



Model Number: **TTN-10-B7B7**

RF Engineering  
and Custom Build

# Titan IF Matrix Router

128 x 128 signal routing taken to new levels



Front View of Model TTN-10-B7B7

ETL's new ground breaking Titan (TTN) series is designed for modern multiple antenna sites, particularly Government and Military use.

Offering up to 128 x 128 routing in one chassis, this resilient matrix offers a high performance solution to frequent signal routing changes.

The Titan is a highly compact matrix in a 16U shelf and offers a full fan-out / fully distributive system covering 40 to 200MHz.

New features include auto re-routing and a colour XGA Touchscreen for fast control & monitoring.

All active RF and CPU cards are designed to be hot-swapped from front and rear without removing RF cables or connectors.



Rear View of Model TTN-10-B7B7





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## Titan New Features

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

**Control & Expansion** - Monitoring & Control is via RS232 / 485 or RJ45 ethernet. Serial ports on the rear allow future expansion.

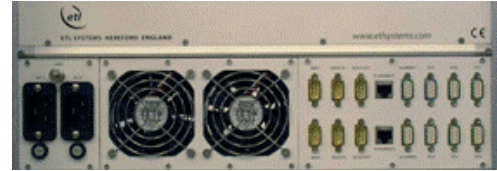


Fig 3 – Expansion & Control Ports

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



Fig 4 – Routing screen

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



Fig 5 – Touchscreen control

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



Fig 6 – Setting Aliases

## Titan Flexibility

The Titan Matrix can be adapted and grown to a number of different sizes. This example shows a 128 x 256 IF Matrix for a government project.

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

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

**Splitters and combiners** allow Titan modules to be joined



Fig 7 – 256 x 256 Titan IF Matrix System



## Titan Resilience

The Titan 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.

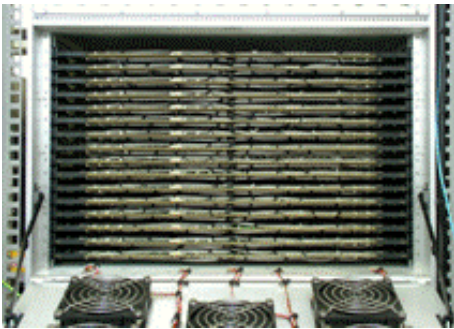


Fig 8 – Matrix Card Access Door

### Minimal impact from card failure

The matrix design incorporates input, mid and output matrix cards, which allow auto re-routing in the unlikely event of card failure.

### Minimal impact from CPU failure

The matrix contains dual redundant CPU's which both operate in parallel. CPU's can be hot-swapped.

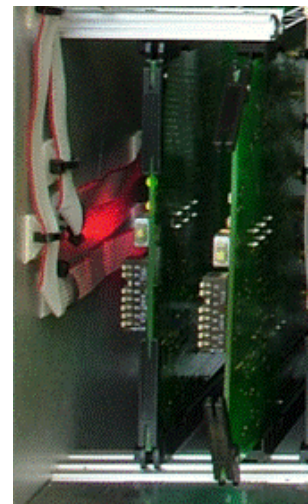


Fig 9 – Dual Redundant CPU Cards



Fig 10 – Hot-swap power supplies

### Hot-Swap Power Supplies

Upgraded dual redundant PSUs can be quickly hot-swapped from the front.

### 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.



Fig 11 – Touchscreen Monitoring Page



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## 128 x 128 Titan IF Matrix Router

Technical specifications and operating parameters

RF Parameters			
Capacity		128 inputs x 128 outputs, expandable to 256 x 256	
Routing		Distributive, non-blocking. Any input can be connected to any number of outputs	
Frequency Range		40-200 MHz (IF)	
Gain		1 dB $\pm$ 2 dB	Mid-band (120MHz), attenuator at 0 dB
Flatness	40-200MHz	$\pm$ 2 dB	$\pm$ 1 dB typical
	Any 60MHz band	$\pm$ 0.5 dB	
	Any 1MHz band	$\pm$ 0.015 dB	Over 60 MHz band **
Gain Tracking		2.5 dB	Output to output
1 dB Compression		$\geq$ +2.5 dBm	Output power
IP3		$\geq$ +14 dBm	Equal signals – 15 dBm $\geq$ 300 kHz separation.
IP2		$\geq$ +25 dBm	In band products
Input Levels		-50 dBm to -5 dBm	All parameters apply
Input Attenuator		0-5 dB attenuation approx	31 dB attenuator range **
Isolation	I/P-I/P	$\geq$ 60 dB	
	I/P-O/P	$\geq$ 60 dB	
	O/P-O/P	$\geq$ 60 dB	
Group Delay		$\leq$ 2.0 ns	Pk-pk, any 60MHz segment
Noise Figure		20 dB	
Switching Time		$\leq$ 50 ms	From when command received by interface until the connection is made
Input Return Loss		14 dB typical	
Output Return Loss		14 dB typical	

\*\* (Designed to run at or near minimum attenuation for nominal unity gain)

Physical	
Input Connector	BNC
Input Impedance	75 $\Omega$
Output Connector	BNC
Output Impedance	75 $\Omega$
Dimensions	16U high x 620mm deep x 19" wide
Weight	82 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	85% non-condensing

System Control	
Local Control	Touchscreen and VGA display
Remote Control	Via Serial (RS232/422/485) Port on rear panel and Ethernet (RJ45) Port
Display	Front Panel VGA display
SNMP Traps	For alarms & monitoring
Comms/Power Failure	Retains settings
Remote Control Software	Available

Power		
LNB Power	None	
AC Power	85-264Vac 47/63Hz Fused <20A	
PSU	Dual redundant	Either PSU is rated to power the matrix
Hot-swap PSU	No	
DC Source	6 off +5Vdc at 4A	To power ETL peripherals. Fused with self resetting fuses

Key Features	
CPU	Dual, Hot-Swap
PSU	Dual, Hot-Swap
Self Diagnostics	Continuous Monitoring

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