Sirius 800 AHP

Advanced Hybrid Processing and MV-800 Integrated Multiviewer

Sirius 800 AHP is the most flexible platform for hybrid video and audio routing available. Additionally, Advanced Hybrid Processing (AHP) is the most flexible and powerful processing available in a router.

Sirius 800 AHP routers from Grass Valley allows any combination of signal formats and processing, with no limitations on signal timing or synchronization, and no compromises on redundancy, monitoring or expansion capability. This flexibility allows systems to be configured ranging from simple video-only routing, through to powerful hybrid video and audio systems (with any combination of embedded and discrete audio).

Optional processing capability can be assigned to individual channels, allowing processing where it is needed. Combining multiple racks of embedding and processing equipment into a single chassis saves space, cost and power, and increases overall system reliability.

This datasheet covers the outline operation and detailed performance specifications, covering:
- System outline, sizes, resilience
- System architecture
- Monitoring options
- Expansion
- Signal types and interfaces
- Hybrid router architecture and control concepts
- Module specifications, including signal performance and Advanced Hybrid Processing options

**KEY FEATURES**

- 4 chassis options from 288x288 to 1152x1152:
  - Allows best use of valuable rack space
- Field expandable:
  - All systems have hot pluggable modules for easy expansion
  - Additional chassis can be added while the system is live on-air
- Video and audio routing in a single chassis:
  - Route any video and audio input to any output — no limitations
- The most advanced processing architecture:
  - Processing available on every input and output
  - Avoids the need for wrap-around signals, saving I/O, space and cost
  - Upgrade features by software license
- All inputs and outputs are format independent:
  - Allowing a mix of formats on a single module
  - Saves cost, increases system flexibility
- All inputs and outputs are timing independent:
  - No need to synchronize signals externally
- Extensive resilience:
  - Power, control, and crosspoint redundancy. Signal and system status reporting for resilient 24x7 operation
- 3G routing capability as standard:
  - Peace of mind — supports future formats including 4K
- Flexible monitoring options:
  - Integrated multiviewer, up to 140 additional outputs for multiviewers, plus 4 independent outputs for input and output monitoring
## Sirius 800 System Outline Details

### Frames

Sirius 800 is available in four frame configurations:

<table>
<thead>
<tr>
<th></th>
<th>Sirius 830</th>
<th>Sirius 840</th>
<th>Sirius 850</th>
<th>Sirius 850 dual frame</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Video capacity</strong></td>
<td>288x288</td>
<td>576x576</td>
<td>576x1152</td>
<td>1152x1152</td>
</tr>
<tr>
<td><strong>Audio capacity</strong></td>
<td>9216x9216</td>
<td>18432x18432</td>
<td>18432x18432</td>
<td>18432x18432</td>
</tr>
<tr>
<td><strong>Router frame</strong></td>
<td>15 RU</td>
<td>27 RU</td>
<td>34 RU</td>
<td>2x 34 RU</td>
</tr>
<tr>
<td><strong>External PSU chassis (120V nominal power)</strong></td>
<td>1x 2 RU chassis (2x 2 RU chassis with more than 12 Video AHP modules)</td>
<td>2x 2 RU chassis (3x 2 RU chassis with any expansion and more than 24 Video AHP modules)</td>
<td>PER ROUTER FRAME – 2x 2 RU chassis (3x 2 RU chassis with any expansion and more than 24 Video AHP modules)</td>
<td></td>
</tr>
<tr>
<td><strong>External PSU chassis (230V nominal power)</strong></td>
<td>1x 2 RU chassis (2x 2 RU chassis with more than 36 Video AHP modules)</td>
<td>2x 2 RU chassis</td>
<td>PER ROUTER FRAME – 2x 2 RU chassis</td>
<td></td>
</tr>
<tr>
<td><strong>Video redundancy</strong></td>
<td>1 + 1</td>
<td>4 + 1</td>
<td>4 + 1</td>
<td>4 + 1</td>
</tr>
<tr>
<td><strong>Audio redundancy</strong></td>
<td>1 + 1</td>
<td>1 + 1</td>
<td>1 + 1</td>
<td>1 + 1 (2 off)</td>
</tr>
</tbody>
</table>

### Redundancy and Resilience

All systems support:
- Dual redundant PSUs
- Dual redundant controllers
- Redundant video crosspoints
- Redundant audio crosspoints

**Video crosspoint size:** 288x288

**Audio crosspoint size:** 36,864x18,432
Monitoring

**Monitoring Outputs**

Input and output monitoring is available on all Sirius 800 frames, by fitting optional monitoring modules. Each monitoring output can be configured to allow monitoring of video or audio, and can monitor all inputs and outputs.

**External Multiviewer Outputs**

Multiviewer outputs are video feeds from the input modules into a separate crosspoint array. Routing in any combination is possible, without affecting the main crosspoint array routing. All frames allow additional modules to be fitted to give up to 140 additional outputs in addition to the core routing capacity of the router.

**MV-800 Integrated Multiviewer**

The integrated multiviewer takes the place of multiviewer output modules and provides four SDI outputs and 48 streaming outputs from 48 signals. In addition, intelligent monitoring provides status monitoring of not just video and audio signals in the router, but also enables monitoring of external devices and alarms, plus displays of webpages. See separate MV-800 datasheet for more details.

**Monitoring & Multiviewer output options available for each frame**

<table>
<thead>
<tr>
<th>Configurations available</th>
<th>Sirius 830</th>
<th>Sirius 840</th>
<th>Sirius 850</th>
</tr>
</thead>
<tbody>
<tr>
<td>No monitoring or multiviewer outputs</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Output monitoring</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Input/output monitoring</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>48 coax external multiviewer outputs</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>96 coax external multiviewer outputs</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>140 coax external multiviewer outputs</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Input/output monitoring &amp; 48 coax external multiviewer O/PS</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Input/output monitoring &amp; 96 coax external multiviewer O/PS</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Input monitoring &amp; 140 coax external multiviewer O/PS</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>MV-800 integrated multiviewer</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Input/output monitoring &amp; MV-800 integrated multiviewer with 4 outputs enabled</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>48 coax outputs &amp; MV-800 integrated multiviewer with 4 outputs enabled</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Input monitoring &amp; MV-800 integrated multiviewer with 4 outputs enabled</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Input/output monitoring, 48 multiviewer outputs &amp; MV-800 integrated multiviewer with 4 outputs enabled</td>
<td>●</td>
<td></td>
<td>●</td>
</tr>
</tbody>
</table>

**NOTE: Sirius 850 – Single Frame Monitoring.** Monitoring is available on all 576 inputs and the 576 outputs located at the bottom of the Sirius 850 frame. Outputs 577-1152 on a single frame, or expansion outputs on a dual frame cannot be monitored.

**NOTE: Sirius 850 – Dual Frame Monitoring.** In dual frame Sirius 850 systems, multiviewer and monitoring outputs in the first frame cannot access router inputs and outputs from the second frame (and vice versa).

In the diagram below, monitoring and multiviewer outputs colored green have access to green inputs and outputs. Monitoring and multiviewer outputs colored red have access to red inputs and outputs.
Sirius 800 AHP Advanced Hybrid Processing and MV-800 Integrated Multiviewer

Sirius 850 Expansion Options
System Options
The base 576x576 router offers crosspoint redundancy and Catsii functionality on all video inputs and outputs (BNC or fiber). All 576 inputs or main outputs can be monitored using four independent monitoring outputs.

Two options are then available, both are field expandable.
- 576x1152: with additional outputs using HD BNC coax connectors with full redundant crosspoint protection
- Expansion to 1152x1152 using two Sirius 850 frames, each equipped with expansion output cards

To add either option, expansion output modules and expansion crosspoints must be fitted.

Two types of rear panel are available.
- A coaxial (HD BNC) rear panel is used to equip up to 576x1152
- An expansion rear panel is used to allow two chassis to be linked, to expand to 1152x1152

If the rear panels are not ordered with the initial router chassis, this section of the router is fitted with blank rear panels. The choice of expansion or coaxial rear panel can be fitted in the field at a later date.

Sirius 800 Signal Formats and Modules
Routing Options
All Sirius 800 systems can be equipped with any combination of the following types of modules:
- Standard video
- Video AHP
- AES
- MADI
- Standard video, video AHP and MADI modules are available with BNC or fiber connectors
- AES is available with balanced multiway connectors

Note: Video AHP, AES and MADI Outputs can be fitted in the main router output position only. Expansion outputs are video only.

Signal Routing in More Detail
The Sirius 800 architecture allows any module type to be fitted in any position. All module positions have 24 video connections to the video crosspoint array, plus 768 audio connections (via a multiplexed bus) to the audio crosspoint array.

This means for each module position, the different module types will do the following:

| Standard video modules | 24 channels of video can be routed, with all embedded signals remaining untouched |
| Video AHP modules | 24 video channels can be routed. Up to 32 channels of audio can be de-embedded on each video input, routed via the audio crosspoint, and up to 32 channels can be embedded on each of the 24 video outputs |
| AES modules | 120 AES pairs and (240 mono audio signals) plus 3x MADI signals can be routed from/to AES input and output modules |
| MADI modules | Up to 12 MADI signals (768 mono audio signals) can be routed from every MADI module. MADI inputs are dual redundant with auto failover. MADI outputs are dual |

Fiber Rear Connections
Fiber is available on SDI and MADI inputs and outputs. All fiber is 3G capable. There are two options: standard and custom.

Standard and custom dual channel SFP fiber modules can be mixed in any combination on rear panels, and swapped as required, with no changes needed to the system database.

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>Wideband receiver, -18 dBm sensitivity</td>
</tr>
<tr>
<td></td>
<td>1310 nm transmitter, -2 dBm (typical) output power</td>
</tr>
<tr>
<td>Custom</td>
<td>Rear panels supplied unequipped. CWDM wavelengths are available in pairs: -2 dBm (typical) output power</td>
</tr>
<tr>
<td></td>
<td>1271/1291 nm – 1311/1331 nm</td>
</tr>
<tr>
<td></td>
<td>1351/1371 nm – 1391/1411 nm</td>
</tr>
<tr>
<td></td>
<td>1431/1451 nm – 1471/1491 nm</td>
</tr>
<tr>
<td></td>
<td>1511/1531 nm – 1551/1571 nm</td>
</tr>
<tr>
<td></td>
<td>1591/1611 nm</td>
</tr>
</tbody>
</table>

Logical mapping example — routing 5.1 Audio

Routing command: Route Source 14 to destination 27
6 individual routes are made inside the router

5.1 Surround Audio delivered as 3 AES pairs
Logical mapping: 6 mono sources set as logical source 14
Logical mapping: 6 mono sources set as logical destination 27
Advanced Hybrid Processing

Available on Inputs and Outputs

All video channels are fully format and timing independent, and offer (per video channel):

- Audio track swap
- Audio gain, invert, mute, mix
- Mixed embedded audio and discrete audio routing
- Frame and line synchronization
- Delay
- Input embedding

Processing is then enabled by licensed features. A base module is available, licensed options are then purchased. This allows combinations of features to be activated on different channels across the router, as needed.

AHP functionality is detailed later in this specification, in each individual module section.

Advanced Hybrid Processing (AHP) Options and Licensing

AHP options are available for video AHP input, video AHP output and audio input and output modules. AHP modules offer basic routing capability with no licensed options.

The processing functionality depends on which licensed options are then purchased.

Unique input embedding capability allows audio from any source to be embedded on a router input. This reduces the number of input and output modules required, and removes the need for wrap around cables. Input embedding saves cost, space in the frame and simplifies operation and system design.

Most options are available on a “per module” license.

Frame/line synchronization is available in eight channel licenses. These eight channels can be assigned to any AHP video channel in the router.

Options available are:

<table>
<thead>
<tr>
<th>Module</th>
<th>AHP Option</th>
<th>Assignable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video AHP Input (5919)</td>
<td>Embedded Audio Processing</td>
<td>Per module</td>
</tr>
<tr>
<td></td>
<td>Embedded Audio Delay</td>
<td>Per module</td>
</tr>
<tr>
<td></td>
<td>Frame/Line Synchronization</td>
<td>Per 8 channels on any video AHP module</td>
</tr>
<tr>
<td></td>
<td>Input Embedding</td>
<td>Per module</td>
</tr>
<tr>
<td>Video AHP Output (5949)</td>
<td>Embedded Audio Processing</td>
<td>Per module</td>
</tr>
<tr>
<td></td>
<td>Embedded Audio Delay</td>
<td>Per module</td>
</tr>
<tr>
<td></td>
<td>Frame/Line Synchronization</td>
<td>Per 8 channels on any video AHP module</td>
</tr>
<tr>
<td>Audio Input (4915)</td>
<td>Audio Processing</td>
<td>Included</td>
</tr>
<tr>
<td>Audio Output (4929)</td>
<td>Audio Processing</td>
<td>Included</td>
</tr>
<tr>
<td></td>
<td>Sample Rate Conversion</td>
<td>Per module</td>
</tr>
<tr>
<td></td>
<td>Audio Delay</td>
<td>Included</td>
</tr>
</tbody>
</table>

Hybrid Router Control

Sirius 800 can be controlled from a combination of hardware panels, PC based softpanels, or external controllers (Grass Valley or third-party).

Audio Control Concept

Traditional concepts such as video and audio levels have limitations in a hybrid router. A fundamental requirement is that audio can be routed from any input to any output, not restricted by multiple audio levels. Therefore, in Sirius 800 audio is treated as a single matrix. Within the Sirius 800, all audio is routed as mono channels. For control purposes, mono channels can be logically grouped together to allow control of stereo pairs or 5.1 surround signals as a single input or output (see diagram below). Audio sources are then configured as being related to a video source.

Track Routing

A “track routing” concept allows control of video plus its related audio tracks from one simple to use interface. Screens using track routing allow control of video and all related audio simultaneously.

When a video destination is selected, all related audio tracks are also selected. Swaps and breakaway can then be preselected, before all routes are simultaneously taken.

External Control

For external control, video and audio can be routed and processed using Grass Valley’s traditional control protocols (General Switcher protocol SW-P-02, General Remote Protocol SW-P-08, and RollCall). External control will use the groupings defined (as described above) for mono, stereo or 5.1. This simplifies external control, allowing multiple routes to be made simultaneously. The example below shows an example with a 5.1 source routed to a 5.1 destination.
## SPECIFICATIONS

### Sirius 800 – System Specifications

<table>
<thead>
<tr>
<th>Physical</th>
<th>Sirius 800</th>
<th>Sirius 840</th>
<th>Sirius 850</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Router</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>15 RU</td>
<td>27 RU</td>
<td>34 RU</td>
</tr>
<tr>
<td>Weight (fully loaded)</td>
<td>84 kg/185 lbs.</td>
<td>178 kg/393 lbs.</td>
<td>215 kg/474 lbs.</td>
</tr>
<tr>
<td>Depth</td>
<td>530 mm/21 in.</td>
<td>530 mm/21 in.</td>
<td>530 mm/21 in.</td>
</tr>
<tr>
<td><strong>PSU Chassis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>2 RU</td>
<td>2 RU</td>
<td>4 RU</td>
</tr>
<tr>
<td>Weight</td>
<td>24 kg/53 lbs. including PSUs</td>
<td>24 kg/53 lbs. including PSUs</td>
<td>48 kg/106 lbs. including PSUs</td>
</tr>
<tr>
<td>Depth</td>
<td>550 mm/21.5 in.</td>
<td>550 mm/21.5 in.</td>
<td>550 mm/21.5 in.</td>
</tr>
</tbody>
</table>

#### Power Requirements

| Fully equipped – Standard video modules with coax. No monitoring or redundancy options | 1750W | 3250W | 4500W (576x1152) |
| Fully equipped – Standard video modules with fiber. No monitoring or redundancy options | 2000W | 3800W | 4870W (576x1152, Fiber available on first 576 outputs only) |
| Fully equipped – 50% standard video, 50% video AHP, all coax. No monitoring or redundancy options | 2970W | 5640W | 6900W (576x1152, Video AHP on 288 inputs and 288 outputs) |
| Additional – redundant video crosspoints | 50W | 50W | 50W |
| Additional – redundant audio crosspoints | 55W | 55W | 55W |
| Additional – 96 MV outputs | 320W | 320W | 320W |

#### General

- **Power redundancy**: 4 PSUs for full 1+1 redundancy power sharing in a single 2 RU chassis with 4 independent AC line inputs (one per PSU) for all applications
- **DC power connections from PSU to router chassis**: 2.5m (8 ft.) or 8m (26 ft.) optional cable lengths
- **Operating temperature**: 0 to +40°C (32-104°F)
- **Storage temperature**: -10 to +50°C (32-122°F), non-condensing
- **Cooling**: Fan cooled. Front inlet, rear and side exhaust

### Reference Inputs

- **Number and Type**: 4x analog video, all auto sensing to 525 & 625 blackburst, or HD tri-level reference
- **Switch timing**: to SMPTE RP 168. Sources individually assignable to each reference, or auto detected

### Control

- **Serial**: 4x RS-485 on 9-way D-type
- **Ethernet**: 1 x RJ45 per controller/10/100Base-T/SW-P-02 (in and out) over IP/SW-P-08 in over IP/SNPMV2

### Alarms

- Relay changeover for PSU, fan and controller failure
- Comprehensive alarms reporting and auto failure recovery via Workbench or SNMP
- Status available via Workbench or SNMP
- PSU active/fail
- Fan active/fail
- Controller active/fail

### Sirius 850 Additional Outputs 577 – 1152 (5928 with 1366 Rear Panel)

- **Connectors**: 24 per module, reclocked. HD-BNC gold plated connector, 75Ω impedance
- **Standards Supported**: SMPTE ST 259, 525 & 625 SD-SDI, ENS0083-9 DVB-ASI
- **Data rate**: 3 Mb/s – 3 Gb/s. Standard video rates reclocked, all other rates auto-bypassed
- **Return loss**: <15 dB 10 MHz to 1.5 GHz, >10 dB 1.5 GHz to 3 GHz
- **Amplitude**: 800 mV p-p ±10% @ SD & HD, 600 mV p-p ±10% @ 3G

* Systems operating at 100-120V nominal, or with large quantities of AHP modules may need an additional 2 RU PSU chassis

---

www.grassvalley.com
MODULE SPECIFICATIONS

Standard Video Input Module (5917)

Main Router Coax Inputs (5917 with 1235 or 1289 Coax Rear Panel)
Number and type: 24 per card automatic cable equalization and relocked
Connectors: BNC to IEEE1169.8, 75Ω electrical impedance. Gold plated.
Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-ASI
- SMPTE ST 292 720p and 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-ASI
- SMPTE ST 292 720p and 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Main Router Optical Inputs (5917 with 1236 or 1305 Fiber Rear Panel)
Number and type: 24 per card, relocked – removable video SFP modules
Connectors: LC/PC single mode fiber connection as standard
Wavelength: Wideband receiver, 1260-1620 nm nominal
Sensitivity: -18 dBm
Typical link length: 10 km 3 Gb/s, 20 km 1.5 Gb/s, 30 km @ 270 Mbs/s
Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-ASI
- SMPTE ST 292 720p and 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Standard Video Output Module (5926 Non-Expandable or 5938 Expandable)

Main Router Coax Outputs (5926 or 5938 with 1294 Coax Rear Panel)
Type: 24 per card, relocked
Connectors: BNC to IEEE1169.8, 75Ω electrical impedance. Gold plated.
Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-ASI
- SMPTE ST 292 720p and 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Main Router Optical Outputs (5926 or 5938 with 1302 Fiber Rear Panel)
Type: 24 per card, relocked, removable video SFP modules
Connector: LC/PC single-mode connection as standard
Wavelength: 1310 nm
Output power: typical -2 dBm. Other power & CWDM options available – contact Grass Valley
Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-ASI
- SMPTE ST 292 720p and 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Sirius 800 AHP – Advanced Hybrid Processing and MV-800 Integrated Multiviewer

Sirius 800 AHP – Frame Synchronizer
The Sirius 800 AHP Frame Synchronizer provides synchronization for SD-SDI, HD-SDI and 3G signals. Each channel can be independently configured and controlled, and can be locked to any one of 4 references.
Synchronization is based on frame drop/repeat technology throughout. A line synchronizer mode allows short delay and switch line blanking, avoiding SMPTE switching line disturbances and providing true clean switched outputs.

Features
- SD/HD/3G frame synchronizer with up to 14 frames of video delay per channel
- Minimum delay line synchronizer mode to remove SMPTE compliant switching disturbances.

Video Standards Supported
Input standard:
- 525/480p29.97
- 625/576p
- 750/720p50
- 750/720p59.94
- 1125/1080i25
- 1125/1080p29.97
- 1125/1080p50 (A & B - Level B dual link only)
- 1125/1080p59.94 (A & B - Level B dual link only)

Default video output standard:
- Last known good

Controls (per channel)

Genlock Delay:
- Genlock Mode: Lock to Reference, Lock to Input
- Genlock H-Phase: ±0.5H in pixel clock steps
- Genlock V-Phase: ±0.5F in 1 line steps

Video Delay:
- Video H-Delay: 0 - 1 Line in pixel clock steps
- Video V-Delay: 0 - 1 Frame in 1 line steps
- 0 - 14 “pictures”

Reference select mode: configured for each input or output – any of 4 looping references or internally derived references

Other Controls
Loss of input action: freeze, black (configurable)
HANC data blank:
- On/Off
- On removes all HANC data. Note this includes removal of embedded audio
VANC data blank:
- On: Blank all VANC interval
- Off: Pass VANC except SMPTE defined switching line and line following

Other Functions
- DVB-ASI handling: not transparent to DVB-ASI
- Synchronization method: video frame drop/repeat (including all VANC & HANC data and audio)
- Audio selection: pre- or post-video synchronization
- Freeze:
  - Field on interlaced standards
  - Frame in progressive standards
- Minimum delay (reference lock or free run): 2 µs to 7 µs for all formats (dependent on hysteresis state)
- SMPTE hysteresis window: 5 µs
**Video AHP Input (5919)**

Signals – Main Router Coax Inputs (5919 with 1235 or 1289 Coax Rear Panel)

Number and type: 24 per card automatic cable equalization and relocked

Connectors: BNC to IECl169.8, 75Ω electrical impedance. Gold plated.

Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-AS
- SMPTE ST 292 720p and 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Impedance: 75Ω

Data rate: 3 Mb/s - 3 Gb/s. Standard video rates relocked, all other rates auto-bypassed

Return loss: >15 dB 10 MHz to 1.5G Hz, >10 dB 1.5 GHz to 3 GHz

Amplitude: 800 mVp-p nominal

DC offset: <5V

Cable equalization – automatic for:
- Up to 350m/1150 ft. Belden 1694A at SD rates
- Up to 200m/650 ft. Belden 1694A at HD
- Up to 140/460 ft. Belden 1694A at 3G

Main Router Optical Inputs (5919 with 1236 or 1305 Fiber Rear Panel)

Number and type: 24 per card, relocked – removable video SFP modules

Connectors: LC/PC single mode fiber connection as standard

Wavelength: wideband receiver, 1260-1620 nm nominal

Sensitivity: -18 dBm

Typical link length: 10 km @ 3 Gb/s, 20 km @ 1.5 Gb/s, 30 km @ 270 Mbi/s

Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI, EN50083-9 DVB-AS
- SMPTE ST 292 720p and 1080i HD-SDI, SMPTE ST 424 1080p 3G-SDI

All 24 channels on a Video AHP Input module can process the video and embedded audio. Each video channel operates independently of all others. There are no specific timing constraints for de-embedding or processing of audio.

**Embedded Audio Processing**

Each audio processing block can:

- Process each mono audio channel independently:
  - Gain (-72/+30 dB, mute)
  - Signal phase invert
  - 16 independent audio mixers, with a choice of original embedded audio, processed audio, or silence

Audio channel swapping (shuffling) – for each embedded audio channel, choice of 'original' audio, 'gain/invert' audio, or mixed audio

Audio is re-embedded before the video is passed to the video crosspoint

Extract up to 16 channels of audio per video input (SD, HD and 3G level A) and pass all de-embedded audio channels (including VUC bits) to the audio crosspoint

Four video monitoring outputs are available. These can be taken from a point before or after processing. Multiviewer outputs are available from after input processing

Monitoring and multiviewer signals contain embedded audio present at that point in the signal chain

**AHP Embedded Audio Delay (S8AHP-VD)**

Delay adjustment per mono audio channel

Delay range: 0 to 2.7s

Delay resolution: 0.25 ms

**Input Formats De-embedding**

<table>
<thead>
<tr>
<th>Video Format</th>
<th>Channels</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>525/625</td>
<td>Up to 16</td>
<td>SMPTE ST 259 carrier: embedded audio to SMPTE ST 272ADEF, synchronous and asynchronous, with extended data packets for 24-bit audio (for 625 only)</td>
</tr>
<tr>
<td>720p</td>
<td>Up to 16</td>
<td>SMPTE ST 292 carrier: SMPTE ST 296 720p – 4:2:2 10-bit, 50/59.94/60 progressive frames/s Embedded audio to SMPTE ST 299-1 Audio synchronous or asynchronous to video 48 kHz nominal sample rate</td>
</tr>
<tr>
<td>1080i</td>
<td>Up to 16</td>
<td>SMPTE ST 292 carrier: SMPTE ST 274 1080i – 4:2:2 10-bit, 25/29.97/30 interlaced frames/s Embedded audio to SMPTE ST 299-1 Audio synchronous or asynchronous to video 48 kHz nominal sample rate</td>
</tr>
<tr>
<td>1080p</td>
<td>Up to 16</td>
<td>SMPTE ST 424 carrier: SMPTE ST 425 Level A – 1080p 4:2:2 10-bit 50/59.94/60 progressive frames/s (mapping structure 1) Embedded audio to SMPTE ST 299-1 &amp; 1080p 4:2:2 10-bit at 50/59.94/60 progressive frames/s Embedded audio to SMPTE ST 299 Audio synchronous or asynchronous to video 48 kHz nominal sample rate</td>
</tr>
<tr>
<td></td>
<td>Up to 16</td>
<td>SMPTE ST 425 Level B Dual Link, mapped to SMPTE ST 372/SMPTE ST 274 – 4:2:2 10-bit at 50/59.94/60 progressive frames/s Embedded audio to SMPTE ST 299 Audio synchronous or asynchronous to video 48 kHz nominal sample rate</td>
</tr>
</tbody>
</table>
**Video AHP Output (5949)**

**Main Router Coax Outputs (5949 with 1294 Coax Rear Panel)**
Type: 24 per card, reclocked
Connectors: BNC to IEC61169.8, 75Ω electrical impedance. Gold plated

Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-ASI
- SMPTE ST 292 720p & 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Impedance: 75Ω
Data rate: 3 Mb/s – 3 Gb/s. Standard video rates reclocked, all other rates auto-bypassed
Return loss: >15 dB 10 MHz to 1.5 GHz, >10 dB 1.5 GHz to 3 GHz typical
Amplitude: 800 mVp-p ±10%
Rise/fall time: <180 ps @ HD, <650 ps @ SD
Timing jitter: <0.2 UI @ 1.5G and 3G, <0.15 UI @ SD
Alignment jitter: <0.15 UI @ 1.5G and 3G, <0.1 UI @ SD
DC offset: 0V ± 0.5V

**Main Router Optical Outputs (5949 with 1302 Fiber Rear Panel)**
Type: 24 per card, reclocked, removable SFP modules
Connector: LC/PC single mode connection as standard

Wavelength: 1310 nm
Output power: typical -2 dBm. Other power & CWDM options available – contact Grass Valley

Standards supported:
- SMPTE ST 259 525 & 625 SD-SDI
- EN50083-9 DVB-ASI
- SMPTE ST 292 720p & 1080i HD-SDI
- SMPTE ST 424 1080p 3G-SDI

Data rate: 3 Mb/s – 3 Gb/s. Standard video rates reclocked, all other rates auto-bypassed
All 24 channels on a Video AHP Output module can process the video and embedded audio. Each video channel operates independently of all others. There are no specific timing constraints for de-embedding or processing of audio.

Video AHP Output modules select audio embedded in the incoming video signal, or audio from the audio crosspoint. This is then processed and embedded into the outgoing video signal (after processing, if required). Each audio channel can be individually selected, allowing a combination of embedded and routed audio sources to be processed and embedded

**Embedded Audio Processing and Embedded Audio Delay Block Diagram**

**AHP Embedded Audio Processing (S8AHP-VA)**

**Processing**
- Up to 16 mono channels per mix. Selectable from incoming video or separately routed audio
- Gain adjustment range per channel
- Silence or -72 to +30 dB in 0.1 dB steps
- Audio phase invert: available per mono or stereo signal. NORMAL/INVERT control (on/off)
- Audio gain adjustment:
  - Per mono or stereo signal
  - Silence or -72 to +30 dB in 0.1 dB steps
- Channel swap (shuffle): change the channel order of up to 16 audio channels

**Output Formats**

<table>
<thead>
<tr>
<th>Video Format</th>
<th>Channels</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>525/625</td>
<td>Up to 16</td>
<td>SMPTE ST 259 carrier: Audio to SMPTE ST 272 – Level A (20 bits) Synchronous to video at 48 kHz sample rate nominal, 4 audio groups maximum for 525/59.94 or 525/60</td>
</tr>
<tr>
<td>720p</td>
<td>Up to 16</td>
<td>SMPTE ST 292 carrier: SMPTE ST 296 720p – 4:2:2 10-bit, 50/59.94/60 progressive frames/s Embedded audio to SMPTE ST 299 Synchronous to video at 48 kHz sample rate nominal</td>
</tr>
<tr>
<td>1080i</td>
<td>Up to 16</td>
<td>SMPTE ST 292 carrier: SMPTE ST 274 1080i – 4:2:2 10-bit, 25/29.97/30 interlaced frames/s Embedded audio to SMPTE ST 299 Synchronous to video at 48 kHz sample rate nominal</td>
</tr>
<tr>
<td>1080p</td>
<td>Up to 16</td>
<td>SMPTE ST 424 carrier: SMPTE ST 425 Level A – 1080p 4:2:2 10-bit 50/59.94/60 progressive frames/s (Mapping structure 1) Embedded audio to SMPTE ST 299-1 and SMPTE ST 299-2 Synchronous to video at 48 kHz sample rate nominal</td>
</tr>
<tr>
<td></td>
<td>Up to 16</td>
<td>SMPTE ST 425 Level B Dual Link, mapped to SMPTE ST 372/SMPTE ST 274 – 4:2:2 10-bit at 50/59.94/60 progressive frames/s Embedded audio to SMPTE ST 299-1 Synchronous to video at 48 kHz sample rate nominal</td>
</tr>
</tbody>
</table>
**AES Input Module (4915)**

120 balanced AES at nominal 48 kHz sample rate
Pass all input audio channels (including VUC bits) to the audio crosspoint
Pass asynchronous audio transparently from any input
Dolby E is flagged as non-audio and passed transparently to the audio crosspoint

*Note: The 4915 Audio Input module is used for both AES and MADI inputs. The module is automatically configured to work as an AES input or MADI input when plugged into the appropriate rear panel.*

**AES Inputs**

Signal Standard: AES3-2009
Sample Rate: 48 kHz nominal. Synchronous or asynchronous to references or video input signals
Format: 20-bit or 24-bit transparent

**Balanced AES Electrical Interface (AES inputs) 4915 with 1352 (Sirius 840 and Sirius 850) or 1354 (Sirius 830)**

**D-Type Rear Panel**

Number and type: 120 AES pairs per card, balanced
Connector: 5x 62 way high-density D-type
Input signal sensitivity: >250 mVp-p

**Unbalanced AES Interface 4915 with 1355 (Sirius 840 and Sirius 850) or 1357 (Sirius 830)**

**Rear Panel**

Number and type: 120 AES pairs per card
Connector: 5x 62 way high-density D-type. Breakout cable to BNC also available

**MADI Input Module (4915)**

12 MADI inputs per input card (64 or 56 channel) nominal 48 kHz sample rate – auto changeover if main input fails
Pass all audio channels to the audio crosspoint
Dolby E is flagged as non-audio and passed transparently to the audio crosspoint

**AES and MADI input card processing:**

- Gain
- Phase invert
- Left/right swap
- Mono mix

**MADI Inputs (Balanced and Unbalanced rear panels) 4915 with 1285 (Sirius 840 or Sirius 850) or 1303 (Sirius 830)**

**Rear Panel**

Number and type: 3 per card. Unbalanced to AES10-id. 56 or 64 channel capable
Connector: HD-BNC
Cable equalization: 200m Belden 1855A or equivalent

**Processing on AES Inputs**

Gain: silence or -72 to +30 dB in 0.1 dB steps
Phase invert
Left/right swap
Mono mix: (A + B)/2
SPECIFICATIONS

AES Output Modules (4929)
Audio processing is standard on older 4925 and current 4929 modules
- Delay is standard on 4929 only
- Sample rate conversion is an option available on 4929 only
4929
Audio processing (gain/invert, delay, left/right swap, left to both, right to both, mono-mix)
S8A-SRC
Audio output sample rate conversion for 4929 modules (all audio channels on one module)
AES Outputs – Functional
Signal standard: AES3-2009
Output sample rate: free running (asynchronous to any reference) the signal input sample rate is re-generated at the output
Format: 20-bit or 24-bit, as input format
AES Outputs – Interface – Balanced 4929 with 1353 D Type Rear Panel
Number and type: 120 AES pairs per card, balanced
Connector: 5x 62 way high-density D-type
Output amplitude: > 2 Vp-p into 110Ω
Output impedance: 110Ω ±10%
Output rise and fall time: <30 ns
AES Outputs – Unbalanced 4929 with 1356 Unbalanced Rear Panel
Number and type: 120 AES pairs per card, unbalanced
Connector: 5x 62 way high-density D-type. Breakout cable to BNC also available

Audio Processing
Audio is routed from the audio crosspoint as mono signals
Individual mono channels (or stereo pairs as appropriate) can be processed as described below
Processing on AES Inputs
Gain: silence or -72 to +30 dB in 0.1 dB steps
Phase invert
Left/right swap
Mono mix: (A + B)/2
Delay (4949 only): 0 - 2s in 0.25 ms steps

With No Sample Rate Conversion:
Synchronous and asynchronous audio is passed transparently (including VU & C bits). Parity is re-calculated at the output
If two mono signals making up an AES pair are not synchronous, the left channel clock is used to generate the pair. Right channel samples are re-timed by drop/repeat
The AES clock rate is re-generated from the incoming audio (nominally 48 kHz)
VU & C flags are regenerated to default values when re-aligning audio

With Sample Rate Conversion enabled:
16 mono/8 AES are grouped together in each Sample Rate Conversion block
A reference clock is selected for each SRC block (any one of the video references, or the AES reference)
AES pairs are processed together through the SRC block. VU & C bits are regenerated to default values
If two mono signals making up an AES pair are not synchronous, the left channel clock is used to generate the pair. Right channel samples are re-timed by drop/repeat before sample rate conversion
Dolby E is detected and automatically bypasses sample rate conversion

Sample Rate Conversion (blocks of 16 mono channels, converted as AES pairs)

Reference Selection
Derived Video Reference 1 - 4
AES Reference

MADI Inputs (on Balanced and Unbalanced Rear Panels)
Number and type: 3 per card, unbalanced to AES10-id. 56 or 64 channels @ 48 kHz
Connector: HD-BNC
Impedance: 75Ω ±2Ω
Output amplitude: 720 mV nominal
**MADI Output Modules (4925 or 4929)**

Audio processing is standard on all modules
- Delay is standard on 4929 only
- Sample rate conversion is an option available on 4929 only

**Note:** The 4925 and 4929 Audio Output module is used for both AES and MADI inputs. The module is automatically configured to work as an AES input or MADI input when plugged into the appropriate rear panel.

**4925**
- Audio processing (gain/invert, left/right swap, left to both, right to both, mono-mix)

**4929**
- Audio processing (gain/invert, delay, left/right swap, left to both, right to both, mono-mix)

**S8A-SRC**
- Audio output sample rate conversion for 4929 modules (all audio channels on one module)
- **4925 modules do not support sample rate conversion or delay**

**MADI Outputs – Functional**
- Signal standard: AES10-2003. 56 or 64 channels @ 48 kHz sample rate
- Sample rate: synchronous to AES reference or video ref 1-4. Lock to MADI channel 0 if no reference is present
- Audio format: 20-bit or 24-bit transparent

**Audio Processing**

Receive 24 video signals (which may contain embedded audio)

Receive 16 channels of mono audio per video output, routed from the audio crosspoint
- Gain (-72/+30 dB, mute)
- Signal phase invert
- 16 independent audio mixers
- Pass audio already embedded on the incoming video, or synchronously embed up to 16 channels per video stream from the audio crosspoint on a mono channel by channel basis
- Synchronize routed audio channels (by drop/repeat) to re-time to the video signal for embedding
- All VANC data is removed

**With No Sample Rate Conversion:**

- Synchronous and asynchronous audio is passed transparently (including VU & C bits). Parity is re-calculated at the output
- If two mono signals making up an AES pair are not synchronous, the left channel clock is used to generate the pair. Right channel samples are re-timed by drop/repeat
- The AES clock rate is re-generated from the incoming audio (nominally 48 kHz)
- VU & C flags are regenerated to default values when re-aligning audio

**With Sample Rate Conversion enabled:**

- 16 mono/8 AES are grouped together in each Sample Rate Conversion block
- A reference clock is selected for each SRC block (any one of the video references, or the AES reference)
- AES pairs are processed together through the SRC block. VU & C bits are re-generated to default values
- If two mono signals making up an AES pair are not synchronous, the left channel clock is used to generate the pair. Right channel samples are re-timed by drop/repeat before sample rate conversion
- Dolby E is detected and automatically bypasses sample rate conversion

**MADI Outputs (Coax Rear Panel) 4925 or 4929 with 1295**

**Cox Rear Panel**
- Number and type: 12 with dual outputs per signal
- Connector: BNC to IEC61169.8 75Ω electrical impedance
- Impedance: 75Ω ± 2Ω
- Output amplitude: 720 mV nominal

**MADI Outputs (Fiber Rear Panel) 4925 or 4929 with 1296**

**Fiber Rear Panel**
- Number and type: 12 with dual outputs per signal. Removable SFP modules
- Fiber connector: LC/PC single mode
- Wavelength: 1310 nm nominal
- Output power: typical -2 dBm. Other power and CWDM wavelength options available – contact Grass Valley
- Typical fiber length (MADI): 20 km (12.5 miles) single mode
<table>
<thead>
<tr>
<th>System Components</th>
<th>Audio Inputs</th>
<th>Audio Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>U48N3800</td>
<td>4915</td>
<td>4929</td>
</tr>
<tr>
<td>Sirius 800 Series PSU</td>
<td>Sirius 800 AES / MADI Input Module — 120 AES pairs or 12 MADI (main + redundant)</td>
<td>Sirius 800 AES/MADI Output Module with Audio Delay. 120 AES pairs or 12 MADI (main and redundant)</td>
</tr>
<tr>
<td>1911</td>
<td>1354</td>
<td>S&amp;8A-SRC</td>
</tr>
<tr>
<td>Sirius 800 Series PSU shelf, for up to 4 PSUs</td>
<td>Sirius 830 Balanced AES Input Rear Panel — 120 AES pairs + 3 MADI</td>
<td>Sirius 800 AHP — Audio Output Sample Rate Conversion (all audio channels on one module). For 4929</td>
</tr>
<tr>
<td>2463</td>
<td>1357</td>
<td>1353</td>
</tr>
<tr>
<td>Nucleus2 Router Control Module</td>
<td>Sirius 830 Unbalanced AES Input Rear Panel — 120 AES pairs + 3 MADI — EXCLUDES BREAKOUT CABLE ASSEMBLIES. 5 NEEDED PER REAR PANEL</td>
<td>Sirius 800 Balanced AES Output Rear Panel — 120 AES pairs + 3 MADI (for 4925/9 modules)</td>
</tr>
<tr>
<td>2457</td>
<td>2502910</td>
<td>1356</td>
</tr>
<tr>
<td>Sirius 830 Control Interface Module for Cool Blue Fans</td>
<td>24-channel unbalanced AES breakout cable — BNC</td>
<td>Sirius 800 Unbalanced AES Output Rear Panel — 120 AES pairs + 3 MADI — EXCLUDES BREAKOUT CABLE ASSEMBLIES. 5 NEEDED PER REAR PANEL</td>
</tr>
<tr>
<td>2458</td>
<td></td>
<td>2502910</td>
</tr>
<tr>
<td>Sirius 840/850 Nucleus1 Control Interface Module for Cool Blue Fans</td>
<td></td>
<td>24-channel Unbalanced AES breakout cable — BNC</td>
</tr>
<tr>
<td>6081270</td>
<td></td>
<td>1295</td>
</tr>
<tr>
<td>Sirius 800 Cool Blue Slim Fan Assembly</td>
<td></td>
<td>Sirius 800 Output Video/MADI BNC rear connector strip — 24-channel (for 5923 &amp; 4925/9 modules)</td>
</tr>
<tr>
<td>6081280</td>
<td></td>
<td>1296</td>
</tr>
<tr>
<td>Sirius 800 Cool Blue HF Fan Assembly</td>
<td></td>
<td>Sirius 800 Video/MADI Output Rear Panel NOT INCLUDING FIBER TRANSMITTERS — 24/dual 12 channel (for 5924 &amp; 4925 modules)</td>
</tr>
<tr>
<td>5905</td>
<td></td>
<td>1303</td>
</tr>
<tr>
<td>Sirius 800 Series Video Crosspoint Module</td>
<td>Sirius 830 MADI BNC Input Rear Panel — dual 12-channel (for 4915 Input Module)</td>
<td>Sirius 850 Standard Video Output Module (expandable) — 48-channel (for 5931 or 5932 modules)</td>
</tr>
<tr>
<td>S800-X-EXP</td>
<td>1304</td>
<td>1309</td>
</tr>
<tr>
<td>Sirius 850 Expansion Video Crosspoint Kit</td>
<td>Sirius 830 MADI Fiber Input rear panel NOT INCLUDING FIBER RECEIVERS — dual 12-channel (for 4915 input modules)</td>
<td>Sirius 850 Video Expansion Output Rear Panel — 24-channel (to connect to second Sirius 850 frame). Includes expansion interconnect cables</td>
</tr>
<tr>
<td>5903</td>
<td>1352</td>
<td>1365</td>
</tr>
<tr>
<td>Sirius 800 Series Audio Crosspoint Module</td>
<td>Sirius 840/850 Balanced AES Input rear panel — 120 AES pairs + 3 MADI (uses 1369 or 1370 rear panel)</td>
<td>Sirius 850 Video HD BNC Expansion Output Rear Panel — 24-channel (outputs 576-1152 on single S850 frames)</td>
</tr>
<tr>
<td>RMYS HWPC890</td>
<td>1355</td>
<td>Monitoring and Multiviewer Outputs</td>
</tr>
<tr>
<td>Sirius 800 Door PC and Screen Assembly</td>
<td>Sirius 840/850 Unbalanced AES Input rear panel — 120 AES pairs — EXCLUDES BREAKOUT CABLE ASSEMBLIES. 5 NEEDED PER REAR PANEL</td>
<td>5902</td>
</tr>
<tr>
<td></td>
<td>1285</td>
<td>Sirius 800 Series Multiviewer Crosspoint</td>
</tr>
<tr>
<td>Video Inputs</td>
<td>1286</td>
<td>5931</td>
</tr>
<tr>
<td>5917</td>
<td>Sirius 800 AES/MADI Output Module with Audio Delay. 120 AES pairs or 12 MADI (main and redundant)</td>
<td>Sirius 800 External Multiviewer Output Module — 48-channel (uses 1369 or 1370 rear panel)</td>
</tr>
<tr>
<td>Sirius 800 Standard Video BNC/Fiber Input Module — 24-channel (uses 1234/1349 coax or 1236/1305 fiber rear panels)</td>
<td>1369</td>
<td>Sirius 830/840 Video External Multiviewer Output Rear Panel HD BNC — 48-channel</td>
</tr>
<tr>
<td>5919</td>
<td>5926</td>
<td>1370</td>
</tr>
<tr>
<td>Sirius 800 AHP Input Module with delay and sync capability — NO PROCESSING FITTED. 24-channel (uses 1234/1349 coax or 1236/1305 fiber rear panels)</td>
<td>Sirius 850 AES/MADI Output Module with Audio Delay. 120 AES pairs + 3 MADI (uses 1236/1305 fiber rear panels)</td>
<td>Sirius 850 Video External Multiviewer Output HD BNC Rear Panel — 48-channel (for 5931 or 5932 modules)</td>
</tr>
<tr>
<td>1234</td>
<td>5938</td>
<td>5930</td>
</tr>
<tr>
<td>Sirius 830 Video BNC Input Rear Panel — 24-channel (use with 5915/6/7/9 input modules)</td>
<td>Sirius 850 Standard Video Output Module (expandable) — 24-channel (uses 1294 or 1302 rear panel)</td>
<td>Sirius 840/850 Input Monitoring Crosspoint Card (for I/O monitoring)</td>
</tr>
<tr>
<td>1236</td>
<td>5925</td>
<td>5933</td>
</tr>
<tr>
<td>Sirius 830 Video Fiber Input Rear Panel NOT INCLUDING FIBER RECEIVERS — 24-channel (for 5915/6/7/9 input modules)</td>
<td>Sirius 800 Video Embedding &amp; AHP Output Module NO PROCESSING FITTED — 24-channel (uses 1294 or 1302 rear panel)</td>
<td>Sirius 840/850 Output Monitoring Card</td>
</tr>
<tr>
<td>1349</td>
<td>1294</td>
<td>5934</td>
</tr>
<tr>
<td>Sirius 840/850 Video BNC Input Rear Panel — 24-channel (for 5915/6/7/9 input modules)</td>
<td>Sirius 800 Video BNC Output Rear Panel — 24-channel (for 5925/6 &amp; 5937/8 modules)</td>
<td>MV-800 Integrated Multiviewer Module, including 4 output licenses</td>
</tr>
<tr>
<td>1305</td>
<td>1302</td>
<td>1312</td>
</tr>
<tr>
<td>Sirius 840/850 Video Fiber Input Rear Panel NOT INCLUDING FIBER RECEIVERS — 24-channel (for 5915/6/7/9 modules)</td>
<td>Sirius 800 Video Fiber Output Rear Panel NOT INCLUDING FIBER TRANSMITTERS — 24-channel (for 5925/6 &amp; 5937/8 modules)</td>
<td>MV-800 Multiplexer Rear Panel Output (modules ordered separately — see output modules below)</td>
</tr>
<tr>
<td>1296</td>
<td></td>
<td>1322</td>
</tr>
<tr>
<td>Sirius 840/850 Video/MADI BNC Input Rear Panel — 24-channel (for 5913/4915 Input Modules)</td>
<td>Sirius 830/840 Video External Multiviewer Output Rear Panel HD BNC — 48-channel (for 5931 or 5932 modules)</td>
<td>CC-TTH-3G-N Dual Output HD-BNC Coaxial SFP Module</td>
</tr>
<tr>
<td>1322</td>
<td></td>
<td>1312</td>
</tr>
<tr>
<td>Sirius 840/850 Video/MADI Fiber Input rear panel NOT INCLUDING FIBER RECEIVERS - 24-channel (For 5914 &amp; 4915 Input Modules)</td>
<td>Sirius 850 AES / MADI Input Module — 120 AES pairs or 12 MADI (main + redundant)</td>
<td>ST31ST31-3 Dual Output Fiber SFP Module (1310 nm Single Mode LC/PC)</td>
</tr>
<tr>
<td>1352</td>
<td></td>
<td>1312</td>
</tr>
<tr>
<td>Sirius 840/850/850 Balanced AES Input rear panel — 120 AES pairs + 3 MADI (uses 1294 rear panel)</td>
<td>Sirius 830 Balanced AES Input Rear Panel — 120 AES pairs + 3 MADI — EXCLUDES BREAKOUT CABLE ASSEMBLIES. 5 NEEDED PER REAR PANEL</td>
<td></td>
</tr>
</tbody>
</table>
SFP Fiber Modules

**FGAEY ST47ST49-3**  
CWDM SFP Laser Dual Transmitter Module — 1470 nm + 1490 nm. 0 to -4 dBm output power

**FGAEY ST51ST53-3**  
CWDM SFP Laser Dual Transmitter Module — 1510 nm + 1530 nm. 0 to -4 dBm output power

**FGAEY ST55ST57-3**  
CWDM SFP Laser Dual Transmitter Module — 1550 nm + 1570 nm. 0 to -4 dBm output power

**FGAEY ST59ST61-3**  
CWDM SFP Laser Dual Transmitter Module — 1590 nm + 1610 nm. 0 to -4 dBm output power

**FGAEY SRR-3**  
Dual Channel SFP Fiber Receiver — 3G/HD/SD/MADI

**FGAEY ST31ST31-3**  
Dual Channel SFP Fiber Transmitter — 1310 nm -5 to 0 dBm output power. For 3G, HD, SD & MADI

**FGAEY ST55ST55-3**  
Fiber SFP — 2-channel 1550 nm Transmitter. +5 to 0 dBm output power. For 3G, HD, SD & MADI

**FGAEY ST27ST29-3**  
CWDM SFP Laser Dual Transmitter Module — 1270 nm + 1290 nm. 0 to -4 dBm output power

**FGAEY ST31ST33-3**  
CWDM SFP Laser Dual Transmitter Module — 1310 nm + 1330 nm. 0 to -4 dBm output power

**FGAEY ST35ST37-3**  
CWDM SFP Laser Dual Transmitter Module — 1350 nm + 1370 nm. 0 to -4 dBm output power

**FGAEY ST39ST41-3**  
CWDM SFP Laser Dual Transmitter Module — 1390 nm + 1410 nm. 0 to -4 dBm output power

**FGAEY ST43ST45-3**  
CWDM SFP Laser Dual Transmitter Module — 1430 nm + 1450 nm. 0 to -4 dBm output power

**FGAEY ST47ST49-3**  
CWDM SFP Laser Dual Transmitter Module — 1470 nm + 1490 nm. 0 to -4 dBm output power

**FGAEY ST51ST53-3**  
CWDM SFP Laser Dual Transmitter Module — 1510 nm + 1530 nm. 0 to -4 dBm output power

**FGAEY ST55ST57-3**  
CWDM SFP Laser Dual Transmitter Module — 1550 nm + 1570 nm. 0 to -4 dBm output power

**FGAEY ST59ST61-3**  
CWDM SFP Laser Dual Transmitter Module — 1590 nm + 1610 nm. 0 to -4 dBm output power