# Introduction

## Features

❖ **Fast 128-bit GUI accelerator**
- Optimized 24- and 32-bit truecolor
- 256 raster operations
- Source and destination transparency

❖ **No-cost motion video™**
- Smooth scaling and color conversion
- 64-step bilinear filter
- On-chip line buffer
- DirectDraw/Direct Video/DCI support
- Graphics and 24-bit video in 1MB buffer
- Hardware occlusion

❖ **Integrated DAC and clock generator**
- Refresh rates to 120 Hz
- Gamma correction

❖ **BetterHalf™ cost-saving technology**

❖ **VESA® standards support**
- VAFC advanced feature connector
- DPMS power management
- DDC 2.0B Bi-directional monitor data

❖ **High throughput PCI interface**
- Zero wait state bursts
- 66MHz/PCI 2.1 compliant

❖ **Fast 64-bit interleaved DRAM interface**
- 400MB/second peak bandwidth
- EDO and fast page DRAM

❖ **Programmable resolution to 1600×1200**

|        | 256 colors | 32K/64K colors | 16M colors |
|--------|------------|----------------|------------|
| 1 M    | 1152×864   | 800×600        | 640×480    |
| 1.5 M  | 1152×864   | 800×600        | 800×600    |
| 2 M    | 1600×1200  | 1152×864       | 800×600    |
| 3 M    | 1600×1200  | 1152×864       | 1024×768   |
| 4 M    | 1600×1200  | 1600×1200      | 1280×1024  |

## Block diagram
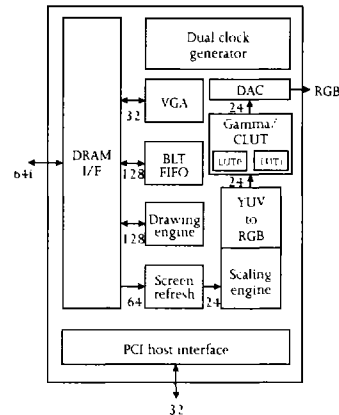


## Overview

ProMotion®-AT24 launches Alliance Semiconductor's new Alliance Truecolor family of high-performance MultiMedia User Interface accelerators. It incorporates a powerful Windows graphical user interface accelerator engine, unique motion video acceleration hardware and a high-precision DAC + clock generator, all in a single integrated 208-pin PQFP package. The ProMotion-AT24 family offers pin-compatibility with previous-generation ProMotion-642x controllers.

The chip's 128-bit internal architecture and 64-bit single-cycle interleaved memory bus give the AT24 superior performance in a low-cost DRAM-based accelerator. Proprietary BetterHalf™ technology cuts cost by reducing system memory requirements, enabling 1024×768 accelerated truecolor display with just 3MB standard DRAM.

The chip's advanced multimedia acceleration engine enables high quality motion video playback at no cost premium over graphics-only solutions. The engine includes an on-chip color space converter to accelerate decompression, and a scaler with full bilinear filter and line buffer, to scale smoothly from native size up to full screen at full speed. The engine delivers smooth display of motion video data at 30 fps, at full SIF resolution under DirectDraw™, DirectVideo™, and other interfaces. Supported standards include MPEG-1, Video for Windows™, Indeo™, TrueMotion™, DCI, and other video applications and codecs.

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## Software drivers

❖ **Microsoft® Windows 95™**

❖ **Windows NT™ 4.0, 3.5x**

❖ **Microsoft DirectDraw & DirectVideo**
- Codec-neutral, multi-vendor standards

❖ **MS Windows™ 3.X with DCI**
- Flat-model optimized drivers
- Switch resolutions on the fly
- Virtual desktop to 1600×1200

❖ **Microsoft Video for Windows**

❖ **AutoDesk® ADI for AutoCAD®**

❖ **WordPerfect® 6.0**

❖ **OS/2™ Warp, 2.11**

❖ **Linux**

❖ **SCO Open Desktop™**

→ *Complete, high-performance, robust*

Alliance supports the ProMotion family with high-quality flat-model optimized driver software. ProMotion drivers take full advantage of ProMotion-AT24 hardware and the latest software technology to accelerate real performance of real applications, from word processing and spreadsheets to the most demanding CAD programs and multimedia software.

The ProMotion driver set accelerates all major operating environments, graphics-intensive software, and motion video applications. With 100% VGA and VESA compatibility, ProMotion controllers can also run standard DOS and VBE-compatible applications directly without driver software.

Source code to ProMotion drivers is available to permit customization and differentiation.

## VGA BIOS

❖ **Industry standard Phoenix® BIOS**

❖ **100% IBM® compatible**

❖ **VESA DPMS power management**

❖ **DDC 2.0B**

❖ **VESA BIOS extensions**

→ *Compatible, user-friendly*

ProMotion-AT24 controls an external VGA BIOS ROM for add-in card applications. Binary and source code for the PhoenixView BIOS are available from Alliance.

## Manufacturing package

❖ **Reference PCB designs**

❖ **OEM software utilities**

❖ **Customer software utilities**

→ *Full customer support*

ProMotion reference designs, OEM tools, and application notes reduce time-to-market. Alliance's OEM support and quality standards, developed over years as a high-volume system supplier to the PC industry, meet the strictest requirements.

# No-cost motion video™

## ❖ Motion video application explosion

- Entertainment
- Education
- Training
- Communications

## ❖ Specialized requirements

- Color space conversion
- vWindow™ scaling and pixel interpolation
- 3X throughput by off-loading CPU

→ **30 fps full-screen, full-motion display**

Today's shift to multimedia user interface has created a need for motion video acceleration, just as the shift from text-based to graphical user interface created a need for GUI acceleration. As new graphics+video systems enter the market, graphics-only displays are going the way of yesterday's text-only terminals.

Motion video playback requires a small set of specialized operations which are CPU-intensive but can be accelerated with dedicated hardware. For a typical stored-video codec, off-loading color space conversion and scaling from the host CPU can increase throughput threefold, increasing frame rates and eliminating jerky dropped frames. ProMotion provides this acceleration, along with state of the art graphics performance, at no additional cost above graphics-only solutions.

# System block diagram

Host bus: PCI/VL

DRAM
1-4 MB

ProMotion-AT24

BIOS ROM
(for adapter card)
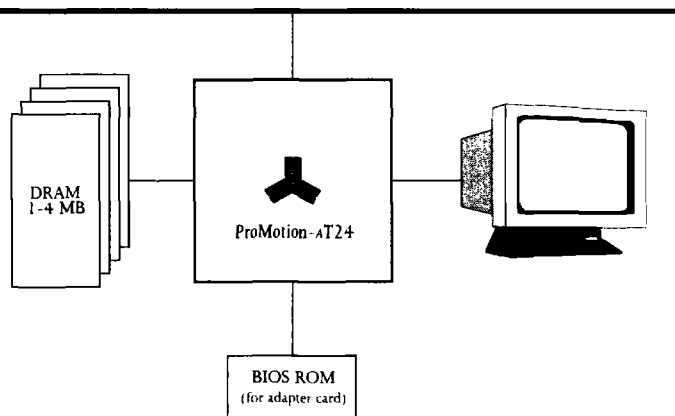
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# Functional description

## 2D Graphics accelerator

The ProMotion-AT24 integrated MMUI accelerator includes a high performance 128-bit graphics accelerator designed for demanding truecolor, hi-color, and pseudo-color GUI and CAD applications. An optimized BLT engine maximizes performance of host-to-screen and screen-to-screen operations. A separate drawing engine efficiently handles pattern fills, text rendering, lines and polygons. Advanced features include:

- 256 raster operations
- RGBR truecolor rotate accelerator
- Color DitherFill™
- Flexible sprite engine
- Source and destination transparency
- Line draw
- Strip draw
- Quick-start and auto-update capability
- Linear memory access
- Mono-to-color expansion
- Short-stroke vectors
- Clipping
- Hardware cursor

## Motion video accelerator

An on-chip motion video accelerator enables software codecs to achieve 30 fps full-screen playback with no additional hardware. ProMotion-AT24 accomplishes this feat by off-loading the CPU-intensive tasks of scaling and color space conversion, and by minimizing the memory bandwidth required for display of decompressed video data.

The chip manages a hardware motion video window, the vWindow™. When displaying the vWindow, the controller stretches by programmable X and Y factors ranging from 1.01 to 255.0. High-precision bilinear interpolation filters and on-chip line buffer circuitry enhance the quality of scaled low-resolution images. AT24 provides hardware occlusion up to 1280×1024 without loss of quality.

Motion video data may be in pseudo-color, RGB, or YUV format (4:2:2, 4:1:1, or 4:0:0). ProMotion-AT24 converts YUV data to RGB "on the fly" for display in photo-realistic color using ProMotion's onboard DAC. Advanced ProMotion architecture permits full 24-bit color for motion video data, even when the graphics desktop uses lower color depth. With ProMotion-AT24, a 1MB graphics system can display 8-bit graphics up to 1024×768 resolution, along with 24-bit full-screen motion video.

The ProMotion architecture maximizes motion video performance as well. Because YUV format is more compact than truecolor RGB, and because each motion video frame is sent across the host bus at its unscaled resolution, the host sends a minimum of data across the system bus. Because ProMotion-AT24 does scaling on the fly, it reads only the minimum required data for each screen update, making the best possible use of available bandwidth. ProMotion's innovative architecture removes bandwidth bottlenecks to display multimedia data at its full speed.

## VGA controller

A fully register-compatible Super VGA controller in the ProMotion-AT24 chip supports all monochrome and 4-bit packed and planar modes. The controller is reverse-compatible to MDA, CGA, EGA, and IBM VGA standards. Super VGA modes conform to VESA standards. Refer to Table A, for extended modes.

| Mode no. | Screen format | Display mode |
|---|---|---|
| 0,1 | 360 × 400 | text |
| 2,3 | 720 × 400 | text |
| 4,5 | 320 × 200 | graphics |
| 6 | 640 × 200 | graphics |
| 7 | 720 × 400 | text |
| D | 320 × 200 | graphics |
| E | 640 × 200 | graphics |
| F | 640 × 350 | graphics |
| 10 | 640 × 350 | graphics |
| 11 | 640 × 480 | graphics |
| 12 | 640 × 480 | graphics |
| 13 | 320 × 200 | graphics |

## Clock generator and DAC

ProMotion-AT24's high-frequency clock generator and integrated palette DAC give high-quality high-resolution display. Table A details the resolutions available with standard BIOS and drivers. The analog biasing circuitry appears in Figure A and Figure B.

Gamma correction in 16- and 24-bit modes—including separate gamma tables for desktop and video areas—permits software color matching and brightness/tint control.

Table A. ProMotion-AT24 extended graphics modes

| Display resolution | Bits per pixel | VESA mode (hex) | Mem. req. (MB) | Vert.freq. (Hz) | Horiz. freq. (KHz) | Pixel freq. (MHz) | VCLK freq. (MHz) |
|---|---|---|---|---|---|---|---|
| 640×400 | 8 | 100 | 1.0 | 70 | 31.5 | 25.175 | 25.175 |
| | 32 | | 1.0 | 70 | 31.5 | 25.175 | 25.175 |
| 640×480 | 4 | | 1.0 | 60 | 31.5 | 25.175 | 25.175 |
| | 8 | 101 | 1.0 | 60 | 31.5 | 25.175 | 25.175 |
| | 15, 16 | 110, 111 | 1.0 | 60 | 31.5 | 25.175 | 25.175 |
| | 24 | 112 | 1.0 | 60 | 31.5 | 25.175 | 25.175 |
| | 32 | | 1.5$^\dagger$ | 60 | 31.5 | 25.175 | 25.175 |
| | 4 | | 1.0 | 72 | 37.9 | 31.5 | 31.5 |
| | 8 | | 1.0 | 72 | 37.9 | 31.5 | 31.5 |
| | 15, 16 | | 1.0 | 72 | 37.9 | 31.5 | 31.5 |
| | 24 | | 1.0 | 72 | 37.9 | 31.5 | 31.5 |
| | 32 | | 1.5$^\dagger$ | 72 | 37.9 | 31.5 | 31.5 |
| | 4 | | 1.0 | 75 | 37.5 | 31.5 | 31.5 |
| | 8 | | 1.0 | 75 | 37.5 | 31.5 | 31.5 |
| | 15, 16 | | 1.0 | 75 | 37.5 | 31.5 | 31.5 |
| | 24 | | 1.0 | 75 | 37.5 | 31.5 | 31.5 |
| | 32 | | 1.5$^\dagger$ | 75 | 37.5 | 31.5 | 31.5 |
| | 8 | | 1.0 | 85 | 43.3 | 36.0 | 36.0 |
| | 15, 16 | | 1.0 | 85 | 43.3 | 36.0 | 36.0 |
| | 32 | | 1.5† | 85 | 43.3 | 36.0 | 36.0 |
| | 8 | | 1.0 | 100 | 50.95 | 41.165 | 41.165 |
| | 15, 16 | | 1.0 | 100 | 50.95 | 41.165 | 41.165 |
| | 8 | | 1.0 | 120 | 63.92 | 53.69 | 53.69 |
| | 15, 16 | | 1.0 | 120 | 63.92 | 53.69 | 53.69 |

$\dagger$ = BetterHalf™ modes

Notes for Table A:

Modes supported through BIOS is independent of drivers.

Implementation of refresh rates is driver-dependant.

Refresh rates shown may require high MCLK and/or non-fast page DRAM.

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## Table A. ProMotion-AT24 extended graphics modes

| Display resolution | Bits per pixel | VESA mode (hex) | Mem. req. (MB) | Vert.freq. (Hz) | Horiz. freq. (KHz) | Pixel freq. (MHz) | VCLK freq. (MHz) |
|---|---|---|---|---|---|---|---|
| 800×600 | 4 | 102 | 1.0 | 56 | 35.2 | 36 | 36 |
| | 8 | 103 | 1.0 | 56 | 35.2 | 36 | 36 |
| | 15, 16 | 113, 114 | 1.0 | 56 | 35.2 | 36 | 36 |
| | 24 | | 2.0 | 56 | 35.2 | 36 | 36 |
| | 32 | 115 | 1.5$^\dagger$ | 56 | 35.2 | 36 | 36 |
| | 8 | | 1.0 | 60 | 37.9 | 40 | 40 |
| | 15, 16 | | 1.0 | 60 | 37.9 | 40 | 40 |
| | 24 | | 2.0 | 60 | 37.9 | 40 | 40 |
| | 32 | | 1.5$^\dagger$ | 60 | 37.9 | 40 | 40 |
| | 8 | | 1.0 | 72 | 48.1 | 50 | 50 |
| | 15, 16 | | 1.0 | 72 | 48.1 | 50 | 50 |
| | 24 | | 2.0 | 72 | 48.1 | 50 | 50 |
| | 32 | | 1.5$^\dagger$ | 72 | 48.1 | 50 | 50 |
| | 8 | | 1.0 | 75 | 46.9 | 50 | 50 |
| | 15, 16 | | 1.0 | 75 | 46.9 | 50 | 50 |
| | 24 | | 2.0 | 75 | 46.9 | 50 | 50 |
| | 32 | | 1.5$^\dagger$ | 75 | 46.9 | 50 | 50 |
| | 8 | | 1.0 | 85 | 53.7 | 56.3 | 56.3 |
| | 15, 16 | | 1.0 | 85 | 53.7 | 56.3 | 56.3 |
| | 32 | | 1.5$^\dagger$ | 85 | 53.7 | 56.3 | 56.3 |
| | 8 | | 1.0 | 100 | 64.0 | 65.0 | 65.0 |
| | 15, 16 | | 1.0 | 100 | 64.0 | 65.0 | 65.0 |
| | 8 | | 1.0 | 120 | 75.2 | 76.96 | 76.96 |
| | 15, 16 | | 1.0 | 120 | 75.2 | 76.96 | 76.96 |

$\dagger$ = BetterHalf™ modes

Notes for Table A:

Modes supported through BIOS is independent of drivers.

Implementation of refresh rates is driver-dependant

Refresh rates shown may require high MCLK and/or non-fast page DRAM.

MMUI

## Table A. ProMotion-AT24 extended graphics modes

| Display resolution | Bits per pixel | VESA mode (hex) | Mem. req. (MB) | Vert. freq. (Hz) | Horiz. freq. (KHz) | Pixel freq. (MHz) | VCLK freq. (MHz) |
|---|---|---|---|---|---|---|---|
| 1024×768 | 8 | | 1.0 | 43(86i) | 35.52 | 44.9 | 44.9 |
| | 15, 16 | | 2.0 | 43(86i) | 35.52 | 44.9 | 44.9 |
| | 4 | 104 | 1.0 | 60 | 48.3 | 65 | 65 |
| | 8 | 105 | 1.0 | 60 | 48.3 | 65 | 65 |
| | 15, 16 | 117 | 2.0 | 60 | 48.3 | 65 | 65 |
| | 32 | 118 | 3.0† | 60 | 48.3 | 65 | 65 |
| | 4 | | 1.0 | 70 | 56.5 | 75 | 75 |
| | 8 | | 1.0 | 70 | 56.5 | 75 | 75 |
| | 15, 16 | | 2.0 | 70 | 56.5 | 75 | 75 |
| | 32 | | 4.0 | 70 | 56.5 | 75 | 75 |
| | 4 | | 1.0 | 75 | 60 | 80 | 80 |
| | 8 | | 1.0 | 75 | 60 | 80 | 80 |
| | 15, 16 | | 2.0 | 75 | 60 | 80 | 80 |
| | 32 | | 3.0† | 75 | 60 | 80 | 80 |
| | 4 | | 1.0 | 85 | 68.6 | 94.5 | 94.5 |
| | 8 | | 1.0 | 85 | 68.6 | 94.5 | 94.5 |
| | 32 | | 4.0 | 85 | 68.6 | 94.5 | 94.5 |
| | 4 | | 1.0 | 100 | 80.8 | 108 | 108 |
| | 8 | | 1.0 | 100 | 80.8 | 108 | 108 |
| | 15, 16 | | 2.0 | 100 | 80.8 | 108 | 108 |
| 1152×864 | 8 | | 1.0 | 60 | 54.1 | 80 | 80 |
| | 15, 16 | | 2.0 | 60 | 54.1 | 80 | 80 |
| | 32 | | 4.0 | 60 | 54.1 | 80 | 80 |
| | 8 | | 1.0 | 70 | 53.9 | 94.5 | 94.5 |
| | 15, 16 | | 2.0 | 70 | 53.9 | 94.5 | 94.5 |
| | 32 | | 4.0 | 70 | 53.9 | 94.5 | 94.5 |
| | 8 | | 1.0 | 75 | 67.5 | 100 | 100 |
| | 15, 16 | | 2.0 | 75 | 67.5 | 100 | 100 |
| | 8 | | 1.0 | 85 | 77.09 | 121.5 | 121.5 |
| | 15, 16 | | 2.0 | 85 | 77.09 | 121.5 | 121.5 |

† = BetterHalf™ modes

Notes for Table A:

Modes supported through BIOS is independent of drivers.

Implementation of refresh rates is driver-dependant.

Refresh rates shown may require high MCLK and/or non-fast page DRAM.

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## Table A. ProMotion-AT24 extended graphics modes

| Display resolution | Bits per pixel | VESA mode (hex) | Mem. req. (MB) | Vert.freq. (Hz) | Horiz. freq. (KHz) | Pixel freq. (MHz) | VCLK freq. (MHz) |
|---|---|---|---|---|---|---|---|
| 1280×1024 | 8 | | 2.0 | 43(86i) | 96.4 | 78.75 | 78.75 |
| | 4 | 106 | 1.0 | 60 | 64 | 110 | 110 |
| | 8 | 107 | 2.0 | 60 | 64 | 100 | 100 |
| | 15, 16 | 119, 11A | 4.0 | 60 | 64 | 110 | 110 |
| | 24 | 11B | 4.0 | 60 | 72 | 75 | 75 |
| | 4 | | 1.0 | 75 | 80.0 | 135 | 135 |
| | 8 | | 2.0 | 75 | 80.5 | 144 | 144 |
| | 15, 16 | | 4.0 | 75 | 80.5 | 144 | 144 |
| | 4 | | 1.0 | 85 | 91.146 | 157 | 157 |
| 1600×1200 | 8 | | 2.0 | 43(86i) | 62.5 | 135 | 135 |
| | 8 | | 2.0 | 60 | 75 | 160 | 160 |
| | 15, 16 | | 4.0 | 60 | 70 | 70 | 70 |
| | 8 | | 2.0 | 65 | 81.25 | 175.5 | 175.5 |

† = BetterHalf™ modes

Notes for Table A:

Modes supported through BIOS is independent of drivers.

Implementation of refresh rates is driver-dependant.

Refresh rates shown may require high MCLK and/or non-fast page DRAM.

Table B. ProMotion-AT24 memory requirements for VESA modes

| Resolution | Color depth | VESA/VBE vertical refresh | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 43i Hz | 56 Hz | 60 Hz | 70 Hz | 72 Hz | 75 Hz | 85 Hz |
| 640×480 | 4-bit | | | 1 MB | | 1 MB | 1 MB | 1 MB |
| | 8-bit | | | 1 MB | | 1 MB | 1 MB | 1 MB |
| | 15/16-bit | | | 1 MB | | 1 MB | 1 MB | 1 MB |
| | 32-bit | | | 1.5 MB | | 1.5 MB | 1.5 MB | 2 MB |
| | 32-bit PP | | | 1.5 MB | | 1.5 MB | 1.5 MB | |
| 800×600 | 4-bit | | | 1 MB | | 1 MB | 1 MB | |
| | 8-bit | | 1 MB | 1 MB | | 1 MB | 1 MB | |
| | 15/16-bit | | | 1 MB | | 1 MB | 1 MB | |
| | 32-bit | | | 1.5 MB | | 1.5 MB | 1.5 MB | |
| 1024×768 | 4-bit | | | 1 MB | | 1 MB | 1 MB | |
| | 8-bit | 1 MB | | 1 MB | 1 MB | 1 MB | 1 MB | 1 MB |
| | 15/16-bit | | | 2 MB | | 2 MB | 2 MB | 2 MB |
| | 32-bit | | | 3 MB | | 3 MB | 3 MB | |
| 1152×864 | 4-bit | | | 1 MB | | 1 MB | 1 MB | |
| | 8-bit | | | 1 MB | | 1 MB | 1 MB | |
| | 15/16-bit | | | 2 MB | | 2 MB | 2 MB | |
| | 32-bit | | | | | | | |
| 1280×1024 | 4-bit | | | 1 MB | | 1 MB | | |
| | 8-bit | 2 MB | | 2 MB | | 2 MB | 2 MB | 2 MB |
| | 15/16-bit | | | 4 MB | | | 4 MB | |
| | 32-bit PP | | | 4 MB | | | | |
| 1600×1200 | 8-bit | | | 2 MB | 2 MB | | | |
| | 15/16-bit | | | 4 MB | | | | |

NOTE: All AT24 refresh rates comply with VESA tolerances, ±0.5% PCLK.

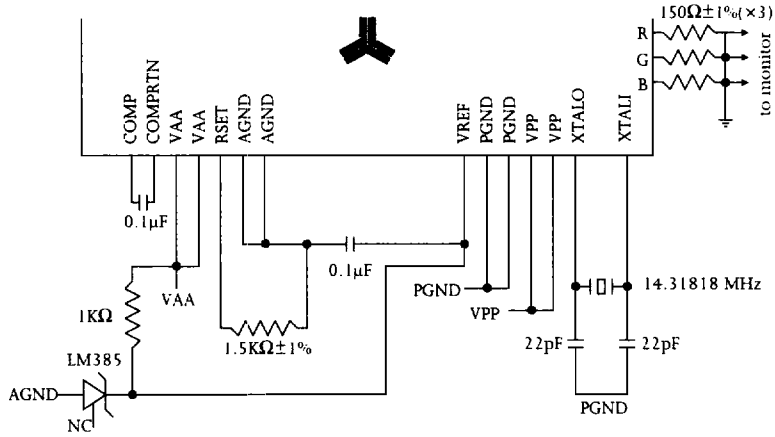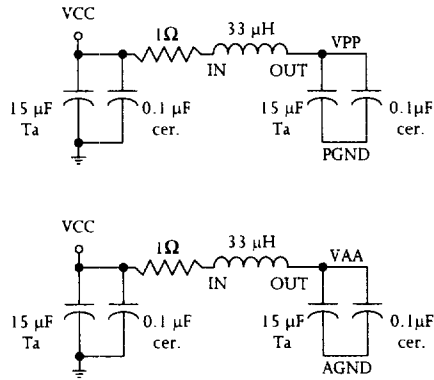Figure A. ProMotion-AT24 recommended analog interface



Figure B. ProMotion-AT24 suggested analog power filter

## PCI host interface

ProMotion-AT24 interfaces directly to a PCI bus. On PCI bus, the AT24 supports zero wait state bursts of successive dwords into the chip's inbound command FIFO. After dispatching commands and data to the AT24, the host CPU can continue execution. Configuration strap MD[27] selects PCI bus operation; refer to the ProMotion-AT24 Databook for more information on configuration straps.

**Figure C. ProMotion-AT24 glueless PCI/ROM interface**
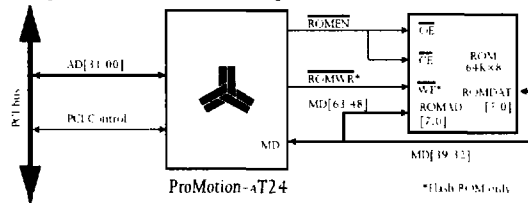


## ROM BIOS interface

ProMotion-AT24 supports address, data and flash write control interface for ROM BIOS as shown in Figure C, "ProMotion-AT24 glueless PCI/ROM interface."
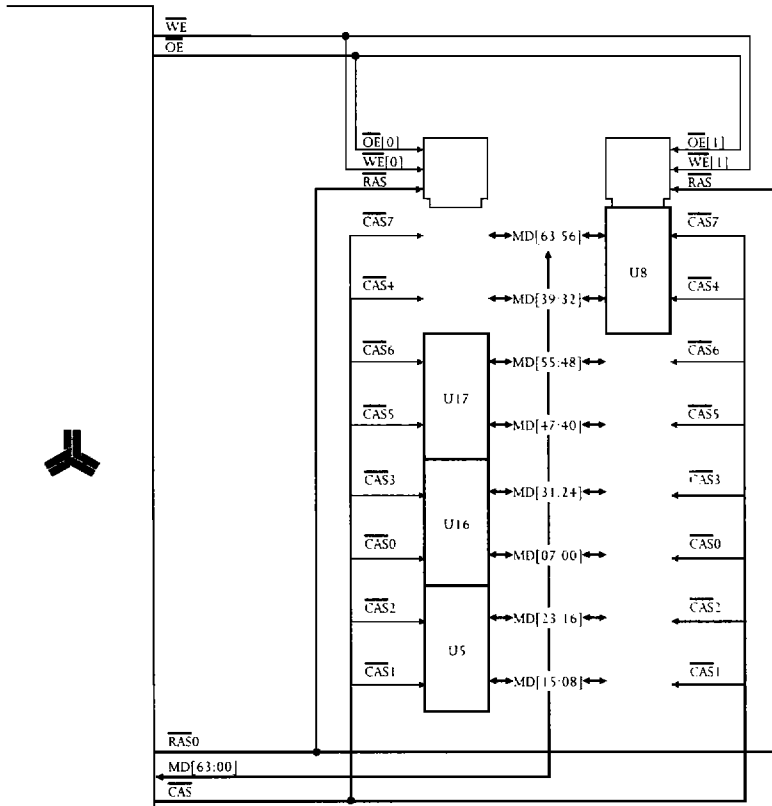
## DRAM interface

ProMotion-AT24 controls 1, 1.5, 2, 3, or 4 megabytes of DRAM frame buffer memory. For 1MB, 1.5MB, and 2MB systems 256K×4, ×8, or ×16 parts may be used. For 3–4MB systems 256K×8 or ×16 may be used. Dual-$\overline{CAS}$ EDO and fast-page are supported.

Software must be configured to gang together $\overline{OE}$[0] with $\overline{OE}$[1] and $\overline{WE}$[0] with $\overline{WE}$[1], by enabling 'Better Half' 3 MB mode with watermark = 0.

Single cycle EDO timing permits high memory efficiency even in 1–2 MB configurations. Programmable memory timing allows ProMotion-AT24 to use standard speed DRAM or take advantage of high-speed DRAMs.

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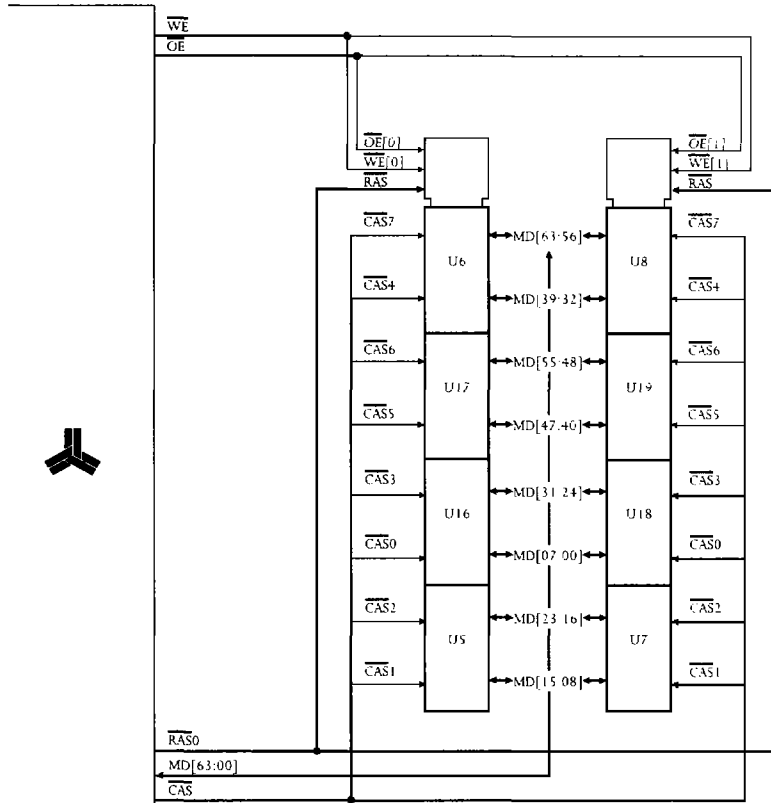## Figure D. ProMotion-AT24 memory interface: 1 / 1.5 / 2M configurations



Population guide (U numbers refer to ProMotion-ATxx reference design)

| 1.0 MB | 1.5 MB | 2.0 MB |
|---|---|---|
| U5, U16 | U5, U16, U17 | U5, U8, U16, U17 |

**Note that $\overline{CAS}$ and MD are not in sequential order in this diagram.**

Figure E. ProMotion-AT24 Memory interface: 1–4M (default mode/multiple $\overline{CAS}$)

Population guide (U numbers refer to ProMotion-ATxx reference design)

| 1.0 MB | 1.5 MB | |
|---|---|---|
| U5, U16 | U5, U16, U17 | |

| 2.0 MB | 3.0 MB | 4.0 MB |
|---|---|---|
| U5, U8, U16, U17 | U5, U7, U8, U16, U17, U19 | U5, U6, U7, U8, U16, U17, U18, U19 |

**Note that $\overline{CAS}$ and MD are not in sequential order in this diagram.**

## Monitor and feature connector interface

For interoperability with video capture and other multimedia cards, ProMotion-AT24 offers two feature connector options, selectable by configuration strap MD[26]. In VSVPC mode, ProMotion-AT24 connects to an industry-standard 8-bit VGA pass-through connector; refer to Figure F, "ProMotion-AT24 glueless VSVPC feature connector." In VAFC mode, the chip supports the VESA Advanced Feature Connector standard, including 16-bit input and output. With the circuit shown in Figure G, VAFC can be implemented without an expensive multiport DAC.

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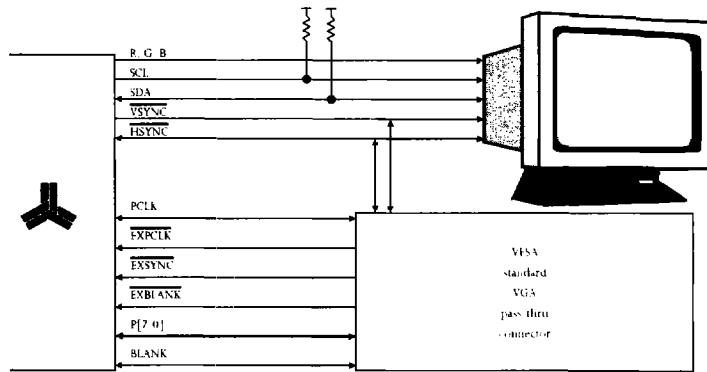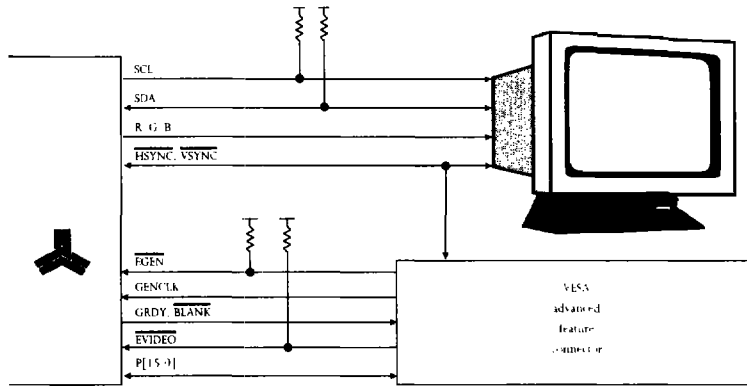Figure F. ProMotion-AT24 glueless VSVPC feature connector



Figure G. ProMotion-AT24 glueless VAFC feature connector



## DDC 2.0B support

ProMotion-AT24 includes dedicated I/O pins for bi-directional DDC monitor connections in PCI bus configuration. Using industry standard protocols, software can use DDC to read status and write configurations to compliant monitors.

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