XXn: [mmm,mmm]DIAGN
```

### 5.1.1 SPECIFICATION OF DEVICES AND UIC'S

The command file will ask the user to specify the diagnostics storage device, the distribution device, and the Mapped and Unmapped storage UIC's. A carriage-return in response to either UIC query will prevent the associated tasks from being copied.

### 5.1.2 TASK COPYING

The command file will proceed to run PIP or FLX and copy all necessary files similar to paragraphs 4.1 and 4.2.

### 5.1.3 INSTALLATION OF PSDEV0 BY DIAGN.CMD

Under Mapped RSX-11M only, the command file will inquire whether the user wishes to install the PSDEV0 common block at this time. On an affirmative response, (Y), the command file will proceed to specify the partition. It will then assemble, task build, and install PSDEV0. The command file will then terminate and the mapped diagnostic tasks should now be operable.

## 5.2 REINSTALLATION OF PSDEV0

Where XXXX equals 7676 on a machine with 18-bit addresses or 177676 on a machine with 22-bit addresses, the following commands reinstall PSDVE0:

```
>SET /MAIN=PSDEV0:xxxx:1:DEV
```

```
>INS XXn: [mmm,mmm]PSDEV0
```

These commands may be inserted into file SY:[1,2]STARTUP.CMD so that the partition will be automatically installed whenever the Mapped system is booted, or VMR may be used to make the partition a permanent part of the system.

### 5.3 PSDEVO DETAILED INFORMATION

Before PSDEVO is task built, the SET /MAIN command, as used in paragraph 5.2, must be performed.

PSDEVO.MAC, a macro file, contains the following:

```
.TITLE PSDEVO
.IDENT /NC/
.PSECT PSDEVO,D,GBL,OVR
.BLKB 72
.END
```

PSDEVO.CMD, a TKB command file, contains the following:

```
PSDEVO/PI/-HD,,PSDEVO=PSDEVO
/
STACK=0
PAR=PSDEVO
//
```

The base address of the block of five Picture System interface registers (normally 767660) as accessed by Mapped diagnostic tasks, is derived from two sources of information. The SET /MAIN command contains the physical base address, divided by octal 100, of the PSDEVO partition. HSTB, a table which is linked with all diagnostics, contains location H1 (HSTB+2), which must equal octal 160000, plus the offset from the base of PSDEVO to the first Picture System interface register (normally H1=160060). The Picture System 2 Diagnostics Manual explains how H1 may be either patched using ZAP or else modified at runtime with the MODIFY command.