

MEDIA | NUMERICS
hear. we are.

hear. we are.



ROCK | NET 300
by MEDIA NUMERICS

About ...

... Media Numerics

Media Numerics is focusing on research and development of innovative real-time network solutions for live performances. One of our objectives is to hide complex technology behind a transparent and intuitive way of system set-up and operation. Making our customers part of the design team results in an outstanding feature set to suit real world applications.

Media Numerics is proud of an international team of senior professionals with profound experience in various fields of our industry such as pro-audio, live sound, broadcast and communications technology. They possess a vast knowledge of digital audio technology and their expertise is marked by a number of awards and patents.

... RockNet

RockNet is a real-time, low latency audio distribution network tailored to tour and installed sound applications. RockNet provides a universal solution to almost any imaginable audio distribution challenge and behaves very much like a traditional analog active split system. It conveys 160 24bit/48kHz audio channels counterrotating on a single CAT5 cable. RockNet products are designed for heavy duty road use. Their ruggedized steel enclosures resemble the look and feel of a modular stagebox. All devices feature locking IEC connectors for the redundant power supplies. All other connectors are entirely gold-plated and the circuit design is streamlined to ultra low noise and minimum distortion to meet the highest demands in audio quality.

RockNet 300 Series

Performance Audio Networks

Genuine audio technology

RockNet is a genuine audio network platform, designed purposely for live sound applications. It is a cost-effective, integrated networking product invented, designed, and optimized for audio contribution and distribution.

RockNet provides ultra low latency and very high audio quality.

Easy Installation

RockNet is an integrated system that does not require any third party products. Only two types of cables are necessary to hook up a network, microphone cable with XLR (male/female) and CAT5 with RJ45 (Ethercon®). RockNet devices do not require breakout panels or any special cables and connectors. Up to 99 devices can easily be added to the network.

RockNet can be setup within minutes.

Easy Operation

All devices can be configured intuitively by front panel push buttons. No particular IT or computer networking know-how is needed to setup and operate RockNet. A system check can be performed within a few seconds per each device even without using a computer.

RockNet offers very high flexibility.

High Reliability

RockNet incorporates a streamline redundancy concept on device and network level. The network interface of each device features two interconnections for fail-safe transmission of audio signals on CAT5 infrastructure. Based on a redundant ring topology, RockNet forms a self-healing network in case of a connection fault between two devices. All devices feature dual power supplies with locking IEC connectors.

RockNet offers superior resilience.

RN.300 Features:

- 160 channels
- Up to 99 devices in one network
- CAT5 redundant network interface
- Free wheeling data interface
- Front panel operation
- Redundant power supply
- 48kHz or 96kHz sample rate
- Status indicators (LEDs)
- Remote Control

Redundant Network Topology





Picture this ...

70,000 spectators surrounding the stage and waiting for the show to start, the band approaches the stage, your cabinets and amps are flying high under the roof and the FOH mixer is ready to start. Not a good moment to worry about the reliability of the audio network.

Here is the dream ...

A system that sounds excellent, is easy to setup, install and operate, delivers highest resilience, allows maximum system flexibility and central management. High power analog outputs and digital console interfacing complete the wish list.

... that finally comes true!

Simplicity

RockNet is a simple to install and easy to operate audio network. Eight port granularity provides maximum distribution efficiency and feasibility. Intuitive front panel operation makes quick and easy configuration available at your fingertips.

No Ethernet, no IP, no fuss.

- auto addressing
- easy system setup
- easy operation

Resilience

RockNet is a fully redundant audio network, protected against device, power supply and network connection failures. RockNet ring topology avoids single points of failure in the network.

General Network Specifications

Audio Data Rate	184.32 Mbit/s	
Ancillary Data Rate	10 Mbit/s sustained data rate	
Number of Nodes	1 .. 99	
Sampling Frequencies	48 kHz, 96 kHz	+ / - 10 ppm (internal) + / - 80 ppm (external lock range)
Max. Number of Inputs	768	
Max. Number of Outputs	768	
Number of Channels	160 @ 24 Bit / 48 kHz	
	80 @ 24 Bit / 96 kHz	
	128 @ 32 Bit / 48 kHz	
	64 @ 32 Bit / 96 kHz	
Delay	400 µs D In - D Out @ 48 kHz	maximum system size (99 network devices within 10 km system perimeter)
	850 µs A In - A Out @ 48 kHz	
Cable Length	150 m CAT 5e Cable	max. distance between two network devices
	2 km Multi Mode Fiber	
	20 km Single Mode Fiber	
Wordclock In	TTL / 75Ω BNC Connector	
Wordclock Out	TTL / 75Ω BNC Connector	
USB Port	USB 1.1 / 2.0 compatible	
Ethernet Port	10 BaseT / 100 BaseT	
Operating Temperature	0 .. 50° C	32 .. 122° F
Power Requirements	100 .. 240 VAC	47 .. 63 Hz

RockNet 300 Series

Performance Audio Networks

Control Section, Network Interface and Thermal Management



Control Section

The control section of all 19" RockNet products provides the controls to set up and configure the unit without a computer. It incorporates three two-digit displays and six push buttons that are used for intuitive operation of a three level menu: Default mode, Channel mode, Options mode.

Default mode displays the status of the device when the system is in normal operation and shows:

- device ID [1 to 99]
- channel assignment for the left hand channels [quad 1 to 40]
- channel assignment for the right hand channels [quad 1 to 40]

A 'quad' is a term used to describe a four channel block that simplifies the routing. The 160 transport channels are packaged into 40 quads.

Channel mode displays and controls each channel parameter. By pushing the select button besides the XLR connector of the respective channel, the parameter values are displayed and can be adjusted.

Options mode accesses general device setup:

- select primary / secondary master
- select sync source [internal / external wordclock / digital Input #]
- select sample rate [48kHz / 96kHz]
- lock-out front panel operation
- switch off display
- display device temperature

LED indicators are provided for the redundant power supply and network connectivity status, master selection, external sync and sample rate.

Network Interface

The network interface incorporates Media Numerics' proprietary core technologies. Lateral™ ultra-low latency asynchronous transmission enables RockNet to support various redundant network topologies and to provide real-time, isochronous data transport in conjunction with packetized data such as TCP/IP. The data rate is 400 MBits/s on a CAT5 cable and the number of nodes is infinite, though limited to 99 for practical reasons.

Concrete™ clock recovery and jitter rejection utilizes a unique digital PLL structure. Jitter magnitude, spectrum and probability distribution are de-randomized by a sophisticated digital modulation scheme, resulting in an extremely high jitter rejection and zero jitter build-up through the network.

Two Ethercon® RJ45 network connectors link to an upstream and a downstream neighbor in a redundant ring topology. These two connectors can also be used to provide a parallel link in case of point-to-point network scenarios.

Thermal Management / Power Supply



RockNet devices feature redundant switch-mode power supplies suitable for world-wide operation. The power supplies are modular and therefore provide easy replacement in case of failure. Locking IEC connectors are standard. Built in silent running fans add to the component reliability and enable ultimate rackspace efficiency.

RockNet 300 Series

Performance Audio Networks

RockNet is a scaleable, cost-effective network solution conceived and optimized for managing audio and control data for live sound. It is designed to link up to 99 devices into one single network. Any of the 160 audio channels can be 'dropped' to a maximum of 768 outputs in the bidirectional network without limitation. A highlight of RockNet is the redundant ring topology. A connection failure between two devices does not affect the audio transmission or system integrity. The ring is self-healing and offers significant advantages in performance, consistency, and flexibility. All products feature front-panel facilities to simply confi-

gure the unit without a computer. Optionally RockNet can be remotely controlled using the RockWorks PC software via the USB interface. A word clock in- and output is made available on the rear. A front panel 10/100BaseT interface provides a free wheeling data port that can be used for the transport of control data. The rugged steel enclosures are made for heavy duty road use and offer the distinct advantage of magnetic shielding. All connectors are gold plated. The circuit design is streamlined to ultra low noise and minimum distortion to meet the highest demands in audio quality.

RN.301.MI Microphone / Line Input Interface

The RN.301.MI provides 8 remote controllable microphone / line input channels on XLR connectors. The state of the art circuitry is designed to

fulfill the highest demands in dynamic range, common mode rejection and overall audio quality.

Specifications

Gain Range	-6 .. 66 dB	150 Ω Source
Gain Step	1 dB	+/- 1dB
Sensitivity	+30 dBu .. -42 dBu	Max. before clip
Max. Input Level	+30 dBu	
Input Impedance	5.5 kΩ	
Phantom Power	+48 V	
Mute	selectable per channel	
Equivalent	-127 dBu	150 Ω Source, 20 kHz BW
Input Noise (EIN)	-151 dBFS	
	-122 dBu	
Dynamic Range	119 dB	@ Gain = -6 dB 150 Ω Source, "A" weighted

Frequency Response	-0.1 dB	20 Hz .. 20 kHz	@ FS = 48 kHz
Common Mode Rejection	> 100 dB	@ 50 Hz-15 kHz	150 Ω Source, > 40 dB Gain
Crosstalk	< -130 dB	@ 15 kHz	adjacent channels
Total Harmonic Distortion	0.006 %	@ 66 dB Gain	Full scale, 100 Hz-10 kHz 150 Ω Source, 20 kHz BW
Delay	420 μs		@ FS = 48 kHz

RN.302.LO Line Output Interface

The RN.302.LO provides 8 analog line output channels on XLR connectors that can drive any amplifier or self-powered speaker to maximum

level. Output redundancy is offered to drive a single amplifier from two different RN.302.LO devices.

Specifications

Max. Output Level	+24 dBu	+/- 0.2 dB	@ digital full scale, 600 Ω load
Output Level Range	-9 .. +24 dBu		
Output Impedance	< 1 Ω		
Impedance Imbalance	< 1%		
Mute	selectable per channel		
Noise	-94 dBu	@ +24 dBu Out	"A" weighted
Dynamic Range	119 dB		
Crosstalk	< -130 dB	@ 15 kHz	adjacent channels

Frequency Response	- 0.1 dB	20 Hz .. 20 kHz	@ FS = 48 kHz
	- 0.5 dB	20 Hz .. 40 kHz	@ FS = 96 kHz
Total Harmonic Distortion	< 0.001%	@ +24 dBu Out	100 Hz - 10 kHz
	< 0.002%	@ + 4 dBu Out	600 Ω Load, 20 kHz BW
Resolution	24 Bit		
Sample Rate	48 kHz, 96 kHz		
Delay	330 μs		@ FS = 48 kHz

RockNet 300 Series

Performance Audio Networks

RN.331.DD / RN.332.DO / RN.333.DI Digital Interfaces



The RockNet digital products provide AES/EBU interfaces in different configurations of in- and outputs on XLR connectors.

Inputs

Input Format	AES3
Input Impedance	110 Ω
min. Input Level	200 mVpp
Sample Rate	48 kHz, 96 kHz
Signal Delay	24 Bit
Level Indicators	150 μ s
Mute	Signal, Clip
Power Requirements	selectable per channel

Outputs

Output Format	AES3
Output Impedance	110 Ω
Output Level	> 5 Vpp @ no load
Sample Rate	48 kHz, 96 kHz
Resolution	24 Bit
Signal Delay	150 μ s
Level Indicators	Signal, Clip
Mute	selectable per channel



General Dimension and Environmental Specifications of RockNet 300 Series

Operating Temperature	0 .. 50° C	32 .. 122° F
Power Requirements	100 .. 240 VAC	47 .. 63 Hz
Power Consumption	25 W	
Dimensions (W x H x D)	483 x 44 x 200 mm	19" x 1.75" x 7.9"
Mass	3.0 kg	6.6 lbs



hear we are

RockNet 300 Series

Performance Audio Networks

RN.341.MY Yamaha Interface Card



The RN.341.MY card fits into a Yamaha MY-card expansion slot and gives access to 16 in- and 16 output channels. A word clock in- and output is available to the host device via the backplane connector and a front panel rotary switch is provided for device identification and selection of up to 15 programmable routing tables. The RN.341.MY makes the respective Yamaha product become a part of the network and enables remote control of the RN.301.MI microphone preamplifiers. The card is compatible with the following Yamaha host devices: 01V, 01V96, AD824, DA824, DIO8, DM1000, DM2000, DME24N, DME32, DME64N, LS9-16, LS9-32, M7CL, PM5D.

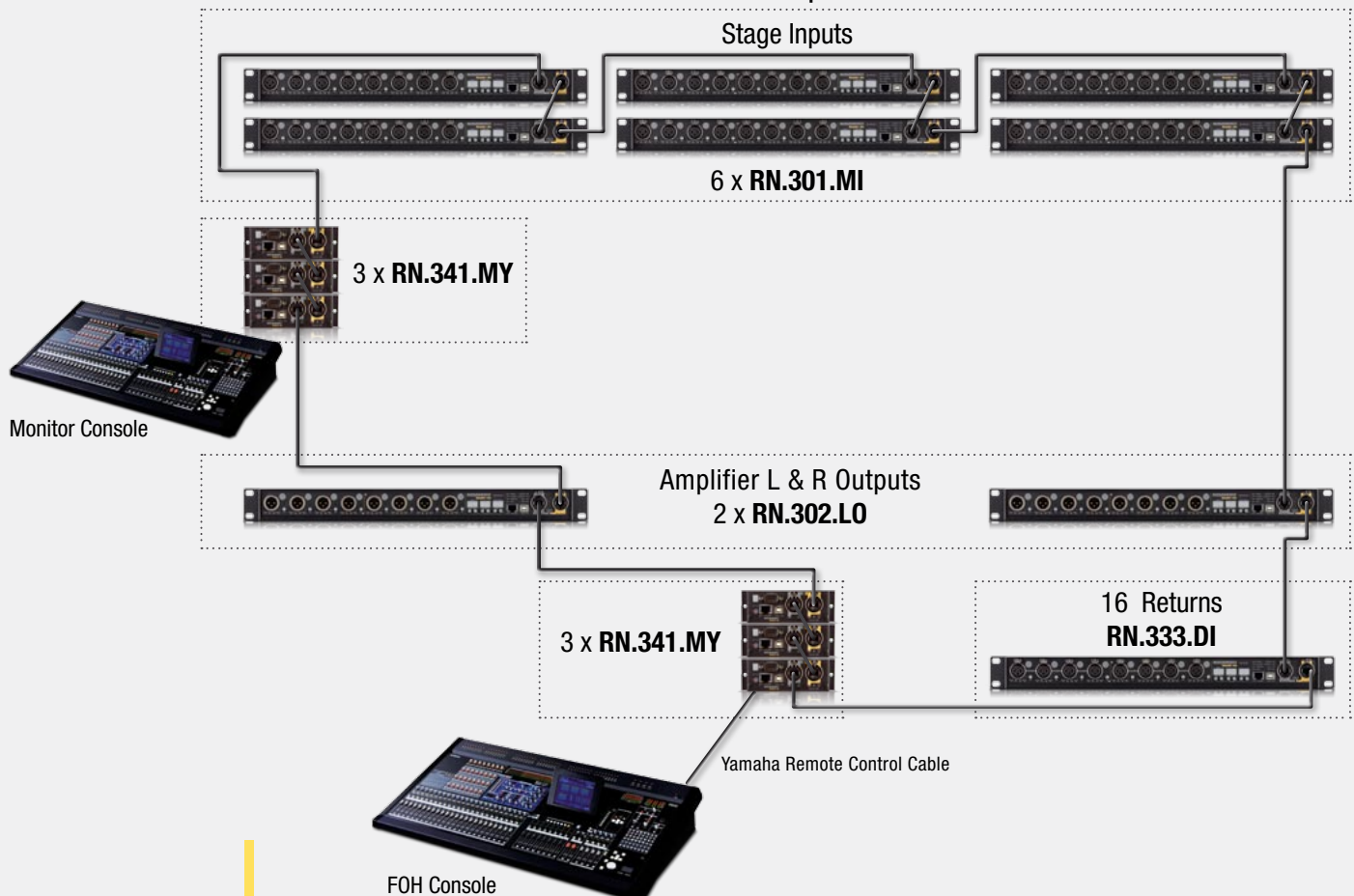
Specifications

Number of Channels	16 Inputs, 16 Outputs
Resolution	24 Bit
Sample Rate	48 kHz, 96 kHz
Remote Control Interface	RS-422, AD8HR protocol compatible

USB Port	USB 1.1/2.0 compatible
Ethernet Port	10 BaseT / 100 BaseT
Operating Temperature	0 .. 50° C 32 .. 122° F
Dimensions (W x H x D)	120 x 40 x 175 mm 4.7" x 1.6" x 6.9"

Tour Sound Application

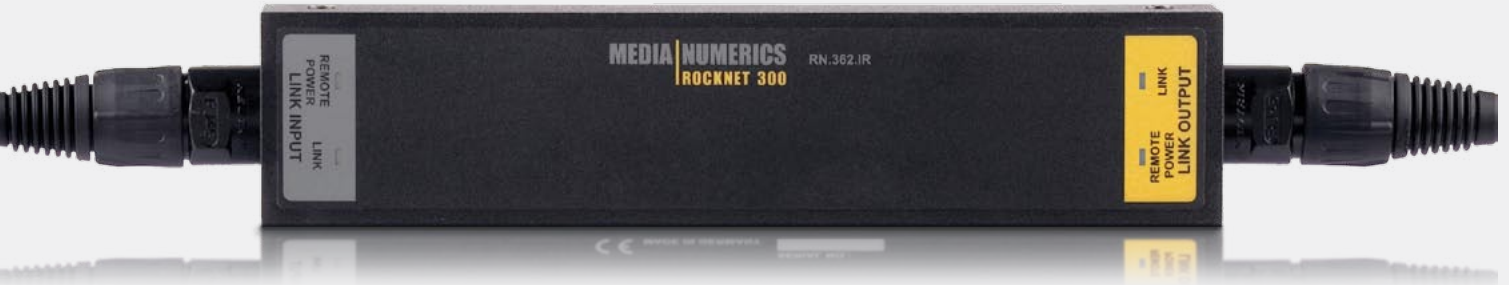
48in/16out network with interfaces for two consoles and 16 return inputs



RockNet 300 Series

Performance Audio Networks

RN.362.IR In-Line Repeater



The RN.362.IR Inline Repeater extends the length of the CAT5 based infrastructure between two RockNet 300 devices to a maximum of 450m (1,500ft). It utilizes the standard network interface incorporating Media Numerics® proprietary core technology. The Inline Repeater can be remotely powered by any 19" RockNet 300

device. The in- and output provide two LED indicators each for remote power and link status. One RN.362.IR can extend a connection by 150m (500ft), two can be used for a 300m (1,000ft) extension. In both cases the repeaters are powered off the adjacent network devices.

RN.352.FI and RN.352.FO Fiber-optical Converter



The 350 Series Fiber Interfaces are designed to be used for applications where extended distance between network devices is required. They are equipped with universal transceivers for single- or multi-mode fibers to meet the respective infrastructure requirements. The modules cover a range of up to 20 km on single-mode fiber.

The RN.351.FI and RN.352.FO consist of the standard RockNet CAT5 Network Interface in- and output on the front panel and the rear of the products is designed with locking duplex fiber connectors and a locking IEC power connector. The converters feature modular rugged enclosures.

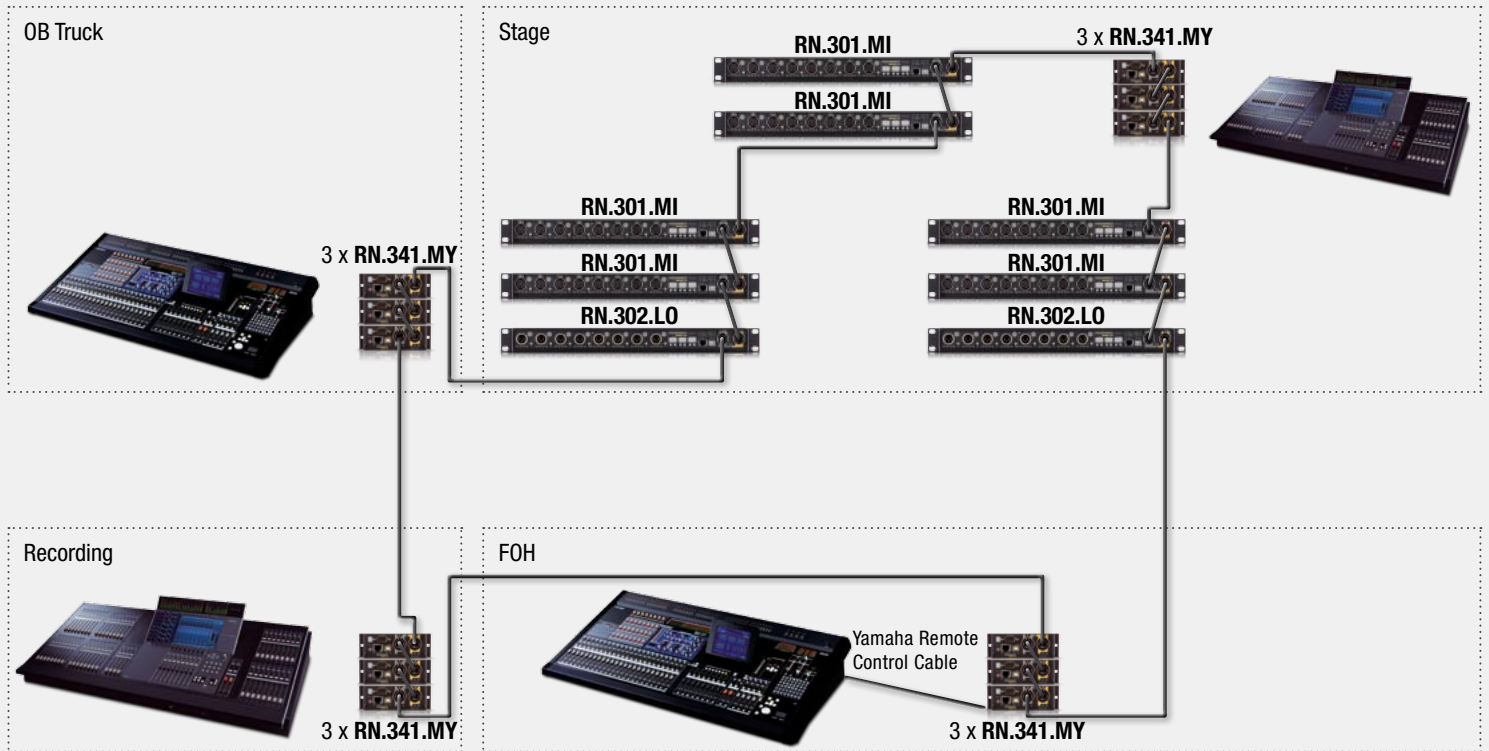
Features:

- Long-haul connectivity
- Fiber optic media conversion
- Compatibility with FiberFOX® modular frame
- Status indicators
- CAT5 redundant network interface
- 160 channels

Applications

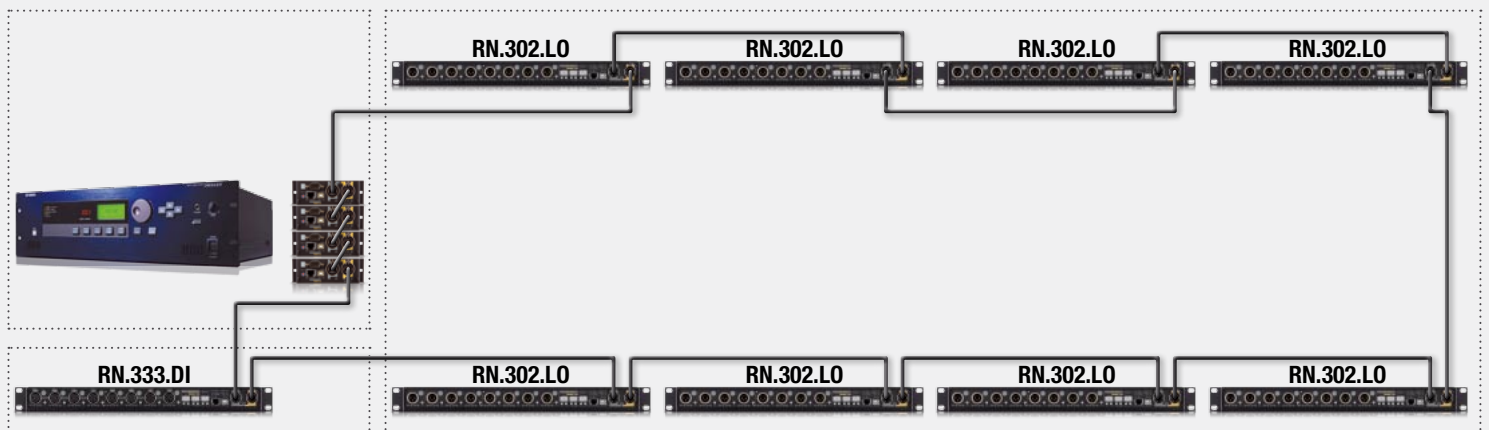
Opera House Application

48in/16out with 4 console splits Monitor, FOH, Recording and OB truck



Drive System Application

Comprehensive drive system with 64 line outs and 16 inputs



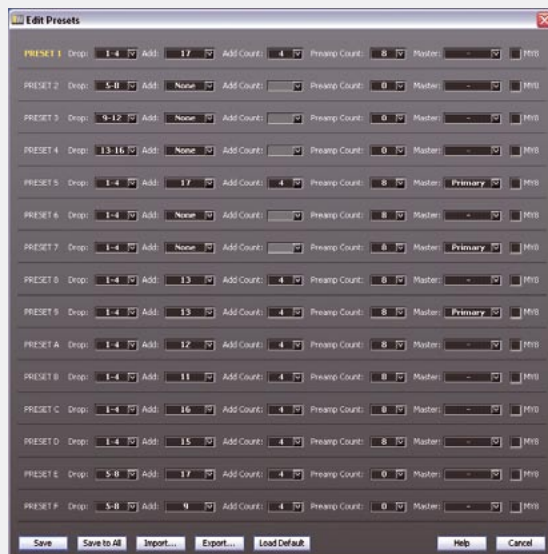
RockWorks

RockNet Online Remote Control Software

RockWorks is a real time management system for RockNet and enhances the remote operation of complex wide spread networks. Each RockNet device can be monitored and configured onscreen according to the front panel operation. RockWorks enables labelling of each device and channel within the network. The software provides alarm indications and allows network-wide default reset of channel parameters and naming.

RockWorks ...

- enables full remote control of RockNet
- can be connected to any RockNet device (incl. console interfaces)
- allows multiple PC connectivity
- shows complete network device list and displays routing overview
- features network alarm indications
- enables labelling of RockNet devices and channels
- allows network default reset
- displays all status indicators
- provides remote channel parameter control



RockWorks MY card preset dialog

The RockWorks preset dialog provides full access to RN.341.MY interface card presets and allows individual configuration of emulation mode, channel routing, microphone preamp count (RN.301.MI) as well as sync master settings.

In total 15 presets (1...9, A...F) can be configured. Presets are activated by using the rotary switch on the front panel of the RN.341.MY.

In order to enable maximum flexibility in routing the number of dropped quads from the network (send to the mixing console) as well as the number of added quads to the network (dropped from the mixing console) can be individually adjusted to specific needs, e.g. direct connections between monitor and FOH consoles. Even more flexibility is added by being able to determine the number of remote controlled RN.301.MI microphone preamps and by providing sync master settings.

The MY emulation mode can be individually set to 16 (MY-16AT) or 8 channel emulation (MY-8AE).

