ETL Systems
New technologies
in RF distribution

Model Number:
HAV-80

256 x 256 L-Band Havoc Matrix, ultra compact

Typical applications:

- Managing multiple inputs for growing satellite teleports
- Extended L-band frequency for Ka-band & HTS applications
- Routing live traffic to multiple modems

ETL's new ultra compact Havoc matrix provides routing for up to 256 input and output feeds in a 16U high chassis. The matrix can be expanded from 16x16 up to 256x256 in blocks of 16.

Compact 16U high chassis providing 256 inputs x 256 outputs.

Power savings as only active signal routes are powered. This provides a greatly reduced power consumption compared to traditional matrices.

Minimal training with capacitive touchscreen controls, intuitive HMI and an improved web browser interface.

850-2450 MHz operating frequency range. Ka-band ready.

Temperature monitoring with intelligent fan speed control.

Resilience from quad redundant power supplies & dual redundant CPU modules.

Minimal downtime in the unlikely event of a failure all active components can be hot-swapped without the need to re-boot the matrix. This includes power supplies, CPU modules, RF modules & fan trays.

Expandable can be initially ordered in smaller sizes and then expanded in service in blocks of 16. Multi-chassis expansion available, using system splitters &/or combiners up to a maximum of 1024x1024.

Secure Communication Protocols HTTPS and SNMPv3

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Technical Specifications and Operating Parameters		
Capacity		256 inputs and 256 outputs, configurable in banks of 16 inputs/ outputs
Input & output ports		50Ω SMA (All ports DC blocked)
Frequency		850 to 2450 MHz
Gain, (mean across band)		0±2 dB typical
Gain Flatness	Full Band	±2.0 dB
	Any 36 MHz	±0.50 dB
Input Return Loss	Typical	18 dB
	Minimum	14 dB
Output Return Loss	Typical	20 dB
	Minimum	18 dB
Gain Tracking		4 dB Difference in mean gain between any two outputs when the same input is routed to both.
Gain Stability over Time		±0.2 dB / 24 hours
Gain Stability vs Temp		0.1dB / °C
Group Delay (Peak - Peak across specified bandwidth)	Full Band	<1 ns
	Any 36 MHz	±0.25 ns
Isolation (Minimum between any two ports)	IP-IP	80 dB
	OP-OP	80 dB
	IP-OP	55 dB
Noise Figure		20 dB typical
1dB GCP (output power)	850-2150	-3 dBm minimum
	>2150	-5 dBm minimum
OIP3 (output power)	850-2150	15 dBm typical
	>2150	10 dBm typical
OIP2 (output power)		33 dBm typical 2nd order intercept point,
SFDR		>110 dBm/Hz$^{2/3}$

Environmental Conditions	
Operating Temperature (°C)	0 to 45°C
Storage Temperature (°C)	-20°C to +75°C
Location	Indoor use only
Humidity	20 to 90% non-condensing Relative Humidity
Altitude	2,000 M Above Mean Sea Level (AMSL)

Control, Monitoring and Alarms		
Remote Control & Monitoring	Ethernet – RJ45 connector 10/100/1000BaseTx ETL Protocol over TCP SNMP Web Interface Grass Valley NVision NV9000	
HMI	Capacitive touch screen	
Secure communications	HTTPS SNMPv3	
ETL Protocol over TCP	Supports up to 32 concurrent connections	
Web browser	Full remote control via web browser for 5 connections	
Alarms	Comprehensive alarm status on communication protocols and front panel	
Switching Time	50ms Approx.	Measured from receipt of command on serial port to establishment of RF signal
Amplifier status	All RF amplifiers monitored. Local and Remote reporting	
Temperature monitoring	All cards and modules individually monitored. Alarm when pre-set limits are exceeded	
Fan speed monitoring	All fans fitted with tachos. Alarm on over or under speed	
PSU loading	Monitor unit power consumption. Report locally and remotely	

Non RF Parameters		
All active cards	Hot swappable	
PSU modules	Quad redundant hot swappable	
CPUs	Hot swap dual CPU	
Power requirement	85-264Vac 47-63Hz Fused 4A	
Power consumption	600W (idle state) 1.8kW (fully routed)	Only routed paths are powered.
MTBF	150,000 hours (17.1 years) TBC Fully populated 256x256 chassis	
MTBF (RF cards)	180,000 hours (20.5 years) TBC Each active RF card	
MTTR	20 minutes. Assumes recommended spares are available	

Physical Dimensions & Parameters	
Weight	184 KG
Dimensions	16U high x 850mm deep x 19" wide
Front Panel Colour	RAL9023 – Pearl Dark Grey

Absolute Maximum Ratings		
Max DC voltage on RF ports	48Vdc	All ports are DC blocked
Input RF Power	+27dBm	Any RF port

Tech Spec Version	
Tech Spec Version	V1.2

Note 1: The specification is subject to regular reviews and will be updated from time to time as part of our continuing product development and improved specification accuracy.
Note 2: Operation beyond the quoted limits stated above may cause instantaneous and permanent damage.

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