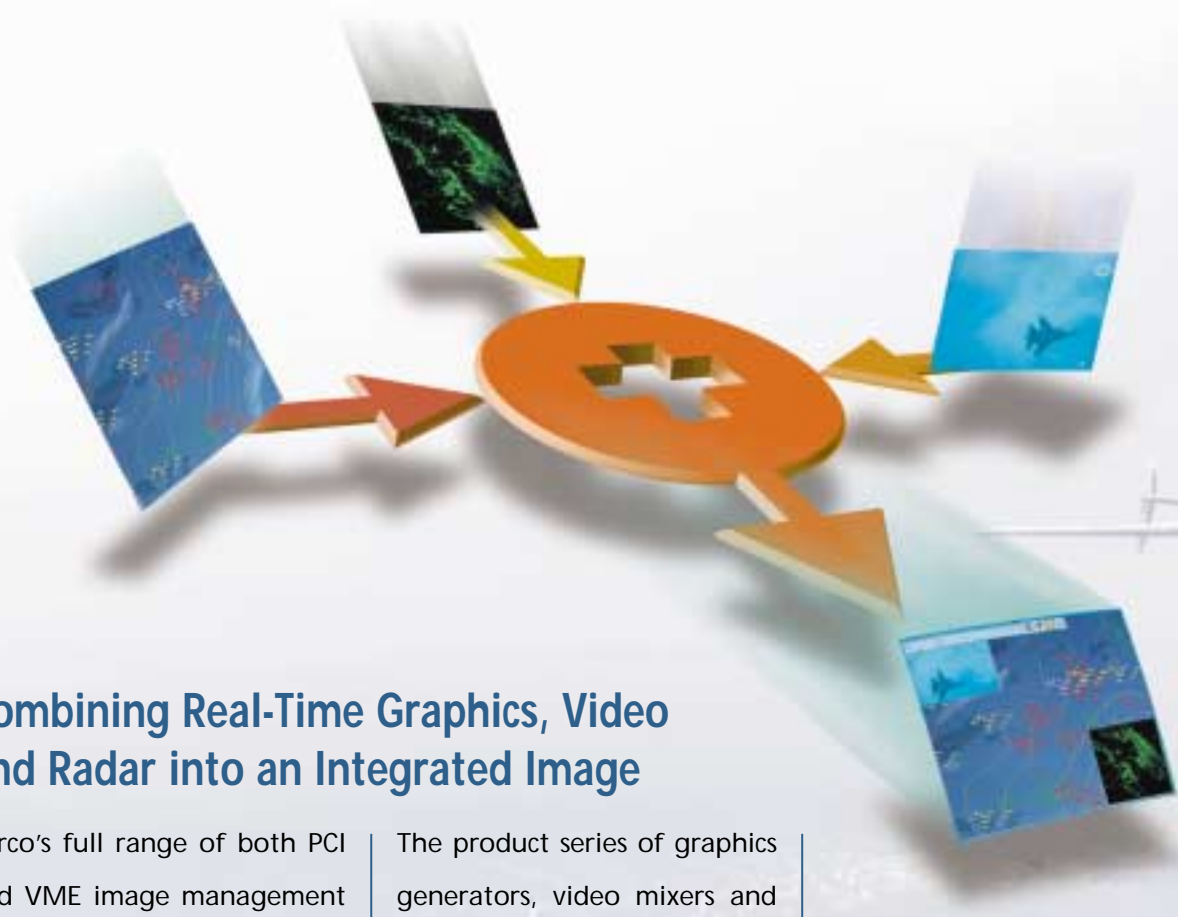# A Full Range of
Integrated Visualization Solutions

BARCO

A World of Vision

Barco is a recognized international technology leader providing high-performance display systems, graphics controllers and video management for mission-critical applications in demanding niche markets, such as C4I, Aerospace, Air Defense and Air Traffic Control. A continued, focused investment of in-house research and development has given the company a unique expertise in state-of-the-art visualization solutions. AQAP-110 and ISO 9001 certifications, configuration control, extensive environmental and lifetime testing programs, stringent design rules, a fully controlled production process and worldwide customer support, confirm Barco's commitment to quality and reliability.

Combining Real-Time Graphics, Video and Radar into an Integrated Image

Barco's full range of both PCI and VME image management products addresses the complex requirements of modern C4I systems. Typical applications include airborne, land-based, naval and simulation workstations that require the viewing of various video sources on a single display device simultaneously.

The product series of graphics generators, video mixers and Radar Scan Converters provides exceptional flexibility and capability in digitally mixing graphics, video and radar into a single RGB output. These image sources appear as windows within the RGB output, which can be independently positioned, scaled and merged. With the archiving products, this RGB signal can be stored as well. Due to their unique design, these Barco products seamlessly merge inserted images, without loading the host processor.

Barco's Full Range of PCI and VME Visualization Solutions

Features	PCI Solution	VME Solution
Graphics Solutions (high-resolution graphics cards)		
max. 1600 x 1200 output	PVS 5011	AVS 5100(x)
max. 2048 x 2048 output	PVS 5611	
	Single-slot boards with EIAVI-interface and VX-bus	
Video Solutions		
• Video Mixers max. 1600 x 1200 input	PMX	VMX
• Video Extension Boards (Single-slot, 5 inputs)	PVX	VX
Max. extensions	3	3
Max. video sources	7	8
• Mezzanine Adapters (Frame Grabbers) (Added to Video Extension Boards)	Monochrome	Monochrome
	RGB	RGB
	Color	Color
Radar Solutions		
1024 x 1024 output	RX 1000	VRC 1000
2048 x 2048 output	RX 2000	VRC 2000
Archiving Solutions		
Full RGB-recording, 4 GB/hour	RGB recorder	
X-Windows Record and Playback	Software solution	

▍Graphics Solutions

Barco's series of graphics generators is designed to support high-resolution, drawing-intensive software. The architecture provides the flexibility to generate graphics data in separate underlay, overlay and superoverlay planes, with simultaneous display of external video sources. The display controllers have separate busses for video and/or radar data insertion (VX-Bus and EIAVI-interface).

All Barco's graphics solutions allow the user to insert external video inputs directly to the graphics card. If additional windows are needed, VX extension boards can be added. These boards accept Barco mezzanine frame grabbers (monochrome, color and RGB*) for every desired configuration. These graphics cards also support interfacing to Barco's Radar Scan Converters via the Enhanced Indexed Auxiliary Video Interface (EIAVI), an open interface for optimum radar performance and low host-processor loading.

* See section on mezzanines

PVS
PCI Visualization System

- Single-slot PCI form factor
- Resolution up to 2048 x 2048
- 8-bit pseudo colored layered graphics
- Software configuration up to 24-bit true color
- RGB analog output
- Digital output (DVI)
- Radar/video insertion interfaces
- Underlay/overlay/superoverlay
- Hardware cursor (up to 3)
- Support for X11R6 and Windows NT
- Application-specific software library extensions

AVS
Advanced Visualization System

- Single-slot 6U VME module
- High bandwidth interface with CPU via PMC adapter
- Resolution up to 1600 x 1200
- 12-bit pseudo colored layered graphics
- RGB analog output
- Radar/video insertion interfaces
- Overlay/underlay
- One hardware cursor
- Application-specific software library extensions

Radar Scan Converter

Extension Board

Graphics Board
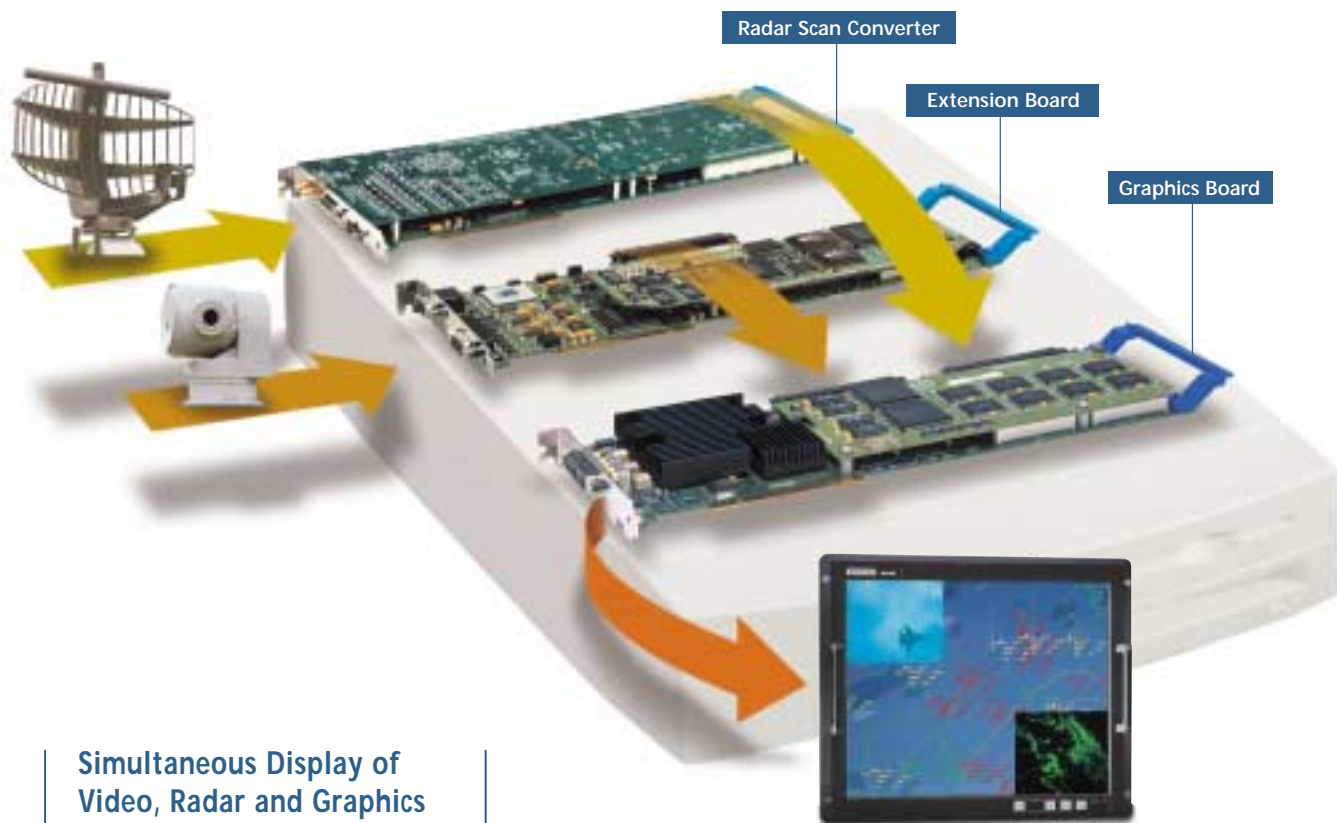
Simultaneous Display of Video, Radar and Graphics

The multi-layer architecture of Barco's graphics solutions enables displaying map data, which can be placed underneath the radar image while target and track data overlay the image. In order to maintain the graphics performance of the system, the radar and video data have independent input channels and are digitally mixed with graphics at the output of the frame buffers.

Video Insertion Capability

Up to three parallel video digitizing boards (VX extension boards) can be connected to the graphics generator, offering the possibility of having up to six video windows. This is accomplished by attaching frame grabber mezzanine cards to the VX. In addition, each frame grabber can accept up to 5 sources and provides a real-time video window of the selected source on the display. The mezzanines are supported by the video extension supplied as part of the Barco X-Server and FLEXIVISION software product.

Open Radar Interface

For its Radar Scan Converters, Barco has designed the Enhanced Indexed Auxiliary Video Interface (EIAVI), which allows users to directly interface with one video and/or graphics card. The interface specifications are available to third party Radar Scan Converters manufacturers.

X-Windows Support

The primary software interface is the industry standard X11 R6. Barco provides extensions for video windowing and a unique client prioritization concept.

Software Extensions

Barco has developed a number of software extensions, which provide enhanced functionality and performance for your application. For instance, these extensions allow recording and playing back data, controlling several graphics controllers at once and adding real-time behavior and many other functionalities.

PMC Adaptor (AVS Models Only)

The AVS interface to the host CPU bus is via a PMC adapter (instead of the VME-bus). This adapter is a standard, single width PMC module that bridges the CPU-bus to the AVS. The module is cabled directly to the front panel of the AVS board. Up to three AVS boards can be supported on this bus.

▍Video Solutions

Barco's FLEXIVISION product family offers a range of hardware and software products that allow the user to mix different input image sources with graphics generated by a host computer. This product family is available in VME and PCI form factors.

The FLEXIVISION product family provides exceptional flexibility and capability in digitally mixing graphics from an independent workstation with video, radar or any other source. The FLEXIVISION boards mix these sources into a single RGB video output, which goes directly to the display device. The video sources appear as windows within the master RGB video output, and can be independently positioned, scaled or merged. Via the Enhanced Indexed Auxiliary Video Interface (EIAVI), radar scan data can be inserted into the image by any compliant Radar Scan Converter. By adding optional Barco VX extension boards and mezzanine frame grabbers*, a maximum of 7 simultaneous windows can be shown at one time, from a maximum of 35 possible inputs.

Barco's VME Mixer (VMX) board is also available in a conduction-cooled version, compliant with IEEE STD 1101.2 - 1992. This conduction-cooled VMX has been especially designed to properly cool the unit in environments where circuit cards are sealed in air-tight enclosures.

See section on mezzanines

PMX
PCI Video Mixer

- Single-slot PCI form factor

- Supports workstations up to 1600 x 1200 at 76 Hz resolution

- Full digital video processing and control

- Selection of up to 5 video sources

- Allows display of 1 video source (can be expanded to 7 by adding PVX extension and associated mezzanine boards)

- Full video window control of positioning and scaling

- Support for UNIX, X11R6 and Windows NT

VMX
VME Video Mixer

- Single-slot 6U VME card

- Supports workstations up to 1600 x 1200 at 76 Hz resolution

- Full digital video processing and control

- Selection of up to 5 video sources

- Allows display of 1 video source (can be expanded to 8 by adding VX extension and associated mezzanine boards)

- Full video window control of positioning and scaling

- Support for UNIX, X11R6 and Windows NT

Radar Scan Converter

Extension Board

Video Mixing Board
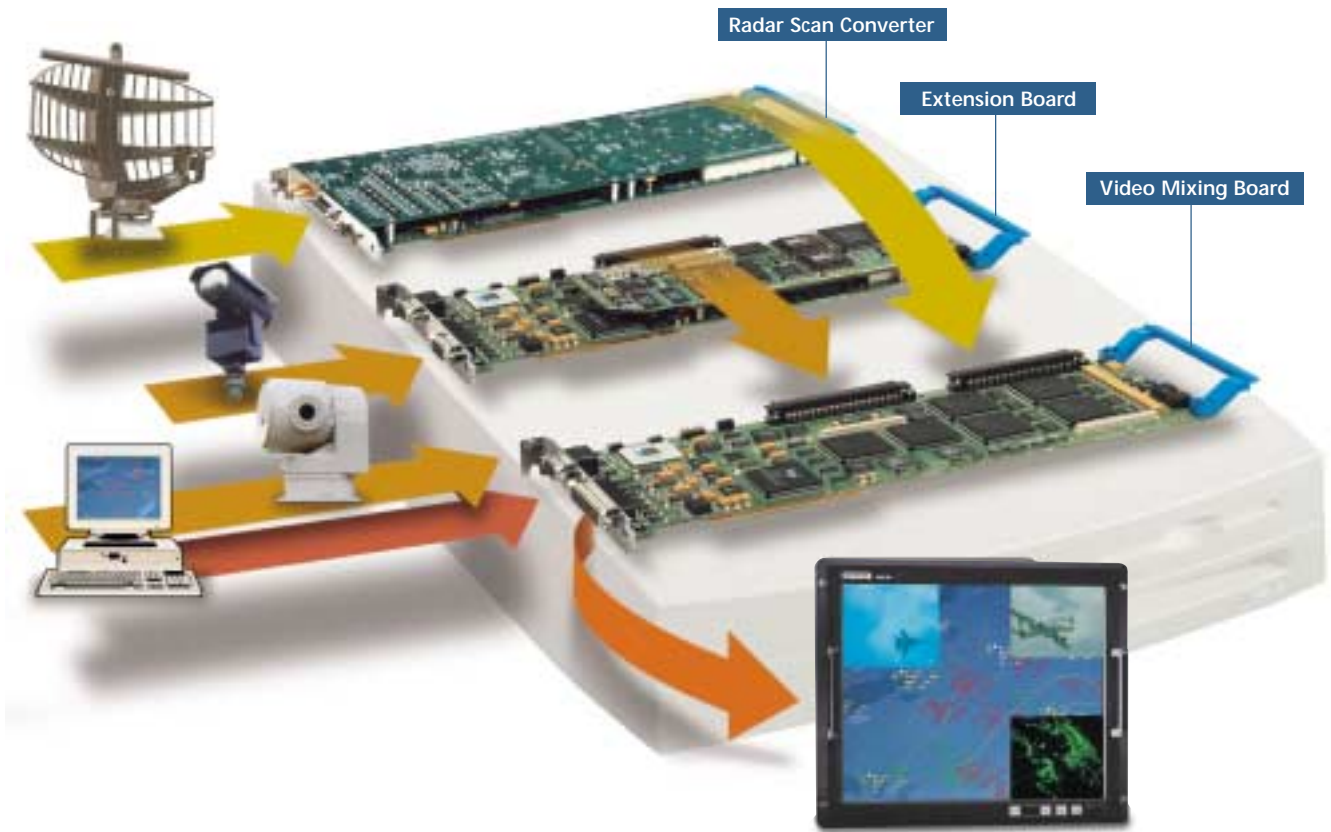
Simultaneous Video, Radar and Graphics in Real-Time

The Chroma keying function on the FLEXIVISION products allows users to define, on a pixel by pixel basis, whether external or master RGB source will be displayed. Thanks to this design, an area on the display can be defined where the Chroma keying is effective. This allows you to use any color in areas of the display where no video mixing is required. The mixing logic further allows you to define overlay and underlay colors. The keying logic also features a transparancy mode, which is extremely useful when placing radar on top of graphics data.

Software Support

Control of all mixer and frame grab-ber features is provided by a high-level API. Software is provided to manage all controls in a window environment.

Open Radar Interface

Barco has designed an interface for Radar Scan Converters, called Enhanced Indexed Auxiliary Video Interface (EIAVI). The interface specifications are available for third party Radar Scan Converters manu-facturers. Barco's range of visualization solutions also features its own Radar Scan Converters, the RX and VRC series.

▌Radar Solutions

Barco's RX and VRC series are a range of single- and dual-slot Radar Scan Converter boards. The Radar Scan Converters receive radar video, trigger and azimuth signals from a radar unit and process these signals to generate a high-resolution display window. The product family has been designed with a modular radar interface to support operation with virtually any radar unit.

The boards have dedicated digital signal processing circuits to provide an extremely high-quality output image without loading the host CPU. The image is updated in real-time in response to the radar-input signals. Barco Radar Scan Converters are available with resolutions up to 2048 x 2048. The RX 1000 and VRC 1000 use pixel replication for windows larger than 1K x 1K, whereas the RX 2000 and VRC 2000 display 2048 x 2048 pixels.

RX
PCI Radar Scan Converter

- Single-slot PCI form factor
- Modular radar interface adapts to any type of radar unit
- Dedicated pixel fill hardware
- Programmable variable persistence
- Built-In Test; internal test pattern generator
- Real-time display
- Option for A and B scope display
- Software Support; UNIX and Windows NT control library
- EIAVI interface

VRC
VME Radar Scan Converter

- Dual-slot 6U VME module
- Up to 3 independent radar inputs
- Processing and display of 2 radar images in 2 windows
- Advanced radar signal processing
- Modular radar interface adapts to any type of radar unit
- Programmable de-clutter map
- Dedicated pixel fill hardware
- Programmable variable persistence
- Option for A and B scope display
- X11R6 support
- EIAVI interface

Radar Scan Converter

Graphics Board
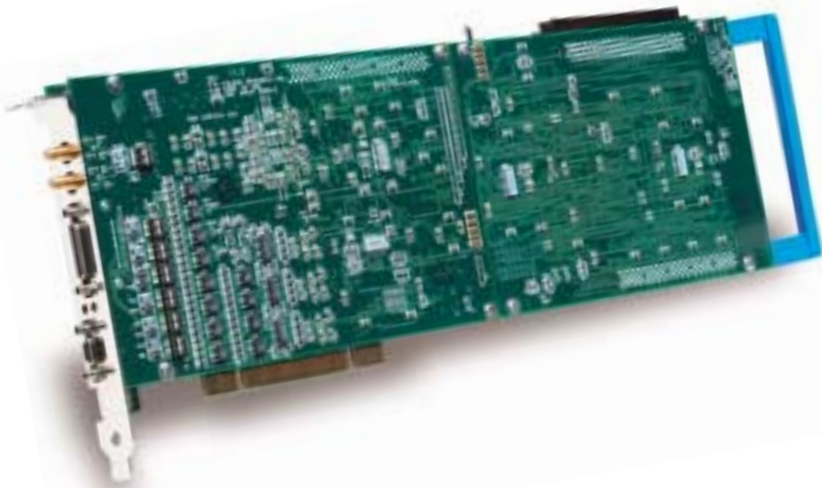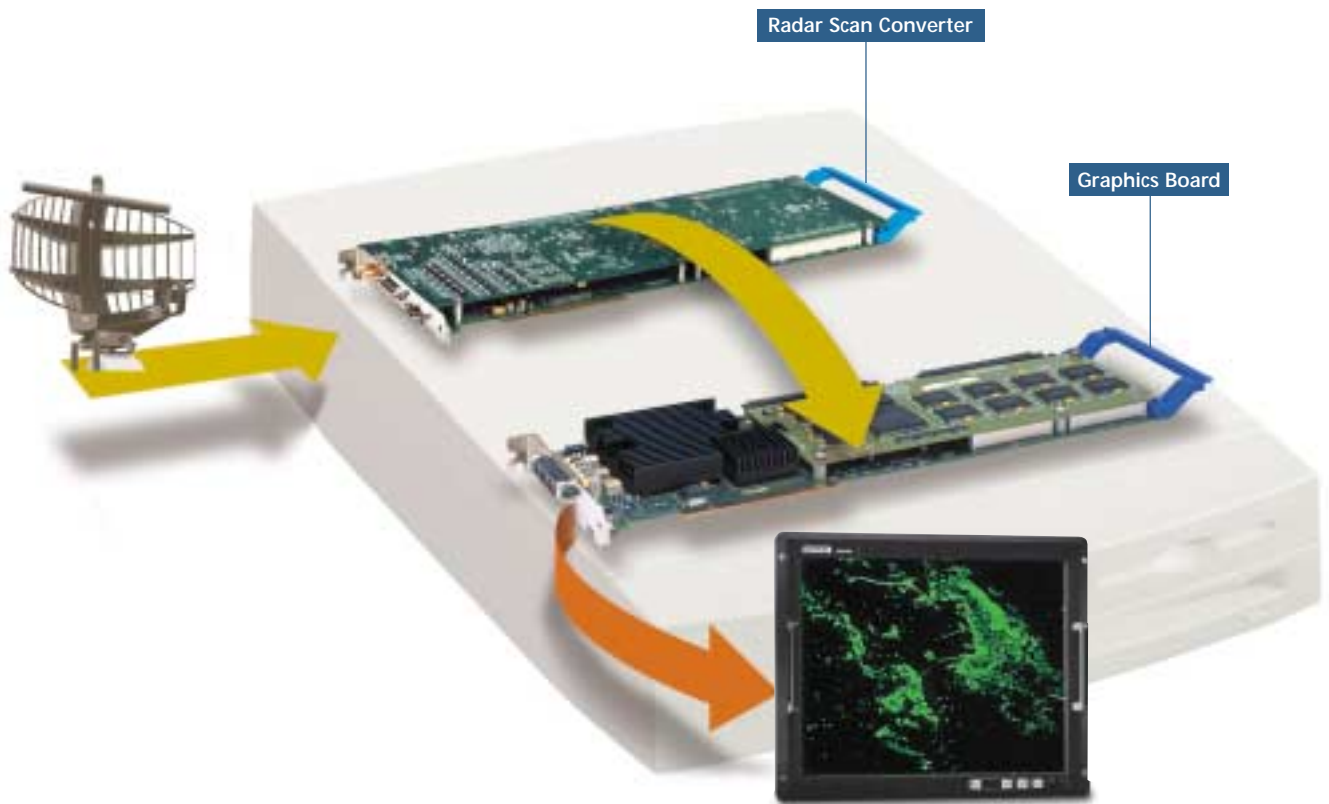
▌Video Crossbar Board (VCB)

The Video Crossbar Board is a single-slot 6U VME board that provides high video bandwidth matrix switching. A built-in microcontroller allows any video input to be connected to any video input. Typical applications of the VCB are connecting multiple workstations to one recording device and adding redundancy to multi-console systems.

Main Features

- Differential video input support
- RS 422 interface
- Up to 25 selectable video input sources, switched to selectable outputs
- Single-slot 6U VME form factor
- High video bandwidth
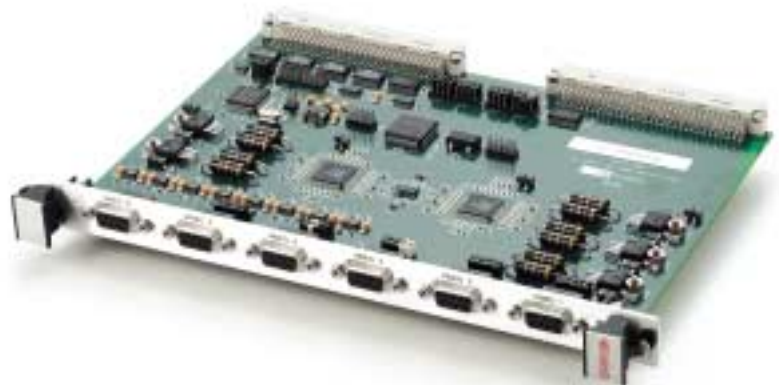
Mezzanines for Video and Graphics

Mezzanine cards are used to customize Barco's graphics and video solutions by allowing the insertion of external video sources. They are installed on the family of extension cards, called VX (Video Extension), or on the video/graphics card itself. The VX boards are single-slot PCI or VME. Each VX board supports one full-size or two half-size frame grabbers. The extension board for VME configurations is also available in a conduction-cooled version.

Frame grabbers are available in monochrome, RGB and color versions. Each mezzanine card accepts one to five video inputs. One input at a time can be selected for mixing.

Features

- Used by PMX, VMX, PVS and AVS
- Installed on PMX, VMX boards and/or
- Installed on VX Extension boards for more inputs

Types

- Color Frame Grabber (CFG); NTSC, PAL, S-Video, CCIR
- Monochrome Frame Grabbers (MFG); Sources such as FLIR, infrared, etc.
- RGB Frame Grabber (RGBFG); RS-343 video (Only one RGB Frame Grabber possible per VX extension board)

VX Extension Bus

Interconnecting VX extension boards is performed via the Barco VX Extension Bus, allowing a total of three video digitizing boards to be daisy-chained. The VX Extenstion bus is available in PCI and VME form factors.

X-Windows Recording and Playback

Barco has developed a Record and Playback (RAP) set of API libraries that allow users to record and playback all graphical and related X11 R6 protocol data. The protocol can be stored on a local or networked database. Barco's X-Windows Recording and Playback is available as a separate licensed software product or as a complete standalone software package (called TELLAR) with a GUI providing obvious and easy-to-use controls.

Features

- Protocol recording and time stamping
- On demand image snapshots
- Local or network storage
- Live playback on remote workstation
- Efficient recording
- Available as standalone software package with integrated GUI (Tellar)
- Also available as licensed software product. Customize library to your application and interface

Main Applications

- Debugging: Review the image and determine which commands cause errors (by recording commands)
- Archiving: Store the recorded image for later review and analysis
- Workstation Monitoring: Utilize the recording extension to view, in real-time, the display of another workstation
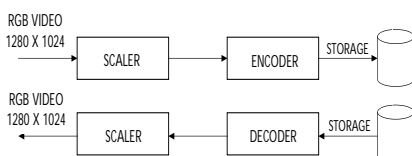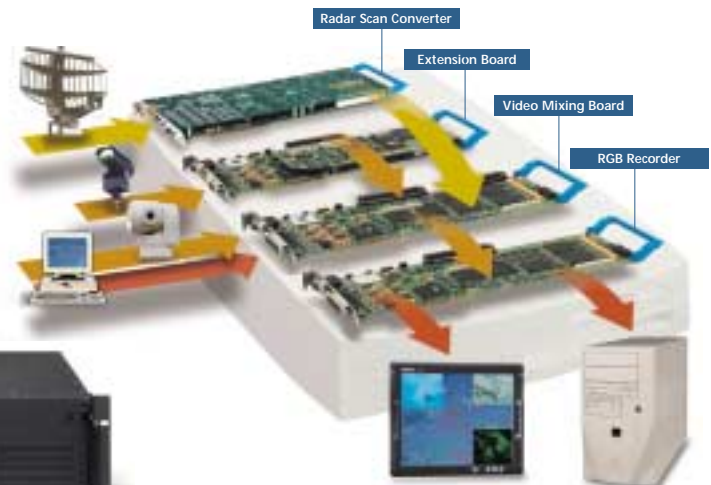- Training: Record and review student responses and techniques
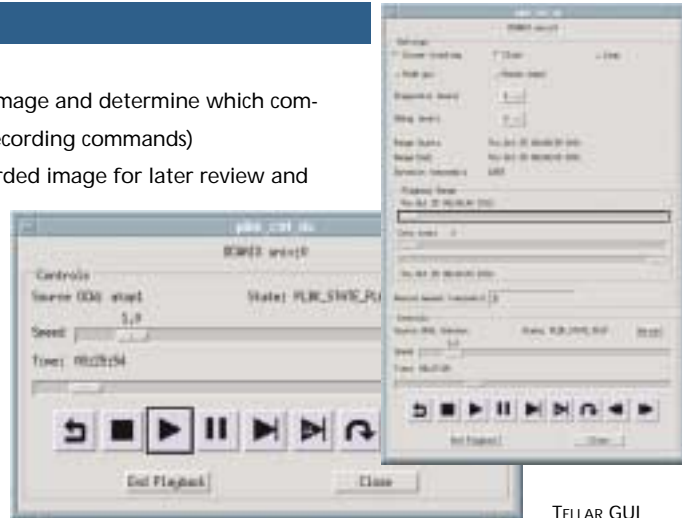
TELLAR GUI

RGB Recorder

Taking image recording a step further, Barco has developed a unique set of compression techniques for effective recording of RGB outputs on storage media. The stored images can be played back later for review and/or analysis. The DIGITAL SCRIBE™ is available in a stand-alone 19" rackmount chassis (external solution) or as a single-slot PCI card* (internal solution).

*available 2003

Features

- 19" rack-mount chassis
- Single-slot PCI
- 4 GB/hour recording
- Local or network storage

Radar Scan Converter
Extension Board
Video Mixing Board
RGB Recorder

RGB VIDEO 1280 X 1024 → SCALER → ENCODER → STORAGE

RGB VIDEO 1280 X 1024 → SCALER → DECODER → STORAGE

Enclosure is representation of final product only

Avionics

Command & Control

Vetronics

Air & Vessel Traffic Control

Medical Imaging

BarcoView

BarcoView is a recognized international technology leader providing high-performance display systems and graphics controllers for demanding niche markets such as Avionics, Command & Control, Vetronics, Air and Vessel Traffic Control and Medical Imaging.

A continued, focused investment in research and development has given the company a unique expertise in providing high-performance, state-of-the-art display systems. Its facilities, located in Kortrijk, Belgium; Toulouse, France; Atlanta, Georgia; and Portland, Oregon, USA; are fully equipped for in-house design, development, testing and manufacturing. AQAP-110 and ISO 9001 certifications, complete control of the production process, extensive environmental testing programs, worldwide customer support and project-specific customization, confirm Barco's commitment to technologically advanced, cost-competitive solutions.

BarcoView is one of the three strategic activities of the Barco Group, active in Image Processing. In 2001, the group delivered a turnover of 792 million EUR. Barco has a network of subsidiaries, distributors and agents in 97 countries throughout the world. The company has been quoted on the Brussels Stock Exchange since 1986, and is now quoted on Brussels/Euronext. Barco is a BEL 20 and Next 150 company and is a member of the Dow Jones Sustainability Indexes.

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