STAGE RACER 2

Decentralized TRANSMISSION, ROUTING, DISTRIBUTION and PROCESSING solution

Product Highlights

The STAGE RACER 2 is a complete optical fiber transmission solution for every broadcast event, ranging from simple OB interconnect to complex star, ring or linear topology spread over a whole TV compound.
It also supports long distance transmission for remote production capacity allowing content exchange between distant locations while using dark fiber or SMPTE IP protocols.

Stage Racer 2 is designed to accept all kinds of signal on a same device without external adapter. Internally those signals can be associated together / routed / distributed to all other machines of the network.

Stage Racer 2 also offers processing capabilities with Audio Embedding/De-embedding, Audio shuffling, Audio SRC, Frame buffering, Delays... Numerous other processing functions will be added later on.

The network can be controlled by a built-in intuitive web interface or with automation systems like VSM, KSC Core…

Electrical Interfaces

The Stage Racer 2 is available in two standard configurations: 24 or 12 SDI channels, direction configurable, plus a common set of signals. Each equipment assumes transmission of a comprehensive set of signals as follows:

Stage Racer 2 – 24 SDI version	Stage Racer 2 – 12 SDI version
16 SD to 3G direction switchable channels	8 SD to 3G direction switchable channels
8 SD to 12G direction switchable channels	4 SD to 12G direction switchable channels
1 Distributed Genlock (Composite video / Black burst / Tri-level)	
16 Analog Audio I/O (optional mic gain/48V module)	
2 Ethernet 10/100/1000Mbs	
2 Data RS 232/422/485 (optional 6 additional 500Kbps RS422 serial channels)	
8 Contact closures	
4 AES3 bidirectional (Intercom panel compatible)	
1 MADI I/O (AES10) signal (Shared with 2 of the 4 AES connectors)	
1 optional Dante / AES67 audio module with 64 channels support.	

Each SDI port can be independently configured as an input or an output for asymmetrical usage at central points.

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Signal Transmission

Transmission is based on TDM multiplexing for the all signals managed by the system, each TDM multiplex is transmitted to another machine by "Trunk" ports. Each machine can have up to 4 trunk ports (minimum is 1 for a network endpoint).

Most part of the bandwidth is dynamically allocated for high data rate signals (SDI / Ethernet / Raw signals). A small remaining bandwidth is fixed and guaranteed, dedicated to low data rate signals (Genlock / Audio / Serial / GPIO / System management) with a predefined maximum channel capacity per signal type.

As a base rule, each trunk total I/O capacity is:

- 25 HD signals (or similar rate signals like GB Ethernet), or 12x3G or 3x12G or any combination,
- 1 Genlock / Tri-level / Composite,
- 400 Bidirectional Processed Audio channels,
- 50 Bidirectional Serial channels,
- GPIO for 256 frames.

For SDI, routing engine will send the signals at the desired points only, after this point the signal is not carried on the network and its bandwidth is available. For audio all required signals will be allocated one of the 400 channels and routed elsewhere in the network. The same principle is applied to GPIO and Serial channels and allow signal distribution or point to point transmission.

For remote production applications, the machine will act as a bridge between the standard and the IP world. Signals managed locally can be sent over IP and vice versa.
Depending of the application, SMPTE ST-2022 or SMPTE ST-2110 is available.

Video & Audio Processing

To ease system setup and provide a seamless integration the Stage Racer 2 currently offers the following processing capabilities:

Frame buffer & Delays: Each 3G SDI ports can be transmitted independently (with its own master clock frequency) or it can be frame synced to the system supplied Genlock. Video phase and audio delay lines are also available.

Embedding/De-embedding: Audio can be inserted or extracted from any SDI port of the system or shuffled between one port to another.

Audio processing: Each digital audio input (SDI De-embedded / MADI / Dante-AES67) enters the transmission engine thru an SRC to be at the same rate as the analog channels. Inversely each output (SDI Embed / Dante-AES67) will exit the transmission engine thru an SRC. Thus, any audio source can be routed to any kind of audio output.

For audio processing, 400 channels are available for all audio signals that need to be embedded or de-embedded to be routed anywhere in the network. Audio processing does not affect the audio transport capabilities that remains virtually unlimited by the use of MADI, AES, Embedded SDI or Networked audio raw transport.

Multiviewer capabilities, signal compression and other processing features will be added later on.

Connectors / Cooling / Power / Options

Standard connectors are used for all the signals. SDI, Analog video and Digital audio are mostly on BNC connectors while eight 3G SDI ports are on Mini sized HD BNC. The other connectors are RJ45 / D SUB with same pinout as the original Stage Racer.

Each transmission trunk is available on a dual LC/PC socket, the 4 remote production ports are grouped on a singlemode MPO connector and need a standard break out cable to access each port

The unit achieves a very efficient and silent cooling thanks to a thorough design on internal heatsinks and venting grilles. Temperature raise on the mother board is kept under 25°C at the fans lower speed making this product a good choice for outside applications.

Each unit has a built-in redundant power supply. An optional 12V power input can act as a third power source.

An 8 channels module with mic preamp plus phantom power and a 6 hi-speed serial channels module are also available.

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Web management interface / Routing

All the configuration is done through a standard HTML web interface. Through this interface the user can:

- Explore the network topology (automatic topology discovery),
- Route and distribute all signals (audio, video, IP, RS, GPIO, ...),
- Monitor status (link saturation, optical losses, redundancy, signal status, signal path used, logs),
- Set priorities for important signals.

The Stage Racer fiber network topology is automatically detected and signals are dynamically re-routed in case of link breakage.

The architecture is completely decentralized, if any node is added or removed the rest of the network will automatically detect the new topology and keep working as intended. It is also possible to temporarily connect multiple networks to mutualize resources for big events without having to reconfigure the entire system.

Network Graph, Device/Port configuration interface, Live Status, Audio Activity and Logs
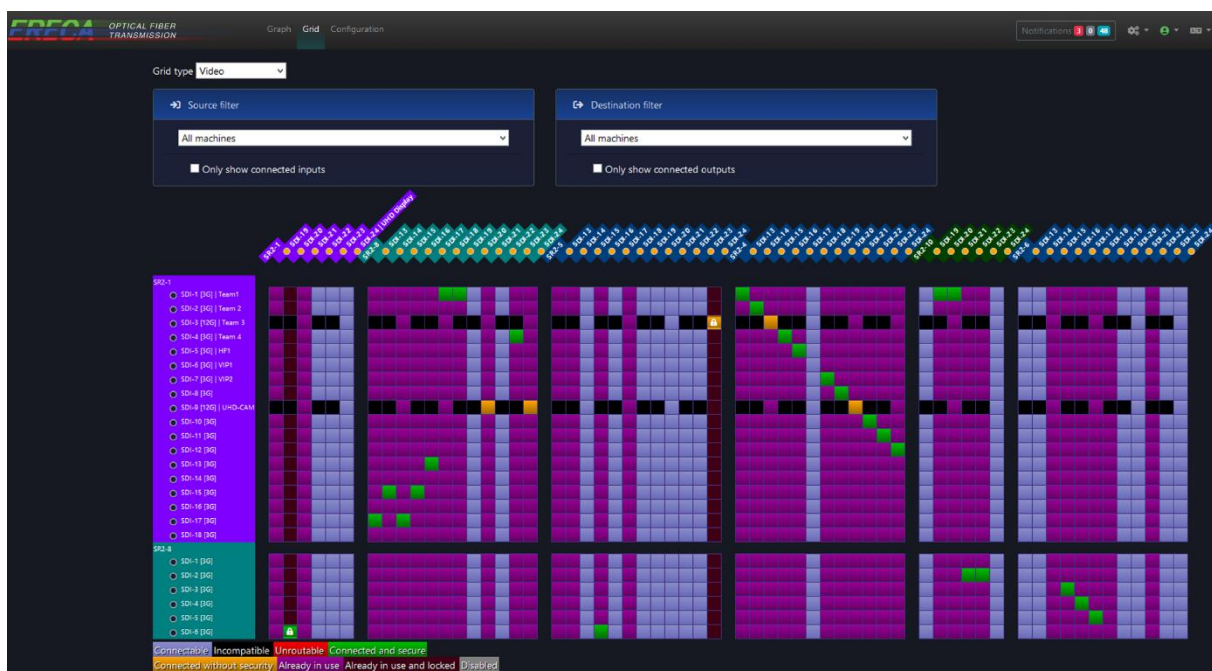
Grid view with cross-points matrix, filters, routing indications and signal status

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Technical specifications

Optical	
Trunk	4 optical fiber trunks per unit providing a total of 160GBps of data traffic In and Out 10Km of single mode fiber / Link power budget 10dB / LC/PC connector (Optionally 40Km range)
ST2110:	4 Standard 10Gbe Ethernet port / 10Km single mode fiber / MPO connector for the 4 channels

SDI Video	
Number, connector:	12 or 24 Channels (Each channel is direction configurable), 75Ω BNC
Standard (Upper row):	SD, ASI, HD, 3G / BNC Connector
Standard (Mid row):	SD, ASI, HD, 3G / HD-BNC Mini Connector
Standard (Lower row):	SD, HD, 3G, 6G, 12G / BNC Connector
Return loss:	Better than -15 dB for 0 to 1,5 GHz / -10 dB for 1,5 to 3 GHz / -6 dB for 6 to 12 GHz

Composite Video / GL	
Number:	1 port, direction configurable / 75Ω BNC connector
Standard:	PAL, NTSC Composite / Black Burst / Tri-level (Auto sense) Genlock clock may not support all formats
Bandwidth:	> 5,8 MHz at +/- 0,2 dB
Differential Gain/Phase:	< 1%, < 1°
Group delay:	< 10 ns
SNR:	> 67 dB (CCIR567)

Analog Audio	
Number, connector:	16 bidirectional channels, D-SUB 37 female socket
Impedance:	Input: 10 KΩ differential (non-floating), Output: 20Ω differential (non-floating)
Amplitude:	+4 dBm nominal (saturation at +18 dBm)
Bandwidth:	50 Hz to 15 kHz at +/- 0,5dB (20 Hz to 20 kHz at -3 dB)
Distortion:	0,05% at 1kHz +18 dBm
Signal to noise ratio:	90dB, "A" weighted
Mic preamp option:	Gain from 10 to 60dB (3dB steps) / Phantom power / Preamp Bypass (8 preamp fitted on channels 9 to 16)

Digital audio	
AES ports:	4 bidirectional ports (Intercom panel compatible) / 75 Ω BNC connector / Shared with Madi port BNC
MADI port:	1 input, 1 output / 48 kHz support (SRC) / 75 Ω BNC connector
DANTE-AES67 option:	Dante and AES67 support / 64 channels / 48 kHz support (SRC) / Routed to the gigabit ports

Serial	
Number, connector:	2 bidirectional channels, 1 RJ 45 socket per channel
Protocols:	RS485, RS422, RS232
Data rate:	0 to 500 KB/s (Sony compatible)
RS422 option:	6 bidirectional RS422 / 0 to 500 KB/s (Sony compatible) / D-SUB 25 female socket on front side

Ethernet	
Number, connector:	2 independent channels, RJ45 Socket
Protocols:	10, 100 or 1000 Mb/s, Full or Half-duplex (Auto), MDI or MDI-X (Auto)

GPIO	
Number, connector:	8 bidirectional GPIO contacts / 6 on D-SUB 15 female plus 1 GPIO along each RJ45 Serial connector
Output:	Relay (dry contact) 'Common' – 'Normally Open' terminals for each relay
Input:	Floating on the D-SUB, Input pin grounding on RJ45

Powering	
Consumption:	80 Watts per unit maximum (All trunks and all signals used + Remote production active)
Mains source:	Dual redundant built in PSU / Voltage range 90 to 260 VAC / 47 to 63 Hz
Low voltage option:	10 to 16 VDC / D-SUB 25 with power inserts (fitted on front side) / protected by internal fast acting fuse

Mechanical	
Size:	1 RU 19" rack, depth 335mm excluding connectors
Weight:	4.5 Kilograms
Cooling:	Internal fan tray with transversal cooling flow / side panels in/out / Passive heatsinks on actives
Operating temp range:	From -20 to + 60°C (Avoiding direct sun exposition)

Signaling / Admin	
Local display:	OLED display for main parameters (IP add / Optical power) / 1 LED per signal / Technical alarms LED
Setup:	Web interface / 3rd party automation protocols (VSM, KSC Core….)
Connection:	1 dedicated 10/100Mbs ethernet port

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Best in class NETWORKED SOLUTION
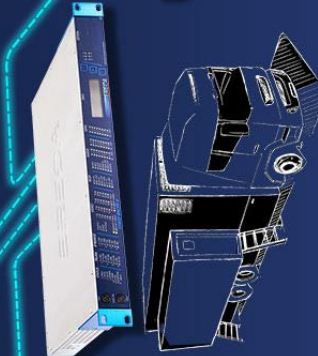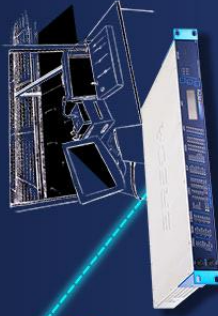
TRANSMISSION CAPACITY 40GBs I/O per port (4/frame)

25*HD signals (or similar rate like GB Ethernet) or 12*3G or 3*12G (or any combinaison)
1 Genlock / Tri-level / Composite
400 bi-di Processed Audio channels
50 bi-di Serial channels
GPIO for 256 Frames

INTERFACES

16 SD to 3G bi-di ports (direction configurable)
8 SD to 12G bi-di ports (direction configurable)
1 Distributed Genlock (Composite video / Black burst / Tri-level)
16 Analog audio I/O (optional Mic gain +48V)
2 Ethernet 10/100/1000Mbs (optional Dante / AES67)
2 Data RS 232/422/485 (optional 6 RS422)
8 Contact closures
4 AES3 bi-di (Intercom panel compatible),
1 MADI I/O (AES10) Signal (Shared with 2 of the 4 AES3 connectors),
1 Administration Port (Web interface / 3rd party control)

FEATURES

Routing, Distribution, Signal lock, Priorities
Processing: Audio Embedding, De-Embedding, SRC,
    Audio Shuffling, Delay, Framesync...
Dynamic topology: star / ring / linear / combinaison
3rd party control (VSM, KSC Core...)
Built for ST-2110 compliance (baseband to IP gateway)

2 optical fibers only

ERECA
Supercharge your optical FIBER

STAGE RACER
Best in class STAGEBOX SOLUTION

SPECIFICATIONS

4 to 12 video 3G / HD / SDI signals (direction configurable with Web interface),
1 Genlock bidirectional (Composite video / Black burst / Tri-level),
16 Analog audio for intercom or broadcasting,
2 Ethernet 10/100/1000Mbs (1 Gigabit trunk with 2 VLANS),
4 Data RS 232/422/485,
8 Contact closures,
4 AES 3 bidirectional (Intercom panel compatible),
1 Bidirectional MADI (AES10) Signal (Shared with 2 of the 4 AES connectors).

2 optical fibers only