

ZLX-E1/E2/E3 Smart Frame Buffer Modules

Owner's Guide

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Guide Overview

Purpose	This guide provides general information on the ZLX-E1/E2/E3 Smart Frame Buffer modules (PMAGD-AA/BA/CA). This information is independent of the hardware platform. For TURBOchannel option installation information, see your system documentation.								
Contents	<p>The following information is included in this guide:</p> <ul style="list-style-type: none">• Module description• Frequency switch settings and monitor values• Programmable ROM (PROM) jumper settings• Confirming proper installation• Running self-tests• Stereo viewing• Module specifications• Cabling information• Field Replaceable Unit (FRU) order numbers								
Conventions	<p>The following conventions are used in this guide:</p> <table><tr><td><code>cns1test</code></td><td>This indicates a command that you must enter exactly as shown in the text.</td></tr><tr><td>CAUTION</td><td>Cautions provide information to prevent damage to equipment or software. Read these carefully.</td></tr><tr><td>Important</td><td>Important notations provide information to allow your system to work properly.</td></tr><tr><td>Note</td><td>Notes contain additional information that you should be aware of.</td></tr></table>	<code>cns1test</code>	This 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 to allow your system to work properly.	Note	Notes contain additional information that you should be aware of.
<code>cns1test</code>	This 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 to allow your system to work properly.								
Note	Notes contain additional information that you should be aware of.								

Module Overview

Description The ZLX-E1/E2/E3 Smart Frame Buffer modules are TURBOchannel options that generate high-resolution, 2- and 3-dimensional color graphics. Application programs can utilize these graphics to display mechanical CAD, electrical CAD, process control, molecular modeling, scientific visualization, simulation, animation, and other graphical information.

Version Information Table 1 provides information about the versions of the ZLX Smart Frame Buffer modules.

Table 1 Module Versions

Designation	Order No.	Planes	Memory
ZLX-E1	PMAGD-AA	8	2 MB
ZLX-E2	PMAGD-BA	24	8 MB
ZLX-E3	PMAGD-CA	24Z	16 MB

Software The ZLX-E1/E2/E3 Smart Frame Buffer modules are compatible with the minimum versions of software shown in Table 2.

Table 2 Compatible Software Versions

Designation	Open3D	OSF/1 AXP	OpenVMS AXP
ZLX-E1	V2.1	V1.3A	V1.5-1H1
ZLX-E2	V2.4	V2.0	V6.1-1H1
ZLX-E3	V2.4	V2.0	V6.1-1H1

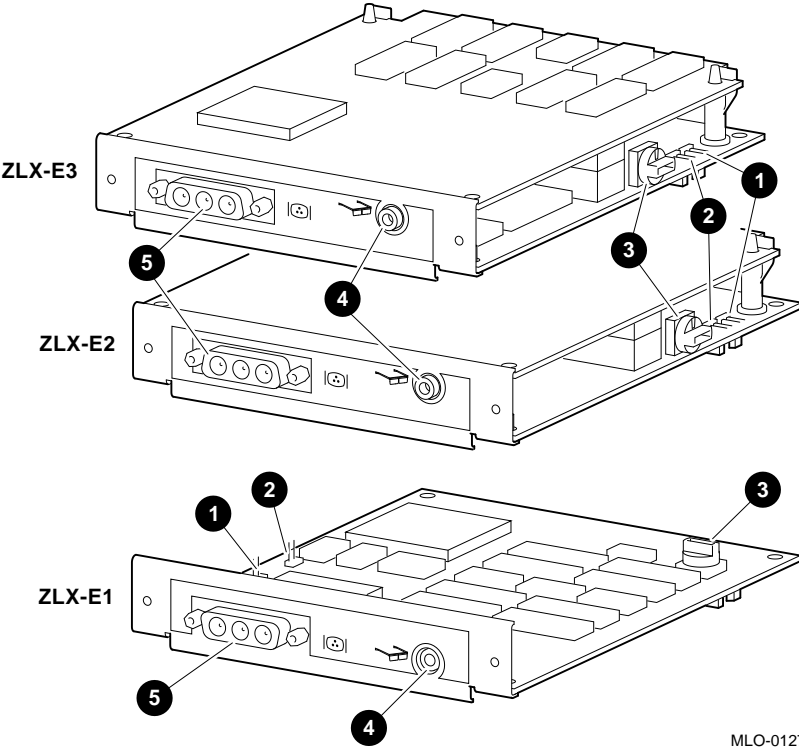
Limitations

The number of modules that can be installed are limited only by the number of TURBOchannel slots available in the system. The ZLX-E1/E2/E3 module cannot be used in a TURBOchannel extender box.

Features

The ZLX-E1/E2/E3 Smart Frame Buffer modules are shown in Figure 1. Table 3 describes the features.

Figure 1 ZLX Smart Frame Buffer Modules



MLO-012770

Table 3 Module Features

Reference Number	Description
❶	PROM jumper holder
❷	PROM jumper
❸	Frequency switch
❹	Stereo cable port
❺	Video cable port

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 4 lists the ZLX–E1/E2/E3 Smart Frame Buffer modules switch settings, their frequencies, monitor resolutions, refresh rates, and monitor model numbers.

Table 4 Switch Settings and Monitor Values

Switch Setting	Pixel Frequency (MHz)	Monitor Resolution (Pixels)	Refresh Rate (Hz)	Monitor Model
0	130	1280x1024	72	VRM17-HA/H4/AA/A4, VRT19-HA/H4, VRT16-HA/H4, VRC16-HA/H4, VR320-DA, VR319-DA, VRC21-HA/H4, PCXAV-EC/ED
1	119	1280x1024	66	VRT19-DA/D3/D4/HA/H4, VRT16-DA/D3/D4/HA/H4, VRC16-CA/C4/HA/H4, VR320-CA, VR319-CA, VRC21-HA/H4, PCXAV-EC/ED
2	108	1280x1024	60	
3	104	1152x900	72	
4	93	1152x900	66	VRC21-HA/H4, PCXAV-EC/ED
5	75	1024x768	70	VRC16-HA/H4, PCXAV-EC/ED
6	74	1024x768	72	VRM17-HA/H4, VRM17-AA/A4, VRC16-CA/C4/HA/H4, VRC21-HA/H4, PCXAV-EC/ED
7	69	1024x864	60	VR297, VR299, VRC21-HA/H4, PCXAV-EC/ED
8	65	1024x768	60	VRC16-CA/C4/HA/H4
9	50	800x600	72	VRC21-HA/H4, PCXAV-EC/ED

(continued on next page)

Frequency Switch

Table 4 (Cont.) Switch Settings and Monitor Values

Switch Setting	Pixel Frequency (MHz)	Monitor Resolution (Pixels)	Refresh Rate (Hz)	Monitor Model
A	40	800x600	60	VRC21-HA/H4
B	32	640x480	73	VRC16-CA/C4/HA/H4, VRC21-HA/H4, PCXAV-EC/ED
C	25	640x480	60	VRC21-HA/H4, PCXAV-EC/ED
D	135	1280x1024	75	PCXAV-EC/ED
E	110	1280x1024	60	VRC21-HA/H4, PCXAV-EC/ED
F	Reserved			

Programmable ROM Jumper

Setting

The setting of the Programmable ROM (PROM) jumper determines whether the PROM can be programmed (see Table 5). The PROM is shipped from the factory in the enabled (programmable) position. The PROM jumper is shown in Figure 1, at ②.

Note

Store the jumper on the holder when removed from the programming position.

Table 5 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 ZLX-E1/E2/E3 Smart Frame Buffer 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 enclosure's 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, do the following:

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. Connect the stereo cable to the installed option and emitter box as described by the stereo viewing equipment's instruction manual (optional).
3. Turn on the monitor, stereo emitter (optional), and any other devices connected to the system unit.
4. Turn on the system unit. Allow the system to run through its self-test first.
5. Enter the `show config` command on the console of the DEC 3000 AXP system.

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

If nothing appears on the screen or if `PMAGD-AA` or `PMAGD` are 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 You 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 6 lists the module self-tests.

Table 6 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)

Running Self-Tests

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 7 on the command line, separating each by a space.

Table 7 Qualifiers

Name	Function
-v	<i>Verbose mode</i> is used to prompt the user at the end of each subtest. >>>t tc0 patt -v
-t(l:n)	<i>Subtest specifier</i> runs the specified subtest(s). >>>t tc0 patt -t8:9
-dv	<i>Line verify mode</i> 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	<i>Supplemental info</i> is used when in line verify mode and an error occurs.
-dp	<i>Supplemental print</i> is the line driver that prints out line coordinates and line mode when line drawing. For example: >>>t tc0 line -dv -dp -dx
-fH	<i>Font character</i> is used in scrolling the letter H.
pattern	<i>Pattern</i> is used to specify a pattern from the video RAM test. >>>t tc0 vram 33333333
erase	<i>Erase</i> is used with the <i>init</i> 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 <i>cnsltest</i> script and the <i>pst-m</i> 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 8 lists the scripts commands.

Table 8 Scripts

Name	Function
cns1test	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 6.
pst-m	A thorough test that runs all the tests listed in Table 6. 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 appears if there is a video RAM test failure in slot 0:

```
TFL #0 PMAGD = 0x908 VRAM 5: Check 55555555 Test
Address= 100200000 Expect= aaaaaaaaa 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
```

Stereo Viewing

Description StereoGraphics, a leading manufacturer of true stereo viewing systems, produces equipment to allow stereo viewing applications to work with your ZLX Smart Frame Buffer modules.

For more information, contact:

StereoGraphics
2171 East Francisco Boulevard
San Raphael, California 94901
U.S.A.
Telephone: (415) 459-4500
FAX: (415) 459-3020

Stereo Cable A special 3-meter (10-foot) stereo cable is required for the ZLX Smart Frame Buffer modules. The StereoGraphics order number for this cable is DEC 69990 and has the following description: DEC EMITTER CABLE MINI-STEREO TO BNC MST-BNC.

StereoGraphics is currently shipping a cable with a metal housing that may interfere with the system bulkhead, thus not allowing the cable to make full contact. Please contact StereoGraphics for the plastic-molded housing version of this cable.

Stereo Monitor Stereo viewing requires special monitor frequency support. The VRC21-HA/H4 video monitors support this stereo mode, as well as video monitors available from other vendors.

Appendix A — Module Specifications

Physical Specifications

The physical specifications of the module are listed in Table 9.

Table 9 ZLX–E1/E2/E3 Smart Frame Buffer modules Weight and Dimensions

Module	Weight	Height	Width	Depth
ZLX–E1	154 gm (5.50 oz)	144.05 mm (5.675 in.)	116.84 mm (4.6 in.)	26.4 mm (1.4 in.)
ZLX–E2	260 gm (9.60 oz)	144.05 mm (5.675 in.)	116.84 mm (4.6 in.)	26.4 mm (1.4 in.)
ZLX–E3	280 gm (10.4 oz)	144.05 mm (5.675 in.)	116.84 mm (4.6 in.)	26.4 mm (1.4 in.)

Environmental Specifications

The environmental specifications are listed in Table 10.

Table 10 ZLX–E1/E2/E3 Smart Frame Buffer modules 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 11 lists the cables with the ZLX Smart Frame Buffer module.

Table 11 Cable Options

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

Note

The BC29G-09 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 12 to order field replaceable units (FRUs) for the customer.

Table 12 Module FRUs

FRU	Order Number
ZLX-E1 Module	54-22861-01
ZLX-E2 Module	70-29104-01
ZLX-E3 Module	70-29104-02
Antistatic wrist strap	12-36175-01

Power-Up Self-Test (POST) The power-up self-test runs the `cns1test`, `pst-g`, `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 (❷ in Figure 1), must be in the enabled (program) position. To prevent updates, store the jumper on the holder (❶ in Figure 1).

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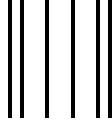
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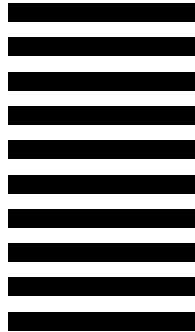
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