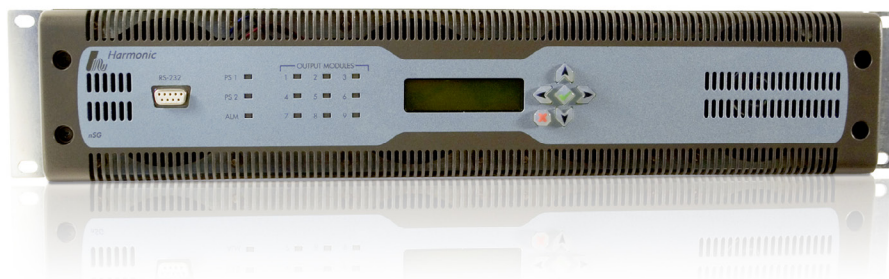# bNSG 9000
Broadcast EdgeQAM

HIGHLIGHTS

- High density, modular 2-RU system capable of hosting up to nine QAM RF output modules, each with two quad QAM channels

- Dual redundant, load sharing power supplies

- Processing module with three GbE ports

- Controlled via NMX Digital Service manager

bNSG is a broadcast EdgeQAM system based on the modular Harmonic NSG™ 9000 hardware platform. The system is designed as a highly integrated digital video gateway which multiplexes broadcast content streamed over an IP network. The NSG 9000 platform was engineered for scalability; it is capable of growing in QAM density from one to 72 QAMs per unit. In addition to providing unparalleled output density, the bNSG is designed as a robust and highly reliable broadcast QAM that can support MPEG processing and scrambling in a single device.

STREAM PROCESSING

The bNSG 9000 is housed in a modular, 2-RU chassis, and performs PID filtering, multiplexing, QAM modulation, and RF upconversion for up to 72 MPEG transport streams simultaneously. The bNSG accepts digital MPEG input through its gigabit Ethernet (GbE) ports, then directs the multimedia to different QAMs to create the outgoing transport streams as QAM-RF output signals. The bNSG 9000 is also designed to perform realtime scrambling using different ciphers and supporting future MPEG processing applications

MODULARITY

In order to maximize scalability and flexibility, the NSG 9000 platform is designed as a completely modular system. The chassis is fitted with a passive backplane, while all the processing and modulation functions are performed on retrievable modules. The chassis has nine QAM RF module slots; each module has two QAM RF ports, and each port is capable of supporting up to 4 adjacent QAM channels (3 channels in Annex A). The system can host two AC or DC power supplies, which can be redundant to each other.

The processing module features three 1000base-T ports as well as three SFP cages for optical fiber interfaces. The processing module also includes two 10/100Base-T ports for management and conditional access networks. An on-board ASI monitoring port is used to monitor the transport streams within the system with an MPEG analyzer.

Designed for ease of operation, the bNSG 9000 QAM RF modules and power supplies are hot-swappable, allowing for flexible enhancement of the system density without service down-time. The bNSG 9000 unit has a detachable front bezel that snaps on the chassis allowing field replacement.

APPLICATIONS

- PID Remapping & Filtering
- SI/PSI extraction & spooling
- Multiple IP sockets (SPTS/MPTS)
- Socket pass-through
- Service redundancy

MANAGEMENT

bNSG includes a local control panel, with LCD display area and a keypad. The control panel can be used to get device information and perform basic configuration.

bNSG 9000 supports in-depth monitoring, control and alarm aggregation via Harmonic's NMX Digital Services Manager. Using NMX, the operator can create automatic redundancy rules such as low-delay 1:1 failover, and socket redundancy.

BENEFITS OF THE BNSG 9000

- **High Density** – Supporting up to 72 QAMs per 2-RU unit, the NSG 9000 is capable of supporting more than 720 services.

- **Performance** – The bNSG 9000 supports the same high performance standard of the existing NSG family, with superior RF specifications, stream and processing functionality and management options.

- **Modular Design** – The NSG 9000 platform features hot swappable modules and power supplies, a retrievable processing module and detachable front panel.

- **Reliability** – The system supports dual redundant, load sharing power supplies, cast-aluminum covered QAM RF modules and a robust chassis design, all designed to provide high reliability and superior performance over time.

- **Network Management** – Harmonic's NMX Digital Service Manager simplifies mass configuring, monitoring and automated redundancy in both centralized and distributed architectures

GIGABIT ETHERNET INPUT

Type	Gigabit Ethernet 802.3z
Ports	3 Independent ports
Connector	3 x 1000Base-T, RJ45 ports 3 x SFP cages
I/O Speed	1 x 960 Mbps per port
IP Encapsulation	MPEG TS over UDP/IP/MA 1 to 7 TS/ IP
MPEG Format	188 Bytes per TS packet
I/O Processing	Up to 960 Mbps per port
Addressing & Protocol	Multicast (IGMPv1,2,3)
Management	ARP, ICMP

ASI MONITOR PORT

Type	ASI Output
Connector	BNC, 75Ω
Configuration	Configurable mirroring per QAM
MPEG Format	188 Bytes per TS packet

MANAGEMENT INTERFACES

Ethernet	2 x 10/100Base-T
Connector	RJ-45 (1 Management, 1 reserved for CAS)
Serial Port	RS232 (Reserved for factory use)

RE-MULTIPLEXING

PID	Re-mapping, filtering
PSI/SI	Extraction, spooling

QAM RF

Connector	F-Type, 75 Ω
Ports	2 RF ports per module
RF Output Level	+62 dBmV @ 1 channel +59 dBmV @ 2 channels +57.2 dBmv @ 3 channels +56 dBmv @ 4 channels
RF frequency range (Annex B) RF frequency range (Annex A)	53 MHz to 867 MHz, ±3kHz, 1kHz steps 54 Mhz to 866 Mhz, ±3kHz, 1kHz steps
QAM Constellations	16, 32, 64, 128, 256
Bandwidth	6Mhz or 8 Mhz
QAM Density	ITU-T J.83 Annex A mode: 1, 2 or 3 Adjacent QAM channels per up-converter. ITU-T J.83 Annex B or C mode: 1, 2 or 4 Adjacent QAM channels per up-converter.
QAM Encoding	ITU-T J.83 Annex A (DVB), Annex B, and Annex C (Japan)
RF Output Power Adjustment Range	15 dB in 0.1 dB steps
Output Return Loss	14 dB

MANAGEMENT

NMS	Harmonic NMX Digital Service Manager
Protocols	TCP/IP

ENVIRONMENTAL

Operating Temperature Range	0° to 50 °C 32° to 122 °F
Storage Temperature Range	-20° to +80 °C -4° to +176 °F
Relative Humidity	0 to 95% non-condensing
Operating Altitude	Up to 4,572 meters (15,000 feet)
Storage Altitude	Up to 12,192 meters (40,000 feet)

PHYSICAL

Input Voltage	85-264 VAC, 47-63 Hz 36-72V VDC
Typical Power Consumption	482W @ 220VAC 492W @ 110VAC DC: 452W
Power Modules	2 x AC or 2 x DC redundant, load sharing power supplies
Rack Space	2-RU
Dimensions (WxHxD)	19" x 3.47" x 20.75" 48.26 cm x 8.81 cm x 52.7 cm
Weight Chassis and processing board Power supplies RF Module	 15.4Kg/34 lb 1.8Kg/3.9 lb 1.0Kg/2.2 lb

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