



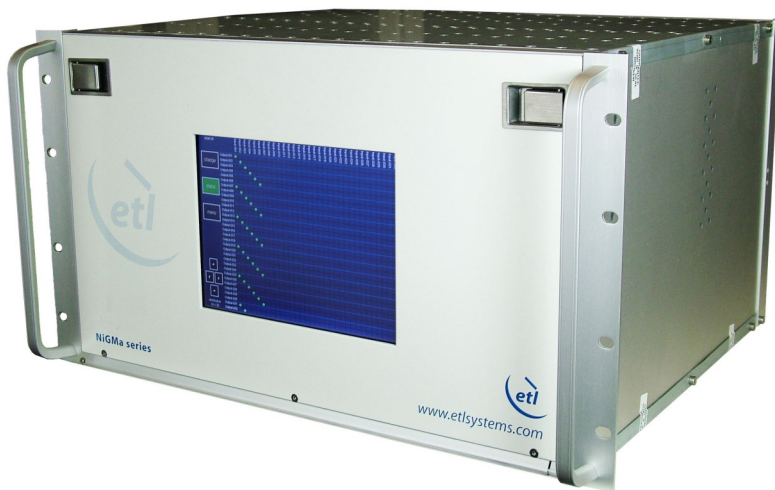
Model Number: **NGM-21-xxxx**

RF Engineering  
and Custom Build

## NEXT GENERATION

# Enigma L-band Switch Matrix / Router

32 x 32 L-band signal routing evolves to new heights



ETL's popular high performance Enigma L-band distributive matrix evolves to set new benchmarks for RF performance and leading edge technologies.

The next generation of Enigma matrix focuses on **improved resilience and performance** the impact of failure is minimised throughout the unit.

Front View of Model NGM-21 showing touchscreen VGA

As ETL customers use matrices in mission-critical applications, we understand the importance of redundancy and hot swap. Input and output cards, power supplies, CPU controller cards, fans and the new VGA human interface can all be **hot swapped**.

**New Matrix** design means there is one card associated with each input and each output – so failure of a card only affects one channel. For broadcasters, satellite operators and the defence sector, this provides exceptional resilience. The refined design offers rugged dual redundant power supplies with simple front access, enhanced CPU change-out, hot-swap fans and new card connectors. **Web Browser Interface** is standard on an NGM-21.

**Improved RF performance** of the Enigma which provides superior Isolation, frequency response or flatness, and 1 dB GCP levels – helping our customers ensure that their overall RF chain signal performance is optimised.

**Self Diagnostics** with continuous monitoring (and reporting) of amplifier status, PSU status (including temperature), fan speed and internal communications is included as standard. Any problems are rapidly identified and hot swap means they can be addressed in minutes.





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## NEW FEATURES:

A number of new features have been introduced to the Enigma matrix, including those described below:

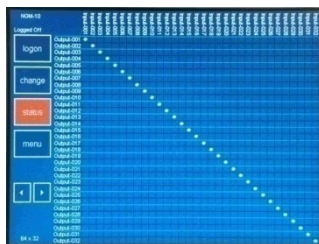
**Fast Matrix Card Changeout** from front and rear



**On board log** records all routing changes for each user



**Touchscreen VGA** control with security log on for up to 10 users



**Aliases** (10 character) on front screen to identify signal sources



## FLEXIBILITY

The Enigma Matrix can be adapted and grown to a number of different sizes

**Master Matrix** offers routing control from touchscreen or remotely

**All modules offer hot-swap CPUs and PSUs** for peace of mind



Front View

**Hot-Swap Input & Output Matrix Cards** on all modules offer easy expansion

**Active Splitter & combiners** offer patch panel & gain options



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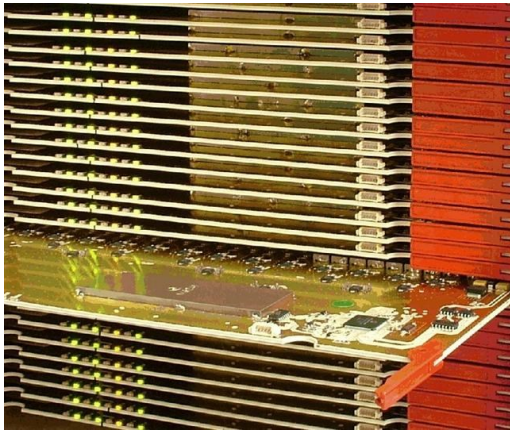
Enigma L-band Switch Matrix / Router

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## Resilience

### Resilience is designed-in

The Enigma matrix has been designed with resilience in mind. The impact of component failure is minimised and all active components can be hot swapped. Problems are rapidly identified and can be easily sorted out.

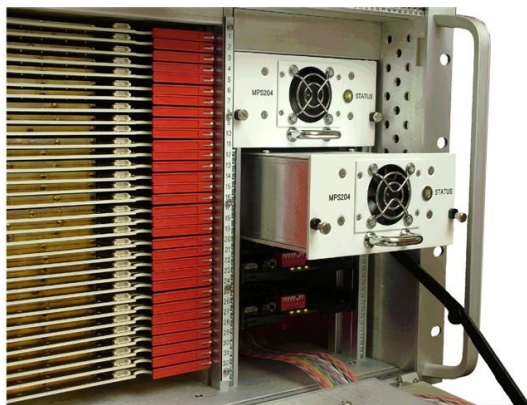
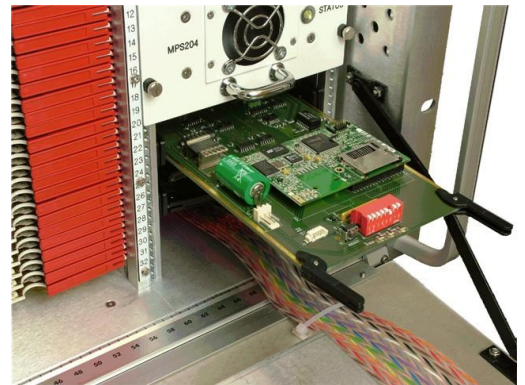


### Minimal impact from card failure

One card per input and one card per output mean that the impact of card failure is minimised. Cards can be hot-swapped, and hot expansion can take place in single increments.

### Minimal impact from CPU failure

The matrix contains dual redundant CPU's which both operate in parallel. If one CPU fails the other automatically becomes the master. CPU's can be hot-swapped.



### Minimal impact from PSU failure

Dual redundant PSU's can be hot-swapped.

### Rapid diagnosis of problems

The matrix continuously monitors the conditions of amplifiers, CPUs and PSUs. Any faults are immediately reported through the front panel and remotely. Alarms report the specific faults down to component level.





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Enigma L-band Matrix Router

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## Technical specifications and operating parameters

| RF Parameters      |                                    |   |  |            |          |
|--------------------|------------------------------------|---|--|------------|----------|
| Capacity           | 32 inputs x 32 outputs             |   |  |            |          |
| Routing            | Distributive non-blocking          | Any input can be connected to any number of outputs |  |            |          |
| Frequency (MHz)    | 850-2150                           |   |  |            |          |
| Gain               | 0±1 dB (nominal, mean across band) |   |  |            |          |
| 1 dB Compression   | 5 dBm at unity gain                |   |  |            |          |
| Noise Figure       | 20 dB                              |   |  |            |          |
| OIP3               | 19 dBm typ, 16 dBm min             |   |  |            |          |
| Connector Type     | SMA 50Ω                            | BNC 50Ω   | BNC 75Ω  | F-Type 75Ω |          |
| Isolation          | Input-output                       | 65 dB   |  |            |          |
|                    | Input-Input                        | 75 dB   |  |            |          |
|                    | Output-output                      | 75 dB   |  |            |          |
| Flatness           | Full Band                          | ± 1.0 dB  | ± 1.0 dB   | ± 1.5 dB   | ± 1.5 dB |
|                    | Any 36MHz                          | ± 0.25 dB   | ± 0.25 dB  | ± 0.5 dB   | ± 0.5 dB |
| Input Return Loss  | Typical                            | 20 dB   | 20 dB  | 14 dB      | 12dB     |
|                    | Minimum                            | 16 dB   | 16 dB  | 10 dB      | 8 dB     |
| Output Return Loss | Typical                            | 20 dB   | 20 dB  | 14 dB      | 12 dB    |
|                    | Minimum                            | 16 dB   | 16 dB  | 10 dB      | 8 dB     |
| Switching Time     | <50ms                              |   | From receipt of command to implementation of path change |            |          |
| Group Delay        | <1ns                               |   |  |            |          |

| Physical   |                                 |
|------------|---------------------------------|
| Dimensions | 6U high x 450mm deep x 19" wide |
| Weight     | 35 kg                           |
| Colour     | White 00-E-55 semi-gloss        |

| Environmental         |                          |
|-----------------------|--------------------------|
| Operating temperature | 0 to 45°C                |
| Location              | Indoor use only          |
| Storage temperature   | -20°C to +75°C           |
| Humidity              | 20 to 90% non-condensing |

| System Control          |                                   |
|-------------------------|-----------------------------------|
| Local Control           | Touchscreen & VGA Display         |
| Remote Connection       | Via RS232/RS485 and RJ45 Ethernet |
| SNMP Traps              | For alarms & monitoring           |
| Comms/Power Failure     | Retains settings                  |
| Remote Control Software | Available                         |
| Web Browser Interface   | Standard                          |

| Power          |                             |                 |
|----------------|-----------------------------|-----------------|
| AC Power       | 85-264Vac 50/60Hz, Fused 2A |                 |
| PSU            | Dual redundant              | Diode OR        |
| Hot-swap PSU   | Yes                         |                 |
| AC Consumption | 100W                        | Max Consumption |

| Key Features         |                          |
|----------------------|--------------------------|
| Input Splitter Cards | One Card per input       |
| Output Switch Cards  | One Card per output      |
| Matrix Cards         | Single, Hot-swap         |
| CPU                  | Dual redundant, Hot-swap |
| PSU                  | Dual redundant, Hot-swap |
| Self Diagnostics     | Continuous Monitoring    |

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