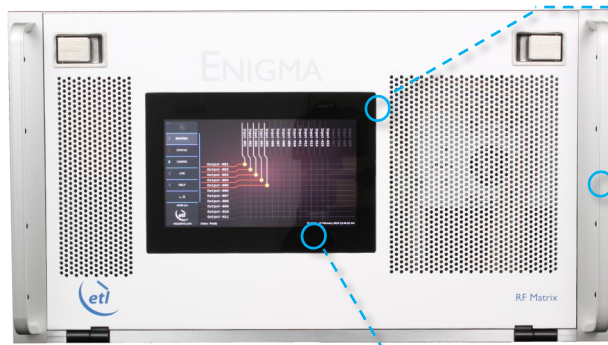# 32 x 32 Enigma L-band Combining Switch Matrix / Router

4th generation Enigma Matrix with enhanced RF performance including variable gain –5 dB to +5 dB settable per input.

850 - 2150 MHz operating frequency range

Compact up to 32 inputs x 32 outputs in a 6U high chassis

Upgraded local control & monitoring via front panel capacitive touchscreen

Self diagnostics with continuous monitoring of amplifiers, CPU's & PSU's

Expansion in single increments or with additional matrix modules for larger systems

Resilience from dual redundant power supplies & CPU modules

Minimal impact from failure with hot-swap single input & output RF cards, dual power supplies & dual CPU's, fans
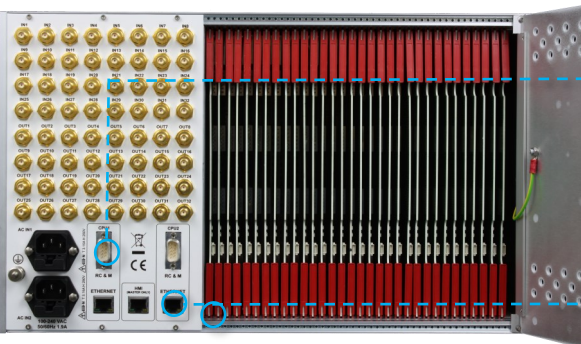
Dry contact alarm port & serial communications for amplifier & power supply status

Future proof secure protocols with SNMPv3 & HTTPS

Remote control & monitoring via RJ45 Ethernet port with SNMP & web browser interface

Technical specifications and operating parameters

RF Parameters

Capacity	32 inputs x 32 outputs, fully populated			
Routing	Combining (fan-out), non-blocking		Many inputs can be routed to each outputs	
Frequency Range	850-2150 MHz (L-band)			
Gain	0±1 Typical, mean across band			
Gain Control	-5 to +5 in 0.25dB steps		Settable at each input	

RF Connectors		50Ω SMA	50Ω BNC	75Ω BNC	75Ω F-type
		All ports DC blocked			
Gain Flatness	Full band	±1.0 dB	±1.0 dB	±1.5 dB	±1.5 dB
	Any 36MHz	±0.25 dB	±0.25 dB	±0.50 dB	±0.50 dB
Input Return Loss	Typical	18 dB	18dB	16 dB	16 dB
	Minimum	14 dB	14 dB	10 dB	10 dB
Output Return Loss	Typical	20 dB	20 dB	16 dB	16 dB
	Minimum	16 dB	16 dB	10 dB	10 dB
Isolation (min between any 2 ports)	I/P - O/P	60 dB			
	I/P - I/P	75 dB			
	O/P - O/P	75 dB			
Group Delay		≤ 1 ns, across operational bandwidth			
Noise Figure	Typical	16 dB	Typical, 1 input routed to 1 output (@ unity gain)		
	Maximum	18 dB			
1dB GCP (dBm)		+10 dBm output power (@ unity gain)			
OIP3	Typical	22 dBm (@ unity gain)			
	Minimum	20 dBm (@ unity gain)			
OIP2	Typical	32 dBm (@ unity gain)			
	Minimum	30 dBm (@ unity gain)			
Switching Time		< 50ms from receipt of a command to implementation of path change			
Input RF Power		+ 20 dBm	Absolute maximum		

System Control

Local Control	Via Front Panel capacitive touchscreen
Remote Control	Serial (RS232 or RS422/485) and Ethernet port via RJ45, 10BaseT/100BaseTx. TCP/IP, SNMPv3, HTTPS & web browser interface
Alarms	Dry contact (D-type) & Ethernet (RJ45) for PSU & Amp. status

Power

PSU Power	85-264Vac 50-60Hz		Fused 2A
AC Consumption	150W		Max. consumption at steady state
LNB Power	None		
PSU	Dual redundant & alarmed		Diode OR. Hot swappable
Hot-swap PSU	Yes		
CPU	Dual Redundant		Hot swappable
Input Cards	Hot swap		Failure effects only one input port
Output Cards	Hot swap		Failure effects only one output port
MTTR	20 mins, 15 mins to retrieve spare part and 5 mins to replace		Applies to LRUs only and assumed in house stock.
MTBF	Chassis	271,444	Chassis excludes HMI & RF cards
	Switch card	270,297	
	Divider card	317,227	

Environmental

Operating temperature	0 to 45˚C
Gain Stability versus Temperature	0.05dB/°C
Storage temperature	-20˚C to +75˚C
Location	Indoor use only
Humidity	20 to 90% non-condensing
Altitude operational	10,000 feet AMSL (Above Mean Sea Level)
Altitude storage	30,000 feet AMSL (Above Mean Sea Level)

Physical

Dimensions	6U high x 450mm deep x 19" wide
Weight	35 kg, fully populated
Colour	RAL9003—White (Semi-Matte)

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 spec accuracy.
Note 2: Operation beyond the quoted limits stated above may cause instantaneous and permanent damage.

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