2T–PMAGD–TF Smart Frame Buffer Module

Owner's Guide

Order Number: EK–PMAGD–IN. A01

Digital Equipment Corporation
Maynard, Massachusetts

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Guide Overview

Purpose

This guide provides general information on the 2T–PMAGD–TF Smart Frame Buffer module. The information contained in this guide is independent of the hardware platform. For TURBOchannel option installation information, see your system documentation.

Contents

The following information is included in this guide:

- Module description
- Frequency switch settings
- Programmable ROM (PROM) jumper settings
- Confirming proper installation
- Running self-tests
- Stereo viewing
- Module specifications
- Cabling information
- Field Replaceable Unit (FRU) order numbers

Conventions

The following typographic conventions are used in this guide:

`cnsltest`	This typeface indicates a command that you must enter exactly as shown in the text.
CAUTION	Cautions provide information to prevent damage to equipment or software. Read these carefully.
Important	Important notations provide information critical to the proper functioning of your system.
Note	Notes contain additional helpful information.

Module Overview

Description

The 2T–PMAGD–TF Smart Frame Buffer module is a TURBOchannel option that generates high-resolution, 2- and 3-dimensional color graphics on a variety of flat panel and video CRT displays. Application programs can utilize these graphics to display mechanical CAD, electrical CAD, process control, molecular modeling, scientific visualization, simulation, animation, and other graphical information.

Basic Module and Bulkhead Option

The basic module has a 3W3P video out, keyboard/mouse connector on board, and is useful in a custom cabinet where a flat panel display cable is routed internally.

The optional bulkhead plate assembly permits cable routing outside the standard cabinet for attachment of a flat panel display externally via an FCC-approved attachment point.

Software

The 2T–PMAGD–TF Smart Frame Buffer module is compatible with the DEC OSF/1, Version 3.0 operating system.

Limitations

The number of modules that can be installed is limited only by the number of TURBOchannel slots available in the system. The 2T–PMAGD–TF module cannot be used in a TURBOchannel extender box.

Features

The basic 2T–PMAGD–TF Smart Frame Buffer module is shown in view (A) of Figure 1. The bulkhead option is shown in view (B). Table 1 describes the features.

Figure 1 2T–PMAGD–TF Smart Frame Buffer Module

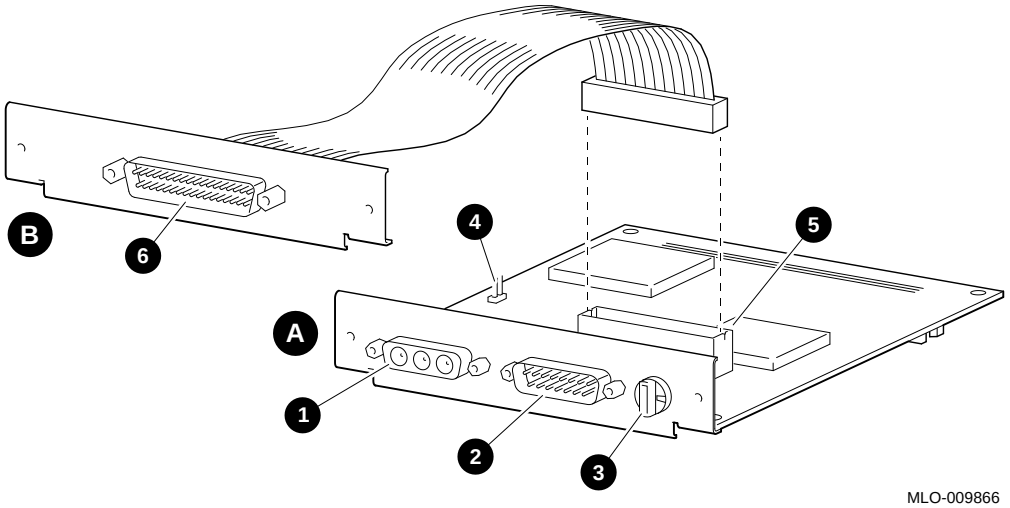


Table 1 Module Features

Reference Number	Description
❶	Video cable connector
❷	Keyboard/mouse connector
❸	Frequency switch
❹	PROM jumper
❺	Internal flat panel interface connector
❻	External flat panel interface connector

Frequency Switch

Description

Each module has a switch that selects the frequency and resolution of the video signal that the module produces. The frequency switch is shown in Figure 1 at ❸.

Note

The switch setting is not dynamic and is read-only upon initialization, power up, or system reset.

Switch Settings and Monitor Values

Table 2 lists the 2T–PMAGD–TF Smart Frame Buffer module switch settings, their frequencies, monitor resolutions, and refresh rates. Note that the information in Table 2 relates to RGB video output. Simultaneous RGB and flat panel output is not supported.

Table 2 Switch Settings and Monitor Values

Switch Setting	Pixel Frequency (MHz)	Monitor Resolution (Pixels)	Refresh Rate (Hz)
0	130	1280x1024	72
1	119	1280x1024	66
2	108	1280x1024	60
3	104	1152x900	72
4	93	1152x900	66
5	75	1024x768	70
6	74	1024x768	72
7	69	1024x864	60

Switch Settings and Devices Supported

Table 3 lists the flat panel devices supported by specific switch settings.

Table 3 Switch Settings and Flat Panel Devices Supported

Switch Setting	Device Supported	Model Number
8 (Reserved)		
9 (Reserved)		
A (Reserved)		
B (Reserved)		
C	NEC	NL6448AC30-06
D	Planar	EL640.480
E	Sharp	LQ10DH15
F (Reserved)		

Programmable ROM Jumper

Setting

The setting of the programmable ROM (PROM) jumper determines whether the PROM can be programmed (see Table 4). The PROM is shipped from the factory in the enabled (programmable) position. The PROM jumper is shown in Figure 1 at ❹ .

Note

When you remove the jumper from the programming position, store the jumper on the holder [WHERE IS THE HOLDER IN FIG 1 ?]

Table 4 PROM Jumper Settings

If the PROM Jumper is...	Then the PROM...
On the pins	Can be programmed
Removed	Cannot be programmed

Module Installation

Procedure

The installation of the 2T–PMAGD–TF module can be accomplished in a few easy-to-do steps. Each step presumes that you are familiar with your hardware platform. For specific information regarding module installation on your hardware platform, refer to your system documentation.

When installing a module inside a system, use the screws that came with the system to fasten the module to the system enclosure bulkhead.

CAUTION

To avoid damage to the module from static discharge, wear the antistatic wrist strap (part number 12–36175–010) provided with your option. Instructions for use are on the strap's envelope.

Confirming Proper Installation

Procedure

To confirm that the module is installed properly, follow these steps:

1. Connect the video cable to the installed option and video monitor as described in the options and/or system user's guide.

   Important

   Before you make the connection, note the position of the D-sub connector. Position the cable to match the connector. It is possible to force the cable on backwards, which reverses the red and blue colors to the video monitor.

2. Turn on the system unit. Allow the system to run through its self-test first.
3. Enter the `show config` command on the console of the DEC 3000 AXP system.

   Verify that `PMAGD-TF` appears in the configuration display and that no errors have been reported. Note that the system recognizes the module as a `PMAGD-TF`.

If nothing appears on the screen or if `PMAGD-TF` is not listed in the configuration display on your primary console device, verify that the module is seated correctly in the TURBOchannel slot. If the problem persists, contact your Digital service representative.

Running Self-Tests

Overview

This section describes how to execute the module self-tests.

Console Mode

Run self-tests with the system in console mode (>>>).

Note

References to slot numbers are used in the following examples. The actual slot number varies depending on the platform and the slot in which the module is installed.

Command Format

Perform the following command format to run a self-test:

```
>>>t tc# testname
```

For example, to run the video RAM test for the option in slot 0, enter:

```
>>>t tc0 vram
```

Use the REPEAT (>>>r) command to repeat a self-test:

```
>>>r t tc0 vram
>>>r t tc0 pst-m
```

Available Module Tests

To find out which tests are available, enter:

```
>>>t tc0 ?
```

To find out which subtests are available, such as in the video RAM test, enter:

```
>>>t tc0 vram ?
```

List of Tests

Table 5 lists the module self-tests.

Table 5 Self-Tests

Test	Function
`init`	Initializes the PMAGD module.
`cnfg`	Prints PMAGD configuration information, such as the current selected monitor selection, video timing parameters, and firmware revision.
`reg`	Register test
`vram`	Video RAM test
`int`	Interrupt test
`plane`	Planemask test
`pshift`	Pixel shifter test
`stip`	Stipple mode test
`copy`	Copy mode test
`bool`	Raster op test
`line`	Line mode test
`vdac`	Video DAC register and color map test
`patt`	Color patterns test
`box`	Crosshatch pattern with circle utility
`font`	ASCII and MCS font utility
`stereo`	Stereo viewing test
`simz`	Simple mode Z buffer test (PMAGD-BA/CA only)
`pack`	8-bit visual test (PMAGD-BA/CA only)

Self-Test Qualifiers

Some of the self-tests have special qualifiers that run the test in a different mode. Enter the qualifiers shown in Table 6 on the command line, separating each by a space.

Table 6 Qualifiers

Name	Function
`-v`	*Verbose mode* is used to prompt the user at the end of each subtest. `>>>t tc0 patt -v`
`-t(l:n)`	*Subtest specifier* runs the specified subtest(s). `>>>t tc0 patt -t8:9`
`-dv`	*Line verify mode* verifies lines as an image at the end of a test. However, each line can be verified as it is drawn using this qualifier.
`-dx`	*Supplemental info* is used when in line verify mode and an error occurs.
`-dp`	*Supplemental print* is the line driver that prints out line coordinates and line mode when line drawing. For example: `>>>t tc0 line -dv -dp -dx`
`-fH`	*Font character* is used in scrolling the letter H.
`pattern`	*Pattern* is used to specify a pattern from the video RAM test. `>>>t tc0 vram 33333333`
`erase`	*Erase* is used with the `init` test to clear the screen. The screen is never cleared unless this qualifier is specified. This is so screen contents are not cleared during installation procedures. The power up `cnsltest` script and the `pst-m` script clear the screens. `>>>t tc0 init e`

Available Scripts

Scripts are a group of tests that provide a convenient way to run related tests consecutively. Scripts are invoked the same way as the individual self-tests. For example:

```
>>>t tc0 pst-m
```

Table 7 lists the scripts commands.

Table 7 Scripts

Name	Function
cnsltest	Run at power up to initialize the module and run the line test.
pst-q	A quick verify script that runs only the line test.
pst-t	A thorough test that runs all the tests listed in Table 5.
pst-m	A thorough test that runs all the tests listed in Table 5. In addition, it runs the video RAM test for various test patterns.

Listing Scripts

You can examine script contents by entering the following command:

```
>>>t tc0 cat pst-m
```

Error Format

The PMAGD diagnostics print errors for the failing test with address, expected, actual, and Xor data. In addition, it lists some of the components in the path being tested. For example, the following display appears if there is a video RAM test failure in slot 0:

```
TFL #0 PMAGD = 0x908 VRAM 5: Check 55555555 Test

Address= 100200000 Expect= aaaaaaaa Actual= aaaaaa55 Xor= ff
Vram Class
VRAM Bank 0 Pix 0 Byte 0 Exx--> 15
Verify E26 AD
Verify E26 Ctl
Verify E5/E18/E9 ABT
```

Appendix A: Module Specifications

Physical Specifications

The physical specifications of the module and the bulkhead option are listed in Table 8.

Table 8 Module and Bulkhead Option Weight and Dimensions

Component	Weight	Height	Width	Depth
Module with option	154 gm (5.50 oz)	26.4 mm (1.4 in.)	116.84 mm (4.6 in.)	144.05 mm (5.675 in.)
Bulkhead option	30 gm (1 oz)	26.4 mm (1.4 in.)	116.84 mm (4.6 in.)	26.4 mm (1.4 in.)

Environmental Specifications

The environmental specifications are listed in Table 9.

Table 9 Environmental Specifications

Temperature range	10°C to 40°C (50°F to 104°F)
Temperature change rate	11°C/hr (20°F/hr) maximum
Relative humidity	5% to 95% noncondensing
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)
Altitude	2400 m (8000 ft) at 36°C (96°F)

Appendix B: Cabling Information

Cable Options

Table 10 lists the cables used with the 2T–PMAGD–TF Smart Frame Buffer module.

Table 10 Cable Options

Designation	Order Number	Length
BC29G–09	17–02906–01	3 meters (10 feet)
BC29H–2E	17–02906–02	1 meter (3 feet)
???????	17–02640–01	3 meters (10 feet)

Note

The BC29G-09 cable is normally shipped with the DEC 3000 AXP systems.

Appendix C: For Digital Service Use

Introduction

The information in this section is for Digital service representatives.

FRU/Order Numbers

See Table 11 to order field replaceable units (FRUs).

Table 11 Module FRUs

FRU	Order Number
2T-PMAGD-TF Module	NN–NNNNN–01 ???
Bulkhead Option (?)	NN–NNNNN–01 ???
Antistatic wrist strap	12–36175–01

Power-Up Self-Test

The power-up self-test runs the `cnsltest`, `pst-q`, `pst-t`, or `pst-m` scripts, depending on the environment variables.

Error Message Format

Errors use the following format:

```
TFL #0 PMAGD = 0x908 VRAM 5: Check 55555555 Test
```

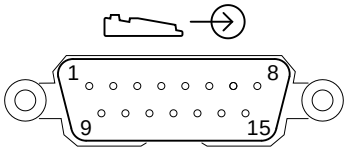
Firmware Updates

When updating firmware, the PROM jumper (❹ in Figure 1), must be in the enabled (program) position. To prevent updates, store the jumper on the holder (???? [WHERE?] in Figure 1).

Mouse/Keyboard or Tablet Connector Diagram

Figure 2 shows the pin layout for the mouse/keyboard connector.

Figure 2 Mouse/Keyboard or Tablet Connector



Mouse/Keyboard or Tablet Connector Pin-outs

Table 12 describes pin usage for the mouse/keyboard connector.

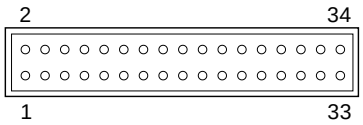
Table 12 Mouse/Keyboard or Tablet Connector Pin-outs

Pin	Source	Signal	Description
1		GND	Chassis ground
2		Key.TX	Keyboard transmitted data
3	Keyboard	KEY.RX	Keyboard received data
4		+12V	Keyboard/tablet power
5		GND	Chassis ground
6	Mouse /tablet	MSE.RX	Mouse received data
7		MSE.TX	Mouse transmitted data
8		GND	Chassis ground
9		GND	Chassis ground
10		NC	Not used
11		NC	Not used
12		NC	Not used
13		+5V	Mouse power
14		-12V	Mouse power
15		GND	Chassis ground

Internal Flat Panel Connector Diagram

Figure 3 shows the pin layout for the internal flat panel connector.

Figure 3 Internal Flat Panel Connector Pin-outs



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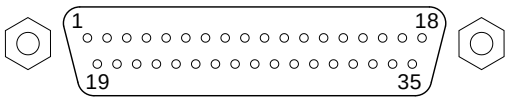
External Flat Panel Connector Diagram

Figure 4 shows the pin layout for the external flat panel connector.

Figure 4 External Flat Panel Connector Pin-outs



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Flat Panel Connector Pin-outs

Table 13 describes pin usage for the internal and external flat panel connectors.

Table 13 Flat Panel Connector Pin-outs

Pin No. (Internal)	Pin No. (External)	Function	Pin No. (Internal)	Pin No. (External)	Function
1	1	PLCK	2	19	VGND
3	2	VGND	4	20	~PHSYNC
5	3	~VSYNC	6	21	VGND
7	4	R0	8	22	R1
9	5	R2	10	23	R3
11	6	VGND	12	24	G0
13	7	G1	14	25	G2
15	8	G3	16	26	VGND
17	9	B0	18	27	B1
19	10	B2	20	28	B3
21	11	VGND	22	29	ACA
23	12	~BLD	24	30	VGND
25	13	VAA (+5V)	26	31	+15V
27	14	+15V	28	32	~PBLANK
29	15	15V RET	30	33	15V RET
31	16	DF	32	34	MODE
33	17	~VOFF	34	35	VGND

[WHAT ABOUT EXTERNAL PIN NO. 18?]

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