

Concerto

Multi- & Mixed-Format Routing Switcher



The Concerto routing switcher is ideal for everything from mobile units to broadcast or post-production facilities — as well as telco or cable head ends.

Combining multiformat video and audio support with a scalable, efficient and highly reliable design, the Concerto routing switcher from Grass Valley, a Belden Brand, is an ideal choice for everything from mobile trucks and OB vans to broadcast or post-production facilities. Its optional 48 VDC power supply also makes it a perfect fit in telco or cable head-end facilities.

The Concerto supports mixed-signal formats, including analog audio and video, as well as SD and 3G/HD/SD digital video, AES/EBU digital audio, timecode and RS-422 data for machine control—all within a single chassis. It offers a variety of rear panel connectors. It even supports the routing of digital audio and analog audio on the same level.

The Concerto routing switcher scales to 128x128 configurations and support three chassis: a 7 RU chassis that can handle up to 4 levels of 32x32, one level of 128x128, or any combination in between; a 4 RU chassis that supports either two levels of 32x32 or one level of 64x64; and an 8 RU chassis that that supports all signal types up to 128x128 and can be used for hosting up to four Maestro master-control engines. All Concerto boards are compatible with any of these chassis. Optional time division multiplexing (TDM) backbone supports audio routing configurations up to 256x256 using the two 7 or 8 RU chassis.

Unlike most routing switchers that require dedicated input, output and crosspoint boards for new configurations and expansion, it takes just one board to add 32x32 crosspoints of video, audio and/or data — in any combination — to an existing Concerto chassis. It takes only four boards to configure up to a 128x128 matrix.

For high reliability, the Concerto routing switcher features low power consumption, a minimal component count and a design that maximizes cooling. For easy serviceability, its active components are front-removable and hot swappable for safe, on-air maintenance.

The Concerto is supported by all Grass Valley control solutions and can be equipped with Maestro master control engines. It also supports the Grass Valley NetCentral status and monitoring application.

Multiformat Flexibility by Design

The Concerto routing switcher supports multiple mixed signal types in the same chassis, including analog audio and video; SD and 3G/HD/SD digital video; AES/EBU digital audio; timecode; and RS-422 data for machine control.

The slots in the Concerto chassis are not format sensitive and you can easily remove and reconfigure its rear panels. This design makes the system easy to expand or modify. It also provides tremendous flexibility when laying out a multiformat system. It's just as easy, for example, for the 7 RU chassis to house a 128x128 serial digital video level as two 64x64 levels for serial digital video and AES/EBU audio respectively, or as four 32x32 levels each handling its own format.

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KEY FEATURES

- Three chassis choices:
 - 8 RU for 128x128 signal routing and Maestro master control
 - 7 RU for 128x128 signal routing
 - 4 RU for 64x64 signal routing
- Supports mixing and matching different signal types in the same frame:
 - Analog audio and video
 - SD and 3G/HD/SD digital video
 - AES/EBU digital audio
 - Timecode
 - Data (RS-422)
- Single-board linear expansion in 32x32 increments up to 128x128
- Optional TDM backbone for linear expansion of audio routing to 256x256
- Integrated A/D and D/A conversion for audio with selectable processing for mono normal, mix, reverse and dual left/right
- Supported by all Grass Valley control solutions
- Front-accessible boards, power supplies and fans for quick hot-swappable service and expansion
- Sophisticated output monitoring outputs for quality control and signal integrity analysis
- Supports NetCentral for SNMP-based monitoring

As one would expect from a true multiformat solution, the Concerto routing switcher provides two independent internal sync reference inputs for video; this approach eliminates the need for multiple chassis in multistandard facilities. For example, PAL or NTSC sync can be assigned to individual, user-selectable outputs.

The unique I/O architecture of the routing switcher makes it the perfect tool for bridging analog and digital environments; one frame accommodates analog and digital video and audio signals simultaneously.

As an added bonus, the analog audio boards of the Concerto include built-in A/D and D/A converters for routing signals between analog and digital environments. For facilities transitioning from analog to digital, this capability is significant because it simplifies wiring and eliminates the need for additional audio-conversion equipment.

Linear Scalability Makes for Easy Upgrades

The Concerto routing switcher features a linearly scalable design to make future growth easy and cost-effective. Unlike most systems that require dedicated input, output and crosspoint boards for expansion, it takes only a single board to change a 32x32 router to a 64x64 configuration and only four boards to configure a full 128x128 routing switcher. Concerto offers separate rear-panel modules with no active components that can be installed and pre-wired in preparation for future expansion. Choose the amount of expansion needed and only pay for that amount.

What's more, the Concerto routing switcher supports expansion to 256x256 configurations for analog and digital audio via optional TDM expansion boards. This straightforward, industry-standard technique simplifies cabling between frames and eliminates the need for secondary switches and distribution amplifiers. Using just four coaxial cables per TDM connection, expand all sources,

destinations and levels across multiple chassis to create a single 256x256 audio routing switcher in 14 RU. Optional redundant TDM boards are also available.

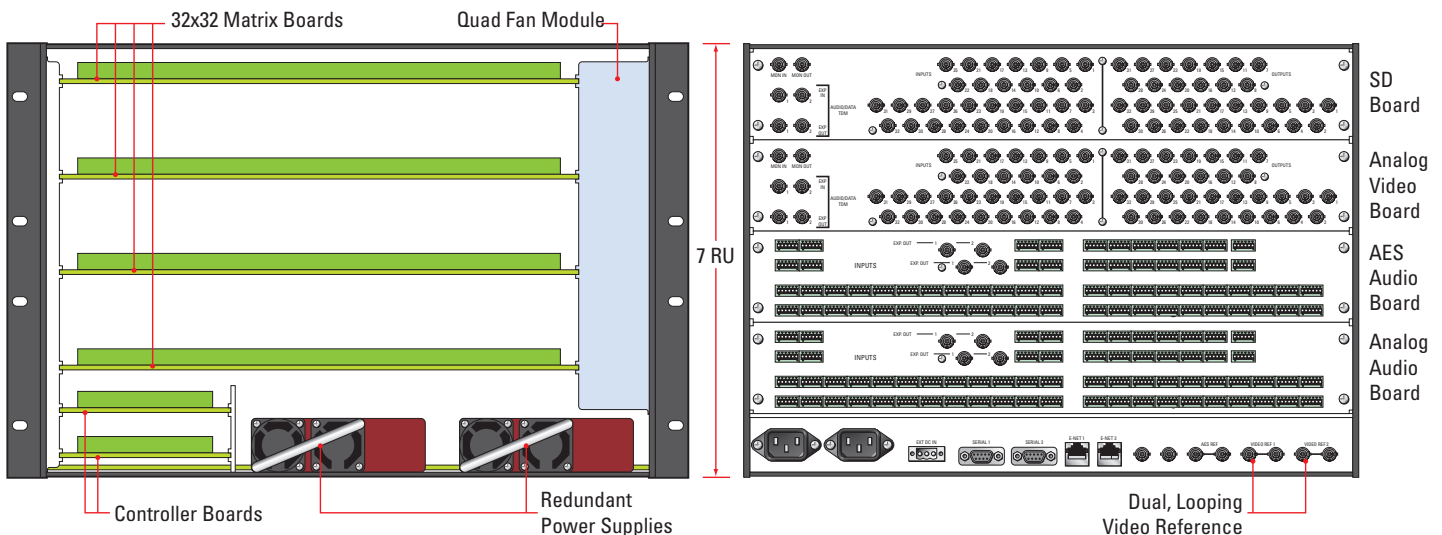
Ensuring High Reliability

Designed for low power consumption, the Concerto routing switcher minimizes its use of components to help ensure high reliability and availability. A basic 32x32 level, for example, requires only a board and a rear panel. What's more, its built-in, multiple fan, forced-air cooling ensures optimal performance and reliability without requiring external fan units.

To further maximize uptime, configure Concerto routing switcher with complete control and power redundancy for mission-critical applications — or with a single controller and power supply for less demanding applications.

The Concerto chassis also features alarm relay outputs to alert facility management and engineering personnel of system anomalies.

Flexible Design and Linear Scalability



The unique I/O architecture of the Concerto routing switcher makes it easy to mix analog and digital formats in the same chassis. Input, output and crosspoint functions are on a single board for easy system expansion.

Ensuring High Serviceability

The Concerto routing switcher also offers maximum serviceability. Its passive rear panel permits hot swapping of all boards from the front of the chassis — even power supplies and fans. This approach keeps the routing switcher online during upgrades and to avoid going behind the equipment rack to perform any service-oriented tasks.

All Concerto video and audio boards have monitor outputs for quality assurance and signal-integrity analysis equipment. The routing switcher also supports the Grass Valley NetCentral Simple Network Management Protocol (SNMP)-based application for remote monitoring.

Full Control System Support

The Concerto routing switcher is supported by all Grass Valley control solutions, including the Encore, Jupiter, Prelude and Series 7000.

Serial Digital Video Module (SMPTE 259M & EBU Tech 3267)

Use the SD video board in either re-clock or bypass mode. The re-clocked bit rates include 143 Mb/s, 177 Mb/s, 270 Mb/s and 360 Mb/s. It also accommodates multisync reference selection on each output.

3 Gb/s High Definition Video Module (SMPTE 424M) (3G/HD/SD)

The 3G video board of the routing switcher will seamlessly handle the 3 Gb/s signals used for the highest quality HD (1080p) and multiplexed 3D signals. The 3G video board also fully supports all SD and HD bitrates and bypass switches all non-standard bit rates from 10 Mb/s to 3 Gb/s.

Analog Video Board

The analog video board features terminating differential inputs and outputs, DC restore capability and wideband signal performance for switching computer graphic signals.

Digital Audio Board

The router's digital audio board not only complies with AES and EBU standards, it includes more advanced features such as synchronous AES/EBU switching (for signals sampled at 48 kHz), attributes control (as described in the stereo analog audio section) and silent switching to eliminate pops and clicks that can be introduced by signal-level differences. If the audio signal being switched is a 48 kHz signal but does not conform to the required 48 kHz sampling rate, the board will convert the signal using high-quality add/drop sampling technology so that the signal can be switched synchronously.

When used with the analog audio board, the digital audio board can be used for D/A conversion, eliminating the need for dedicated tie-lines or additional conversion equipment.

Stereo Analog Audio or Dual Mono Audio Board

This board provides true stereo audio processing and broadcast-quality performance with differential, high-impedance bridging inputs and low-impedance outputs.

The board also includes A/D conversion, so any source that is processed through a stereo analog audio board can be switched to a digital output without the use of tie lines or external A/D conversion. In addition, audio attributes are available on the output to swap channels, invert either channel, sum the two channels, or duplicate a channel to feed mono input to both channels.

Data and Timecode Board

The data board provides precise switching of machine control data and a clean, reliable platform for processing and switching SMPTE time-code streams. This sophisticated processing includes port-oriented, bidirectional signal processing that complies with ANSI/SMPTE 207M standards and dynamic pin-configuration modes for master and slave control (automatic switching of both controlling and controlled devices). The timecode board supports SMPTE 12M for up to 50x shuttle speeds and uses the AES rear connectors for either terminal strip or D-pin connections.

ORDERING

Chassis, Fans and Power Supplies

CRS-FRM128-CPL
7 RU chassis w/PS, MC, fan for CPL control

CRS-FRM128-XPT
7 RU chassis w/PS, MC, fan for XPT bus control

CRS-FRM64-CPL
4 RU chassis w/PS, MC, fan for CPL control

CRS-FRM64-XPT
4 RU chassis w/PS, MC, fan for XPT bus control

CRS-PLS128-XPT
8 RU chassis w/PS, MC, fan for XPT bus control

CRS-PLS128-CPL
8 RU chassis w/PS, MC, fan for CPL control

CRS-FAN128
Fan module – use with 128x128 7 RU chassis

CRS-FAN64
Fan module – use with 64x64 4 RU chassis

CRS-PLSFAN-128
Fan module – use with 128x128 8 RU chassis

I/O & Matrix (1 Circuit Card is I/O and Matrix)

CRS-AA128
Analog audio, stereo, or dual mono board (24 dBFS)

CRS-AES128
AES/EBU digital audio board (7 RU chassis)

CRS-AV128
Analog video board

CRS-SD128
Serial digital video board

CRS-3G128
3 Gb/s high-definition video board

CRS-TC128
Timecode board

CRS-PORT128
RS-422 port board

Rear Panels

CRS-AA-RP
Analog audio rear panel, Phoenix

CRS-AA50-RP
Analog audio rear panel, DB50

CRS-AES-RP
Balanced AES/EBU rear panel, Phoenix

CRS-AES50-RP
Balanced AES/EBU rear panel, DB50

CRS-BNC-RP
BNC rear panel

CRS-3G-RP
3 Gb/s high-definition rear panel

CRS-EBU-RP
Balanced AES transformer rear panel, Phoenix

CRS-PORT9-RP
Port, DB9 rear panel

Accessories

CRS-CBL1
Analog audio: DB50 to pigtail (4.5 meters – 14.5 feet)

CRS-CBL2
AES audio: DB50 to pigtail (4.5 meters – 14.5 feet)

CRS-MC-CPL
Matrix control board for CPL communications

CRS-MC-CPL2
Matrix control board for 8 RU chassis and CPL communications

CRS-MC-XPT
Matrix control board for XPT bus communications

CRS-MC-XPT2
Matrix control board for 8 RU chassis and XPT bus communications

CRS-TDM
TDM expander board

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SPECIFICATIONS

7 RU Chassis

One analog PAL or NTSC color black looping reference input, 75Ω BNC

| Dimensions | cm | in. |
|---------------|---------|---------|
| Height 7 RU | 31.2 | 12.3 |
| Width | 48.3 | 19.0 |
| Depth | 48.3 | 19.0 |
| Weight (max.) | 27.2 kg | 60 lbs. |

4 RU Chassis

One analog PAL or NTSC color black looping reference input, 75Ω BNC

| Dimensions | cm | in. |
|---------------|---------|---------|
| Height 4 RU | 17.9 | 7.0 |
| Width | 48.3 | 19.0 |
| Depth | 48.3 | 19.0 |
| Weight (max.) | 27.2 kg | 60 lbs. |

8 RU Chassis

One analog PAL or NTSC color black looping reference input, 75Ω BNC

| Dimensions | cm | in. |
|---------------|---------|---------|
| Height 8 RU | 35.6 | 14.0 |
| Width | 48.3 | 19.0 |
| Depth | 54.6 | 21.5 |
| Weight (max.) | 31.8 kg | 70 lbs. |

Power

90-260V operating voltage 50-60 Hz

Power consumption: 600W max.

Environmental

Operating temperature: 0 to 40° C

Operating humidity: 10 to 90%, non-condensing

Analog Video

Inputs

System bandwidth: 30 MHz (+0.5 dB, -2 dB)
75Ω BNC, terminating, DC coupled
Nominal level: 1 Vp-p, max. 3 Vp-p
Return loss: >40 dB DC to 10 MHz

Outputs

75Ω BNC, terminating, DC coupled
Nominal level: 1 Vp-p, max. 3 Vp-p
Return loss: >40 dB DC to 10 MHz
One 75Ω QC monitor output

Serial Digital Video

Selectable automatic reclocking at 143 Mb/s, 177 Mb/s, 270 Mb/s and 360 Mb/s. Non-standard bit rates are "bypass" switched from 5 Mb/s to 360 Mb/s

Automatic input cable EQ to 300M of Belden 1694A or equivalent (including 8281) for data rates up to and including 360 Mb/s

Inputs

Conforms to SMPTE 259M
75Ω unbalanced BNC connector
Return loss: >15 dB min.

Outputs

Conforms to SMPTE 259M
75Ω unbalanced BNC connector
Return loss: >15 dB min., 10-360 MHz
Signal amplitude: 800 mV ±10% when terminated into 75Ω
DC offset 0.5V max. when terminated into 75Ω
One 75Ω BNC QC monitoring output

3 Gb/s High-Definition Video (3G/HD/SD Support)

10 Mb/s – 3 Gb/s system bandwidth
Automatic input cable EQ to 80M of Belden 1694A for data rates up to and including 3 Gb/s

Inputs

Conforms to SMPTE-259M, SMPTE-292M and SMPTE-424M
75Ω unbalanced BNC connector, self terminating
Return loss: >15 dB 5 MHz to 1.5 GHz, >10 dB 1.5 GHz to 3 GHz

Outputs

Conforms to SMPTE-259M or SMPTE-292M
75Ω unbalanced BNC connector, self terminating
Return loss: >15 dB 5 MHz to 1.5 GHz, >10 dB 1.5 GHz to 3 GHz

Analog Audio

Inputs

Balanced, terminal strip or 50-pin D connector
Maximum input level: +24 dBu

Output

Balanced, terminal strip or 50-pin D connector
Maximum output level: +24 dBu

Processing

24-bit A-to-D and D-to-A audio conversion
Sum, swap, invert and duplicate

Digital Audio

Inputs

Conforms to AES-3id-1995, SMPTE-276-M AES/EBU
Balanced, terminal strip, or 50-pin D connector. Unbalanced, 75Ω BNC
Maximum input level: +24 dBu

Output

Conforms to AES-3id-1995, SMPTE-276-M AES/EBU
Balanced, terminal strip, or 50-pin D connector
Maximum output level: +24 dBu
Sum, swap, invert and duplicate

Timecode

SMPTE 12M, SMPTE timecode
Terminal strip or 50-pin D connector

Data

RS-485 or RS-422
9-pin D connector
True port-oriented data switching with dynamic pin assignment for master and slave operation

Sync Inputs (used for video switch point locating):

Video

Type: BNC, Hi-z looping, PAL/NTSC analog black or HD tri-level sync (CRS-MC-XXX controller modules)
HD formats supported: 1080i50/60, 1080i24/25/30, 1080psf24/25/30, 720p60; auto-detected
Level: Nominal 1 Vp-p (±6 dB) video
Return Loss: >25 dB 0.1-5 MHz, when terminated into 75Ω

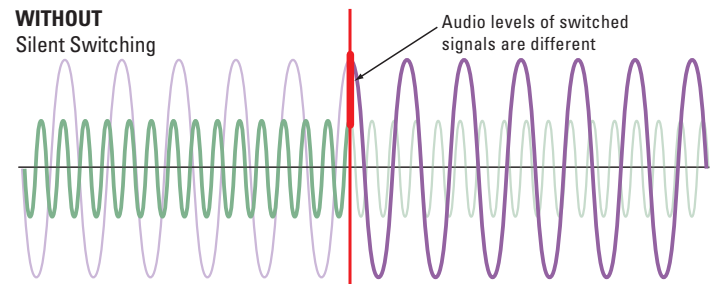
Audio

Type: AES 48 kHz, BNC, Hi-z looping
Level: 1 Vp-p
Return Loss: >15 dB at 0.1 MHz; >25 dB at 6 MHz, when terminated into 75Ω

Silent Switching Audio Signals

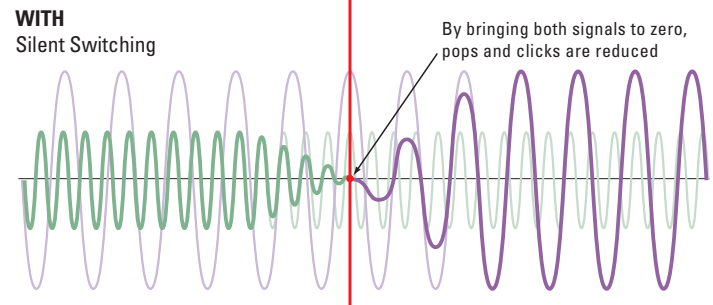
WITHOUT

Silent Switching



WITH

Silent Switching



By quickly bringing audio levels to zero at the switch point, clicks and pops in the audio are reduced.