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Venus2001

modular universal routing switcher



The Venus 2001 routing switcher is a robust technological marvel that seamlessly merges high performance, rock-solid reliability, and unstoppable flexibility into a compact package. It can easily handle any signal format you throw at it — high definition, standard definition and analog video, AES and analog audio, and even time code and data. The SD/HD Venus router is bit rate independent from 3 Mb/s to 1.5 Gb/s — and it's expandable up to matrix sizes of 1024x1024 and beyond, so it'll grow as you do.

- *Completely modular, universal boards handle both SD and HD*
- *Expandable matrix sizes, from 32x32 to 1024 x 1024 and beyond*
- *Complete flexibility, in planning for future expansion*
- *Fully automatic adaptive input equalization, for up to 100 meters of standard coax at HD rates*

Engineers today are facing an unprecedented challenge. How to take all the new digital signal formats, mix in the existing standard formats, meet the ever increasing demand for more and more I/Os, and make it all work together? The Venus 2001 Modular Universal Routing Switcher is the answer.

The Venus 2001 has drawn on over 25 years of experience in developing and manufacturing broadcast-quality routing systems. Venus 2001 offers an unmatched combination of versatility and performance that makes it the best choice for any signal routing application. It is designed with a totally modular building-block approach that allows matrices of any size in any signal format to be combined into a single integrated system.

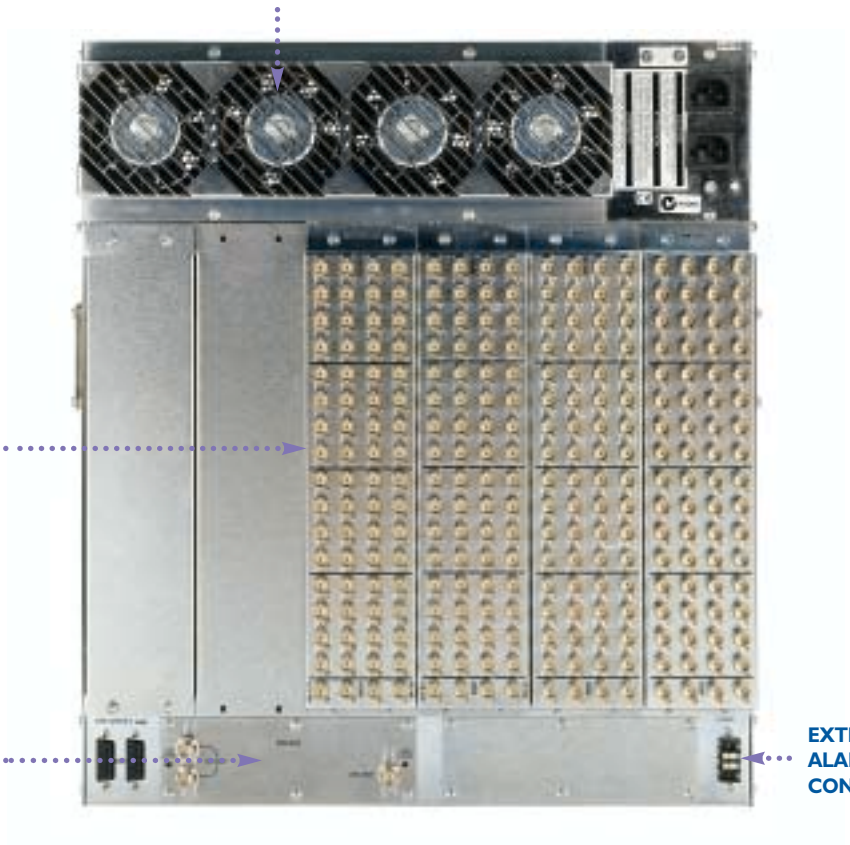
In large systems, the Venus double density architecture provides a distinct advantage in reducing the physical space requirements. This advantage extends across all matrix types, both in single-format and in mixed-format systems. As an example, a digital video system of up to 320 inputs by 256 outputs can be built in just one standard equipment rack—without distribution amplifiers or combiners.

Venus2001
modular universal router

The Venus 2001 is a completely modular routing switcher that uses plug-in matrix cards and options to create the exact system you need. The Venus 2001 chassis is only 11 RUs high and accepts any Venus matrix card you choose. You can select all the same type or mix types to maximize space efficiency.

Each Venus 2001 chassis holds up to 24 matrix modules, one or two universal power supplies, two accessory modules, and all associated connectors. Multiple Venus 2001 routers can be tied together to increase the number of outputs creating any size or type of routing switcher up to 1024 x1024 and beyond.





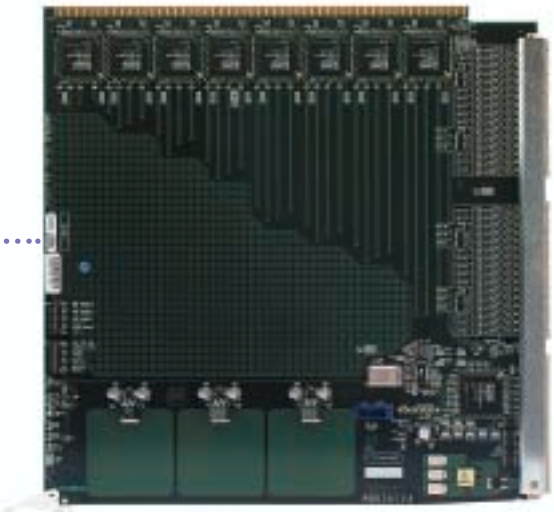


HO-411 UNIVERSAL OUTPUT CARD
SD/HD DIGITAL VIDEO

MIX AND MATCH YOUR CHOICE OF MATRIX MODULES



HS-400 UNIVERSAL MATRIX CARD
SD/HD DIGITAL VIDEO



EO-421 BASIC AES OUTPUT CARD 75 OHM
EO-422 BASIC AES OUTPUT CARD 110 OHM



EO-431 DELUXE AES OUTPUT CARD WITH V-FADE 75 OHM
EO-432 DELUXE AES OUTPUT CARD WITH V-FADE 110 OHM



ES-401 AES MATRIX CARD

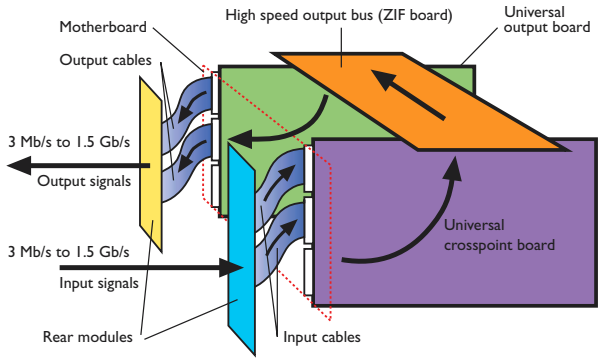
Other matrix boards available:
Analog video module
Analog audio module
Machine control data module

Venus Technology & Expansion

Modular Expandability with COBRA

The Venus 2001 is based the high-speed COBRA System; the architecture that is the foundation of every Venus Routing Switcher frame ever built. The COBRA system allows current and future Venus owners to mix-and-match signal types within a single frame—analog video, digital video, high definition video, analog audio, digital audio and machine control data. All without sacrificing crosspoints.

The COBRA system is built around the Zero-Insertion-Force (ZIF) connector system that has been successfully used in the Venus routing switcher frame since its introduction in 1992. The ZIF connectors used in the Venus are self-cleaning and top-mounted (top-plane) to prevent debris from accumulating in the connector.

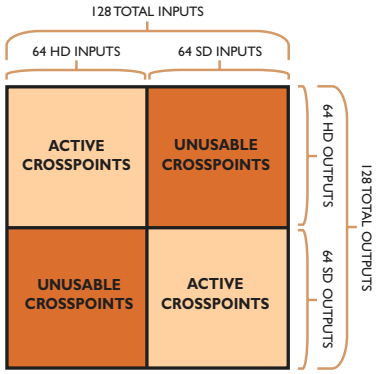


Venus 2001 with Crosspoint Output Bus Router Architecture (COBRA)

COBRA Is The Key

COBRA is the key to the most flexible and expandable router available today. For example, four Venus 2001 frames can be installed in a single 45 RU rack, allowing up to 96 matrix modules with superb ventilation in a single equipment rack.

In the COBRA system, one end of the interconnection bus is terminated at the matrix end of the ZIF board. The other end of the bus is terminated in the output board. The matrix boards feed the bus through isolation networks that isolate the ZIF connectors and matrix boards from the bus. This isolation prevents the ZIF connectors and matrix boards from causing impedance discontinuities on the interconnection bus, thus eliminating reflections caused by the matrix board connections.

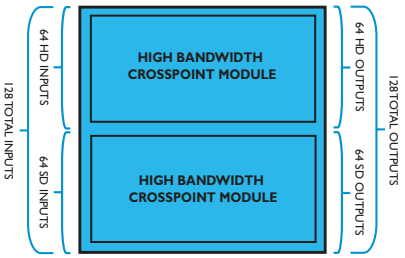


An inefficient routing scheme generally waste valuable crosspoints.

COBRA provides a seamless approach to mixing signal formats within the same frame. Providing separate matrices for SD and HD eliminates unusable crosspoints that befall a single matrix design. Consider where a 128 x 128 matrix is built with half of the inputs and outputs set up for SD and half for HD.

No Wasted Crosspoints

The matrix architecture of this type of design wastes half of all the crosspoints. Although this is an extreme example, it is unavoidable that there will always be some wasted crosspoints in this type of system, crosspoints that you paid for but cannot use.



Nothing is wasted with COBRA technology

The Venus 2001 approach allows you to expand your HD router capacity, as you need to. For example, a 64 x 64 HD router that is pre-wired for 128 x 128 allows you to expand on demand. This is especially important as a facility migrates from SD to HD signals in small blocks.

Transparency is another benefit of the Venus routing switcher HD modules. You never have to buy a new frame to upgrade or expand to HD. The same HD I/Os can be used for standard definition and high definition signals. This cost effectiveness is vital when replacing or adding routers. Nothing compares to the expansion capabilities of the Venus 2001 routing switcher system with the high-speed COBRA system.



Venus 2001 Expanded Features

The Venus 2001 routing switcher comes with expanded features that give extra functionality. These features provide unique advances in router technology.

Independent Internal Sync

With four independent internal sync reference lines available, you can set up your analog or digital system with separate reference signals for different production areas, operating with different signal formats, in any combination you need. This feature provides a significant advantage in designing a complex signal distribution system where system timing can be a major bottleneck.

Transparent Hardware Design

The Venus 2001 digital video hardware is designed to be fully transparent to any data rate. There are no re-clocking (optional) or other data-rate-dependent circuits in the matrix, which means that the same physical matrix can be used for any existing digital video data format, as well as for telecom data rates such as DS-3 and OC-3. This flexibility allows the switcher to serve for routing signals to and from external transport lines, as well as routing the normal SDV signals within the facility. This feature is extended by the availability of line-interface modules that provide full telecom network management capabilities, as well as such additional advanced features as fiber-optic conversion for connection to the telecom network or for private connection within the facility.

Line-Sensing Redundant Power Supplies

Each Venus 2001 chassis can be fitted with two line-sensing power supplies, for redundant protection with automatic changeover. The supplies automatically compensate for power line variations from 86 to 130 volts or from 206 to 250 volts. The loss of any supply voltage on any card lights a red LED on that card and also switches the power supply master alarm LED from green to red (this LED is visible on the swing-open front panel). The same warning is given if any of the four cooling fans stops rotating. Any of these alarm conditions will also activate a contact closure on a rear panel barrier strip that can be used to trigger an external alarm system.



Energy Efficient Design

The system's signal-handling circuitry is designed for minimum power consumption, even to the point of powering-down unused matrix sections to reduce the quiescent current consumed by the amplifier circuitry. This attention to power has two objectives—to reduce the operating cost of the system by minimizing overall power consumption, and more importantly, to reduce the amount of heat developed on the circuit boards to enhance the long-term reliability of the components.

Connection to Jupiter for Powerful Control Features

Venus 2001 switchers are controlled by connection to the Jupiter Control Systems. Jupiter offers a wide range of control panels and external control interface options as well as the flexibility to provide machine control, automation, and master control operation in one integrated network. Venus also supports deterministic switching with Jupiter's AccuSwitch option.

Venus Chassis Configuration

The basic Venus 2001 chassis can be set up to handle up to 6 blocks of 32 outputs each. Using more than one chassis can increase the number of outputs. When multiple chassis are used, all input signals are bussed from the input chassis to the expansion frames by means of multiple-conductor cable assemblies that are totally enclosed within the frames, eliminating external jumpers or looping cables.

Venus 2001 routing switchers employ a common card cage and power supply system. This commonality allows matrix blocks of all types to be mounted in a shared card cage, further enhancing the system's space-saving layout and keeping system costs to a minimum.

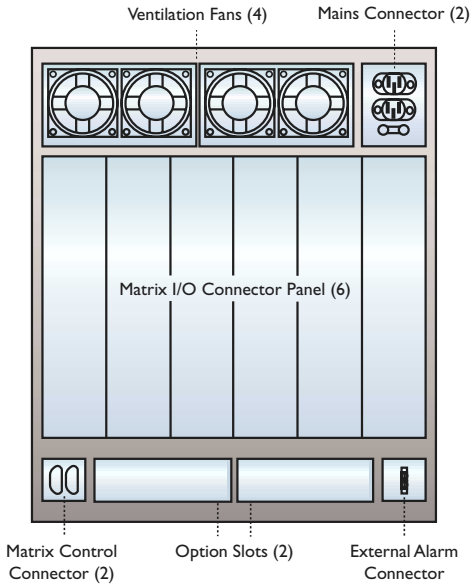
The Venus chassis is a 19.25-inch (11 RU) rack-mount package that can house one or two power supplies, 24 Venus matrix modules, associated cabling and panels, and up to two optional accessory modules.

The chassis includes two pairs of cooling fans mounted on removable carrier plates for convenient servicing. These fans draw air through a controlled ventilation system that ensures proper cooling regardless of the type, number, or pattern of cards installed in the chassis.

The Venus power supply is a high-capacity supply that provides DC voltages to the system modules. This supply features a sophisticated line-sensing system that automatically adjusts for variations in the AC line voltage level, eliminating the need to configure the unit for various line voltage standards.

One Venus power supply will support an entire card cage full of matrix modules. A second supply can be installed for redundancy. Both supplies are wired directly to each card position.

The alarm system monitors each of the power supply outputs and the cooling fan operation. A fault at any of these points causes the power supply's front panel indicator to light and closes a contact on the chassis' alarm connector for use with an external alarm system.



Chassis Specifications

- Total number of matrix modules per chassis: 24
- I/O connector panels: 6
- Optional accessory modules: 2
- Ventilation fans: 4
- Built in matrix control connectors: 2
- External alarm connector: 1
- Power supply type: automatic (line & load comp.)
- Approvals: meets UL and IEC specifications
- Input range: 90-130 V, 50/60 Hz, and 200-250 Hz, 50/60 Hz (automatic range selection)
- Consumption: 1110 VA maximum (typical: 300-500 VA depending on configuration)
- Redundancy: optional second supply provides full redundancy
- Alarms: internal alarm for all power supply output lines and fan operation alarm. Contact closure follows alarm for external connection.
- Chassis dimensions: 11 RUs, 19.25 in. H (489mm), 19 in. W (483mm) 23 in. D (580mm)

Analog Video Matrix Module

The Venus analog video routing switcher was designed to combine true broadcast-quality performance with a flexible packaging arrangement that is able to address a wide range of video switching applications. The Venus video switcher is equally well suited for small component switchers and for extremely large signal distribution plants.

The video crosspoint modules carry 16 video input amplifiers, a 16 x 32-crosspoint array, and 32 buffer amplifiers that carry the selected signals onto the switcher's internal bus structure.

The video configuration boards connect the crosspoint cards and output cards together into a matrix block. There are a number of configuration boards available to facilitate the building of various sizes of switchers, from 32 x 32 to 352 x 128 and beyond.

The video output cards provide 16 video output amplifiers that drive the switcher's outputs. The output card also carries a 16 x 1 switcher that selects one of the output lines onto the output monitoring bus, providing a convenient means to observe the condition of all of the outputs from a single feed.

Video system connections are made at the video rear panel, a modular connector assembly that holds 64 BNC connectors. Cabling between the panel and the matrix and within the matrix is handled by connectorized coax kits that carry eight lines in a single assembly.



Specifications

General

- Matrix card: 16 inputs x 32 outputs
- Output card:16 outputs with on-board monitor bus
- Video connectors: BNC

Video inputs

- Level: 1 V p-p 75 Ω CCVS
- Return loss: >40 dB at 4.43 MHz
- Coupling: DC-coupled
- Clamping: none
- Equalization: none

Video outputs

- Number: one per output bus (second output optional)
- Level: 1 V p-p 75 Ω CCVS
- Return loss: >40 dB @ 4.43 MHz
- Coupling: DC-coupled
- Equalization: none

Performance characteristics

- Frequency response: ±0.1 dB, DC to 10 MHz any crosspoint condition +0.5/–1 dB, 10-30 MHz any crosspoint condition
- –3 dB point: > 50 MHz
- Minimum rise/fall time: < 7.5 nsec for .714 V p-p
- Gain uniformity: input-to-input: ±0.1 dB output-to-output: unity
- Differential gain: <–0.1% @ 1V lum., .286 V sc (typical: <0.03%)
- Differential phase: <–0.1° @ 1V lum., .286 V sc (typical: < 0.04°)
- Crosstalk: < –60 dB DC to 4.43 MHz most hostile condition (typical: > –65 dB) < -40 dB at 30 MHz, most hostile condition (typical: > -45 dB)
- Hum and noise: < –70 dB unweighted with 10 MHz bandwidth
- Delay scatter: ±1°, any input to any one output

These specifications are applicable for all matrix sizes from 32 x 32 to 352 x 128.

Digital Video Matrix Module

The Venus serial digital video routing switcher employs a unique design approach to achieve completely standards–independent operation for handling signals of any data rate up to 400 Mb/sec. Precision equalizer circuits automatically restore losses at the inputs from up to 500 ft (150 m) of cable while preserving data transition timing stability.

The SDV crosspoint modules carry 16 input equalizers, a 16 x 32 VLSI crosspoint array, and 32 buffer amplifiers that carry the selected signals onto the switcher's internal bus structure.

The SDV configuration boards connect the crosspoint cards and output cards together into a matrix block. There are a number of configuration boards available to facilitate the building of various sizes of switchers, from 32 x 32 to 160 x 256 or larger.

The SDV output cards provide 16 output drivers that feed the switcher's outputs. The output card also carries a 16 x 1 switcher that selects one of the output lines onto the output monitoring bus, providing a convenient means to observe the condition of all of the outputs from a single feed.

Digital video connections are made at the video rear panel, a modular connector assembly that holds 64 BNC connectors. A unique passive splitter system divides the input signal into isolated feeds for each crosspoint board, preserving the input return–loss characteristics while avoiding the failure–mode problems that are introduced by active input distribution schemes.



Specifications

General

- Matrix card: 16 inputs x 32 outputs
- Output card: 16 outputs with on-board monitor bus
- Crosspoint type: 16 x 16 integrated circuit switch array
- Video connectors: BNC

Video inputs

- Level: 800 mV p-p ± 10% 75 Ω terminating
- Return loss: >15 dB at 360 MHz

Video outputs

- Level: 800 mV p-p ± 10% 75 Ω
- Return loss: >15 dB at 360 MHz

Performance characteristics

- Maximum data rate: 405 Mb/s
- Signal standards:
  - Serial D1 video (525/60 or 625/50)
  - Serial D2 video (525/60 or 625/50)
  - Serial EDTV video (16:9 aspect ratio, 525/60 or 625/50)
- Equalization: automatic up to 500 feet (150 m) of type 8281 or equivalent coaxial cable
- Data regeneration: proprietary edge detector
- Data reclocking: optional
- Output jitter: < 500 ps p-p, < 50 ps RMS

These specifications are applicable for all matrix sizes from 32 x 32 to 160 x 256.

SD/HD Digital Video Matrix Module

The Venus SD/HD routing switcher is a revolutionary approach to signal distribution. It uses a modular design to provide complete system flexibility with sizes ranging from 32 x 32 up to 1024 x 1024 and beyond. It handles digital video signals at any bit rate from 3 Mb/s to 1.5 Gb/s covering all currently defined digital television standards.

With this wide signal range, the Venus SD/HD router is ideal for HDTV production islands and for general purpose routing where a variety of signal formats is required.

If you are concerned about future upgradeability, the Venus SD/HD router can be configured for SDV-only use and upgraded to HD later by simply changing the rear panels. The SDV-only configuration supports bit rates from 3 Mb/s to 540 Mb/s with equalization to 300 meters of Belden type 8281 coax.

With high definition rear panels you can use this router for both high definition and standard definition applications simultaneously. In the high definition configuration it supports bit rates from 3 Mb/s to 1.5 Gb/s with automatic adaptive equalization on each input to 100 meters of Belden type 1694A coax. Bit rate independence allows you to mix both SD and HD signals in the same matrix without having to create special configurations. This is achieved by cleanly routing the SD/HD signals through the switcher without reclocking. Reclocking is optional at 1.5 Gb/s and is switched on or off via a dip switch on the input/matrix board. Venus handles HD signals so well that it can consistently pass pathological signals at 1.5 Gb/s through the router over 32 times without bit errors. This is exceptional performance at these high bit rates. Dual outputs are standard to provide two isolated copies of each output bus for increased flexibility in system design.

Specifications

General

- Matrix card: 32 inputs x 32 outputs
- Output card: 32 outputs with individual selection of reclocking for 1.5 Gb/s or non-reclocking for all data rates.
- Crosspoint type: 32 x 32 integrated circuit switch array
- Video connectors: 75 Ω BNC
- Mechanical: Fits within the standard Venus rack frame using new matrix, output, equalizer, cable driver, and ZIF boards.
- Power requirements: Uses power from the PS-400 power supplies to generate the voltages used on the modules. Power consumption depends upon the system configuration.
- Dual outputs standard (inverting)

Video inputs

- Level: 800 mV p-p ± 10% 75 Ω terminating
- Return loss:
  >=15 dB from 5 MHz to 1.5 GHz for HE 416
  >=15 dB from 5 MHz to 540 MHz for SE 416
- Input rear panels: 32- or 64-input versions available

Video outputs

- Level: 800 mV p-p ± 10% 75 Ω
- Return loss: >=15 dB from 5 MHz to 1.5 GHz

Performance characteristics

- Maximum data rate: 1.5 Gb/s
- Signal standards:
  SMPTE 292M
  SMPTE 259M
  (output rise and fall times correspond to SMPTE 292M)
- Equalization:
  - Automatic up to 100 meters of Belden 1694A or equivalent coaxial cable for HE 416 HD SDI equalizer.
  - Automatic up to 300 meters of Belden 8281 or equivalent coaxial cable for SE 416 SDI equalizer at 270 Mb/s, reducing to 150 meters at 540 Mb/s
- Data reclocking: (HO-411 output board) switch selectable on an output-by-output basis. Reclocking is functional only for 1.5 Gb/s HD-SDI signals. Other data rates and signals require reclocking to be switched off.
- Output jitter:
  - Reclocked: <= 135 ps p-p for SMPTE 292M signals
  - Non-reclocked: <= 200 ps p-p added to input jitter

These specifications are applicable for all matrix sizes from 32 x 32 to 320 x 256

AES Audio Matrix Module

DESIGNED FOR Dolby E

The Venus 2001 AES synchronous/asynchronous digital audio router provides both automatic operation and advanced signal manipulation functions. Synchronous inputs are automatically timed to the reference signal, while simultaneously asynchronous inputs are passed through the router undisturbed. Sync detectors used on the inputs retransmit the asynchronous signals using clocks derived from the incoming signal. This unique feature introduces unsurpassed flexibility and audio routing while eliminating many potential pitfalls of conventional synchronous routers, by allowing the routing of *free running* asynchronous sources or audio data at different data rates within the same infrastructure.

Audio manipulation functions such as channel swap, mix, and shuffle within an AES pair or multiple pairs give this switcher the ability to perform a wide variety of operations on the digital audio signal that are common in the analog audio environment but have previously not been possible when working with digital audio signals. The Venus Digital Audio Switcher also offers a soft transition-operating mode, which completely removes all switching noise, regardless of the relative signal levels of the two AES/EBU streams being switched

The Venus 2001 AES audio output cards now offer a denser package of 32 outputs per board, along with buffering and re-encoding of the signals. In the Venus 2001 audio router, AES signals arrive and leave the router as AES pairs but are handled internally as individual mono signals. This advanced internal architecture provides the kind of flexibility that will be required in new state of the art installations. Three different crosspoint mappings allow the following modes of operation under Jupiter control.

(1) Single level stereo: all routing is done as pairs.

(2) Two-level stereo: this feature brings to the digital domain the flexibility offered by traditional analog routers, i.e., the ability to separate the left and right channels within the each AES bit stream and to swap and mix any right channel with any left channel.

(3) Single level mono: each individual channel signal is separately routed; the outputs are reassembled into a two-channel AES bit stream which allows full shuffle of signals.

The AES basic output card provides a significant decrease in transition noise. As an option, the user can choose the deluxe output card that offers a soft transition of the output signal to virtually eliminate the clicks and pops normally associated with audio switching; is much like a V-fade transition used in the master control switchers. This feature enables the customers to perform high-quality on-air switching without the need for additional complex and expensive audio processing.

Note, however, that audio modes return to normal when the output is switched. Audio modes are output oriented but the user can do a breakaway switch into 2 x 1. The right channel must be synchronous with a left or the right will be muted

Components

ES-401 Matrix Card

- Incoming signals are disassembled into individual channels.
- Sync detectors at each input determine lock to reference and pass clocks accordingly.
- If the signal is synchronous with the reference, it is re-phased to align the sample boundaries with those of the reference signal.
- If the signal is asynchronous with the reference, it is passed as is with no re-phasing.

ES-421/422 Basic Output Card

- Provides basic buffering and re-coding to AES pairs for 32 outputs
- Provides re-coding to AES pairs and stereo manipulation functions swap, mix, left only, right only

EO-431/432 Deluxe Output Card

- Provides the same basic functions as the EO-421
- On-board hardware provides soft V-fade at switch point for truly clickless switching of synchronous signals

Performance characteristics

Inputs:

Input connectors: 75 Ω BNC or 110 Ω 25-pin D connector
Input impedance: 75 or 110 Ω
Voltage level: 1 to 7 volts peak to peak
Input sample rate: 30 to100 kHz
Input sync detection: input sync detectors compare incoming signals to reference sample rate clocks and determine lock.

Outputs:

Output connector: 75 Ω BNC or 110 Ω 25-pin D connector
Output in pigments: 75 or 110 Ω
Voltage level: 1-volt peak-to-peak
Output sample rate: 32 to 100 kHz

Reference signals: (required for sync operation) 48 kHz AES, NTSC or PAL video.

Analog Audio Matrix Module

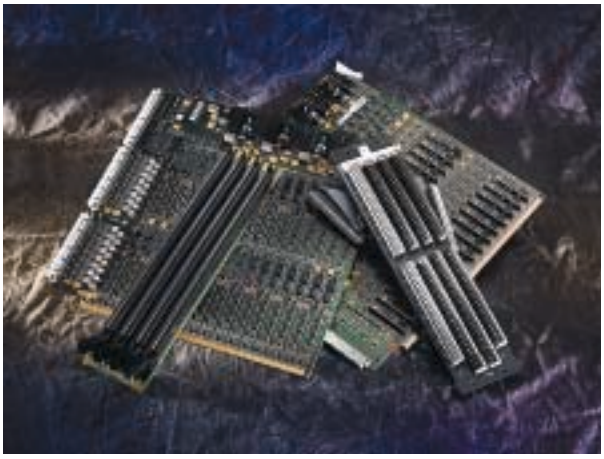
The Venus dual analog audio routing switcher combines two independent high-performance audio channels onto a single set of modules, providing a significant savings in rack space and allowing the switcher to offer stereo manipulation functions that greatly enhance the system.

The audio crosspoint modules carry 16 pairs of input amplifiers, dual 16 x 32 crosspoint arrays, and two sets of 32 buffer amplifiers that carry the selected signals onto the switcher's internal bus structure.

The audio configuration boards connect the crosspoint cards and output cards together into a matrix block. There are a number of configuration boards available to facilitate the building of various sizes of switchers, from 32 x 32 to 352 x 128 and beyond.

The audio output cards provide 16 pairs of output amplifiers that drive the switcher's outputs. The output card also carries a dual 16 x 1 switcher that selects one of the output pairs onto the output monitoring bus. Each of the output lines has a mix/swap circuit which allows the output to work in one of five modes: normal, swap (left-to-right and right-to-left), mix (left plus right to both channels), and forced mono where either the left or right signal is fed to both channels.

Stereo mode selection is made from a standard control panel. System connections are made at the audio rear panel, a modular connector assembly that holds 64 3-pole terminal block connectors. Ribbon wire assemblies that carry 16 lines handle internal cabling between the panel and the matrix and between the matrix blocks



Specifications

General

- Matrix card: 16 inputs x 32 outputs for each channel
- Output card: 16 output pairs with on-board monitor bus for each channel
- Crosspoint type: CMOS integrated circuit
- Audio connectors: direct compression screw terminals (removable)

Audio inputs

- Type: balanced
- Max level: +28 dBu
- Input impedance: 40 kΩ per matrix block

Audio outputs

- Type: balanced
- Maximum level: +28 dBu
- Output impedance: 66 Ω
- Minimum load impedance: 600 Ω (150 Ω with optional AO-430 output card).
- Maximum cable length: 300 ft. (100m) of type 8451 cable or 3000 ft. (1000m) with optional AO-430 output card.
- Gain adjustment: 1.5 dB (to compensate for 600 Ω loads)

Performance characteristics

- Frequency response: ±0.1 dB, 20 Hz to 20 kHz, referenced to 1 kHz n –3dB point: > 150 kHz
- Crosstalk: < –90 dB 20 Hz to 20 kHz (most hostile condition); < –100 dB on adjacent paths
- Noise floor: < –85 dBu, 20 Hz to 20kHz (typ: –90 dB)
- THD: < –.01% @ +24 dBu with 20 Hz to 20 kHz bandwidth (typical: < .005% @ +24 dBu); (typical: < .001% @ +4 dBu)
- IMD (SMPTE): < .01 @ +24 dBu (typical: < .0025% @ +24 dBu)
- Dynamic range: 117 dB with reference of +28dB maximum level
- Common mode rejection: 90dB @ 50 to 60 Hz

RS-422 Data Matrix Module

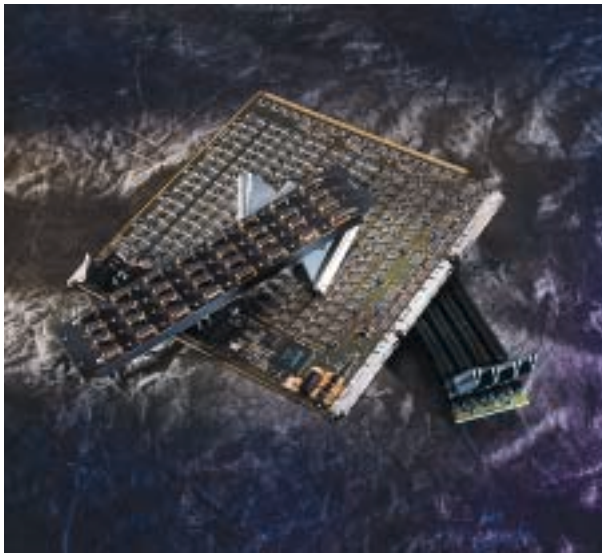
The Venus RS-422 data routing switcher provides a convenient means to route serial data lines, either as a stand-alone unit or in conjunction with other signal distribution.

While the primary use for this system is in the routing of serial machine-control signals, it is equally useful for general purpose data routing in a wide variety of applications. The data matrix modules serve 16 data ports, buffering the incoming data from each port and connecting it to the internal data bus that can handle up to 192 lines.

When used in a machine control application, the Venus data routing switcher offers a built-in capability to correctly configure the control direction of each port to the flow of commands and status messages from the controller to the controlled device. This capability is extremely useful in handling machines that can be both controller and controlled devices, allowing a single matrix port to handle the machine in both modes of operation.

The data configuration board carries the internal bus, connecting it to the matrix cards. There are two sizes of this board, the smaller carries 64 lines, the larger up to 192.

The data matrix module carries a 192 x 1 switch array for each of the 16 ports it serves. This switch bus selects the data line to be sent to the outgoing pins of the port. Data system connections are made at the data rear panel, a modular connector assembly that holds 32 subminiature D-connectors. Ribbon wire assemblies handle cabling between the panel and the matrix and within the matrix.



Specifications

General

- Matrix card: 16 bi-directional data ports
- Crosspoint type: CMOS integrated circuit switch
- Data connector: 9-pin sub-miniature D-connector

Data I/O ports

- Signal standards: RS-422 or RS-485
- Number of ports: 16 to 192, in increments of 16

Performance characteristics

- Maximum data rate: 1 Mb/s

These specifications are applicable for all matrix sizes from 16 to 192 ports.



All Venus matrix boards plug into the same chassis, so you are assured of optimal flexibility and expandability.

Options & Accessories

Venus Options

The option module slots at the bottom of the Venus 2001 chassis' rear panel are provided to house any combination of the following matrix accessory modules:

MS-400B Multi-Standard Sync Reference Module

The MS-400B contains two fully independent sync separator circuits that can derive vertical interval trigger (VIT) signals from any television sync standard for use in timing the switch transitions of Venus video (analog or digital) switching systems. Each Venus chassis has four independent sync lines that can accept VIT signals from the MS-400B—permitting different portions of a matrix to be referenced to different timing systems. DIP switches are provided for each section to select the signal standard and to adjust the precise timing of the trigger signal within the vertical interval.

Monitor Output Combiner Modules:

Monitor output combiners accept the output monitor feeds from up to eight matrix blocks and combine them under control of the matrix control system into a single integrated feed that has access to all of the outputs in the matrix, regardless of size and include the following:

- VM-400 for analog video
- DC-400 for serial digital video
- EM-400/420 for AES/EBU digital audio

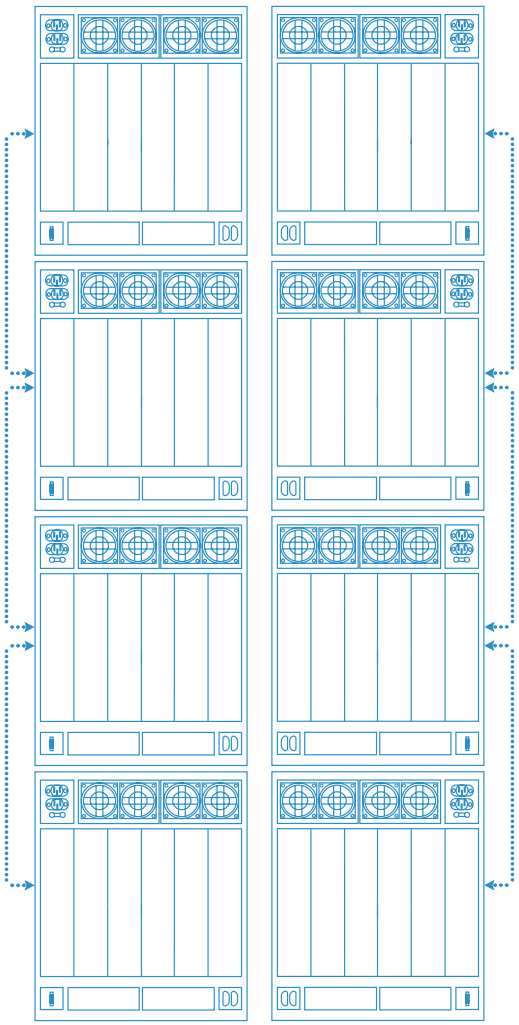
Large-matrix capabilities

When the number of inputs in a matrix requirement exceed the physical limit of 352 inputs per Venus 2001 chassis, there are two options for extending the size of the Venus 2001 system. The first is a two-stage approach which uses a combiner stage to couple two physical switchers into a single set of outputs, and the second is our unique three-stage architecture that allows you to build very large switchers in a very economical package.

Two stage switchers are generally used two build systems from 352 to 512 inputs. These systems are based on the Venus matrix combiner boards, a family of 2 x 1-switch modules that automatically select the correct bank of a multipart matrix to connect the desired input to a particular output. The Venus 2001 matrix combiners also offer an auto-switch capability based on signal presence detectors built in to each input which allow them to be used as protection switches in systems where path redundancy is required.

To build very large systems (over 512 x 512) we can change over from the square matrix approach (where there is a dedicated physical path through one or two crosspoints) to a three-stage architecture, which uses an array of highly interconnected smaller Venus matrices to provide a large number of possible paths through the system.

This architecture provides a very cost-effective way to build fully non-blocking switching systems up to 1024 x 1024 and beyond for a fraction of the price of a square matrix.



Compact Venus Modular Router

The Compact Venus package was developed to provide a way to use the Venus system building blocks in situations where a full-size 11 RU chassis is not practical. Its frame, a mere 5.25 inches (3 RU) in height, can hold four Venus cards of any type, a standard Venus rear panel assembly, two optional accessory modules, and dual power supplies.

The Compact Venus chassis holds 32 x 32 matrix modules of any type. The Compact Venus uses exactly the same modules as the standard Venus frame, mounting a four-card matrix block horizontally instead of the vertical mounting used in the standard Venus frame. A standard 4-slot configuration board is used to connect the cards together, and standard rear panel and cabling assemblies are used to complete the system.

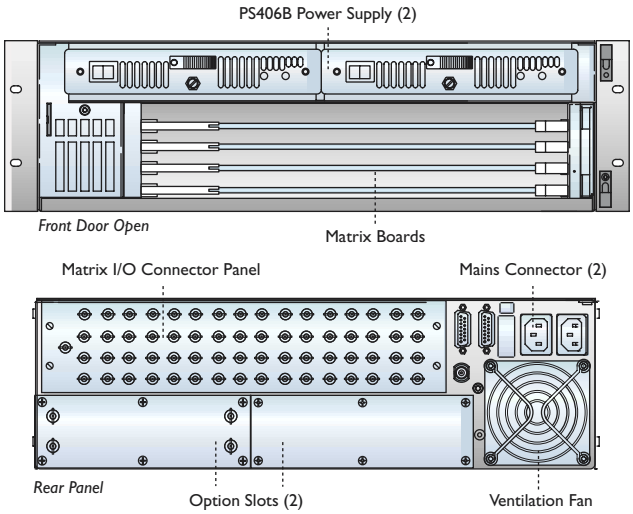
It has dual redundant power supplies as standard equipment. The supplies are mounted in a pullout drawer and are fitted with the same alarm system as is used in the standard Venus chassis. The power supplies are full capacity independent supplies that are individually removable. The two supplies are connected to an alarm system that functions in the same way as the standard Venus system.

The ventilation system in the Compact Venus chassis employs a single fan at the rear of the unit that draws air across the matrix boards and through the power supply chamber, exhausting it to the rear. This system ensures adequate cooling for all Compact Venus configurations.

The following Compact Venus models are available:

- 32 x 32 serial digital video
- 32 x 32 analog video
- 32 x 32 AES/EBU digital audio (110 and 75 Ω)
- 32 x 32 analog audio (mono)
- 16 x 16 analog audio (stereo)
- 32-port RS-232/422 serial data matrix
- 16 x 16 analog video
- 16 x 16 serial digital video





Compact Chassis Specifications

- Total number of matrix modules per chassis: 4
- Optional accessory modules: 2
- Ventilation fans: 1
- Built in matrix control connectors: 1
- External alarm connectors: 1
- Power supply type: automatic (line and load comp.)
- Approvals: meets UL and IEC specifications
- Input range: 100-130 V, 50/60 Hz, and 200-250 Hz, 50/60 Hz (automatic range selection)
- Consumption: 175 VA maximum (typical: 75-125 VA depending on configuration)
- Redundancy: second supply provides full redundancy
- Alarms: internal alarm for all power supply output lines and fan operation alarm. Contact closure follows alarm for external connection.
- Chassis dimensions: 3 RUs, 5.25 in. H (133mm) x 19 in. W (483mm) x 23 in. (580mm)

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