

# Integrator®

## True Analog and Port Routing



The Integrator® line of routing switchers allows you to switch multiple signal formats within the same 4RU, 6RU or 8RU frame. With expansion in groups of 32 inputs or 32 outputs, Integrator provides cost-effective scalability for analog video and many telco formats up to 64x64 in 4RU or 128x64 in 6RU. Analog audio can be expanded up to 128x128 in 6RU. Data routing (i.e., RS-422/232) is supported with up to 64 ports in 4RU and 128 ports in 8RU.

As Integrator routing switchers support true analog video and analog routing, they are especially well-suited to the routing of composite signals (including even lower-quality analog video signals such as VHS), telco signals such as DS3 or E3, and time-code. The Integrator family of routing switchers is widely used in network, local broadcaster, mobile production, cable, telco, military, government and corporate applications where analog signals are still in use.

### Robust Architecture with Proven Reliability

Integrator routing frames are designed for harsh operation (including mobile truck environments) and feature front-loading, hot-swappable modules for ease of serviceability and 24/7 operation. Integrator frames support redundant, load-sharing power supplies. Redundant controllers/logic cards are also supported, providing seamless transition in the event of a failure.

### Enhanced Control and Monitoring

The distributed control system used in Harris routing switchers is unique in the industry in that it does not require a separate, centralized controller. Each Integrator frame features redundant control modules that store configuration information related to that frame in non-volatile memory, protecting your crucial configuration information and current routing status. This topology also allows control panel communication to be distributed throughout the facility, eliminating single points of failure.

## FEATURES

- Mixed-signal routing:
  - 4RU frame: single 64x64; dual 32x32
  - 6RU frame: single 128x64; triple 32x32
  - 8RU frame: single 128x128 audio (128x64 video); dual 64x64
- Modular I/O in groups of 32
- Front loading, hot-swappable modules for 24/7 operation
- Redundant power supplies and controllers
- Enhanced control and monitoring
- Video routing support
  - True analog video routing up to 100 MHz
  - Telco formats such as DS3 and E3
- Audio routing support
  - True analog audio routing
  - Timecode routing
- Data routing support (RS-422/232)
  - Up to 128 ports

## PRODUCT DETAILS

### Mixed Signal Formats can be Integrated in the Same Frame

Signal formats routed include analog audio and video, telco-related formats such as DS3 (45 Mb/s) and E3 (34 Mb/s), and data routing for machine control.

Integrator offers soft-matrix partitioning of hardware matrices for efficient integration of the router into the matrices required by the facility. It also offers software that provides virtual crosspoint mapping for improved input and output utilization, crosspoint restrictions such as locks and protects, uploadable drivers for diagnostics and control of other vendors' equipment, and left/right audio channel reversal for audio routing systems. All configuration settings are stored in nonvolatile flash memory. Other options available include dual outputs, output monitoring and left/right swapping.

### Designed for Control, Reliability and Redundancy

Integrator is built on distributed architecture that removes single points of failure and supports installations across multiple locations. Plus, the Integrator offers optional, redundant, hot-swappable power supplies and logic controller cards, as well as incorporated alarms for control, fans and power supplies. These are provided via contact closures on the rear of each unit, as well as through our control system software applications, which can be networked through serial, coaxial and Ethernet direct to the frame or through a wide range of control panels.

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### SPECIFICATIONS

Specifications are subject to change without notice.

#### Analog Video Inputs (64X-V)

Number of inputs	From 32 to 128 in steps of 32
Signal type	Composite or component analog video; any RF signal within the voltage & frequency limit
Signal coupling	DC
Connector	BNC, 75 ohms
Return Loss	>45 dB @ 5 MHz, >20 dB @ 70 MHz
Normal Input Level	1 V pk-pk
Maximum Level	3 V pk-pk centered at 0 V

#### Analog Audio Inputs (64X-A)

Number of Inputs	32-128 in steps of 32
Type	Balanced analog audio
Connector	DB-25
Impedance	High Z, > 20k ohms (or 600 ohms, specify 600 version)
Maximum Input Level	+28 dBu (+22 dBm for 600 ohm version)
CMRR	>90 dB rejection, 20 Hz to 20 kHz, typical >75 dB rejection, 20 Hz to 20 kHz, worst case > 65 dB rejection, 20 Hz to 20 kHz, worst case for 600 ohm version

#### Analog Video Outputs (64X-V)

Number of Outputs	From 32 to 64 in steps of 32
Connector	BNC, 75 ohms
Normal Output Level	1 V pk-pk
Maximum Level	3 V pk-pk centered at 0 V
Frequency Response	±0.1 dB DC to 10 MHz, > -3 dB, 70 MHz
Tilt	<0.1 %
Crosstalk	60 dB at 5 MHz, typical
Differential Gain	0.1 %
Differential Phase	0.1°
EQ Response	±0.1 d DC to 10 MHz 328 ft (100 m) Belden 8281
Output Return Loss	>45 dB at 5 MHz (>40 dB at 5 MHz for dual [twin] output) > 20 dB at 70 MHz
Phase Scatter	±1.0° at 3.58 MHz
Gain Scatter	±0.1 dB
Gain Adjustable Range	±0.5 dB
DC Offset	< ±50 mV
Signal to Noise Ratio	>70 dB, 5 MHz, > 60 dB, 70 MHz
Propagation Delay	<18 ns ±2 ns

#### Analog Audio Outputs (64X-A)

Number of Outputs	From 32 to 64 in steps of 32 (A and B channels) From 32 to 128 in steps of 32 (single-channel)
Signal Type	Balanced analog audio
Maximum Output Level	+28 dBu (+22 dBm for 600 ohm version)
Connector	DB-25
Impedance	66 ohms (or 600 ohms, specify 600 ohm version)
DC Output Level	± 50 mV, maximum
Maximum Cable Length	300 ft (100 m) of Belden 8451 or equivalent*
Minimum Load Impedance	600 ohms
Gain	Unity, ±0.1 dB
THD+N	<0.01%, 20Hz to 20kHz (+24 dBu, 600 ohms or High Z load†) <0.005%, typical
IMD (SMPTE 4:1)	<0.005% (+24 dBu, 600 ohms or High Z load) < 0.002%, typical
Crosstalk	>90 dB isolation, 20Hz to 20kHz, all hostile, typical >85 dB isolation, worst case
Frequency Response	±0.1 dB, 20Hz to 20 kHz -3 dB point: >200 kHz
Signal to Noise Ratio	>110 dB reference to +24 dBu, 20 Hz to 20 kHz

\* Frequency response in 600 ohm version with 328 ft (100 m) cable will be -1 dB at 20 kHz, -14 dB at 200 kHz into 600 ohm load.

† THD+N increases as matrix size and/or number of destinations increase. The worst case is a 128x64 stereo system or a 128x128 mono system with all destinations set to a single source. In this worst case, the THD+N is <0.025%, 20Hz to 20kHz, +24dBu, 600 ohms or High Z load.

#### Physical

Input	Coaxial communications 1 V pk-pk
Power	Universal input AC: 90 to 250 VAC, DC: -40 to -50 VDC 47 to 63 Hz, 600 VA, 600 W
Output	V1 = +5 VDC @ 7A V2 = +24 VDC @ 12A V3 = -24 VDC @ 12A
Total Power	400 ohms
Current Sharing	Active, all outputs N+1 hot-swappable (diode isolation)
TRMA (Operating Temperature)	32° to 122° F (0° to 50° C) at 100% power rating
Size (W x D x H)	4RU: 6.969 × 19.00 × 15.83 in. (17.70 × 48.26 × 40.20 cm) 6RU: 10.469 × 19.00 × 15.83 in. (26.59 × 48.26 × 40.20 cm) 8RU: 13.99 × 19.00 × 15.83 in. (35.54 × 48.26 × 40.20 cm)
Weight (fully loaded)	4RU: 57 lb (25.90 kg), approximate 6RU: 68 lb (30.84 kg), approximate 8RU: 79 lb (35.83 kg), approximate

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### ORDERING INFORMATION

Integrator routers may be ordered in one of two ways:

#### Single Format per Frame

Order single signal format matrix sizes using a system number to define the system matrix size, signal format, single or dual outputs and frame size. (i.e., 128x64s6, 32x32v4, etc.)

#### Multiple Formats per Frame

Order multiple signal formats, with or without different matrix sizes, as a multiple line item system. The steps for using the multiple line item system are:

- Select frame size. (i.e., INT-FR4, INT-FR6, or INT-FR8)
- Select primary matrix size and signal format, single or dual outputs and maximum expansion size (#-of-RU; i.e., INT-32X64V-4, INT-64X32A2-6)
- Select secondary matrix size and signal format, single or dual outputs and maximum expansion size (#-of-RU; i.e., INT-32X64V-4, INT-64X32A2-4)
- Repeat step C for each additional matrix/matrices.

INT-32 X 64 A2 - 4	
INT	Represents the Integrator family of routers
32	Number of inputs
64	Number of outputs
A2	Identifies the signal format
4	Indicates the maximum size that the matrix will occupy when fully expanded (maximum #-of-inputs and outputs per RU can differ per format) 2 = 2RU (32x32 maximum for all formats except A1) 4 = 4RU (64x64 maximum for most formats) 6 = 6RU (128x64 maximum or 64x64 with dual outputs for most formats) 8 = 8RU (128x128 maximum or 128x64 with dual outputs for most formats)

Frame	Single Format (Single Output)	Single Format (Twin/Dual Outputs)	Multiple/Mixed Formats	Power Supply (PS)
4RU	32x32 to 64x64 32x32 to 64x128	-V, A2, D422, D232 -A1	N.A.	Two 32x32s 1 PS standard, order additional PS for redundancy
6RU	32x32 to 128x64 32x32 to 128x128	-V, A2, D422, D232 -A1	32x32 to 64x64 -VT	One 64x64 + One 32x32 Three 32x32s 5 or more I/O boards — requires additional PS
8RU	32x32 to 128x128	-A2, D422, D232	32x32 to 128x64 -VT	One 128x64 + One 32x32 Two 64x64s Four 32x32s 5 or more I/O boards — requires additional PS

#### 32-Input, Single-Format Systems

Frames come standard with an AC power supply.

Model Number	Description	Frame Size	Maximum Internal Expansion
32x32V4	32x32 analog video	4RU	64x64
32x32V6	32x32 analog video	6RU	128x64
32x32VT6	32x32 analog video with dual outputs	6RU	64x64
32x32VT8	32x32 analog video with dual outputs	8RU	128x64
32x32A14	32x32 analog monaural audio	4RU	64x128
32x32A16	32x32 analog monaural audio	6RU	128x128
32x32A24	32x32 analog stereo audio	4RU	64x64
32x32A26	32x32 analog stereo audio	6RU	128x64
32x64V4	32x64 analog video	4RU	64x64
32x64V6	32x64 analog video	6RU	128x64
32x64VT6	32x64 analog video with dual outputs	6RU	64x64
32x64VT8	32x64 analog video with dual outputs	8RU	128x64
32x64A14	32x64 analog monaural audio	4RU	64x128
32x64A16	32x64 analog monaural audio	6RU	128x128
32x64A24	32x64 analog stereo audio	4RU	64x64
32x64A26	32x64 analog stereo audio	6RU	128x64
32x96A14	32x96 analog monaural audio	4RU	64x128
32x96A16	32x96 analog monaural audio	6RU	128x128
32x128A14	32x128 analog monaural audio	4RU	64x128
32x128A16	32x128 analog monaural audio	6RU	128x128
64x32V4	64x32 analog video	4RU	64x64
64x32V6	64x32 analog video	6RU	128x64
64x32VT6	64x32 analog video with dual outputs	6RU	64x64
64x32VT8	64x32 analog video with dual outputs	8RU	128x64
64x32A14	64x32 analog monaural audio	4RU	64x128
64x32A16	64x32 analog monaural audio	6RU	128x128
64x32A24	64x32 analog stereo audio	4RU	64x64
64x32A26	64x32 analog stereo audio	6RU	128x64
64x64V4	64x64 analog video	4RU	N/A
64x64V6	64x64 analog video	6RU	128x64
64x64VT6	64x64 analog video with dual outputs	6RU	N/A
64x64VT8	64x64 analog video with dual outputs	8RU	128x64
64x64A14	64x64 analog monaural audio	4RU	64x128
64x64A16	64x64 analog monaural audio	6RU	128x128
64x64A24	64x64 analog stereo audio	4RU	N/A
64x64A26	64x64 analog stereo audio	6RU	128x64
64x96A14	64x96 analog monaural audio	4RU	64x128
64x96A16	64x96 analog monaural audio	6RU	128x128
64x128A14	64x128 analog monaural audio	4RU	N/A
64x128A16	64x128 analog monaural audio	6RU	128x128

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### 96-Input, Single-Format Systems

Frames come standard with an AC power supply. For 600 ohm audio versions, convert A1 to AL1 for mono audio and A2 for stereo audio.

Model Number	Description	Frame Size	Maximum Internal Expansion
96x32V6	96x32 analog video	6RU	128x64
96x32VT8	96x32 analog video with dual outputs	8RU	128x64
96x32A16	96x32 analog monaural audio	6RU	128x128
96x32A26	96x32 analog stereo audio	6RU	128x64
96x64V6	96x64 analog video	6RU	128x64
96x64VT8	96x64 analog video with dual outputs	8RU	128x64
96x64A16	96x64 analog monaural audio	6RU	128x128
96x64A26	96x64 analog stereo audio	6RU	128x64
96x96A16	96x96 analog monaural audio	6RU	128x128
96x128A16	96x128 analog monaural audio	6RU	128x128

### 128-Input, Single-Format Systems

Frames come standard with an AC power supply. For 600 ohm audio versions, convert A1 to AL1 for mono audio and A2 to AL2 for stereo audio.

Model Number	Description	Frame Size	Maximum Internal Expansion
128x32V6	128x32 analog video	6RU	128x64
128x64V6	128x64 analog video	6RU	N/A
128x32VT8	128x32 analog video with dual outputs	8RU	128x64
128x64VT8	128x64 analog video with dual outputs	8RU	N/A
128x32A16	128x32 analog monaural audio	6RU	128x64
128x64A16	128x64 analog monaural audio	6RU	128x128
128x32A26	128x32 analog stereo audio	6RU	128x64
128x64A26	128x64 analog stereo audio	6RU	N/A
128x96A16	128x96 analog monaural audio	6RU	128x128
128x128A16	128x128 analog monaural audio	6RU	N/A

### Data Port Router Module (does not include frame)

INT-32PD422-2	Integrator 32-port RS-422 data port routing switcher, 2RU
INT-32PD422-4	Integrator 32-port RS-422 data port routing switcher, 4RU
INT-64PD422-4	Integrator 64-port RS-422 data port routing switcher, 4RU
INT-32PD422-6	Integrator 32-port RS-422 data port routing switcher, 6RU
INT-64PD422-6	Integrator 64-port RS-422 data port routing switcher, 6RU
INT-96PD422-6	Integrator 96-port RS-422 data port routing switcher, 6RU
INT-32PD422-8	Integrator 32-port RS-422 data port routing switcher, 8RU
INT-64PD422-8	Integrator 64-port RS-422 data port routing switcher, 8RU
INT-96PD422-8	Integrator 96-port RS-422 data port routing switcher, 8RU
INT-128PD422-8	Integrator 128-port RS-422 data port routing switcher, 8RU
INT-32PD232-2	Integrator 32-port RS-232 data port routing switcher, 2RU
INT-32PD232-4	Integrator 32-port RS-232 data port routing switcher, 4RU
INT-64PD232-4	Integrator 64-port RS-232 data port routing switcher, 4RU
INT-32PD232-6	Integrator 32-port RS-232 data port routing switcher, 6RU
INT-64PD232-6	Integrator 64-port RS-232 data port routing switcher, 6RU
INT-96PD232-6	Integrator 96-port RS-232 data port routing switcher, 6RU
INT-32PD232-8	Integrator 32-port RS-232 data port routing switcher, 8RU
INT-64PD232-8	Integrator 64-port RS-232 data port routing switcher, 8RU
INT-96PD232-8	Integrator 96-port RS-232 data port routing switcher, 8RU
INT-128PD232-8	Integrator 128-port RS-232 data port routing switcher, 8RU

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### Data Port Router Complete with Frame

32PD4224	32-port RS-422 data port routing switcher, 4RU Integrator
64PD4224	64-port RS-422 data port routing switcher, 4RU Integrator
32PD4226	32-port RS-422 data port routing switcher, 6RU Integrator
64PD4226	64-port RS-422 data port routing switcher, 6RU Integrator
96PD4226	96-port RS-422 data port routing switcher, 6RU Integrator
32PD4228	32-port RS-422 data port routing switcher, 8RU Integrator
64PD4228	64-port RS-422 data port routing switcher, 8RU Integrator
96PD4228	96-port RS-422 data port routing switcher, 8RU Integrator
128PD4228	128-port RS-422 data port routing switcher, 8RU Integrator
32PD2324	32-port RS-232 data port routing switcher, 4RU Integrator
64PD2324	64-port RS-232 data port routing switcher, 4RU Integrator
32PD2326	32-port RS-232 data port routing switcher, 6RU Integrator
64PD2326	64-port RS-232 data port routing switcher, 6RU Integrator
96PD2326	96-port RS-232 data port routing switcher, 6RU Integrator
32PD2328	32-port RS-232 data port routing switcher, 8RU Integrator
64PD2328	64-port RS-232 data port routing switcher, 8RU Integrator
96PD2328	96-port RS-232 data port routing switcher, 8RU Integrator
128PD2328	128-port RS-232 data port routing switcher, 8RU Integrator

### Related Products

INT-FR4	Integrator 4RU frame assembly
INT-FR6	Integrator 6RU frame assembly
INT-FR8	Integrator 8RU frame assembly
INT-PS	Redundant power supply, Integrator
INT-LOGIC	Redundant logic board, Integrator