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VISICOM LABORATORIES, INC

SLIVER™

VMEbus Multimedia Server

Sliver™ is a high performance VMEbus multimedia server which provides live video in a window, accelerated graphics, compression/decompression, audio input and output, and digital graphics output to active matrix LCD panels. Sliver is ideal for applications requiring video conferencing, real-time video-in-a-window, high-performance graphics, or digital video distribution over a network or video playback from a hard disk or CD-ROM.

Sliver is modular in design so that it may be configured to specific requirements. It is designed around several high performance, highly integrated components working together to implement a very powerful and cost effective X Window system server. The core RISC processor handles communication and control and executes X Window instructions. The VMEbus interface controller decouples the system bus from the VMEbus to speed throughput. Up to two graphics accelerators provide very high speed 8-bit per pixel rendering into two orthogonal frame buffers. Up to two video accelerators support smooth scaling (shrink and enlarge) of full frame rate resolution video windows. Optional multimedia daughter boards provide frame grabbing, digitizing, image compression/decompression, audio input and output, and displaying of still and live video in a window. In addition, Sliver is adaptable to many digital flat panel displays via display adapter modules.

Sliver Features

- Fully Embedded X11R6 Server
- VT100 Terminal Emulator acts as system console
- Multiple Resolutions, 640x480 through 1600x1280
- High Performance VME/64 bus interface
- 8 or 32MBytes of on-board DRAM
- Single or Double buffered frame buffer
- Virtual Memory support
- Dedicated DMA Controller
- Keyboard and Mouse Port
- Very high rendering performance (>1.5million vectors/sec.)
- Active Matrix LCD Panel support
- Single slot 6U VME board

Hardware Architecture

Sliver provides a VME/64 compatible master/slave interface from the VMEbus to the local 32-bit system bus, an on-board 32-bit RISC processor, 8 or 32MBytes of DRAM and 128KBytes of FLASH EPROM. In addition, there is a four channel UART which provides a PC or Sun keyboard interface, serial mouse port, and two RS232C serial ports. Sliver also has two separate accelerated frame buffers each providing 2.5MBytes of VRAM, two video accelerators, and two daughter board sites each with a system bus interface and a video accelerator interface.

Block Diagram

ìSee Attachedî

As shown in the block diagram, Sliver provides a VME-64 compatible interface from the VMEbus to the local 32-bit system bus, an on board 32-bit RISC processor, 8 or 32 Mbytes of DRAM, and 128Kbytes of FLASH EPROM. In addition, Sliver also provides a four channel serial port with keyboard and mouse, two graphics accelerators, 5 Mbytes of Video RAM, 170MHz RAMDAC, two video scalers and two daughter cards with both a system bus interface and a video scaler interface for various video decoder options.

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X-Server Software

Sliver's embedded server architecture provides excellent X Window performance without loading the host CPU. Sliver includes a fully embedded X11R6 X Window server which communicates with the host via operating system dependent code called a daemon. The daemon is a host process that provides networking support to the X-server via the standard TCP/IP interface and provides file access via the host operating system.

The Sliver X Window system server turns Sliver into a complete, very high performance VMEbus-based X-terminal. Sliver can be integrated into a system in much the same way as a remote X-terminal and will allow the host system's CPU to focus its processing power on the system's primary application. The advantage of this arrangement over remote X-terminals is that the VMEbus backplane provides a much higher bandwidth data path than the ethernet link normally used by X-terminals. This is important since the demand for data traffic between clients and servers is significantly higher than ethernet bandwidth.

Video Output

The video output of Sliver is extremely flexible, allowing the selection of virtually any non-interlaced monitor parameters including standard VGA, various super VGA formats, workstation formats through 1600x1280 - all with live video windows. A digital interface is also provided which can drive Active Matrix LCD (and other) flat panel displays with resolutions up to 1280x1024 via tailored daughter cards. Sliver provides VMEbus, mouse and keyboard interfaces in addition to two auxiliary serial ports, one of which provides the interface to Sliver's built-in VT100 compatible terminal emulator.

Sliver Options

Sliver is a modular system comprised of the VME X-Server, optional Video-Input daughter card, and optional Video/CODEC/Audio daughter card. The X-Server has options for 8 or 32Mbytes of DRAM and single or double buffered frame buffer. Daughter card functions are detailed below. Up to two daughter cards can reside on one Sliver and still comply with the single slot VME standard.

Video Input Daughter Card

Sliverís optional video input daughter cards provide video digitizing and full motion (30 frames per second) video-in-a-window. Up to two daughter cards per Sliver gives the user two simultaneous full motion video windows. Most analog video standards are supported including NTSC, PAL, SECAM, RS-170 and S-Video. In addition, Sliver allows the user to overlay graphics on top of video as well as video scaling and cropping. Software includes library calls to open a video window (Xv), grab and display a frame of video or a stream of video, scale video input, and select video data type (RGB or YUV).

- Capture video and put it in a window using Xv extensions
- Full motion video-in-a-window (30 frames per second)
- Video windows arbitrarily scaled down to 1:16 and up to 2:1
- Video windows arbitrarily occluded
- Video windows overlaid with 8bit graphics for annotation
- Interpolative scaling for clear and sharp enlarged video windows

Video/CODEC/Audio Daughter Card

The Video/CODEC/Audio daughter card for Sliver provides all the above mentioned video capabilities plus video compression/decompression and professional audio input/output.

- Decompress video and put it in a window
- Compress video and transfer it to another program
- Simultaneous video compression and decompression
- Compress audio and store it in memory
- Decompress audio from memory and play back on speaker
- Simultaneous audio compression and decompression
- CD quality audio input/output
- Supported compression formats: JPEG, MPEG1, H.261
- Supported decompression formats: JPEG, MPEG1 and 2, H.261
- Maximum compressed data rate: 1.5Mbits per second
- Compression ratio (at 1.5Mbits/sec data rate): 40:1
- Compression frame size: 352 x 288

Audio

The audio quality of Sliver is professional CD quality. Sliver provides one stereo channel of audio input and output as well as audio compression and decompression. Supported audio compression standards are G.711 (digital, telephone quality) and G.728 (telephone quality, 4:1 compressed). In addition to one stereo line input and output, there are also microphone and headphone inputs.

Compression/Decompression

Sliver utilizes the Integrated Information Technology (IIT) video compression processor for video and audio compression and decompression. The IIT chip supports multiple compression and decompression standards and is programmable, allowing for variations to existing standards and the addition of new standards such as MPEG2. Supported compression standards are JPEG, H.261 and MPEG1 ("I" frame only). Decompression standards supported by Sliver include JPEG, MPEG1, MPEG2 and H.261.

Sliver reduces the load on the host system by handling compression and decompression in hardware on the board, thereby increasing overall system performance. Sliver helps reduce bus traffic on the host system by transferring compressed data through direct connections of the decoder, VRAM and CODEC.

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Technical Specifications:

CPU	IDT3081E (40MHz)
DRAM	8 or 32Mbytes
VRAM	Main: 2Mbytes (2048x1024) per FB
Video Input	RS-170, NTSC, PAL, SECAM
Dot Clock Generator	RAMDAC internal PLL
Hardware Cursor	64 x 64 x 2-bits
Pixel Depth	8-bits
Color Palettes	256 colors out of >16M (4 palettes per head)
Analog Video Out	RS343 - 640x480 to 1600x1280
Flat Panel Output	Panel specific via display adapter board
Keyboard Port	IBM/AT, Sun, and PS/2 compatible
Mouse Port	RS232C - RxD, TxD, RTS, CTS, DTR, DSR
Serial Ports (2)	RS232C - RxD, TxD, RTS, CTS, DTR, DSR
VMEbus	Master/Slave A32, D32, D16, D08, BLK32, BLK64 Interrupts - I(1-7), D08
Power	5V @ 7.50A max. +12V @ 1.4A max. -12V @ 0.5A max.
Operating Temperature	0 to 50 degrees C ambient
Storage Temperature	-40 to +120 degrees C
Humidity	0 to 95% non-condensing
Dimensions	6U VME (10.3î x 7.3î including front panel)
Connectors-X-Server	Graphics output: 15 pin Micro D RS232 Serial Ports (4): 9 pin Micro D
Connectors-Daughtercard	Video input: 15 pin Micro D Audio input/output: 15 pin Micro D (Line level audio in/out, PTT input, microphone, headset)
Software	X11R6, Xv extensions
Operating System Support	Call for list of available software

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