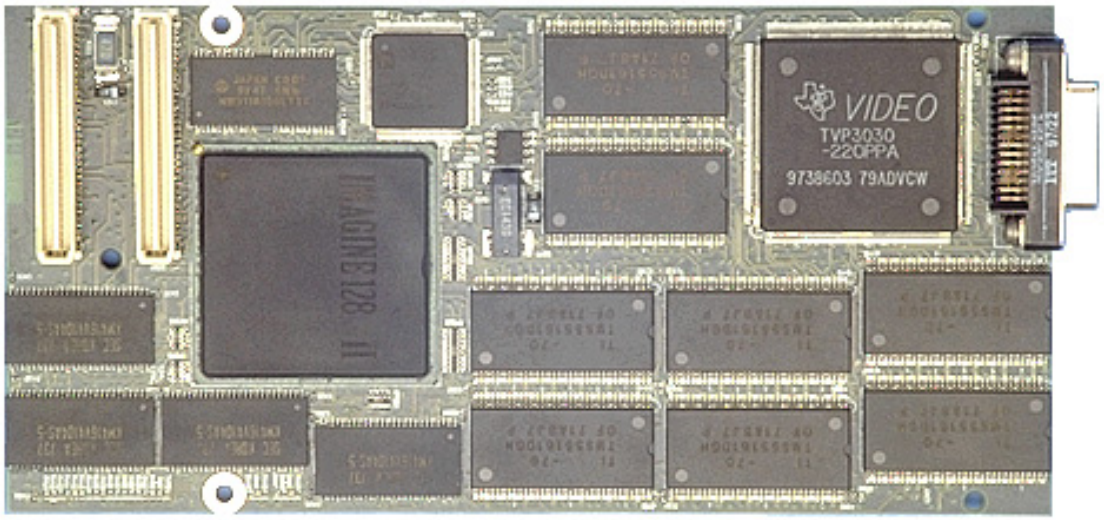
Rastergraf

VFX-M

High Performance 128-bit PMC Bus Color Graphics Display Controller



Features

- 128-bit graphics accelerator
- 8 MB Display memory (VRAM)
- 64 MB Local Buffer memory (DRAM)
- RGB output up to 1600 x 1280 at 8, 16, or 32 bits/pixel graphics
- 24 bit true color plus 8-bit overlay
- Interlaced and non-interlaced displays
- VGA or FCode BIOS

The VFX-M

The Rastergraf VFX-M is a single slot PMC (PCI Mezannine Card) graphics display controller for VMEbus and CompactPCI computers.

It uses a 128-bit wide 2D/3D graphics accelerator to provide high graphics performance. It can draw sixteen 256-color pixels to the memory each instruction cycle. For startup and maintenance, VGA compatible graphics and RAMDAC are supported. Once the operating system is running, the VFX-M's extended instruction set can then be utilized by the OS driver.

The drawing engine can generate more than 610K Gouraud-shaded triangles/second. It can accept a list of instructions from the CPU, rather than just one at a time so that while it is processing a command from the command queue, it continues to request commands. This means that the VFX-M and the host CPU can process data independently which improves system efficiency.

The VFX-M graphics accelerator includes a separate copy engine which can smoothly X/Y scale small RGB or YUV video clips up to full screen at any resolution and any color depth, and maintain a frame rate greater than 30 frames per second. The copy engine can also interpolate the pixels to reduce the effects of the enlargement.

Video refresh rates of up to 150 Hz vertical and up to 100 KHz horizontal are available running either interlaced or non-interlaced formats. A programmable clock generator allows the user to set the pixel clock up to 220 MHz. Display formats include 640 x 480 up to 1600 x 1280. Standard 8-bit (mapped) as well as 16 and 32-bit direct color modes are supported. The display can be configured to be 24-bit direct color plus an 8-bit mapped overlay display. Sync-on-Green is software selectable.

The display memory has 8 MB VRAM which gives approximately 95% memory availability to the graphics and host processors. An additional 64 MB of DRAM is included for off screen, Z-buffer, and backing store. A 2 MB mask buffer RAM is also supplied, for use in accelerating pattern and character drawing. Finally, a Flash PROM is included for VGA BIOS and other program storage.

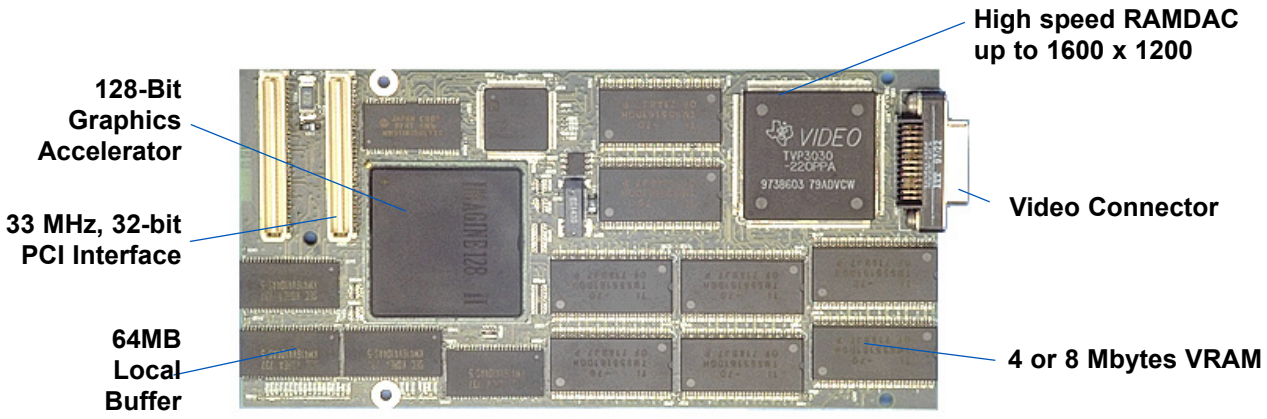
The video output is directed through an a Texas Instruments TVP3030 RAMDAC. It includes a graphics cursor with a 64 x 64 x 2 bit map. It translates the primary, overlay, and 2-bit cursor pixels into 24-bit color values (8 bits each of red, green, and blue). The analog red, green, and blue signals from the color map are connected to a standard RGB monitor. DDC (display data channel) lines are supplied so that the monitor can be controlled by the host computer.

I/O Connections

A special MDSM-to-VGA cable assembly adapts the VFX-M's MicroDSub (MDSM) connector to a standard VGA connector.

PMC Form Factor

The PCI Mezzanine Card (PMC) implementation provides a modular graphics solution for VMEbus and other platforms that support the PMC specification.



VFX-M Features

- 128-bit graphics accelerator
- 4 or 8 MB display memory
- 64 MB local buffer memory
- Display List processor
- Separate Copy Engine with scaler
- 33 MHz, 32-bit PCI interface
- 8, 16, or 24-bits per pixel
- 1600 x 1280 max. display resolution
- Hardware bit-mapped cursor
- Standard Drawing Library (SDL)
- VxWorks drivers

VFX-M Technical Overview

True 128-bit Graphics Accelerator

Implemented in a 0.5 micron 3.3 volt CMOS gate array process. Features 128-bit BitBLT acceleration and copy engines, a 128-bit display memory interface, and 128-bit data paths.

Key Device Features:

+ VGA controller core for service and maintenance
+ Programmable display controller
+ Color Space and DIB Converter
+ Directly supports Two Operand Bit Blts
+ Scaling with X and Y interpolation
+ Flat and shaded patterned line drawing
+ Flat and Gouraud-shaded patterned triangles
+ 64 MB shared Z buffer and back buffer
+ 2 MB Mask Buffer for high speed pattern and character drawing
+ Hardware 3-D volume clipping
+ 16-bit X/Y logical address, 32 bits in Z
+ Two configurable Memory Windows
+ High speed image transfer

Graphics and Copy Engines:

The Drawing Engine commands provide all of the normally required operations including: BIT BLT, Line, Triangle, Write Image, and Read Image. The Copy Engine duplicates the non-drawing functions, including BITBLT, Read Image, and Write Image. Note that software may also access pixels directly through the Memory Windows interface.

Display List Processor:

The Symmetric Multi Graphic Processor architecture includes a Display List Processor (DLP) which allows the execution of two drawing commands simultaneously with totally independent parameters. The DLP drives the Copy and Drawing Engines.

32-bit PMC/PCI 2.1 host bus Interface:

Multiple PCI apertures support simultaneous high-performance graphics and video. Extended burst cycle and automatic bus retry support for high data transfer rates.

High-performance memory interface:

Display memory utilizes a 128-bit interface and has 8 MB VRAM.

Back Buffer memory utilizes a 128-bit interface and has 64 MB DRAM.

Mask Buffer memory utilizes a 16-bit interface and has 2 MB DRAM.

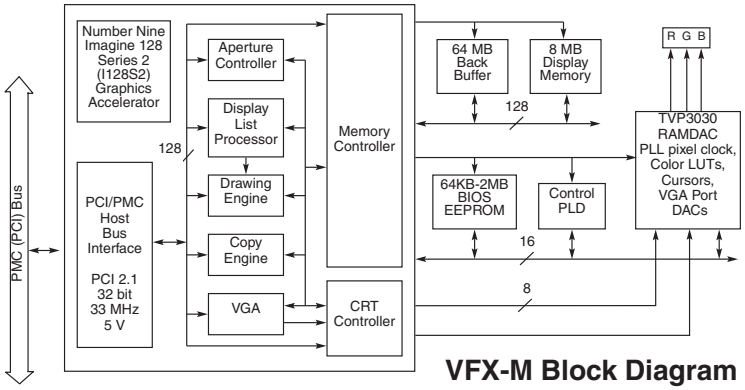
BIOS memory utilizes an 8-bit interface and has up to 2 MB of flash EEPROM. The low 64 KB contains a VGA BIOS.

Scroll and Pan:

Scroll - single line (smooth scroll).
Pan - anywhere on 16 pixel boundaries.

Flat Panel Compatibility:

The VFX-M has analog output (only). However, many flat panels are available which have analog VGA-style inputs that operate up to 1600x1200.



VFX-M Block Diagram

SDL Overview

The Standard Drawing Library, SDL, is a scaleable C graphics library designed for use with real-time and non-real-time operating systems. SDL is small, compact, ROMable, and offers device independent graphics functions for board level and embedded systems applications.

SDL is easy to use and provides a complete set of graphics primitives. These graphics primitives can be extended by adding utility functions for specialized graphics tasks.

SDL is written in ANSI C and is supplied in library format, which means that its target code size can be controlled by limiting the number of functions used in a given application. SDL has been designed to run on any CPU and operating system that uses linear addressing and that is supported by an ANSI C compiler and linker.

SDL Feature Summary

- Written in ANSI C
- Full Featured and Easy to Use
- Scaleable, ROMable, and Minimal RAM usage
- Solid (thin and wide) and Dashed Lines and Rectangles
- Circles, Ellipses, and Arcs
- Filled Circles, Chords, Sectors, and Polygons
- Solid and Pattern Fills
- Pixel Processing
- Proportional and Fixed Width Fonts
- Clipping Rectangle and Logical Origin
- Screen to Screen and Host to Screen Image Copy
- Mouse and Keyboard Support

VFX-M Product Specifications

Graphics Controller	128-bit Graphics Acclerator
Horizontal Scan Rates	15.75 to 115 KHz
Maximum Dot Clock	220 MHz
Display Resolution	1600 x 1200 (max.)
Display Colors	16.7 Million @ 24-bpp, 256 @ 8-bpp
Memory Configuration	
Display memory	4MB or 8MB VRAM
Local (non-display)	64MB DRAM
Mask/Pattern	2MB DRAM
BIOS EEPROM	64KB
Serial EEPROM	4Kb
Analog Monitor Support	Multi-frequency (VGA type) monitors. Sync-On-Green (SOG) is software selectable.
Composite Video/Sync Signal	1 Volt peak to peak, consisting of: 660 mV Reference White 54 mV Reference Black 286 mV Sync (Sync on Green)
Flatpanel Support	Analog with VGA compatible interface
PMC Bus Compatibility	IEEE P1386.1 and PCI 2.1 compliant 5V PCI Bus signaling, 32-bit (J1 only)
PMC Bus Interrupt	INTA
Video Connector	25 pin Cannon MDSM Micro D-sub supplies Analog RGB, Horizontal and Vertical Sync, DDC, and fused 5 V. An MDSM25-to-VGA adapter cable is available.
Multiple Display Support	Multiple VFX-M boards may be added to a single system.
Power-management capabilities	**DDC-2B** (display data channel) controls the monitor.
	TVP3030 RAMDAC can be powered off.
VFX Maintenance Features	3 LEDs (Red, Yellow, and Green) which can be driven by customer software
	TVP3030 RAMDAC has integral CRC capability which allows any 24 video data lines to be tested. It can also sense monitor connections.
	A 4Kb Serial EEPROM stores the serial number, display timing information, and customer specific parameters.
Software Support	Windows NT/2K
	Linux/XFree86 and Solaris SunX DDX
	Standard Drawing Library (SDL) for Linux and VxWorks
	Rastergraf provides both VGA BIOS and FCode firmware options for the VFX-M.
Environment	
Operating temperature	0°C to +70°C
Storage temperature	-40°C to +120°C
Altitude	7,500 Feet
Humidity	5% - 95% non-condensing
Power Requirements	+ 5V ±5%, 1.5A, typical
Dimensions	IEEE 1386 PMC, 149mm x 74mm

Display Resolutions

Resolution	Vertical Scan Rate			
	Windows and RTOS		Solaris	
	Format	Frequency	Index	Frequency
640 x 480	VGA	60 Hz 75 Hz	8 9	60 Hz 75 Hz
800 x 600	SVGA	60 Hz 75 Hz	6 7	60 Hz 75 Hz
1024 x 768	UVGA	60 Hz 75 Hz	0 1	60 Hz 75 Hz
1152 x 864	Sun	60 Hz 75 Hz	2 [default] 3	60 Hz 75 Hz
1280 x 1024	SXGA	60 Hz 75 Hz	4 5	60 Hz 75 Hz
1600 x 1200	UXGA	60 Hz	C	60 Hz

Ordering Information

VFX-M

VFX-M includes Graphics Accelerator, 4 or 8 MB display memory, 64 MB back buffer/mask memory option, hardware pan, scroll, and zoom, 2-bit cursor, and analog out.

VFX-M Model	Display Capabilities	Display Memory	Back & Mask Buffer Memory
VFX-M/X	640 x 480 to 1600 x 1280 x 24	8 MB	yes
VFX-M/L	640 x 480 to 1600 x 1280 x 24	8 MB	no
VFX-M/LC	640 x 480 to 1600 x 1280 x 8	4 MB	no

Transition Cable Assembly:

MVK-1/3 MDSM to VGA Cable, 3 ft.

Software:

SDL/R3.6

Standard Drawing Library (SDL): C-callable graphics library for VxWorks.

Windows, Solaris, and Linux drivers are also available. Please contact the factory for more information.

Note: Version number may change as enhancements and improvements occur.

www.rastergraf.com

Rastergraf, Inc.
1804-P SE First Street
Redmond, Oregon 97756
tel: +1 (541) 923-5530
fax: +1 (541) 923-6475
email:sales@rastergraf.com

Rastergraf