



PRODUCT CATALOGUE

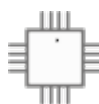
Edition 3



Authorized Distributor:
Range Communication, Inc.
Ph. (801) 598-8305
Email: Sales@rangeeco.net
Web: <http://www.rangeeco.net>



Rack Systems



RF Components



Custom Build

New technologies in RF Distribution



ETL Systems

New technologies in RF distribution

Our Company

ETL Systems are world leaders in designing and manufacturing Radio Frequency (RF) distribution and satellite communications equipment, where RF performance and reliability matter.

The company has been operating since 1984, benefitting from new management of Ian Hilditch and Dr Esen Bayar in 2003. In 2013 we received our third Queens Award for Enterprise, marking impressive growth in International Trade.

As well as our main office in Hereford (UK), we also have offices in Watford (UK), Washington D.C. (USA) and Dubai (UAE), who support our customers in 112 countries.

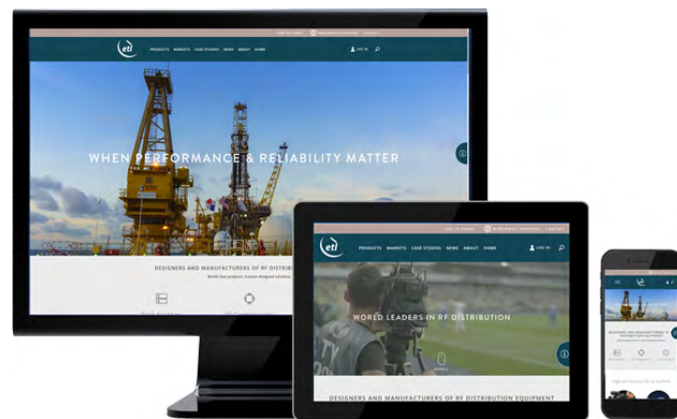
Many of our products are custom built, benefit from in-house RF testing facilities, software design, automated circuit board assembly, concept design areas, pick and place machinery, as well as machining workshops. This means that design, production and maintenance can be carried out under the umbrella of our ISO 9001 Quality Management System.

Atlantic Microwave Ltd

In 2019 we successfully acquired Atlantic Microwave Ltd, a leading provider of microwave components, quantum cryogenics and satellite communication test equipment. Atlantic Microwave manufacture and supply a comprehensive range to the Satcom, Telecommunications, Broadcast, Aerospace, Defence and Scientific Research industries. **For contact details & more information visit page 81 .**

Our Focus

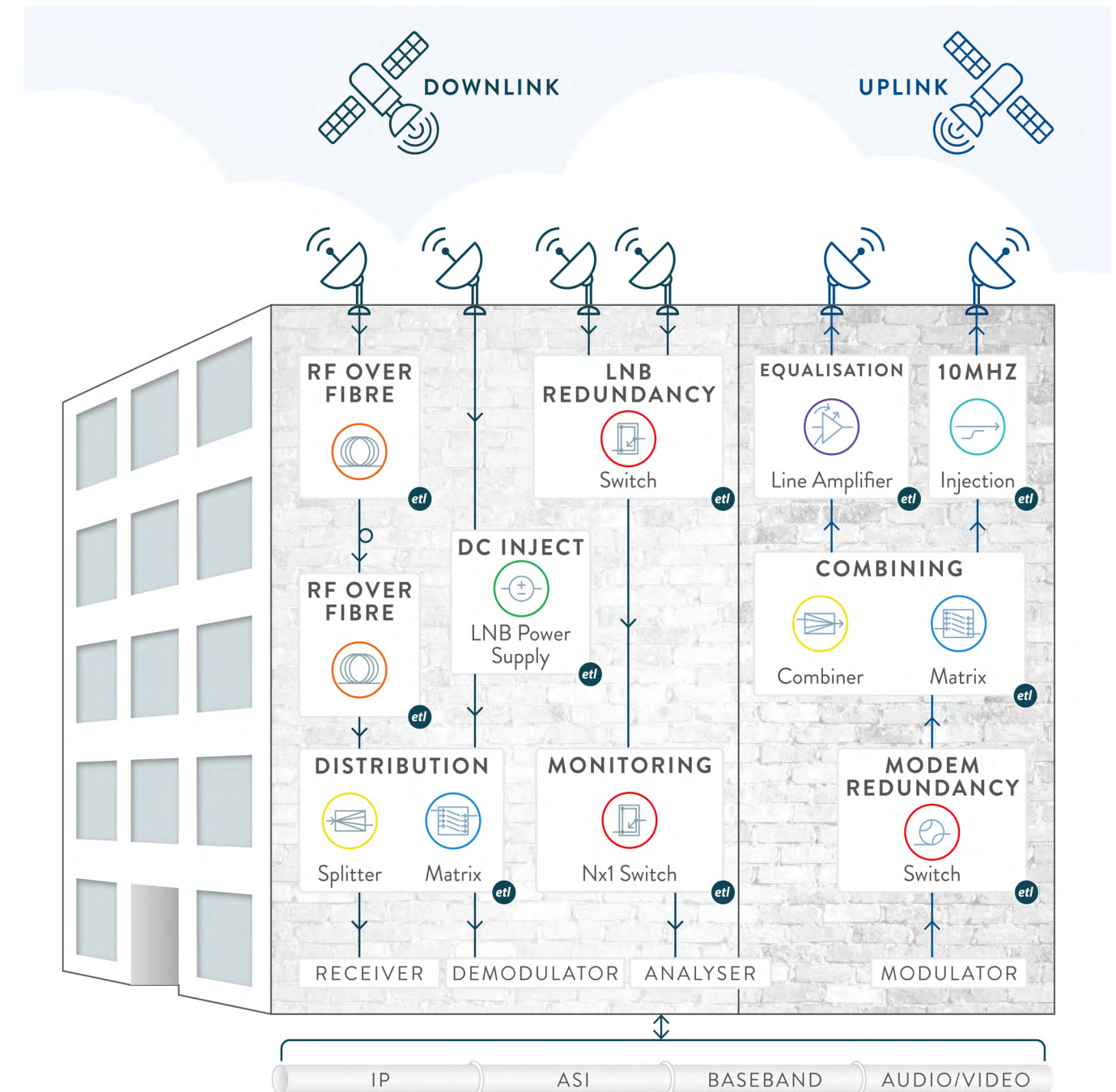
Reliability, Resilience, and RF performance are at the heart of all ETL designs and these drive product innovation and development. Also, adaptability and scale-ability allows future expansion for growing Satcom users.



Please visit our website for all up to date ETL news and product information
www.etlsystems.com

Our Products & Their Role In The RF Chain

Our product range covers DC- 40GHz and includes Matrix Routers, Switches, Splitters, Combiners, Amplifiers, as well as RF over Fibre. These are used for RF routing, RF distribution, satellite signal handling and redundancy switching, in addition to more esoteric applications.



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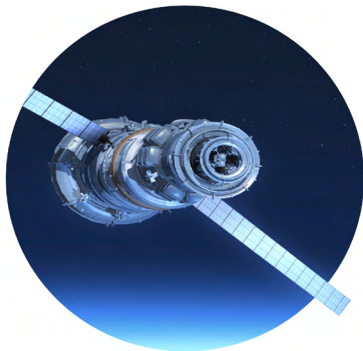
Our Customers

Our RF equipment is used by customers in a wide range of sectors.



Broadcaster

We work with a large array of the world's leading broadcasters. Our products are used in TVRO applications for payout centres, news gathering and sports events; requiring rapid changing of occasional use services.



Satellite Operator

14 of the top 20 satellite operators use our switch matrices and RF products. Our range of satellite signal handling equipment is used for TT & C, monitoring and traffic management applications, including for new fleets of HTS and Ka Band satellites.



Oil & Gas

Communications on land and off-shore in remote areas for the oil and gas sector are essential to successful operation. Our range of VSAT system products are ideal for this sector, providing reliability and a compact form factor.



Government & Defence

75% of the main NATO governments use our products to protect their citizens. Our large RF router range can be used for uplink and downlink satcoms, including general traffic and data management, and TVRO applications, as well as receive (RX) only satcoms.



Telecoms

Telecoms companies with traditional satcoms for telephony, use our splitters and combiners, as well as LNB service shelves and other equipment. ETL has also provided both straight RF distribution via splitters, and full fan-out switch matrices for more demanding IPTV applications.

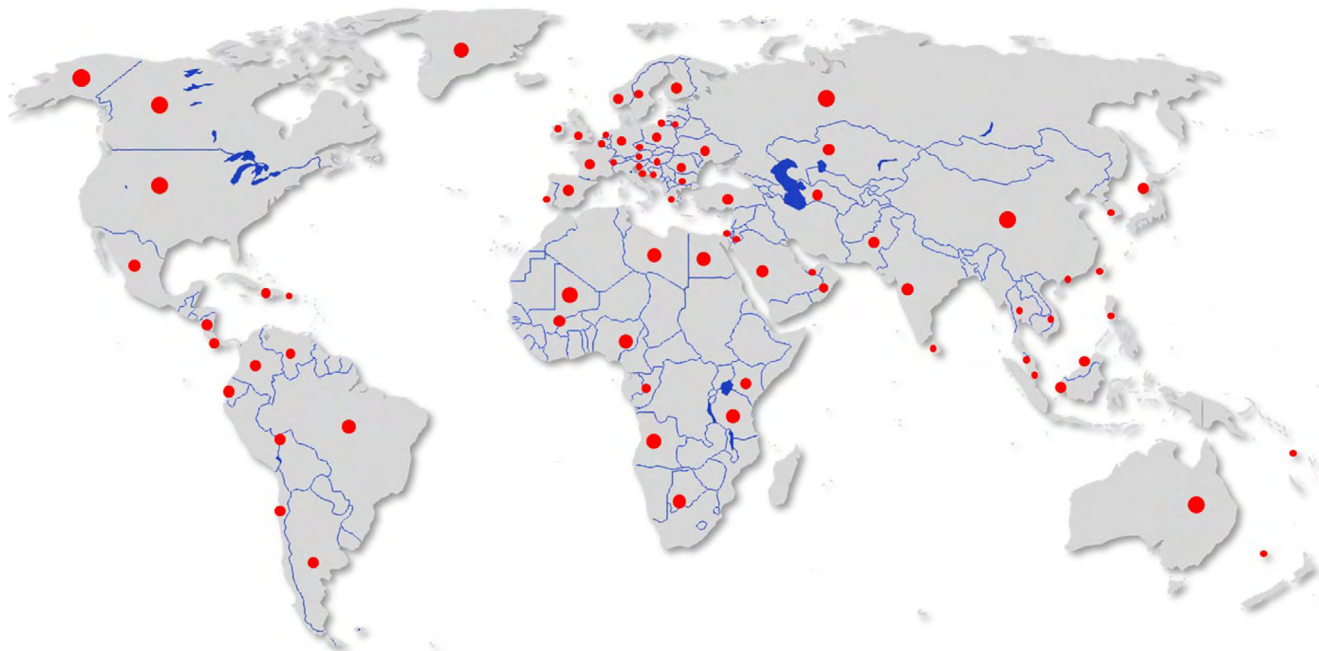


Marine

29 out of the top 50 largest cruise ships use our matrices to switch their RF signals. We have a wide range of RF solutions for reliable satellite communications on cruise liners and super yachts, which can be used as part of a VSAT system or for a TVRO system.

Global Sales And Support

We ship to 112 countries, and have a team of experts handling your equipment through customs and shipping. ETL's worldwide partners provide support to our customers around the world. To see if we have a dedicated partner in your region, please visit the website, www.etlsystems.com/worldwide-partners.



Our Capabilities

Our in-house services and facilities provide a greater range of production capabilities for design, production and maintenance under the ISO 9001 Quality Management System.



In-house RF, PCB, mechanical and software design engineers

Custom build design with modest NRE costs



Support, FAT, commissioning and system training

Ad-hoc on-site support



Fully integrated production and test with two pick and place (SMT) lines

100% testing at sub-assembly and finished product levels



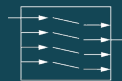
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Matrix / Router Overview

Matrix Range & Options

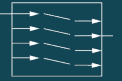
ETL has a broad RF switch matrix / router range, providing RF signal distribution for satellite communications. The switch matrix / router products are available in a variety of frequencies including IF-band, L-band and Ka-band and in distributive fan-out or combining fan-in. ETL also has the Ensign fan-in fan-out L-band matrix.

Did you know... our range of L-band matrices is more than double that of our nearest competitor, enabling us to offer you the best fit for your requirements.

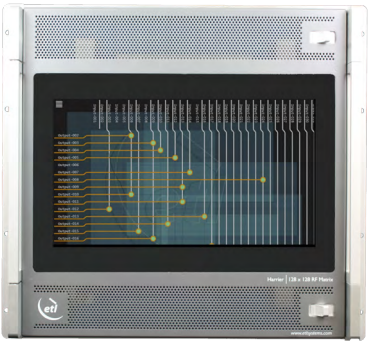
Matrix	HAR	VCN	HUR	VTX	NGM	NSN	VLT	VTR	OPT	HWK
Page Number	9	10	11	12	13	14	15	16	17	18
Frequency	850-2450 MHz	40-2150 MHz	850-2450 MHz	50-2450 MHz	50-4000 MHz	850-2450 MHz	50-2450 MHz	50-2500 MHz	850-2150 MHz	850-2450 MHz
Capacity	128 x 128	128 x 128	64 x 64	64 x 64	32 x 32	32 x 32	16 x 32	16 x 16	Quad 4x16 Dual 4x32 Single 4x64	Dual 8 x 8 Distributive/ Combining
Max System Size	1024 x 1024	1024 x 1024	512 x 512	512 x 512	512 x 512	512 x 512	16 x 32	32 x 32	4 x 64	16 x 8 8 x 16
Chassis Height	10U	16U	4U	8U	6U	6U	3U	1U	3U	1U
Hot Swap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PSU Redundancy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Software Enabled Expansion	-	-	-	-	-	-	-	✓	-	✓
Distributive/Fan Out	✓	✓	✓	✓	✓	-	✓	✓	✓	✓
Combining/Fan in	-	-	-	-	✓	-	-	✓	-	✓
Fan In Fan Out (FIFO)	-	-	-	-	-	✓	-	-	-	-
IF-Band	-	✓	-	✓	✓	-	✓	✓	-	-
L-band	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ka-Band	✓	-	✓	✓	✓	✓	✓	✓	-	✓
Enhanced RF Performance	✓	✓	✓	✓	✓	-	-	-	-	-
Auto RF Redundancy*	✓	✓	✓	-	-	-	-	-	-	-
Variable Gain	✓	✓	✓	✓	✓	✓	-	✓	-	-
RF Detect	✓	✓	✓	-	-	-	-	✓	-	-
LNB Power	✓	-	✓	-	-	-	✓	✓	✓	-
Fibre Inputs	✓	-	✓	-	-	-	-	-	-	-

* Auto Mid Matrix redundancy - in the event of a mid matrix path failure

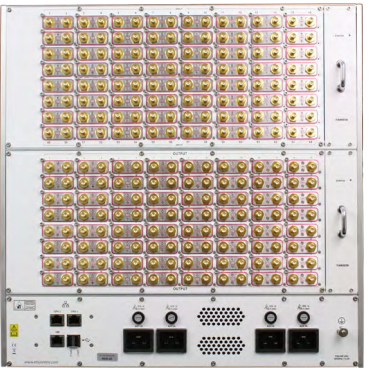
For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.



128 x 128 Harrier Matrix / Router



Front view



Rear view

ETL's ultra compact, fully featured 128 x 128 Harrier L-band matrix (router) offers full fan-out / distributive routing in a compact form factor (10U high) with optional integrated LNB powering and fibre inputs, via compatible IO modules.

The Harrier's configurable design offers a range of input and output modules (IO) with features to suit specific RF needs for each satellite feed. The Harrier can be expanded from 8 x 8 up to 128 x 128 in blocks of 8.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Compact 128 x 128 routing in a 10U shelf.
- Extended L-band frequency for Ka-band & HTS applications.
- Configurable IO modules including fixed gain, variable gain, LNB powering & optical fibre inputs.
- Reliability in service with dual redundant PSU & CPU modules & hot- swappable active components.
- Applications include teleports requiring input gain/ fibre inputs.

FEATURES

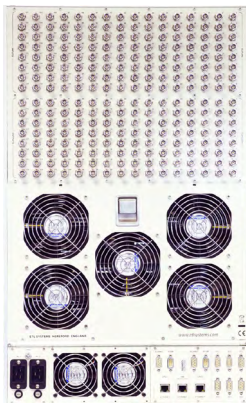
Model	HAR-40			
Frequency	850-2450 MHz (Extended L-band)			
Matrix Type	Distributive (Fan-out)			
Capacity	128 inputs x 128 outputs			
Hot-Swap	RF Matrix Cards, CPUs, PSUs & Fans			
Dual Redundant CPUs & PSUs	As standard			
Redundant Mid Matrix Paths	As standard			
LNB Power	✓			
H-Series IO Module Options	Standard passive input or output module	Variable gain input module	Optical fibre input module	LNB power module
Dimensions	10U high x 550mm deep x 19" wide			
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type			



128 x 128 Vulcan Matrix / Router



Front view



Rear view

ETL's Vulcan high density RF matrix (router) offers up to 128 x 128 routing in a 16U high chassis. The dependable Vulcan is a cost-effective fan-out / distributive system.

Designed for use in modern multiple antenna sites, particularly for Government and large commercial teleports. This resilient matrix is a high performance solution to frequent signal routing changes and handling a high volume of downlink feeds.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Compact 128 x 128 routing in a 16U chassis.
- Simple 'plug & go' installation.
- Further expansion of RF Matrix in steps up to 1024 x 1024.
- Self diagnostics with continuous monitoring & reporting of all active components (e.g amplifiers).
- Reliability in service with dual redundant PSU & CPU modules & hot- swappable active components.
- Applications include RF content acquisition for TVRO & IPTV head-ends, remote controlled unmanned satcom sites & telecoms.

FEATURES

Model	VCN-11	VCN-12
Frequency	850-2150 MHz (L-band)	40-200 MHz (IF)
Matrix Type	Distributive (fan-out)	
Capacity	128 inputs x 128 outputs	
Hot-Swap	RF Matrix Cards, CPUs, PSUs & Fans	
Dual Redundant CPUs & PSUs	As standard	
Redundant Mid-Matrix Paths	As standard	
Dimensions	16U high x 620mm deep x 19" wide	
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type	

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

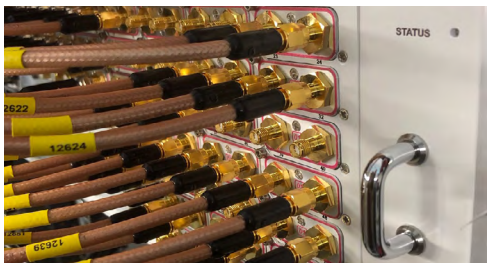
UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



64 x 64 Hurricane Matrix / Router



Front view



Rear view cabling



Rear view

ETL's ultra compact 64 x 64 Hurricane matrix (router), offers full fan-out / distributive routing in a compact form factor (4U high) with optional integrated LNB powering fibre inputs, via compatible IO modules. The Hurricane's configurable design offers a range of input and output modules (IO modules) with features to suit specific RF needs for each satellite feed. The matrix can be expanded from 8 x 8 up to 64 x 64 in blocks of 8.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Ultra compact 64 x 64 routing in a 4U shelf.
- Extended L-band frequency for Ka-band & HTS applications.
- Configurable IO modules including fixed gain, variable gain, LNB powering & optical fibre inputs.
- Reliability in service with dual redundant PSU & CPU modules & hot- swappable active components.
- Minimal impact from failure as all settings are retained after a communications / power failure.
- Applications include teleports requiring input gain/ fibre inputs.

FEATURES

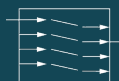
FEATURES				
Model	HUR-10			
Frequency	850-2450 MHz (Extended L-band)			
Matrix Type	Distributive (Fan-out)			
Capacity	64 inputs x 64 outputs			
Hot-Swap	As standard			
Dual Redundant CPUs & PSUs	As standard			
LNB Power	✓			
H-Series IO Module Options	Standard passive input or output module	Variable gain input module	Optical fibre input module	LNB Power input module
Dimensions	4U high x 650mm deep x 19" wide			
RF connectors & impedance	50Ω BNC, 50Ω SMA, 75Ω BNC & 75Ω F-type			

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

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Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com

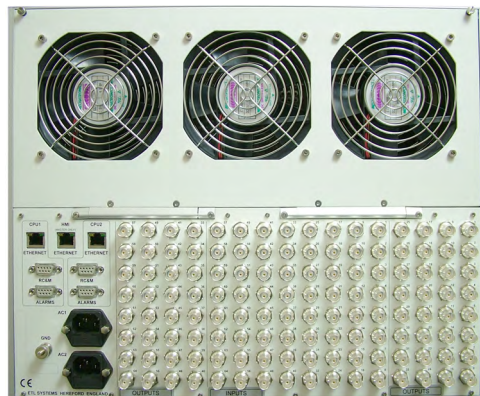




64 x 64 Vortex Matrix / Router



Front view



Rear view

ETL’s Vortex high density RF matrix (router) offers up to 64 x 64 routing in 8U high chassis. The dependable Vortex is a cost-effective fan-out / distributive system.

The Vortex has been designed to provide high resilience for mission-critical applications, with redundant, hot-swap active components. Operating over a range of frequencies including IF-band , L-band & extended L-band.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

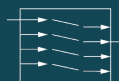
- Compact 64 x 64 routing in an 8U shelf.
- Simple ‘plug & go’ installation.
- Further expansion of RF matrix to 1024 x1024.
- Self diagnostics with continuous monitoring and reporting of all active components.
- Reliability in service with hot-swappable active components.
- Applications include RF content acquisition for TVRP & IPTV head-ends, remote controlled unmanned satcom sites & broadcasters.

FEATURES			
Model	VTX-10	VTX-30	VTX-31
Frequency	850-2450 MHz (L-band)	50-200 MHz (IF)	50-2450 MHz (Extended L-band)
Matrix Type	Distributive (fan-out)		
Capacity	64 inputs x 64 outputs		
Dual Redundant CPU's & PSUs	As standard		
Hot-Swap	RF Matrix Cards, CPUs, PSUs & Fans		
Dimensions	8U high x 620mm deep x 19" wide		
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type		

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Email: info@etlsystems.com

US Office:
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Email: ussales@etlsystems.com

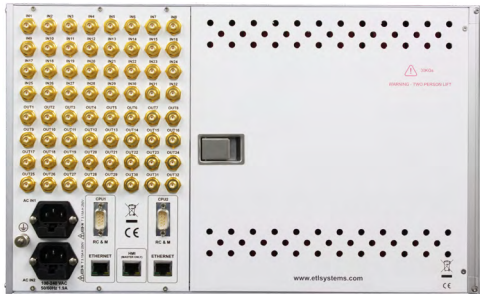
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Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



32 x 32 Enigma Matrix / Router



Front view



Rear view

Did you know...over 1,000 Enigma matrices are used in teleports around the world

ETL’s flagship Enigma matrix (router) range offers up to 32 x 32 routing in a 6U chassis. With fan-out / distributive and fan-in / combining options.

The Enigma matrix is designed to improve resilience and minimise the risk of expensive downtime for the satcoms user, with single input and output cards and hot-swap active components.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Inputs & outputs can be expanded in single increments.
- New capacitive touchscreen for ease of use & durability (NGM-1xx).
- Simple ‘plug & go’ installation.
- Expansion of RF Matrix to 512 x 512.
- Self diagnostics with continuous monitoring & reporting of all active components (e.g amplifiers).
- Reliability in service with hot-swappable active components.
- Applications include live news & sport traffic, satellite communications & signal monitoring of satellite traffic.

FEATURES														
Model	NGM-23	NGM-25	NGM-27	NGM-29	NGM-46	NGMC-47	NGM-48	NGM-50	NGM-101	NGMC-101	NGM-102	NGMC-102	NGM-103	NGMC-103
Frequency (MHz)	850-2150	50-2150	50-200	50-1000	1000-2000	1000-2000	1500-4000	850-2450	850-2150	850-2150	850-2450	850-2450	500-3150	500-3150
Matrix Type*	D	D	D	D	D	C	D	D	D	C	D	C	D	C
Capacity	32 inputs x 32 outputs													
Matrix Expansion	✓													
Dual Redundant CPU's & PSUs	As standard													
Hot-Swap	RF Matrix Cards, CPUs, PSUs & Fans													
Dimensions	6U high x 450mm deep x 19" wide													
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type													

*Matrix Type defined as D - Distributive or C - Combining

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Email: info@etlsystems.com

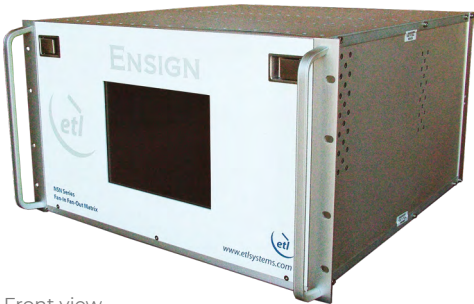
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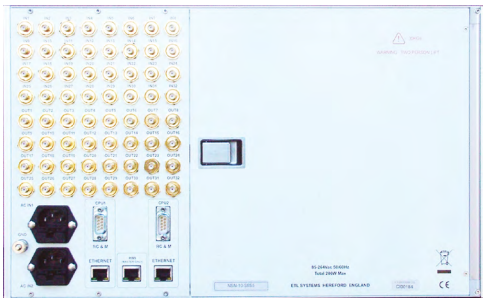




32 x 32 Ensign Matrix / Router



Front view



Rear view

ETL's Ensign RF matrix (router) offers up to 32 x 32 routing in a 6U chassis. The resilient Fan-In and Fan-Out (FIFO) L-band matrix allows multiple inputs to be combined. The combined signal can then be routed (distributed) to multiple outputs.

This design provides modems access to multiple uplink and downlink chains. The Ensign can also be used as a Transmit and Receive matrix for smaller teleports or ground stations.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS



- Switching flexibility with ability to split and combine feeds at the same time.
- Single expansion of input & output cards.
- Further expansion of RF Matrix to 512 x 512.
- Self diagnostics with continuous monitoring & reporting of all active components (e.g amplifiers).
- Reliability in service with hot-swappable active components.
- Applications include VSAT traffic distribution, RF distribution in cruise liners or luxury yachts, downlink & uplink applications.

FEATURES		
Model	NSN- 11	NSN- 15
Frequency	850-2450 MHz (Extended L-band)	
Matrix type	Distributive & Combining / Fan-in Fan-out (FIFO)	
Capacity	32 inputs x 32 outputs	
Gain	Fixed	Variable
Dual Redundant CPUs & PSUs	✓	✓
Hot-swap	RF Matrix Cards, CPUs & PSUs	
Dimensions	6U high x 450mm deep x 19" wide	
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type	

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Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



16 x 32 Valiant Matrix / Router



Front view



Rear view



Front view showing hot-swap power supplies

ETL's Valiant RF matrix (router) offers up to 16 x 32 routing in a compact 3U chassis. The Valiant has a hot-swap configuration, and includes the option of LNB powering.

This RF matrix is ideal for smaller broadcasters, satellite ground stations, cruise liners and luxury yachts, providing the flexibility of RF routing. The matrix can be used for L-band, IF and broadband signals.

Larger systems such as 16 x 48 or 16 x 64 can be built by adding more matrix modules and splitters or combiners.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS



- Reliability in service with hot-swappable active components.
- Excellent RF signal performance with high Isolation, unity gain & excellent flatness across band.
- Broad frequency handling of L-band, IF & Broadband signals.
- Applications include SNG or outside broadcast trucks, marine cruise liners and luxury yachts and satellite ground stations.

FEATURES		
Model	VLT-50	VLT-10
Frequency	50-2450 MHz (IF to L-band)	
Matrix Type	Distributive (fan-out)	
Capacity	16 inputs x 32 outputs	
Dual Redundant PSUs	✓	
Hot-swap	RF Matrix Cards, CPU & PSU's	
LNB Powering & 22 KHz tone	-	✓
Dimensions	3U high x 300mm deep x 19" wide	
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type	

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





16 x 16 Victor Matrix / Router



Front view



Rear view



Front view showing hot-swap fan modules



Did you know... 29 of the world's largest 50 cruise ships already use our matrices to switch their RF signals

ETL's compact Victor RF matrix (router) offers up to 16 x 16 routing in a 1U chassis. The matrix series provides fan-out / distributive and fan-in / combining routing options and optional LNB powering.

The matrix can be used for L-band, IF and broadband applications. It can be supplied part populated and expanded via software keys.

It is ideal for TVRO, smaller teleports and satellite ground stations, providing the flexibility of RF routing.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS



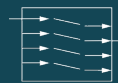
- Variable gain on each input, to allow for signal balancing.
- RF detection for signal strength monitoring.
- Reliability in service with dual redundant power supplies.
- Simple 'plug & go' installation.
- Compact 1U chassis, ideal for restricted rack space.
- LNB Powering options.
- Applications include marine, SNG trucks & mobile satcoms.

FEATURES			
Model	VTR-71	VTRC-71	VTR-80
Matrix Type	Distributive (fan-out)	Combining (fan-in)	Distributive (fan-out)
Frequency	50-2500 MHz (IF to Extended L-band)		
Capacity	16 inputs x 16 outputs		
Dual Redundant PSUs		✓	
Variable Gain		✓	
LNB Powering	-	-	✓
Software Enabled Expansion		✓	
RF Detection	-	-	✓
Dimensions	1U high x 550mm deep x 19" wide		
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type		

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

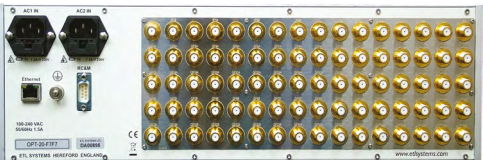
UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



4 x 16 / 4 x 32 / 4 x 64 Optimus Matrix / Router



Front view



Rear view



Internal view showing hot-swap cards & power supplies

ETL's Optimus RF matrix (router) offers up to 4 x 64 routing in a 1U chassis. The matrix provides fan-out / distributive routing and combines all the features of a multiswitch and a distribution RF matrix in one chassis.

The Optimus chassis can be configured in a number of sizes depending on the number of modems to be linked. This includes quad 4 x 16, dual 4 x 32 and single 4 x 64.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS



- Choice of multiswitch or RF matrix mode.
- Configurable as quad 4 x 16, dual 4 x 32 or single 4 x 64 matrices.
- LNB current monitoring.
- Reliability from dual redundant power supplies.
- The risk of failure is minimised with hot-swappable active components.
- Applications include RF content acquisition for TVRO and IPTV headends, bulk distribution of satellite transponders and RF distribution in cruise liners or luxury yachts.

FEATURES	
	OPT-20
Matrix Type	Distributive (fan-out)
Frequency	850-2150 MHz (L-band)
Capacity	Quad 4 x 16 or Dual 4 x 32 or Single 4 x 64
Dual Redundant PSUs	✓
Hot-swap	RF Matrix Cards, CPU & PSUs
LNB Powering & 22KHz tone	✓
Dimensions	3U high x 500mm deep x 19" wide
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





Dual 8 x 8 Hawk Matrix / Router



Front view



Rear view



Typical applications include small teleports

ETL's compact Hawk RF Matrix (router) offers up to 16 x 8 or 8 x 16 routing in a 1U chassis. Designed for the latest LEO constellations the matrix has capacity for two fan-out / distributive or fan-in / combining 8 x 8 matrix cards.

The Hawk can be fitted with any combination of combining (fan-in) or distributive (fan-out) cards depending on application, but is ideally suited for smaller gateways with multiple modems and one or two antennas.

Single 8 x 16 & 16 x 8 configurations are also available upon enquiry. For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Flexible module configurations providing routing solutions with dual 8 x 8 distribution modules, dual 8 x 8 combining modules or a combination of distributive and combining modules.
- Resilience with dual redundant power supplies.
- The risk of failure is minimised with hot-swap power supplies & field serviceable matrix modules.
- Applications include LEO satellite constellations, small teleports, uplink and downlink systems.

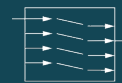
FEATURES

Model	HWK-10
Matrix Type	Distributive (fan-out) or Combining (fan-in)
Frequency	850-2450 MHz (Extended L-band)
Capacity	2 matrix cards, each 8 x 8
Dual Redundant PSUs	✓
Hot-swap	PSUs & CPU
Field Serviceable	RF Matrix Cards
Dimensions	1U high x 550mm deep x 19" wide
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



Matrix / Router Larger Systems



A large satellite teleports requiring multiple RF matrices

Where a large number of satellite feeds is required, ETL's matrix range can be supplied as a multi-module matrix system, using splitters and combiners.

Matrix system splitters and combiners can add additional requirements to the system such as variable gain, variable slope compensation, LNB powering and RF detection.

Matrix Expansion

Satellite ground stations constantly change and expand their satellite feeds.

Matrices can also be easily expanded on the inputs, outputs or both, by adding additional matrix cards/software keys, matrix modules, splitters and/or combiners.



64 x 64 Enigma Matrix System



64 x 192 Vortex Matrix System



128 x 256 Vulcan Matrix System

FEATURES

Matrix	Victor	Optimus	Valiant	Ensign	Enigma	Hurricane	Vortex	Harrier	Vulcan
Module Capacity	16x16	Quad 4x16 Dual 4x32 Single 4x64	16x32	32x32	32x32	64x64	64x64	128x128	128x128
Maximum System Size	32x32	4x64	16x32	512x512	512x512	512x512	512x512	1024x1024	1024x1024

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





StingRay RF over Fibre Overview



Standalone fibre modules are also available - see the RF components section.

The StingRay RF over Fibre links are used as an alternative to copper coaxial cable. They convert high quality RF to optical signals over single mode fibre from, for example, a satellite antenna to reception equipment room, up to 10 km away, with options for distances up to 500 km.

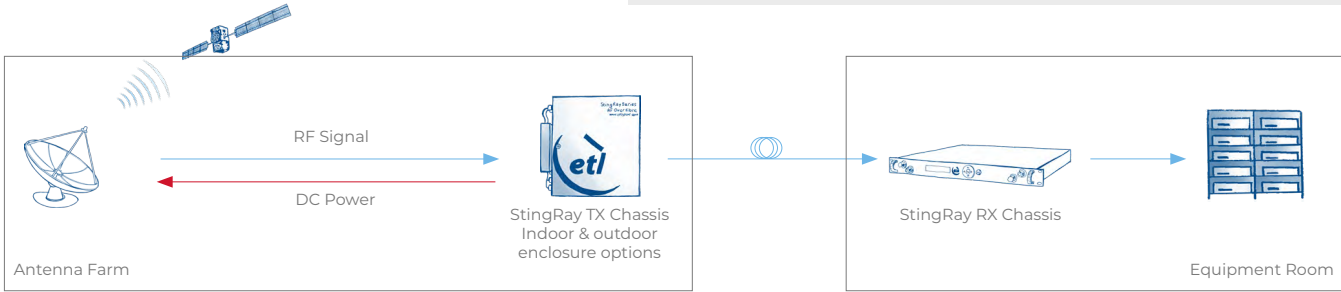
StingRay RF over Fibre uses single-mode fibre, as the optical performance is improved over long distances and wider bandwidths.

ETL offer a range of ultra-compact indoor and outdoor chassis options which can hold a combination of fibre modules.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Optical fibre links are a lower cost & space alternative to copper cable.
- Low noise performance & high isolation between fibre modules.
- Higher information carrying capacity by using wavelength division multiplexing to place many feeds on a single fibre.
- Weatherproof IP65 rated enclosures to withstand harsh weather conditions.
- Reliability in service with hot-swap fibre modules, fans and dual redundant power supplies.
- Applications include HTS, long distance teleports & general satcoms.



Typical fibre link application

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



StingRay RF over Fibre Module Overview



ETL's StingRay RF over Fibre modules are designed to be housed in the indoor and outdoor chassis. The module range is split in to 100 and 200 series.

The 100 series range is ideal for ultra-compact requirements or for smaller applications, such as a single antenna, with up to 16 RF modules housed in a 1U high chassis.

The 200 series range offer twin module options, where 2 separate links are provided on one module or with a -20 dB monitoring port for input signal monitoring.

100 series Fibre Module Model Numbers						For full model numbers see pages 22-23			
Frequency / Module Type	Gain			Redundancy		Longer Distances		Monitor Port	Dual Modules
	AGC	Fixed Gain	Manual Gain	1+1	4+1 2+1	CWDM (<45km)	DWDM (>45km)		

L-band	103/104 113/114 115/116 141/142	109/110	-	See 200 series	See 200 series	OCM-08-545-47 141/142	See 200 series	See 200 series	See 200 series
S-band	117/118	-	-	-	-	-	-	-	-
Broadband	105/106 143/144	111/112	-	-	-	143/144	-	-	-
10 MHz	107/108	-	-	-	-	-	-	-	-
Ethernet	See 200 series modules below								

200 series Fibre Module Model Numbers						For full model numbers see pages 24-27			
Frequency / Module Type	Gain			Redundancy		Longer Distances		Monitor Port	Dual Modules
	AGC	Fixed Gain	Manual Gain	1+1 Redundancy	4+1 2+1	CWDM (<45km)	DWDM (>45km)		

L-band	201/202 205/206 241/242 251/252 253/254 281/282 287/288 291/292	267/268 267a & b/ 267a	273/274	See AGC	291/292	OCM-08-545-47 241/242	257/242	201/202 241/242 251/252 266 267/268 291/292	205/206
S-band	293/294	-	-	-	-	-	-	-	293/294
Broadband	203/204 207/208	269/270	-	222	-	-	253/254	203/204 269/270	207/208
10 MHz	281/282	-	-	281/282	-	249/250	255/256	281/282	-
Ethernet	261	-	-	-	-	261m+Cxx-102	261m+Dxx-103	-	-

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





StingRay RF over Fibre

Optical Fibre Connectors

ETL offer APC connectors (Angled Physical Contact). APC connectors are used as they provide an extremely reliable way of achieving the high return losses essential in RF systems.

ETL offer 2 optical fibre connector types that offer low loss and create an extremely reliable connection:



FC/APC (Angled ferrule connector / fibre connector).
Ferrule diameter: 2.5 mm
Coupling type: Screw



SC/APC (Angled subscriber connector / square connector / standard connector).
Ferrule diameter: 2.5 mm
Coupling type: Snap (push-pull coupling)

Up To 10km - Short distance fibre

100 Series

Our 100 series range is ideal for ultra-compact requirements or for smaller applications, such as a single antenna, with up to 16 RF modules housed in a 1U high chassis.

100 Series Module Options

FEATURES										
Model	SRY-TX-L1-103	SRY-RX-L1-104	SRY-TX-L1-109	SRY-RX-L1-110	SRY-TX-B2-105	SRY-RX-B2-106	SRY-TX-B2-111	SRY-RX-B2-112	SRY-TX-S4-117	SRY-RX-S4-118
Type	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX
Frequency	850-2450 MHz (Extended L-band)		850-2450 MHz (Extended L-band)		50-2450 MHz (Broadband)		50-2450 MHz (Broadband)		500-3150 MHz (S-band)	
Gain	AGC	AGC	Fixed	Fixed	AGC	AGC	Fixed	Fixed	Fixed & AGC	Fixed & AGC
LNB DC*	✓	-	-	-	✓	-	-	-	✓	-

*LNB DC only available with compatible chassis

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



StingRay RF over Fibre

100 Series 10 MHz Reference Module Options

The 100 series 10 MHz Reference RF over fibre modules can be used to provide a timing reference signal to lock oscillators in both up and down converters (LNB and BUC).

FEATURES		
Model	SRY-TX-Y-107	SRY-RX-Y-108
Type	Fibre TX	Fibre RX
Frequency	10 MHz	10 MHz



100 series StingRay RF over Fibre modules

100 Series Indoor Chassis Options - Compact

FEATURES			
Model	SRY-C100-1U	SRY-C101-1U	SRY-C103-1U
Capacity	Up to 16 modules	Up to 12 modules	Up to 12 modules
Single/Dual IECs	Single	Dual	Dual
LNB DC	-	-	✓
10 MHz inject	-		
Remote control & monitoring	RJ45 Ethernet Port, SNMP, Web Browser Interface & PC Software (optional)		RJ45 Ethernet Port, SNMP, Web Browser Interface & PC Software (optional). Summary alarm port
Local control & monitoring	Front panel keypad & display		Front panel keypad & display
Dual Redundant PSUs	✓		✓
Hot-swap	Power supplies, fibre modules & fan modules		



Hot-swap power supplies, fibre modules & fan modules on 100 series chassis

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





StingRay RF over Fibre

200 Series

Our 200 series range offer twin module options, where 2 separate links are provided on one module or with a -20 dB monitoring port for input signal monitoring.

200 Series Module Options

FEATURES											
Model	SRY-TX-L1-201	SRY-RX-L1-202	SRY-TX-L1-205	SRY-RX-L1-206	SRY-RX-L1-266	SRY-TX-L1-267	SRY-RX-L1-268	SRY-TX-L1-273	SRY-RX-L1-274	SRY-TX-L1-291	SRY-RX-L1-292
Type	Fibre TX	Fibre RX	Fibre TX	Fibre RX	GNSS Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX
Frequency	850-2450 MHz (Extended L-band)		850-2450 MHz (Extended L-band)		850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)		850-2450 MHz (Extended L-band)		850-2450 MHz (Extended L-band)	
Capacity	Single	Single	Dual	Dual	Single	Single	Single	Single	Single	Single	Single
Gain	AGC	AGC	AGC	AGC	AGC	Fixed	Fixed	Manual	Manual	AGC	AGC
LNB Powering	✓	-	✓	-	-	-	-	-	-	-	-
-20dB monitor port	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓

FEATURES											
Model	SRY-TX-B2-203	SRY-RX-B2-204	SRY-TX-B2-207	SRY-RX-B2-208	SRY-TX-B2-269	SRY-RX-B2-270	SRY-TX-S4-287	SRY-RX-S4-288	SRY-TX-S4-293	SRY-RX-S4-294	
Type	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	
Frequency	50-2450 MHz (Broadband)		50-2450 MHz (Broadband)		50-2450 MHz (Broadband)		500-3150 MHz (S-band)		500-3150 MHz (S-band)		
Capacity	Single	Single	Dual	Dual	Single	Single	Single	Single	Dual	Dual	
Gain	AGC	AGC	AGC	AGC	Fixed	Fixed	AGC	AGC	AGC	AGC	
LNB Powering	✓	-	✓	-	-	-	✓	-	✓	-	
-20dB monitor port	✓	✓	-	-	✓	✓	✓	✓	-	-	



200 series StingRay RF over Fibre modules

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



StingRay RF over Fibre

200 Series 10 MHz Reference Module Options

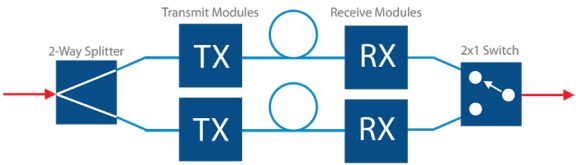
The 200 series 10 MHz Reference RF over fibre modules can be used to provide a timing reference signal to lock oscillators in both up and down converters (LNB and BUC).

FEATURES				
Model	SRY-TX-Y-211	SRY-RX-Y-212	SRY-TX-Y-281	SRY-RX-Y-282
Type	Fibre TX	Fibre RX	Fibre TX	Fibre RX
Frequency	10 MHz	10 MHz	10 MHz	10 MHz
Enhanced Performance	-	-	Ultra low phase noise	Ultra low phase noise

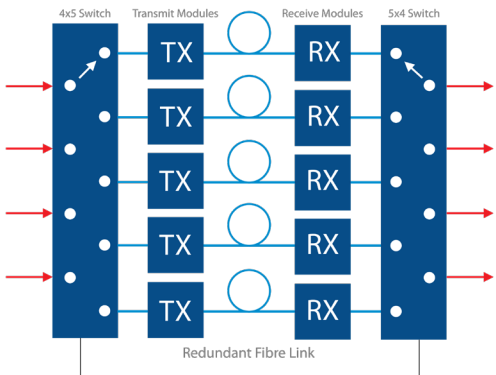
200 Series Redundancy System Module Options

For enhanced resilience the 200 series StingRay redundancy RF over fibre modules can be configured to provide 1+1 and 4+1 or 4+2 redundancy systems. Redundancy provides additional resilience for uplink and downlink transmissions over fibre. If one fibre link fails, the signal is automatically switched to the redundant path.

FEATURES								
Model	SRY-DIV-L1-213	SRY-SW-L1-214	SRY-DIV-Y-219	SRY-SW-Y-220	SRY-DIV-B2-221	SRY-SW-B2-222	SRY-DIV-L1-289	SRY-SW-L1-271
Module Type	RF Splitter	RF Switch	RF Splitter	RF Switch	RF Splitter	RF Switch	RF Splitter	RF Switch
Frequency	850-2450 MHz	850-2450 MHz	5-1000 MHz	10 MHz	50-2450 MHz	50-2450 MHz	850-2450 MHz	850-2450 MHz
Gain	Active	-	Passive	-	Active	-	Passive	-



1+1 redundancy schematic



4+1 redundancy schematic

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





StingRay RF over Fibre

200 Series Indoor Chassis Options - High Capacity Chassis

FEATURES						
Model	SRY-C200-1U	SRY-C201-2U	SRY-C205-2U	SRY-C206-2U	SRY-C207-1U	SRY-C209-2U
Capacity	Up to 4 modules	Up to 16 modules	Up to 16 modules	Up to 16 modules	Up to 4 modules	Up to 12 modules
Redundancy Options	1+1 redundancy configuration available with modules SRY-L1-DIV213 & SRY-L1-SW214					Dual 4+2 with Two independent 4+2 switch matrices. 4+2 block can be subdivided into 1+1, 2+1 etc.
LNB DC	✓	✓	✓	✓	✓	-
10 MHz Inject	-	-	✓	-	✓	-
Remote Control & monitoring	RS232/RS485 Serial Port, RJ45 Ethernet Port, SNMP, Web Browser Interface & PC Software (optional). Summary alarm port.					
Local Control & monitoring	Applicable to all models above: Front panel keypad & display					
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓
Hot-swap	Applicable to all models above: Power supplies, fibre modules & fan modules					



Hot-swap power supplies, fibre modules & fan modules on 200 series chassis



104 x RF over Fibre Links required for an antenna array. ETL supplied StingRay 200 Series fibre chassis with redundant 10MHz distribution housed in a environmentally controlled 42U custom outdoor cabinet.

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



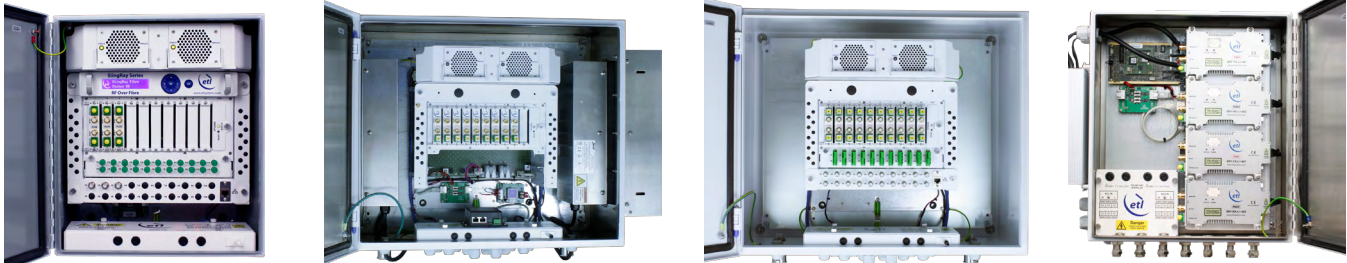
StingRay RF over Fibre

200 Series Outdoor Chassis Options

The StingRay RF over Fibre Outdoor unit (ODU) is a robust weatherproof (IP65 rated) enclosure which has been designed to be wall or post mounted close to an antenna.

ETL offers advanced, extended temperature or basic ODU versions as follows;

FEATURES				
Model	ODU-201	ODU-205	ODU-206	ODU-203
Capacity	Up to 10 modules	Up to 10 modules	Up to 10 modules	Up to 4 modules (400 series only)
Redundancy Options	1+1 redundancy	1+1 redundancy	1+1 redundancy	-
Remote Control & Monitoring	RS232/RS485 Serial Port, RJ45 Ethernet Port, SNMP & Web Browser Interface			
Local Control & Monitoring	Optional Keypad & Display	-	-	Module DIP Switches
LNB DC	✓	✓	✓	✓
10 MHz Inject	✓	✓	✓	-
Temperature Rating	Standard temperature	Extended temperature with AC units	Elevated temperature	Standard temperature
Dual Redundant PSUs	✓	✓	✓	✓
Hot-swap PSU's	✓	✓	✓	Field serviceable



Model SRY-ODU201
Model SRY-ODU205 Extended temperature with AC units
Model SRY-ODU206 Extended temperature
Model SRY-ODU203 Compact 4-channel

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





StingRay RF over Fibre



StingRay RF over Fibre

STINGRAY ODU ADDITIONAL OPTIONS					
Model		ODU-201	ODU-205	ODU-206	ODU-203
Control					
SRY-OPT4-LCU	Local control panel with keypad / display	✓	✓	✓	✓
SRY-OPT3-OPE-xx	Optical Ethernet converter for remote communications over fibre 10 km	✓	✓	✓	✓
SRY-OPT10-EC1	Ethernet Copper Interface provides additional surge protection	✓	✓	✓	✓
SRY-OPT23-CPU	ODU203 CPU card upgrade	-	-	-	✓
Fixing / Mounting / Locks					
SRY-OPT6-BR1	Bolts and spacers for wall mount	✓	✓	✓	✓
SRY-OPT7-BR2	Pole mounting bracket	✓	✓	-	✓
SRY-OPT26-BR2	Pole mounting bracket	-	-	✓	-
SRY-OPT9-DRL	Key operated door lock, replaces screwdriver operated door lock	✓	✓	✓	✓
Environmental					
SRY-OPT1-40C	Thermostat controlled heater for -20°C to -40°C	✓	✓	✓	✓
SRY-OPT2-60C	Thermostat controlled heater for -20°C to -60°C	✓	✓	✓	✓
SRY-OPT8-SUN	Sun shade to protect from solar loading / direct sun light	✓	✓	-	✓
SRY-OPT127-SUN	Sun shade to protect from solar loading / direct sun light	-	-	✓	-
Patch Panels / Cables					
SRY-OPT11-TRY-xx	Fibre management tray and optical patch panel (excluding patch leads)	✓	✓	✓	-
SRY-OPT5-PPN-xxxx	F-Type RF patch panel to facilitate easy cabling (excluding patch leads)	✓	✓	✓	-
SRY-OPT12-CCB-xxxx	Coaxial patch lead (to connect RF ports of the fibre modules to the patch panel)	✓	✓	✓	-
SRY-OPT13-FPC-xx	Fibre patch cable (to connect optical ports of the fibre modules to the fibre patch panel)	✓	✓	✓	-
SRY-FPT-xx-1M	1 metre fibre pig tail with FC/APC (or SC/APC) connector to splice onto unconnectorised fibre	✓	✓	✓	✓
SRY-OPT14-GP1	Fit Roxtec CF 16 EMC Cable gland for up to 28 cables	✓	✓	✓	-
SRY-OPT15-GP2	Custom gland plate to customer design (excluding glands and connectors)	✓	✓	✓	-
Other					
SRY-OPT16-10M	Internal 10 MHz passive splitter for 10 MHz distribution to modules	✓	✓	✓	-

Model SRY-ODU201 - Outdoor Fibre Chassis

IP65 rated weatherproof enclosure can house up to 10 single or dual RX or TX 200 series modules

Fibre management tray & patch panel for termination of the incoming fibre cable & slack cable storage (O)

Cable options:

- RF patch coax cables (O)
- Optical patch cables (O)
- Optical pigtails (O)
- Ethernet cables (O)
- EMC cable gland (O)

RF patch panel allowing incoming RF cables to be connected to the panel & then patch up to modules (O)

Sunshade to protect from direct sunlight/solar loading (O)

LNB powering 13/18V & 22KHz tone (provided on TX modules)

Reliability from dual redundant hot-swap fibre modules, power supplies & CPU

Local control & monitoring via local control unit push buttons & display (O)

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

- Copper Ethernet interface
- Single optical Ethernet interface (O)
- Ethernet switch (O)

Alarm to notify if door is left open

Thermostat/Heater options for operation below -20 °C to -60 °C & humidity detection (O)

(O) = Optional Item

Front view - door closed

Front view - door open

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com

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StingRay RF over Fibre



StingRay RF over Fibre

Model SRY-ODU205 - Extended temperature with AC units

IP65 rated weatherproof enclosure can house up to 10 single or dual RX or TX 200 series modules

Fibre management tray & patch panel for termination of the incoming fibre cable & slack cable storage (O)

Cable options:

- RF patch coax cables (O)
- Optical patch cables (O)
- Optical pigtails (O)
- Ethernet cables (O)
- EMC cable gland (O)

RF patch panel allowing incoming RF cables to be connected to the panel & then patch up to modules (O)

Sunshade to protect from direct sunlight/solar loading (O)

AC units for operation from -40 °C to +65 °C & humidity detection

LNB powering 13/18V & 22KHz tone (provided on TX modules)

Reliability from dual redundant hot-swap fibre modules, power supplies & CPU

Local control & monitoring via local control unit push buttons & display (O)

Remote control & monitoring via RJ45 Ethernet port with SNMP & web browser interface. Ethernet options:
- Copper Ethernet interface (O)
- Single optical Ethernet interface (O)
- Ethernet switch (O)

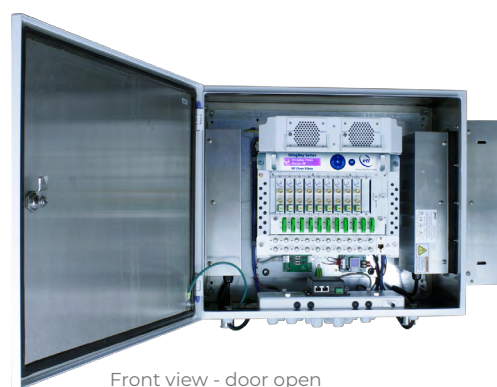
Thermostat/Heater options for operation below -40 °C to -60 °C & humidity detection (O)

Alarm to notify if door is left open

(O) = Optional Item



Front view - door closed



Front view - door open

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



Model SRY-ODU206 - Extended temperature outdoor chassis

IP65 rated weatherproof enclosure can house up to 10 single or dual RX or TX 200 series modules

Fibre management tray & patch panel for termination of the incoming fibre cable & slack cable storage (O)

Cable options:

- RF patch coax cables (O)
- Optical patch cables (O)
- Optical pigtails (O)
- Ethernet cables (O)
- EMC cable gland (O)

RF patch panel allowing incoming RF cables to be connected to the panel & then patch up to modules (O)

Sunshade to protect from direct sunlight/solar loading (O)

LNB powering 13/18V & 22KHz tone (provided on TX modules)

Reliability from dual redundant hot-swap fibre modules, power supplies & CPU

Local control & monitoring via local control unit push buttons & display (O)

Remote control & monitoring via RJ45 Ethernet port with SNMP & web browser interface. Ethernet options:
- Copper Ethernet interface (O)
- Single optical Ethernet interface (O)
- Ethernet switch (O)

Thermostat/Heater options for operation below -40 °C to -60 °C & humidity detection (O)

Alarm to notify if door is left open

(O) = Optional Item



Front view - door closed



Front view - door open

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





StingRay RF over Fibre

Model SRY-ODU203 - Compact 4-channel outdoor chassis

IP65 rated weatherproof enclosure can house up to 4 single RX or TX 400 series modules

LNB powering 13/18V & 22KHz tone (provided on TX modules)

Reliability from dual redundant field serviceable power supplies

Local control & monitoring via dip switches located under access panel

Remote control & monitoring via RJ45 Ethernet port with SNMP & web browser interface. Ethernet options:
- Copper Ethernet interface (O)
- Single optical Ethernet interface (O)

Sunshade to protect from direct sunlight/solar loading (O)



Front view - door closed



Front view - door open

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



New technologies
in RF distribution



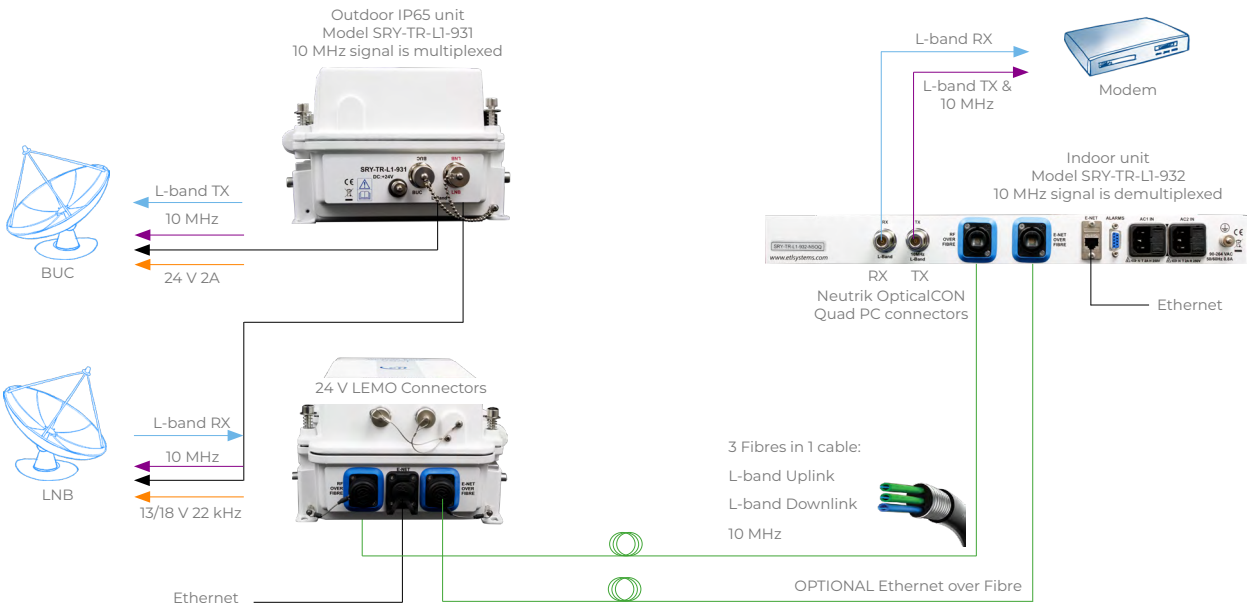
StingRay VSAT Fibre



VSAT Fibre - outdoor & indoor unit

The StingRay VSAT fibre system provides connectivity between a VSAT antenna to a remote control room, up to 10km away. It is ideal for applications such as SNG trucks, mobile satcoms, flyaway VSAT systems and government and military.

The system consists of one downlink transmission path, with a multiplexed 10 MHz reference signal, and one uplink path with a 10 MHz reference signal. The 10MHz tone is extracted from the uplink input, carried on a separate fibre, for best performance, and injected into both L-band connectors at the ODU.



FEATURES		
Model	SRY-TR-LI-931	SRY-TR-LI-932
Type	Outdoor - IP65 rated	Indoor
Dual Redundant PSUs	✓	✓
LNB / BUC	✓	x
10 MHz Reference	✓	✓
Ethernet over Fibre	Optional	



Typical applications include SNG trucks

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



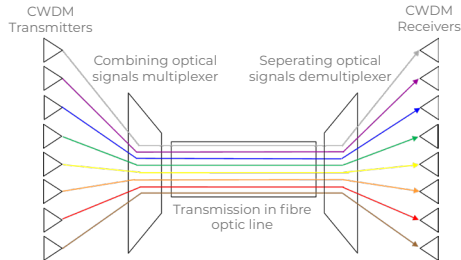
New technologies
in RF distribution



StingRay RF over Fibre

Up To 45km - Medium Distance Fibre CWDM (Coarse Wavelength Division Multiplexing)

The StingRay CWDM system transmits RF signals up to 45km in distance. It comprises transmit modules and a multiplexer module to combine up to 8 wavelengths on to a single fibre cable at the transmit end. A demultiplexer module and receive modules are then used at the receive end to split the separate wavelengths.



CWDM System Module Options

FEATURES								
Model	SRY-Txx-L1-141	SRY-RX-L1-142	SRY-Txx-B2-143	SRY-RX-B2-144	SRY-Txx-L1-241	SRY-RX-L1-242	SRY-Txx-Y-249	SRY-RX-Y-250
StingRay Series	100	100	100	100	200	200	200	200
Type	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX
Frequency	850-2450 MHz (Extended L-band)		50-2450 MHz (Broadband)		850-2450 MHz (Extended L-band)		10 MHz	
Gain	AGC	AGC	Fixed	Fixed	AGC	AGC	AGC	AGC
LNB DC	✓	-	-	-	✓	-	-	-

CWDM Indoor Chassis Options

FEATURES			
Model	SRY-C100-1U	SRY-C101-1U	SRY-C103-1U
Capacity	Up to 16 modules		Up to 12 modules
Single/Dual IECs	Single		Dual
LNB DC	-		✓
10 MHz inject	-		-
Remote control & monitoring	RJ45 Ethernet Port, SNMP, Web Browser Interface & PC Software (optional)		RJ45 Ethernet Port, SNMP, Web Browser Interface & PC Software (optional). Summary alarm port
Local control & monitoring	Applicable to all models above: Front panel keypad & display		
Dual Redundant PSUs	✓		✓
Hot-swap	Applicable to all models above: Power supplies, fibre modules & fan modules		

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Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



StingRay RF over Fibre

Up to 500 km - Long Distance Fibre DWDM (Dense Wavelength Division Multiplexing)

The StingRay DWDM system transmits RF signals up to 500km in distance, for diverse sites. It comprises transmit modules and a multiplexer module to combine up to 40 wavelengths on to a single fibre cable at the transmit end.

An EDFA (Erbium-Doped Fibre Amplifier) is used to boost the signal at the receive end, to overcome excessive optical loss on long fibre runs. A DCF (Dispersion Compensation Fibre) module may need to be used for distances approaching 100km. A demultiplexer module and receive modules are then used to split the separate wavelengths.



DWDM Fibre System in a rack

DWDM System Module Options

FEATURES							
Model	SRY-Txx-L1-257	SRY-Txx-L1-259	SRY-RX-L1-242	SRY-Txx-B2-253	SRY-RX-B2-254	SRY-Txx-Y-255	SRY-RX-Y-256
StingRay Series	200	200	200	200	200	200	200
Type	Fibre TX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX
Frequency	850-2450 MHz (Extended L-band)			50-2450 MHz (Broadband)		10 MHz	
Gain	AGC	Fixed	AGC	AGC	AGC	AGC	AGC
LNB DC	✓	✓	-	✓	-	-	-
Enhanced Performance	+10 dBm output power	-	-	-	-	-	-

FEATURES								
Model	SRY-OAC-13-801	SRY-OAC-22-802	SRY-ODM-08-753	SRY-ODM-16-753	SRY-ODX-32-759	SRY-ODD-32-760	SRY-ODX-40-761	SRY-ODD-40-762
Type	Optical Amplifier	Optical Amplifier	Mux/Demux	Mux/Demux	Mux	Demux	Mux	Demux
Capacity	-	-	Dual 8 channel	Dual 16 channel	Single 32 channel	Single 32 channel	Single 40 channel	Single 40 channel
Gain	13 dB	22 dB	-	-	-	-	-	-

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Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





StingRay RF over Fibre

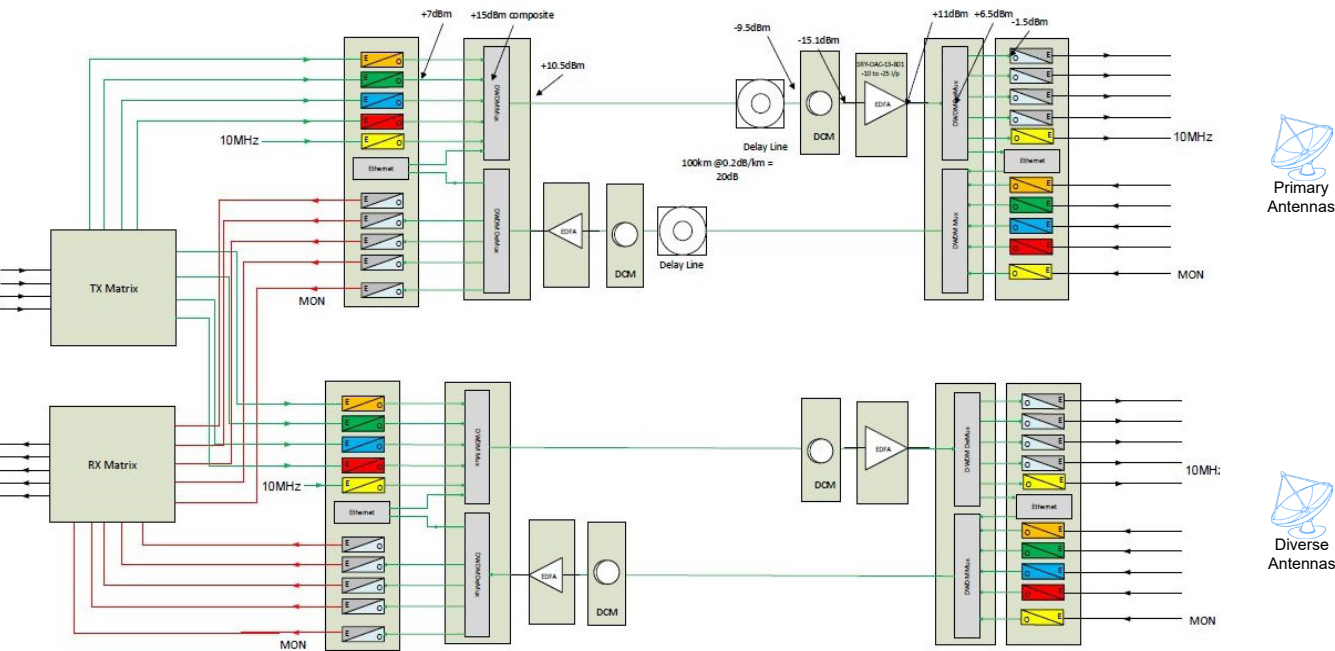
Typical DWDM System

The below schematic shows a typical application for DWDM fibre optic transmission. This is a Ka-band gateway with two remote antenna sites for site diversity. The purpose of this is to have back up transmission and reception sites, in case of adverse weather conditions that can seriously attenuate transmission in the Ka band spectrum.

The system shown uses L-band matrix switches to perform the diversity switching for both transmit and received signals between the two sites. This switching can also be performed in the optical domain, using ETL's optical switches, that are designed to be housed in the Griffin modular switch chassis.

ETL products available for this system are:

- RF Matrix Switch
- Optical switch e.g. Griffin optical switch
- Optical amplifiers (EDFA)
- Optical multiplexer / demultiplexer
- Optical delay lines
- Optical transmit / receive modules
- Dispersion compensation modules



A typical DWDM application

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



StingRay RF over Fibre

CWDM & DWDM 200 Series Indoor Chassis Options

FEATURES						
Model	SRY-C200-1U	SRY-C201-2U	SRY-C205-2U	SRY-C206-2U	SRY-C207-1U	SRY-C209-2U
Capacity	Up to 4 modules	Up to 16 modules	Up to 16 modules	Up to 16 modules	Up to 4 modules	Up to 12 modules
Redundancy Options	1+1 redundancy configuration available with modules SRY-L1-DIV213 & SRY-L1-SW214					Dual 4+2 with Two independent 4+2 switch matrices. 4+2 block can be subdivided into 1+1, 2+1 etc.
LNB DC	✓	✓	✓	✓	✓	-
10 MHz Inject	-	-	✓	-	✓	-
Remote Control & monitoring	RS232/RS485 Serial Port, RJ45 Ethernet Port, SNMP, Web Browser Interface & PC Software (optional). Summary alarm port.					
Local Control & monitoring	Applicable to all models above: Front panel keypad & display					
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓
Hot-swap	Applicable to all models above: Power supplies, fibre modules & fan modules					



CWDM & DWDM 200 Series Outdoor Chassis Options

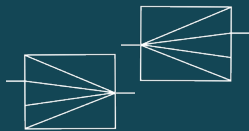
FEATURES				
Model	ODU-201	ODU-205	ODU-206	ODU-203
Capacity	Up to 10 modules	Up to 10 modules	Up to 10 modules	Up to 4 modules (400 series only)
Redundancy Options	1+1 redundancy	1+1 redundancy	1+1 redundancy	-
Remote Control & Monitoring	RS232/RS485 Serial Port, RJ45 Ethernet Port, SNMP & Web Browser Interface			
Local Control & Monitoring	Optional Keypad & Display	-	-	Module DIP Switches
LNB DC	-	-	✓	-
10 MHz Inject	✓	✓	✓	-
Temperature Rating	Standard temperature	Extended temperature with AC units	Elevated temperature	Standard temperature
Dual Redundant PSUs	-	-	✓	-
Hot-swap PSU's	✓	✓	✓	Field serviceable

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Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





Dextra Splitters & Combiners



Front view



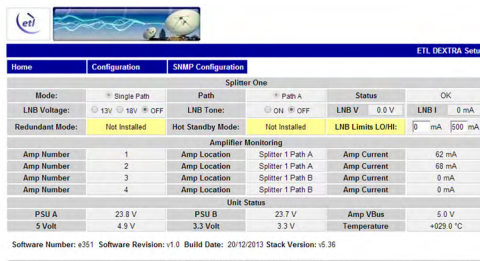
Rear view of 4-way splitter



Rear view of 8-way splitter



Rear view of 16-way splitter



Dextra Web Browser Interface Screen showing remote control and monitoring options

The Dextra range of RF splitters and combiners has been designed for high resilience RF distribution and combining of uplink and downlink satellite signals.

Active splitters and combiners are available as 4-way (single & dual), 8-way (single & dual) and 16-way.

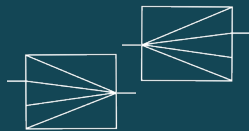
The range benefits from excellent RF performance and a compact form factor, as well as advanced functionality including; web enabled control and monitoring, LNB powering and an option for dual redundant amplifiers for added resilience.

All models are equipped with a -20 dB SMA monitor port on the front panel.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Highly resilient solution minimising the risk of expensive downtime for the satcoms user.
- Single or Dual configurations available.
- Peace of mind for mission critical applications with extensive remote monitoring facilities.
- Compact 1U 19" chassis.
- Improved RF performance using latest components.
- Applications include Satellite operators, VSAT, teleports and broadcasters. High resilience RF distribution and Ka-band and HTS applications.



Dextra Splitters & Combiners



RF Splitters

Single Splitters

FEATURES										
Model	D0104SIU-LA-22410	D0104SIU-LA-22450	D0108SIU-LA-22412	D0108SIU-LA-22483	D0108SIU-LA-22452	D0116SIULA-22414	D0116SIULA-22454	D0104SIUIA-22470	D0108SIUIA-22472	D0116SIUIA-22474
Frequency	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	5-1000 MHz (IF)	5-1000 MHz (IF)	5-1000 MHz (IF)
Size	4-way	4-way	8-way	8-way	8-way	16-way	16-way	4-way	8-way	16-way
Dual Redundant Amps*	Applicable to all models above: Optional									
10MHz Pass	-	✓	-	✓	✓	-	✓	-	-	-
DC Pass**	-	-	-	Optional	-	-	✓	-	-	-
Variable Attenuation	-	-	-	✓	-	-	-	-	-	-
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LNB Powering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Remote Control & Monitoring -20 dB monitor port, RS232/RS485 Serial port, RJ45 Ethernet port, SNMP & Web Browser Interface

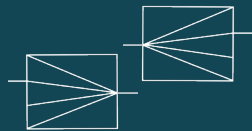
* Please use suffix OPT-R on the model number to specify the option of dual redundant amplifiers
** Please use suffix OPT-D on the model number to specify the option of DC pass

Dual Splitters

FEATURES						
Model	D0104DIULA-22411	D0108DIULA-22413	D0104DIUIA-22451	D0108DIUIA-22453	D0104DIUIA-22471	D0108DIUIA-22473
Frequency	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	5-1000 MHz (IF)	5-1000 MHz (IF)
Size	4-way	8-way	4-way	8-way	4-way	8-way
Dual Redundant Amps*	Applicable to all models above: Optional					
10MHz Pass	-	-	✓	✓	-	-
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓
LNB Powering	✓	✓	✓	✓	-	-

Remote Control & Monitoring Applicable to all models above: -20 dB monitor port, RS232/RS485 Serial port, RJ45 Ethernet port, SNMP & Web Browser Interface

* Please use suffix OPT-R on the model number to specify the option of dual redundant amplifiers



Dextra Splitters & Combiners

RF Combiners

Single Combiners



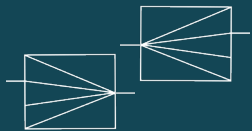
FEATURES									
Model	C0401S1ULA-22418	C0401S1ULA-22455	C0801S1ULA-22420	C0801S1ULA-22457	C1601S1ULA-22422	C1601S1ULA-22459	C0401S1UIA-22475	C0801S1UIA-22477	C1601S1UIA-22479
Frequency	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	5-1000 MHz (IF)	5-1000 MHz (IF)	5-1000 MHz (IF)
Size	4-way	4-way	8-way	8-way	16-way	16-way	4-way	8-way	16-way
Dual Redundant Amps*	Applicable to all models above: Optional								
10MHz Pass	-	✓	-	✓	-	✓	-	-	-
DC Pass**	-	Optional	-	-	-	Optional	-	-	-
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓	✓	✓	✓
Remote Control & Monitoring	-20 dB monitor port, RS232/RS485 Serial port, RJ45 Ethernet port, SNMP & Web Browser Interface								

* Please use suffix OPT-R on the model number to specify the option of dual redundant amplifiers
** Please use suffix OPT-D on the model number to specify the option of DC pass

Dual Combiners

FEATURES						
Model	C0401D1ULA-22419	C0801D1ULA-22421	C0401D1ULA-22456	C0801D1ULA-22458	C0401D1UIA-22476	C0801D1UIA-22478
Frequency	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	850-2450 MHz (Extended L-band)	5-1000 MHz (IF)	5-1000 MHz (IF)
Size	4-way	8-way	4-way	8-way	4-way	8-way
Dual Redundant Amps*	Applicable to all models above: Optional					
10MHz Pass	-	-	✓	✓	-	-
DC Pass**	-	-	Optional	Optional	-	-
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓
Remote Control & Monitoring	-20 dB monitor port, RS232/RS485 Serial port, RJ45 Ethernet port, SNMP & Web Browser Interface					

* Please use suffix OPT-R on the model number to specify the option of dual redundant amplifiers
** Please use suffix OPT-D on the model number to specify the option of DC pass



Dextra Splitters & Combiners

Hybrid Splitters & Combiners

Dextra hybrid units contain one splitter and one combine module in a compact 1U high 19" rack mountable shelf.

FEATURES				
Model	H0104D1ULA-22430	H0108D1ULA-22431	H0104D1ULA-22460	H0108D1ULA-22461
Frequency	850-2450 MHz (Extended L-band)			
Size	4-way	8-way	4-way	8-way
Dual Redundant Amplifiers *	Applicable to all models above: Optional			
10MHz Pass	-	-	✓	✓
DC Pass**	-	-	Optional	Optional
Dual Redundant PSUs	✓	✓	✓	✓
LNB Powering	✓	✓	✓	✓
Remote Control & Monitoring	-20 dB monitor port, RS232/RS485 Serial port, RJ45 Ethernet port, SNMP & Web Browser Interface			

* Please use suffix OPT-R on the model number to specify the option of dual redundant amplifiers
** Please use suffix OPT-D on the model number to specify the option of DC pass



Front view: hybrid splitter and combiner with optional dual redundant amplifiers (OPT-R)



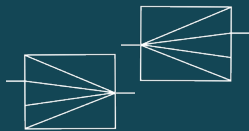
1U hybrid splitter and combiner with monitoring ports via front panel to indicate LNB & power supply status



Rear view: hybrid splitter and combiner with optional DC pass (OPT-D)



ETL's RF Splitters at a ground station



LD Series Splitters & Combiners



Front view: LD series splitter/combiner chassis



Rear view 4-way splitter, Model D0104S1ULA-22239



Rear view 8-way splitter, Model D0108S1ULA-22245



Rear view 16-way splitter, Model D0116S1ULA-22235

ETL’s LD series of RF splitters and combiners are designed to provide affordable L-band (850-2150MHz) splitting and combining with excellent RF performance in a compact 1U high, 19” rack mountable chassis.

The LD range offers 4, 8 and 16-way distribution for basic splitting, combining and integrated LNB powering.

These are designed to provide low cost RF distribution to the budget conscious satcoms customer.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

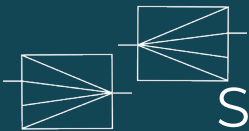
- Affordable RF distribution.
- Wide range of 4-way, 8-way & 16-way chassis.
- Highly resilient design, with dual redundant power supplies minimising the risk of expensive downtime for the satcoms user.
- Compact 1RU 19” chassis.
- LNB Powering on splitters.
- Applications include satellite operators, VSAT, teleports, broadcasters and high resilience RF distribution.

FEATURES						
Model	C0401S1ULA-22278	C0801S1ULA-22279	C1601S1ULA-22280	D0104S1ULA-22239	D0108S1ULA-22245	D0116S1ULA-22235
Type	Combiner	Combiner	Combiner	Splitter	Splitter	Splitter
Frequency	850-2150 MHz (L-band)					
Capacity	4-way	8-way	16-way	4-way	8-way	16-way
LNB Powering	-	-	-	✓	✓	✓
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

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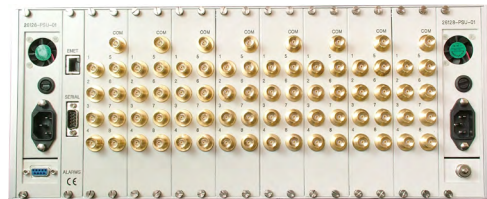
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Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



Modular System Splitter & Combiner Cards



Front view of chassis with hot-swap PSU's



Rear view of chassis fitted with 8 x 8-way splitter modules (each module takes up 2 slots)

ETL’s Modular System Splitter and Combiner cards offer flexibility and resilience in managing L-band signals. The cards are housed in a 4U Modular System chassis (26128), designed to hold a mixture of hot-swap RF distribution cards, and benefits from hot-swap CPU and dual redundant PSU’s. RF cards are front mounted and allow for easy future expansion as a teleport grows.

See page 65 for more information on the modular system chassis.

BENEFITS & APPLICATIONS

- Configurable chassis which can hold a mixture of RF cards.
- 4 & 8-way splitter or combiner cards available.
- Optimise RF signals with gain, slope & LNB powering options.
- Resilience in service with hot-swappable active components.
- Applications include redundancy for remote satellite teleports.

RF Splitter Cards

FEATURES					
Model	26128-DIV404	26128-DIV429	26128-DIV450	26128-DIV808	26128-DIV828
Frequency	850-2150 MHz (L-band)	850-2450 MHz (L-band)	850-2150 MHz (L-band)	50-1000 MHz (L-band)	850-2150 MHz (L-band)
Capacity	4-way	4-way	4-way	8-way	8-way
Variable Slope Compensation	-	✓	✓	-	✓
Fixed Gain	✓	-	-	✓	-
Variable Gain	-	✓	✓	-	✓
LNB Power & 22KHz tone	✓	✓	✓	-	✓

RF Combiner Cards

FEATURES				
Model	26128-COM403	26128-COM407	26128-COM409	26128-COM807
Frequency	850-2150 MHz (L-band)	850 to 2150 MHz (L-band)	950 to 2150 MHz (L-band)	850-2150 MHz (L-band)
Capacity	4-way	4-way	4-way	8-way
Variable Slope Compensation	-	✓	✓	✓
Fixed Gain	✓	-	-	-
Variable Gain	-	✓	✓	✓

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UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





Griffin Redundancy Switch



Front view



Rear view showing hot-swap switch module



Multiple antennas at a teleport

ETL's Griffin redundancy switch offers total flexibility in managing RF, ASI and optical signals.

The modular design comprises a 1U chassis with 2 switch module slots. Different modules can be fitted dependent on application, and can be switched independently (individual mode) or together (simultaneous mode).

Switching may be triggered by front panel, RF level detection, alarm contacts, pulsed voltage or NMS.

The Griffin switch is suitable for satellite modulator, LNB/down converter and modem redundancy applications.

BENEFITS & APPLICATIONS



- User flexibility with range of switch modules & 3 operational mode options.
- Resilience from dual redundant power supplies & hot swap modules.
- Compact 1U chassis which can house 2 switch modules.
- Local & remote control & monitoring.
- Applications include satellite modulator, LNB/ downconverter & modems.

Chassis Options

FEATURES		
Model	GRF-C900-1U	GRF-C910-1U
Capacity	Up to 2 switch modules	Up to 2 switch modules CAN ONLY USE GRF-200 & GRF-201 MODULES
Remote Control & Monitoring	Via RS232/RS485, RJ45 Ethernet and web browser interface	Switches on receipt of a +24VDC pulse and sends out feedback via dry contact relay closure. Also controlled via RJ45 Ethernet and web browser interface
Local Control & Monitoring	Applicable to all models above: Via front panel push buttons	
Dual Redundant PSUs	✓	✓
Hot-swap	Applicable to all models above: Switch modules	

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Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



Griffin Redundancy Switch

Module Options

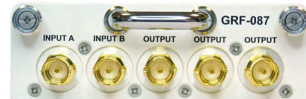
FEATURES			
Model	GRF-010-xxxx	GRF-011-xxxx	GRF-050-xxxx
Capacity	2 inputs, 1 outputs	2 inputs, 1 outputs	2 inputs, 1 outputs
Function	Applicable to all models above: RF Redundancy Switch		
Frequency	850-2450 MHz	DC-850 MHz	DC-2450 MHz
Switch Type	Applicable to all models above: Latching relay switch		

FEATURES				
Model	GRF-087-B7B7	GRF-200-xxxx EXCLUSIVELY FOR USE IN GRF-C910-1U CHASSIS	GRF-201-xxxxxx EXCLUSIVELY FOR USE IN GRF-C910-1U CHASSIS	GRF-202-xxxxxx
Capacity	2 inputs, 3 outputs	1 input, 2 output	2 input, 1 output	1
Function	ASI Redundancy Switch	RF Redundancy Switch	RF Redundancy Switch	Optical Redundancy Switch
Frequency / Signal	-	850-2150 MHz	850-2150 MHz	ASI/SD-SDI/HD-SDI/3G-SDI
Switch Type	NON Latching & failsafe bypass	Solid state switch	Solid state switch	-

Griffin Switch Modules



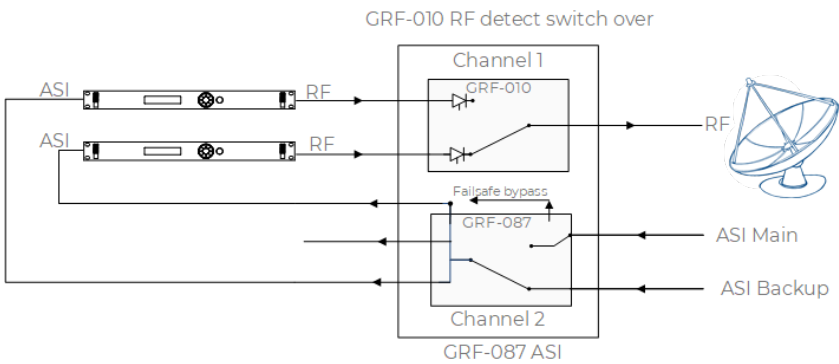
GRF-010 L-band Latching RF Redundancy Switch



GRF-087 Non Latching ASI Redundancy Switch



GRF-202 Optical Redundancy Switch for DWDM



Griffin switch fitted with a GRF-050 module and a GRF-087 module (ASI redundancy and no RF detect)

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Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



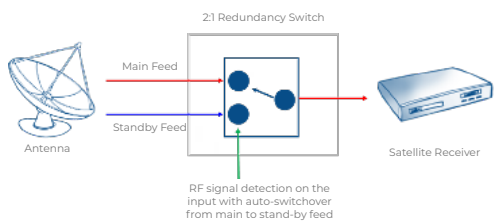
Redundancy Switches



Front & rear view of Model 23116



Redundancy switches housed in a modular system chassis (see pages 49 & 65)



Typical application for a 2:1 redundancy switch

Redundancy switching is a critical feature for many satellite ground stations, and ETL have developed a number of redundancy switch products to meet specific customer requirements.

The redundancy switch includes RF detection, to monitor the main and standby signals, and auto switch-over to the standby feed in the event of signal failure.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Auto switching from main to standby feed with RF monitoring in the event of a signal failure.
- Automatic and manual switching modes.
- Reliability in service with dual redundant power supplies.
- Simple protocol for M & C integration.
- Redundancy switches are also available in the modular system chassis (26128) with up to 16 switch modules - see page 65.
- Applications include signal carrier monitoring of satellite feeds, redundancy switching from main & standby satellite dishes.

FEATURES				
Model	23116	23235	23192	23177
Frequency	850-2150 MHz (L-band)	50-2150 MHz (IF-L-band)	850-2150 MHz (L-band)	DC-6 GHz (SHF)
Capacity	2 x 1	2 x 1	2 x 1	2 x 2
RF detection	✓	✓	-	-
Auto switchover from main to standby	✓	✓	-	-
Remote Control & Monitoring	RS232/RS485 Serial port, RJ45 Ethernet port, SNMP & Web Browser Interface	RS232/RS422/485 Serial port, RJ45 Ethernet port	Dry contact alarm ports for each antenna	External alarm contacts
Local Control	Applicable to all models above: Front panel push buttons			
Dual Redundant PSUs	✓	✓	✓	✓

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



LS Series Monitoring Switch



Front view



Rear view 8 x 1 Model 23225



Rear view 16 x 1 Model 23226



Rear view 32 x 1 Model 23227



Rear view 1 x 8 Model 23228



Rear view 1 x 16 Model 23229



Rear view 1 x 32 Model 23230

ETL's LS series RF monitoring switches are designed principally for satellite signal carrier monitoring applications.

They are available in various sizes and can be linked together for larger number of feeds.

The LS series switch range can be used for signal carrier monitoring of satellite feeds, redundancy switching for main applications, remote controlled unmanned satcom sites and routing signals to multiple IRD's.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Cost effective solution for carrier monitoring applications.
- Fast switching time and long life from solid state switch design.
- Resilience in service with dual redundant power supplies.
- Can be expanded to create larger switch systems.
- Applications include routing signal to multiple IRDs & redundancy switching for main applications.

FEATURES						
Model	23225	23226	23227	23228	23229	23230
Frequency	50-2450 MHz (IF - Extended L-band)					
Switch Type	Solid state					
Capacity	8 x 1	16 x 1	32 x 1	1 x 8	1 x 16	1 x 32
Remote Control & Monitoring	RS232 or RS422/485 Serial port, Ethernet (RJ45-100BASE-TX) on rear panel					
Local Control	Applicable to all models above: LCD & push buttons					
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓

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Email: info@etlsystems.com

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Email: ussales@etlsystems.com

UAE Office:
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Email: menasales@etlsystems.com

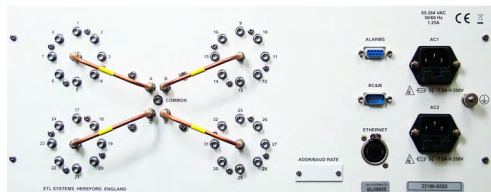




SHF Switch



Front view Model 23265



Rear view Model 23199



Front view Model 23177

ETL’s SHF Switch range operates between DC to 40GHz and are designed for multiple satcom applications, including carrier monitoring and system redundancy. Different configurations and designs can be easily adapted according to the customers requirement.

Choose between either 1U, 2U or 3U solid state or coaxial relay switches, which both benefit from long life and excellent RF performance. Each switch is also designed to offer a variety of local and remote control features.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- High operating frequency range (up to 40 GHz).
- Coaxial relay or PIN diode based switch variants.
- Fast switching speeds using solid state switch design.
- Resilience in service with dual redundant power supplies.
- Reliable designs for RF signal redundancy.
- Applications include signal carrier monitoring of satellite feeds, RF switching for yachts, ships & other marine applications & redundancy switching for upconverters & downconverters.

FEATURES										
Model	23218	23177	23237	23221	23217	23265	23213	23207	23208	23199
Frequency	DC-18 GHz	DC-6GHz	DC-18 GHz	DC-22 GHz	DC-18 GHz	DC-40 GHz	DC-18 GHz	DC-22 GHz	DC-22 GHz	DC-22 GHz
Switch Type	Monitoring	Redundancy	Redundancy	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Capacity	2 x 1	2 x 2	2 x 2	4 x 1	6 x 1	8 x 1	12 x 1	16 x 1	24 X 1	32 x 1
Latching Coaxial Relays	✓	-	-	✓	-	-	-	✓	✓	✓
Non-Latching Coaxial Relays	-	✓	-	-	-	-	-	-	-	-
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Email: info@etlsystems.com

US Office:
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Email: ussales@etlsystems.com

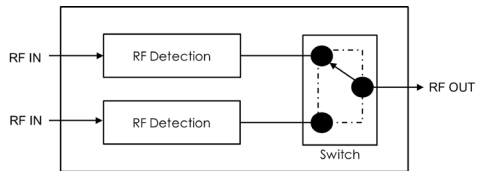
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Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



Modular System Switch Cards



Front view with hot-swap RF modules



Schematic block diagram for Model 26128-SW103



Multiple modular system chassis' used for a broadcast application

ETL’s Modular System Redundancy Switch card offers flexibility and resilience in managing multiple L-band signals. Each switch card is designed to automatically switch between a main and a standby satellite antenna if signal failure is detected.

The cards are housed in a 4U Modular System chassis (26128), which is designed to hold a mixture of hot-swap RF distribution cards, and benefits from hot-swap CPU and dual redundant PSU’s. The RF cards are front mounted and allow for easy future expansion as a teleport grows.

For more information about the modular system chassis, visit page 65 and for our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Configurable chassis which can hold a mixture of RF cards.
- Auto switchover with RF level detection.
- Optimise RF signals with fixed gain, slope & LNB powering.
- Resilience in service with hot-swappable active components.
- Applications include satellite operators, VSAT, teleports & broadcasters.

FEATURES	
Model	26128 - SW103
Frequency	850-2150 MHz (L-band)
Switch Type	Solid state
Capacity	2 x 1 switch module, 16 modules (in chassis)
Fixed Gain	✓
RF Detection	✓
LNB Powering & 22KHz tone	✓

The specifications above are based on 50Ω SMA connectors. Specifications may vary for other impedances and connector types.

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





Alto Amplifiers Overview



Alto Amplifiers



2U Manual Control (M) chassis with local control with dip switches for gain control

The Alto series of amplifiers provide excellent RF performance in a modular design with a variety of chassis and modules which can be configured to suit a range of applications.

The Alto range is split into 4 categories:

Manual control amplifiers

Local control only, with dip switches for gain control.

SMART Amplifiers

Local and remote control amplifier system with variable gain and variable slope compensation.

Automatic Gain Control (AGC) Amplifiers

Local and remote control, when constant signals into an RF chain are required despite varying received levels.

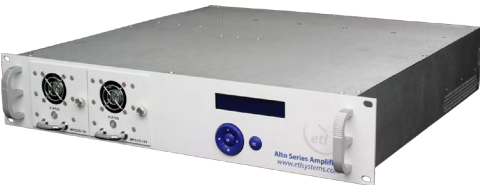
Redundant Amplifiers

Local and remote control amplifier system with variable gain and variable slope compensation. Designed for more demanding applications where extra resilience is required.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.



1U SMART (S) chassis with local & remote control with variable gain & variable slope



2U AGC (A) chassis with local & remote control with automatic gain control



1U Redundant (R) chassis with redundant with local & remote control, variable gain & variable slope

BENEFITS & APPLICATIONS

- Flexible amplifier chassis, which can house different amplifier modules, allowing control of a variety of satellite feeds.
- Resilience in service from hot-swappable amplifier modules.
- Compact chassis with various control options.
- Reliability from dual redundant power supplies.
- Redundant amplifier design options for 24/7 operations.
- Latest components provide excellent RF performance.
- Applications include compensation for passive splitters/ combiners and cable loss and general satcoms.

Manual Control Amplifiers

Local control amplifiers with dip switches for gain control. For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.



1U Local Control Chassis Front Panel



2U Local Control Chassis Front Panel



Alto amplifier module with dip switches

FEATURES - CHASSIS			
Model	ALT-C100-1U	ALT-C101-2U	ALT-C102-2U
Frequency	Applicable to all models above: Module dependent		
Capacity	Up to 8 modules (4 modules for N-type)	Up to 16 modules (8 modules for N-type)	Up to 16 modules (8 modules for N-type)
Power Supplies	Dual Redundant	Dual Redundant	Dual Redundant
Control & monitoring	Local only	Local only	Local only
LNB Power	-	-	✓
Dimensions	1U high x 350mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide

FEATURES - AMPLIFIER MODULES			
Model	ALT-M-L1-001	ALT-M-L1-003	ALT-M-C1-007
Frequency	850-2150 MHz (L-band)	850-2150 MHz (L-band)	3000-4200 MHz (C-band)
Variable Gain	✓	✓	✓
Slope Compensation	-	-	-
LNB Power	-	✓	-



Alto Amplifiers used for a telecoms application

BENEFITS & APPLICATIONS

- Compact chassis options which can house 8 to 16 amplifier modules.
- Local control & monitoring via module DIP switches & front panel LEDs.
- Resilience from dual redundant power supplies & hot- swap amplifier modules.
- Applications include redundancy teleport sites with main & standby dishes, cable loss offset for long runs & signal loss offset from passive RF splitters or combiners.



SMART Ethernet Remote Control & Monitoring

Local and remote control amplifiers with variable gain and variable slope.

FEATURES - CHASSIS						
Model	ALT-C200-1U	ALT-C201-2U	ALT-C202-2U	ALT-C203-2U	ALT-C204-2U	ALT-C205-2U
Frequency	Module dependent					
Capacity	Up to 8 modules (4 modules for N-type)	Up to 16 modules (8 modules for N-type)	Up to 16 modules (8 modules for N-type)	Up to 16 modules (8 modules for N-type)	Up to 16 modules (8 modules for N-type)	Up to 16 modules (8 modules for N-type)
Power Supplies	Dual Redundant	Dual Redundant	Dual Redundant, Hot-swap	External DC 18V required	Dual Redundant, Hot-swap	Dual Redundant
Control & Monitoring	Local & Remote: RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & Remote: RS232/RS485 Serial Port, RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port, SNMP & Web Browser Interface
LNB Power	✓	-	-	✓	-	✓
Dimensions	1U high x 350mm deep x 19" wide	2U high x 350mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide



Model ALT-C200-1U Chassis with 8 modules



Model ALT-C201-2U Chassis with 16 modules



Model ALT-C202-2U Chassis with 16 modules



Model ALT-C203-2U Chassis with 16 modules



Model ALT-C204-2U Chassis with 16 modules



Model ALT-C205-2U Chassis with 16 modules

FEATURES - AMPLIFIER MODULES					
Model	ALT-S-L1-002-xxxx	ALT-S-L1-004-xxxx	ALT-S-L1-005-xxxx	ALT-S-L1-010-xxxx	ALT-S-K1-017-S5S5
Frequency	850-2150 MHz (L-band)	850-2150 MHz (L-band)	850-2150 MHz (L-band)	850-2150 MHz (L-band)	10.70-12.75 GHz (Ku-band)
Variable Gain	✓	✓	✓	✓	-
Variable Attenuation	-	-	-	-	✓
Slope Compensation	✓	✓	✓	✓	-
LNB Power	-	✓	-	-	-
High Linearity	-	-	✓	-	-
DC & 10 MHz Pass	-	-	-	✓	-



Automatic Gain Control (AGC) Amplifiers

AGC amplifiers are used where an output level is required at a constant. The AGC amplifier circuit will adjust the gain to ensure the output signal level remains at a set constant.

FEATURES - CHASSIS					
Model	ALT-C202-2U	ALT-C203-2U	ALT-C205-2U	ALT-C207-1U	ALT-C208-2U
Frequency	Module dependent				
Capacity	Up to 16 modules (8 modules for N-type)	Up to 16 modules (8 modules for N-type)	Up to 16 modules (8 modules for N-type)	Up to 8 modules (4 modules for N-type)	Up to 16 modules (8 modules for N-type)
Power Supplies	Dual Redundant, Hot-swap	External DC 18V required	Dual Redundant	Dual Redundant	External DC 48V required
Control & Monitoring	Local & remote: RS232/RS485 Serial Port, RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & remote: RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & remote: RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & remote: RJ45 Ethernet Port, SNMP & Web Browser Interface	Local & remote: RJ45 Ethernet Port, SNMP & Web Browser Interface
Dimensions	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide	1U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide



Model ALT-C202-2U Chassis with 16 modules



Model ALT-C203-2U Chassis with 16 modules



Model ALT-C205-2U Chassis with 16 modules



Model ALT-C207-1U Chassis with 8 modules



Model ALT-C208-2U Chassis with 16 modules

FEATURES - AMPLIFIER MODULES			
Model	ALT-A-B2-009-xxxx	ALT-A-L1-011-xxxx	ALT-A-L1-031-xxxx
Frequency	Broadband (50-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)
Variable Gain	✓	✓	✓
Slope Compensation	-	✓	✓
High Linearity	-	-	✓



Redundant Amplifiers

Designed for demanding applications, the redundant range benefits from dual redundant amplifiers, with amplifier current monitoring. This normally triggers automatic switchover from a main to standby amplifier. The standby amplifier can be on hot or cold standby. In general, these redundant amplifiers can be hot swapped so that a failed amplifier module can be changed out during a planned maintenance break.

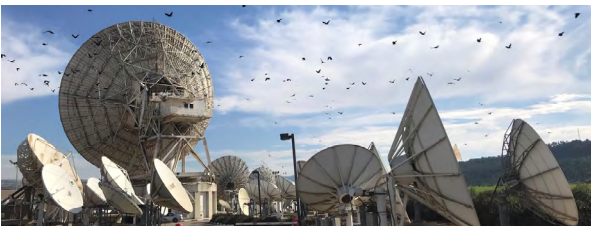
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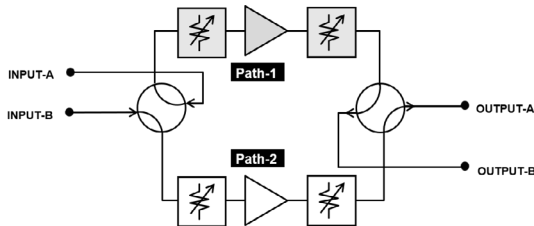
1+1 Redundancy with standby output

FEATURES - CHASSIS						
Model	ALT-25700	ALT-25701	ALT-C301-1U-x5x5	ALT-C318-1U-x5x5	ALT-C319-1U-x5x5	ALT-C401-2U-x5x5
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	Module dependent	Module dependent	Module dependent	Module dependent
Capacity	2 inputs, 2 outputs & 4 RF monitor ports	2 inputs & 2 outputs	2 modules: 1+1 redundancy	2 modules: 1+1 redundant or 2 channel amplifier with 2 input & 2 output	2 modules: 1+1 redundancy with single input & dual output	2 modules: 1+1 redundancy
Power Supplies	Dual Redundant, Hot-swap					
Control & Monitoring	Local & Remote: RJ45 Ethernet Port , SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port , SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port , SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port , SNMP & Web Browser Interface & 9 pin D-type port for dry contact alarms	Local & Remote: RJ45 Ethernet Port , SNMP & Web Browser Interface & 9 pin D-type port for dry contact alarms	Local & Remote: RJ45 Ethernet Port , SNMP & Web Browser Interface & 9 pin D-type port for dry contact alarms
Dimensions	1U high x 450mm deep x 19" wide	1U high x 450mm deep x 19" wide	1U high x 350mm deep x 19" wide	1U high x 450mm deep x 19" wide	1U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C301-1U-x5x5							
Model	ALT-R-L1-006 & ALT-R-L1-020	ALT-R-L1-008 & ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-087	ALT-R-L1-097
Frequency	Applicable to all models above: L-band (850-2150 MHz)						
Gain Range - Min	1dB	-2dB	9dB	9dB	9dB	-11dB	9dB
Gain Range - Max	31dB	21dB	39dB	39dB	39dB	39dB	39dB
Slope Compensation	✓	✓	✓	✓	✓	-	-
High Linearity	-	-	-	✓	✓	✓	✓



Typical amplifier applications include redundancy teleport sites



COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C318-1U-x5x5												
Model	ALT-R-L1-006	ALT-R-L1-008	ALT-R-L1-012	ALT-R-F2-013	ALT-R-L1-019	ALT-R-L1-021	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-043	ALT-R-L1-044	ALT-R-L1-075	ALT-R-L1-079
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	IF Band (50-200 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)
Gain Range Min	1dB	-2dB	9dB	9dB	15dB	9dB	9dB	9dB	10dB	15dB	15dB	7dB
Gain Range Max	31dB	21dB	39dB	39dB	45dB	36dB	39dB	39dB	40dB	44dB	45dB	37dB
Slope Compensation	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓
High Linearity	-	-	-	✓	✓	✓	-	-	-	-	✓	-

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C319-1U-x5x5												
Model	ALT-R-L1-006	ALT-R-L1-008	ALT-R-L1-012	ALT-R-L1-019	ALT-R-L1-021	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-043	ALT-R-L1-044	ALT-R-L1-075	ALT-R-L1-079	ALT-R-L1-087
Frequency	Applicable to all models above: L-band (850-2150 MHz)											
Gain Range Min	5dB	2dB	13dB	13dB	7dB	13dB	13 dB	10 dB	15 dB	15 dB	7 dB	-7 dB
Gain Range Max	35dB	25dB	43dB	43dB	34dB	43dB	43 dB	40 dB	44 dB	45 dB	37 dB	43 dB
Slope Compensation	✓	✓	✓	✓	-	-	✓	-	✓	✓	✓	-
High Linearity	-	-	-	✓	✓	-	-	-	-	✓	-	-

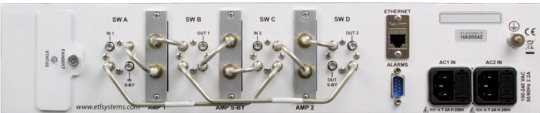
COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C401-2U-x5x5						
Model	ALT-R-KB-200	ALT-R-K0-200	ALT-R-KB1-200	ALT-R-KB2-200	ALT-R-KB3-300	ALT-R-KB4-200
Frequency	Wideband (2.0-18 GHz)	Wideband (6.0-18 GHz)	Wideband (2.0-8.0 GHz)	Wideband (2.0-10 GHz)	Wideband (2.0-13 GHz)	Wideband (2.0-16 GHz)
Fixed Gain	21dB	21dB	22dB	22dB	22dB	21dB
Noise Figure Min	5.5dB	5.5dB	5 dB	5 dB	5 dB	5.5dB
Noise Figure Max	7dB	7dB	6.5dB	6.5dB	6.5dB	7dB
High Linearity	-	-	-	-	-	-



1+1 Redundancy without standby output



Front and rear view Model ALT-C320-1U



Rear view Model ALT-C402-2U rear view

FEATURES - CHASSIS		
Model	ALT-C320-1U-x5x5	ALT-C402-2U-x5x5
Frequency	Module dependent	
Capacity	2 modules: 1:1 redundancy with single input & single output	2 modules: 1:1 redundancy
Power Supplies	Dual Redundant, Hot-swap from front panel	
Control & Monitoring	Local & remote: RJ45 Ethernet Port , 10BaseT/100BaseTx, ETL TCP/IP Protocol, SNMP & Web Browser Interface, 9 pin D-type port for dry contact alarms, RS232 & RS485	
Dimensions	1U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C320-1U-x5x5									
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-F2-013	ALT-R-L1-019	ALT-R-L1-021	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-079
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	IF-Band (50-200 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)
Gain Range Min	7dB	4dB	15dB	9dB	15dB	9dB	15dB	15dB	7dB
Gain Range Max	37dB	27dB	45dB	39dB	45dB	36dB	45dB	45dB	37dB
Slope Compensation	✓	✓	✓	-	✓	-	✓	✓	✓
High Linearity	-	-	-	✓	✓	✓	-	-	-

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C402-2U-x5x5						
Model	ALT-R-KB-200	ALT-R-K0-200	ALT-R-KB1-200	ALT-R-KB2-200	ALT-R-KB3-300	ALT-R-KB4-200
Frequency	Wideband (2.0-18 GHz)	Wideband (6.0-18 GHz)	Wideband (2.0-8.0 GHz)	Wideband (2.0-10 GHz)	Wideband (2.0-13 GHz)	Wideband (2.0-16 GHz)
Fixed Gain	21dB	21dB	22dB	22dB	22dB	21dB
Noise Figure Min	5dB	5dB	4.5dB	4.5dB	4.5dB	5dB
Noise Figure Max	6.5dB	6.5 dB	6dB	6dB	6dB	6.5dB



2+1 Redundancy



Front & rear view Model ALT-25104



Rear view Model ALT-C313-2U

FEATURES - CHASSIS							
Model	ALT-25104	ALT-25702	ALT-25703	ALT-C303-2U	ALT-C313-2U	ALT-C315-2U	ALT-C400-2U
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	Module dependent	Module dependent	Module dependent
Capacity	3 inputs & 3 outputs	3 inputs & 3 outputs 4 RF monitor points	3 inputs & 3 outputs	3 modules: 2+1 redundancy	3 modules: 2+1 redundancy	3 modules: 2+1 redundancy	3 modules: 2+1 redundancy
Power Supplies	Dual Redundant, Hot Swap						
Control & Monitoring	Local & Remote: RJ45 Ethernet Port 10/100 Base T, TCP/IP, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port 10/100 Base T, ETL protocol over TCP, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port 10/100 Base T, TCP/IP, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet port, 10BaseT/100BaseTx ETL TCP/IP, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port 10/100 Base T, TCP/IP, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port 10BaseT/100Base TX, ETL TCP/IP, SNMP & Web Browser Interface	Local & Remote: RJ45 Ethernet Port 10BaseT/100Base TX, ETL TCP/IP, SNMP & Web Browser Interface, 9 pin D-type port for dry contact alarms, RS232 & RS485
Dimensions	1U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 350mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide	2U high x 450mm deep x 19" wide

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C303-2U-x5x5								
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-023	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-087	ALT-R-L1-097
Frequency	L-band (850-2150 MHz)							
Gain Range Min	2dB	-1dB	10dB	10dB	10dB	10dB	10dB	10dB
Gain Range Max	32dB	22dB	40dB	40dB	40dB	40dB	40dB	40dB
Slope Compensation	✓	✓	✓	-	✓	✓	-	-
High Linearity	-	-	-	-	-	-	-	-

The specifications above are based on 50Ω impedances. Specifications may vary for other impedances and connector types.



2+1 Redundancy

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C313-2U-x5x5													
Model	L1-006 L1-020	L1-008 L1-078	L1-012	F2-013	L1-019	L1-021	L1-023	L1-032	L1-038	L1-043	L1-044	L1-087	L1-097
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	IF Band (50-200 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	Broadband (850-2150 MHz)
Gain Range Min	6dB	3dB	14dB	8dB	14dB	8dB	14dB	14dB	14dB	9dB	13dB	-6dB	14dB
Gain Range Max	36dB	26dB	44dB	38dB	44dB	35dB	44dB	44dB	44dB	39dB	43dB	44dB	44dB
Slope Compensation	✓	✓	✓	-	✓	-	-	✓	✓	-	✓	-	-
High Linearity	-	-	-	✓	✓	✓	-	-	-	-	-	-	-

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C315-2U-x5x5													
Model	L1-006 L1-020	L1-008 L1-078	L1-012	F2-013	L1-019	L1-021	L1-023	L1-032	L1-038	L1-043	L1-044	L1-087	L1-097
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	IF Band (50-200 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)
Gain Range Min	5dB	2dB	13dB	7dB	13dB	7dB	13dB	13dB	13dB	8dB	13dB	-7dB	14dB
Gain Range Max	35dB	25dB	43dB	37dB	43dB	34dB	43dB	43dB	43dB	38dB	43dB	43dB	44dB
Slope Compensation	✓	✓	✓	-	✓	-	-	✓	✓	-	✓	-	-
High Linearity	-	-	-	✓	✓	✓	-	-	-	-	-	-	-

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C402-2U-x5x5						
Model	ALT-R-KB-200	ALT-R-K0-200	ALT-R-KB1-200	ALT-R-KB2-200	ALT-R-KB3-300	ALT-R-KB4-200
Frequency	Wideband (2.0-18 GHz)	Wideband (6.0-18 GHz)	Wideband (2.0-8.0 GHz)	Wideband (2.0-10 GHz)	Wideband (2.0-13 GHz)	Wideband (2.0-16 GHz)
Fixed Gain	21dB	21dB	22dB	22dB	22dB	21dB
Noise Figure Min	5.5dB	5.5dB	5dB	5dB	5dB	5.5dB
Noise Figure Max	7dB	7dB	6.5dB	6.5dB	6.5dB	7dB

4+2 Redundancy



Rear view Model ALT-C304-2U

FEATURES - CHASSIS	
Model	ALT-C304-2U-x5x5 ALT-C304-2U-x7x7
Frequency	Module dependent
Capacity	6 modules: 4:2 redundancy
Connector type	50 Ohm BNC / F-type 75 Ohm BNC / F-type
Power Supplies	Dual Redundant, Hot-swap
Control & Monitoring	Local & remote: RJ45 Ethernet Port , 10BaseT/100BaseTx, ETL TCP/IP Protocol, SNMP & Web Browser Interface
Dimensions	2U high x 450mm deep x 19" wide

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C304-2U-x5x5								
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-023	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-087	ALT-R-L1-097
Frequency	L-band (850-2150 MHz)							
Gain Range Min	2dB	-1dB	10dB	10dB	10dB	10dB	-10dB	10dB
Gain Range Max	32dB	22dB	40dB	40dB	40dB	40dB	40dB	40dB
Slope Compensation	✓	✓	✓	-	✓	✓	-	-

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C304-2U-x7x7								
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-023	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-087	ALT-R-L1-097
Frequency	L-band (850-2150 MHz)							
Gain Range Min	1dB	-2dB	9dB	9dB	9dB	9dB	-9dB	9dB
Gain Range Max	31dB	21dB	39dB	39dB	39dB	39dB	39dB	39dB
Slope Compensation	✓	✓	✓	-	✓	✓	-	-



Dual 1+1 Redundancy



FEATURES - CHASSIS		
Model	ALT-310-1U-x5x5	ALT-310-1U-x7x7
Frequency	Module dependent	
Capacity	4 modules: Dual 1+1 redundancy	
Connector Type	50 Ohm BNC / SMA / F-type	75 Ohm BNC / F-type
Power Supplies	Dual Redundant, Hot-swap	
Control & Monitoring	Local & remote: RJ45 Ethernet Port , 10BaseT/100BaseTx, ETL TCP/IP Protocol, SNMP & Web Browser Interface	
Dimensions	1U high x 450mm deep x 19" wide	

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C310-1U-x5x5													
Model	ALT-R-												
	L1-006 L1-020	L1-008 L1-078	L1-012	F2-013	L1-019	L1-021	L1-023	L1-032	L1-038	L1-044	L1-075	L1-087	L1-097
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	IF-band (50-200 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)
Gain Range Min	7dB	4dB	15dB	9dB	15dB	9dB	15dB	15dB	15dB	15dB	15dB	-5dB	15dB
Gain Range Max	37dB	27dB	45dB	39dB	45dB	36dB	45dB	45dB	45dB	44dB	45dB	45dB	45dB
Slope Compensation	✓	✓	✓	-	✓	-	-	✓	✓	✓	✓	-	-
High Linearity	-	-	-	✓	✓	✓	-	✓	✓	-	✓	-	-

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C310-1U-x7x7						
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-F2-013	ALT-R-L1-019	ALT-R-L1-023
Frequency	L-band (850-2150 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)	IF-band (50-200 MHz)	L-band (850-2150 MHz)	L-band (850-2150 MHz)
Gain Range Min	7dB	4dB	15dB	9dB	9dB	15dB
Gain Range Max	37dB	27dB	45dB	39dB	45dB	45dB
Slope Compensation	✓	✓	✓	✓	✓	-
High Linearity	-	-	-	✓	✓	-

Quad 4+1 Redundancy



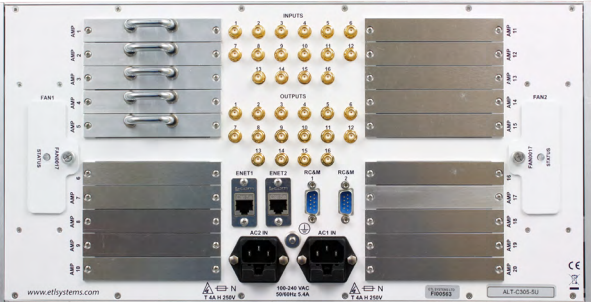
Typical amplifier applications include general satcoms teleports

FEATURES - CHASSIS			
Model	ALT-C305-5U-x5x5	ALT-C306-5U-x5x7	ALT-C307-5U-x7x7
Impedances & RF Connectors	50Ω SMA 50Ω BNC Can be supplied with 50Ω connectors only on both inputs and outputs	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type Can be supplied as mixed impedance with either 50Ω or 75Ω connectors on both inputs and outputs. All input or all output must be the same	75Ω BNC 75Ω F-type Can be supplied with 75Ω connectors only on both inputs and outputs
Frequency	Applicable to all models above: Module dependent		
Capacity	Applicable to all models above: 16 active + 4 standby amplifiers (Quad 4 + 1 redundancy)		
Power Supplies	Applicable to all models above: Dual Redundant, Hot-swap		
Control & Monitoring	Local via front panel LCD and Keypad. Remote via RS232/485 Serial & RJ45 Ethernet, 10BaseT/100BaseTx, ETL TCP/IP protocol, SNMP & web browser interface		
Dimensions	5U high x 600mm deep x 19 " wide	5U high x 600mm deep x 19 " wide	5U high x 600mm deep x 19 " wide

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C305-5U-x5x5								
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-023	ALT-R-L1-032	ALT-R-L1-038	ALT-R-L1-087	ALT-R-L1-097
Frequency	Applicable to all models above: L-band (850-2150 MHz)							
Gain Range Min	2dB	-1dB	10dB	10dB	10dB	10dB	-10dB	10dB
Gain Range Max	32dB	22dB	40dB	40dB	40dB	40dB	40dB	40dB
Slope Compensation	✓	✓	✓	-	✓	✓	-	-



Front view Model ALT-C305-5U



Rear view Model ALT-C305-5U



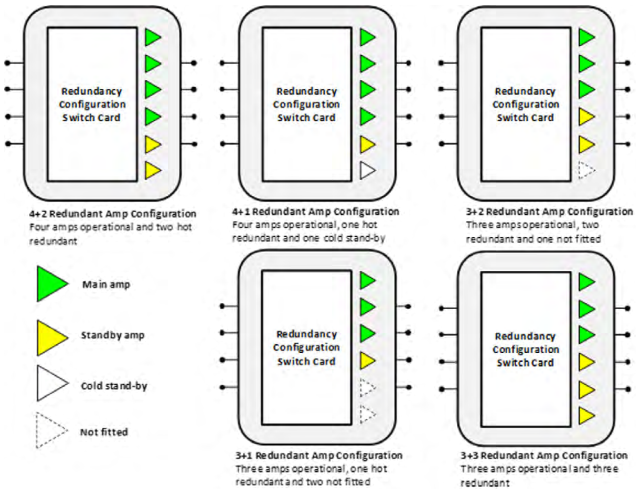
Alto Amplifiers Redundant Designs

Quad 4+1 Redundancy

COMPATIBLE MODULE FEATURES - ALT-C306-2U-x5x7						
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-023	ALT-R-L1-087	ALT-R-L1-097
Frequency	Applicable to all models above: L-band (850-2150 MHz)					
Gain Range Min	1dB	-2dB	9dB	9dB	-11dB	9dB
Gain Range Max	31dB	21dB	39dB	39dB	39dB	39dB
Slope Compensation	✓	✓	✓	-	-	-

The specifications above are based on 50Ω impedances. Specifications may vary for other impedances and connector types.

COMPATIBLE MODULE FEATURES IN CHASSIS ALT-C307-2U-x7x7							
Model	ALT-R-L1-006 ALT-R-L1-020	ALT-R-L1-008 ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-021	ALT-R-L1-023	ALT-R-L1-087	ALT-R-L1-097
Frequency	Applicable to all models above: L-band (850-2150 MHz)						
Gain Range Min	1dB	-2dB	9dB	9dB	9dB	-12dB	8dB
Gain Range Max	31dB	21dB	39dB	39dB	39dB	38dB	38dB
Slope Compensation	✓	✓	✓	-	-	-	-



Model ALT-C305,306 & 307 system schematic



For general satcoms use; teleports, video head-ends & TVRO

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

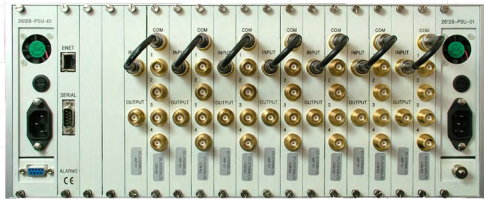
UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



Modular System Amplifier Cards



Model 26128 front view
See page 65 for chassis specs



Model 26128 rear view
Amplifier and Combiner card configuration



Front view showing hot-swap RF modules

ETL's Modular System Amplifier cards offer flexibility and resilience in managing L-band signals. The cards are housed in a 4U Modular System chassis (26128), which is designed to hold a mixture of hot-swap RF distribution cards, and benefits from hot-swap CPU and dual redundant PSU's. The RF cards are front mounted and allow for easy future expansion as a teleport grows.

With a number of options available, including variable slope compensation and redundant amplifier paths, each amplifier card is ideal for improving satellite signal distribution.

For more information about the modular system chassis, visit page 65 and for our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS

- Configurable chassis which can hold a mixture of RF cards.
- Redundancy amplifier options available.
- Optimise RF signals with gain, slope & LNB powering options.
- Resilience in service with hot-swappable active components.
- Applications include compensating for cable & other system losses of RF signals between satellite dishes & teleport, low-cost high resilience applications.

FEATURES				
Model	26128-AMP101	26128-AMP112	26128-AMP114	26128-AMP115
Frequency	950-2150 MHz (L-band)	50-200 MHz (IF)	950-2150 MHz (L-band)	950-2150 MHz (L-band)
Capacity	Applicable to all models above: 16 modules (in chassis)			
Slope Compensation	0-9 dB	-	-	+3.5 dB
Fixed Gain	-	-	-	-
Variable Gain	✓	✓	✓	✓
Amplifier Redundancy	x	✓	✓	✓

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





Piranha Power Supply / Inserter



Front view



Rear view



Power Inserter Module Power Supply Module

The Piranha series of power inserters provides DC powering options for a range of components and devices in satellite ground stations, in addition to RF and power distribution chains.

The Piranha offers flexible energy consumption from 100W, 200W and 500W power supply module options, as well as a range of power inserter modules.

The modular 1U design means the Piranha can be part populated and expanded as requirements grow.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

FEATURES - CHASSIS		
Model	PRN-10	PRN-15
Frequency	Module dependent from 3 - 2450 MHz (IF & Extended L-band)	
LNB & BUC Powering	✓	
Capacity	Up to 16 modules	
10MHz Reference	-	✓
Power Supplies	Dual - redundant, hot-swap	
Remote Control & Monitoring	Remote via RJ45 Ethernet Port Local via LCD & push buttons	

FEATURES - MODULES							
Model	PRN-L106	PRN-L107	PRN-L108	PRN-L109	PRN-L110	PRN-B148	PRN-B224
Frequency	850-2450 MHz Extended L-band	850-2450 MHz Extended L-band	850-2450 MHz Extended L-band	850-2450 MHz Extended L-band	3-30 MHz IF-band	850-2450 MHz Extended L-band	850-2450 MHz Extended L-band
LNB Power	✓	✓	✓	✓	✓	-	-
BUC Power	-	-	-	-	-	✓	✓
10MHz	Inject / Switchable on/ off to port 1	-	Pass between port 1 & 2	Switchable on/ off to port 2	-	Switchable on/ off to port 1	Switchable on/ off to port 1
Variable Voltage	0/13/18Vdc selectable & 22kHz tone on/off port 1	0/13/18Vdc selectable & 22kHz tone on/off port 1	0/13/18Vdc selectable port 1	0/13/18Vdc selectable & 22kHz tone on/off port 2	0/13/18Vdc selectable	0/48Vdc via port	0/13/18/24Vdc selectable port 2
RF Power Detect	-50 - 10 dBm	-50 - 10 dBm	-50 - 10 dBm	-50 - 10 dBm	-40 - 0 dBm	-25 - +25 dBm	-50 - 10 dBm

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



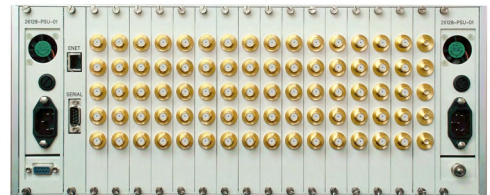
Modular System Chassis



Front view with hot-swap PSU's



Hot-swap RF cards



Rear view of the modular system chassis

The 4U Modular System chassis accommodates up to 16 hot-swap RF cards (8 modules for 8-way versions).

The flexible and resilient RF signal management chassis can hold a mixture of splitter, combiner, switch, amplifier and attenuator cards, with dual redundant hot-swap PSUs and a hot-swap CPU.

The RF cards are front mounted and inserted whilst the shelf is in service, allowing for easy future expansion as a teleport grows.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

BENEFITS & APPLICATIONS



- Configurable chassis which can hold a mixture of RF cards.
- Splitter, combiner, switch, amplifier and attenuator cards available.
- Optimise RF signals with gain, slope, redundancy & LNB powering options.
- Resilience in service with hot-swappable active components.
- Applications include Satellite operators, VSAT, teleports & broadcasters, high resilience RF distribution where single points of failure can be minimised, redundancy applications for remote satellite teleports.

FEATURES - CHASSIS		
Model	26128	
Frequency	RF card dependent 50 MHz to 2450 MHz	
Capacity	Up to 16 4-way modules & 8 8-way modules	
System Control	Local & Remote	
Remote Control & Monitoring	RS232/RS485 Serial Port, RJ45 Ethernet Port, SNMP, Web Browser Interface & PC Software (optional)	
Hot-swap Active Components	RF Splitter/Combiner Cards, CPU & PSU's	
Dual Redundant PSUs	✓	
RF Card Variants	RF Splitter, Combiner, Redundancy Switch, Amplifier and Attenuator	
Connector & Impedances	50Ω SMA 50Ω BNC 50Ω F-type	75Ω BNC 75Ω F-type

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



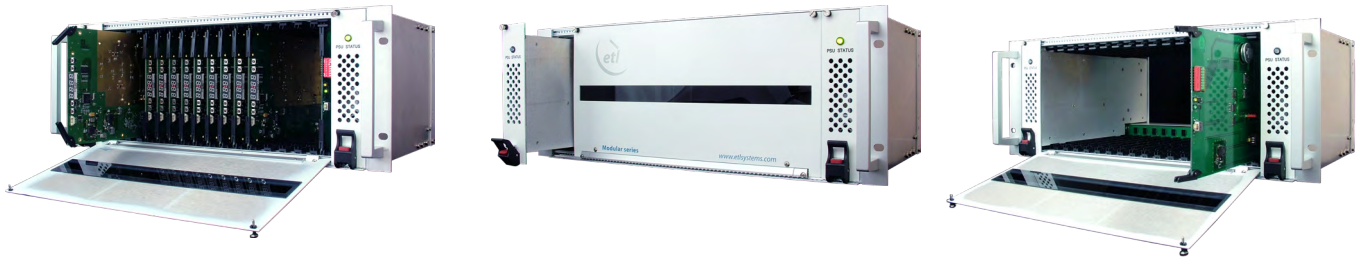


Modular System Card Overview



New Products Coming Soon

RF CARD OPTIONS												
RF Card Functionality Options	Operating Frequency		Active	Passive	Gain		Slope Compensation		LNB Powering	Dual Redundant Amplifiers	RF Level Detection	Page number
	L-band	IF			Fixed	Variable	Fixed	Variable				
4-way splitter cards	✓	–	✓	✓	✓	✓	–	✓	✓	✓	✓	43
8-way splitter cards	✓	✓	✓	–	✓	✓	–	✓	✓	✓	✓	43
4-way combiner cards	✓	–	✓	–	✓	✓	✓	✓	–	✓	–	43
8-way combiner cards	✓	–	✓	–	–	✓	–	✓	–	–	–	43
Amplifier cards	✓	✓	–	–	✓	✓	✓	✓	–	✓	✓	65
Redundancy switch cards	✓	–	–	–	✓	–	–	–	✓	–	✓	49
Attenuator cards	✓	–	–	–	–	✓	–	✓	–	–	–	See website



Modular system chassis showing hot-swap RF module, power supply and CPU module

Attenuator Cards

The 4U modular system chassis accommodates up to 16 hot-swap variable attenuator cards. For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.



Applications for the modular system chassis include VSAT, Broadcast & Teleports

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



At ETL we are constantly growing and diversifying our range of RF products and we have a number of new product launches coming to market in 2020.

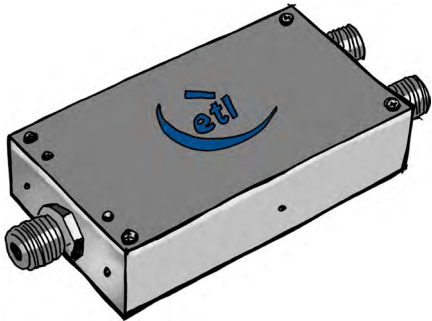
For updates on our newest products and up-to-date specifications please visit the ETL website www.etlsystems.com.

Alternatively you can join us at international exhibitions for product launches (see page 83), sign up to our e-newsletter for announcements and follow us on social media for sneak peeks!

New products for 2020

- Frequency Converters
- Hurricane Combining Matrix
- Low Noise High Gain Alto Amplifiers
- High Frequency Fibre Links
- Smart Modular System

If you are interested in the above products please enquire with the sales manager for your region.

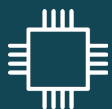


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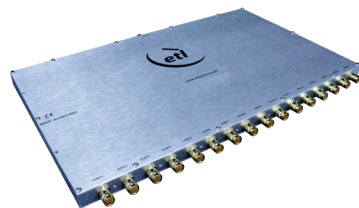
RF Components Overview

Why use RF Components?

If space is an issue and you are looking for high quality RF Components, ETL's wide range is designed and manufactured at the ETL factory. Covering DC to 40GHz, these are at the heart of many of our 19" Rack Systems.

A key feature of many of ETL's components is the ability to pass or block a 10 MHz signal or DC voltage through the products, which can be used to power interconnecting components, or pass a stable frequency reference to a LNB or BUC within the system.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.



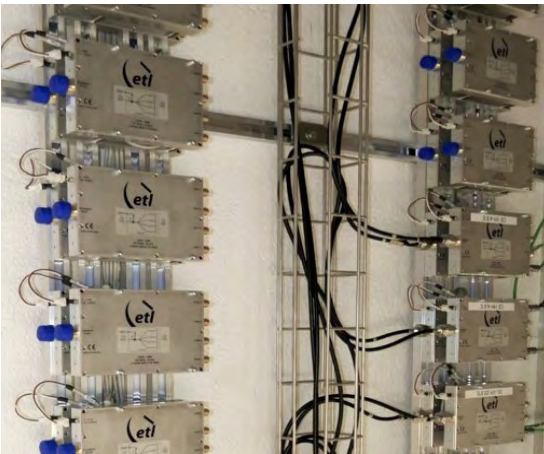
16-way Splitter/Combiner



Scorpion component mounting chassis



RF Over Fibre components



Custom build RF components for a leading telecom company in Switzerland

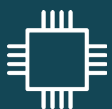
BENEFITS

- Compact & space saving RF products.
- A huge range of products that covers a broad spectrum of RF frequencies, from DC to 40GHz.
- Many RF components can pass or block a 10 MHz signal or DC voltage.
- Indoor chassis options and weatherproof IP65 rated outdoor enclosures that can withstand harsh weather conditions.
- Order quickly via our website with no minimum order charge.

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Email: info@etlsystems.com

US Office:
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Email: ussales@etlsystems.com

UAE Office:
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Email: menasales@etlsystems.com



Active & Passive Splitters & Combiners

ETL's RF component active and passive splitters and combiners cover a range of frequencies including C, IF, L, S, Ka and Ku-band and are available in 2, 3, 4, 6, 8 and 16-way capacities.

Generic specifications include high linearity, very low amplitude unbalance and stable performance over temperature. Units can be provided with various connectors including either 50Ω or 75Ω impedances in a choice of SMA, N-type, BNC or F-type.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.



2-way L-Band Passive Splitter



4-way L-Band Active Splitter



8-way KU-Band Passive Splitter/Combiner



ETL's twin head pick and place machine capable of placing 32,000 components per hour

BENEFITS

- Ability to pass/block 10MHz and/or DC.
- Active units can have external or in-line DC bias.
- High linearity on active splitters & combiners.
- Low insertion loss on passive splitters & combiners.
- Very low amplitude unbalance.
- Stable performance over temperature.

APPLICATIONS

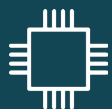
- Telecom infrastructures
- Satellite systems
- Microwave links
- Test and instrumentation
- Military communications
- Radar networks

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UAE Office:
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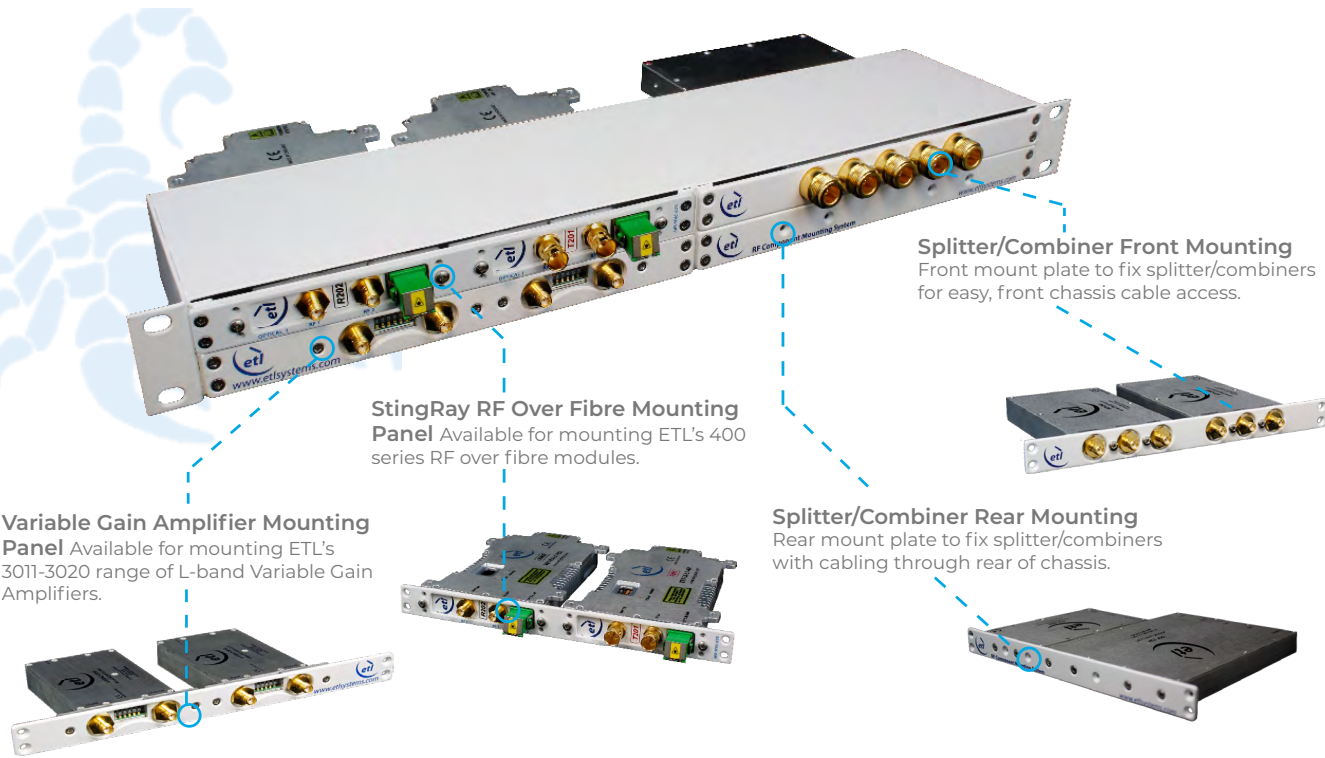




Scorpion Component Mounting Chassis

The Scorpion component mounting chassis provides a neat solution that is cost effective, compact and easy to use. Compatible with a range of ETL RF components, the shelf system is configurable with Amplifiers, Couplers, Fibre Optics, Splitters and Combiner modules.

Available with front, or rear mounting plates for easy access to ports, when fitting to either the front or rear of your 19" rack. For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.



BENEFITS

- Compact space saving alternative to 19" rack chassis.
- Modular design with multiple module options.
- Easy to use & cost effective.

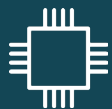
APPLICATIONS

- Telecom infrastructures
- Satellite systems
- Microwave links
- Test and instrumentation
- Military communications
- Radar networks

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Email: info@etlsystems.com

US Office:
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Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



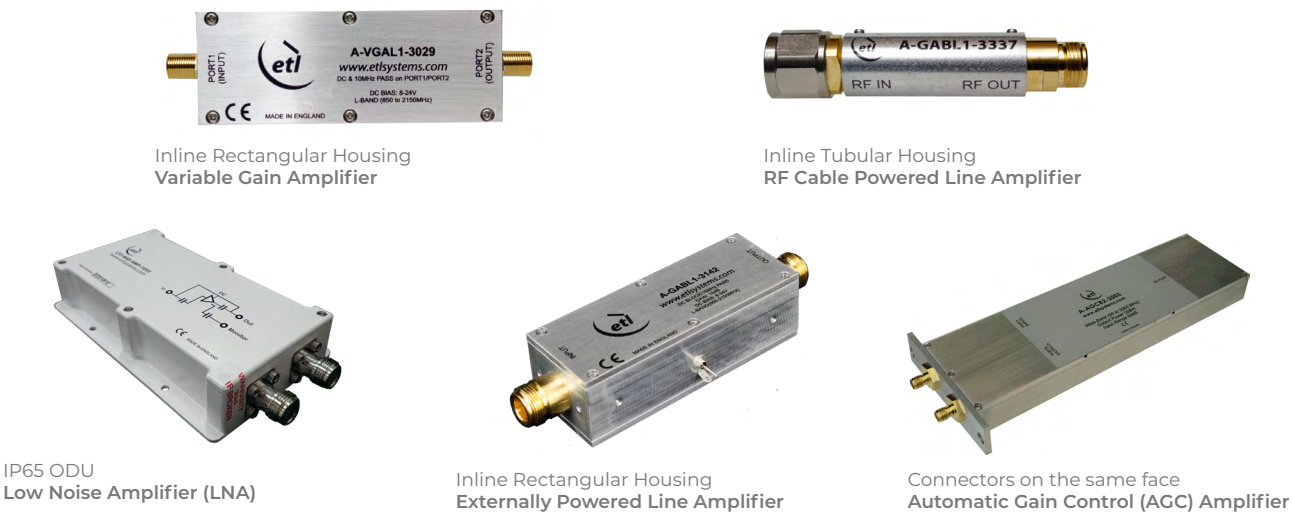
Amplifiers

ETL amplifiers cover a range of frequencies including IF, L, S, C, X, Ku, Ka, wideband and broadband. The units can be supplied with a variety of connectors including SMA, N-type, BNC or F-type, in 50Ω to 75Ω.

Options available in the range include:

- Externally Powered Line Amplifiers
- Variable Gain Amplifiers
- LNA (Low Noise Amplifiers)
- RF Cable Powered Line Amplifiers
- AGC (Automatic Gain Control) Amplifiers
- SMART Amplifiers

Different housings are available, as shown below, including standard rectangular or a compact tubular design. The tubular design is in-line powered. For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.



BENEFITS

- Variety of housing & connector types.
- Amplifiers cover IF, L, S, C, X, Ku, Ka, wideband and broadband frequency ranges.
- Easy to use & cost effective.

APPLICATIONS

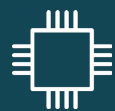
- Telecom infrastructures
- Satellite systems
- Microwave links
- VSAT
- Test and instrumentation
- Military communications
- Radar networks
- GPS and GNSS

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Email: ussales@etlsystems.com

UAE Office:
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Email: menasales@etlsystems.com





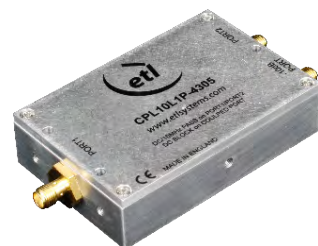
Attenuators / Bias Tees / Couplers / DC Blocks



Attenuator



Bias Tee



Coupler



DC Block

Attenuators

ETL Attenuators, including variable rotary attenuators, cover IF, L-band and frequencies up to 40GHz and are available as DC pass or DC block. They also range from 3, 6, 10, 15, 20 or 30 dB.

Bias Tees

ETL Bias Tees operate over a range of frequencies and are designed to facilitate mounting (onto a base of front/rear panel). They are supplied in EMC shielded non-hermetic housing, with options including traps for 10MHz rejection and high current modules up to 5A and 48V.

Couplers

ETL Couplers provide low insertion loss and passive 10dB or 20dB directional proximity coupling, for RF monitoring over L-band frequency range 850-2150 MHz. These devices are designed with a number of options for 10MHz and DC passing/blocking on the through line and/or coupled ports. Also available as high current modules for frequencies up to 40GHz.

DC Blocks

ETL DC block units provide reliable DC blocking which can be used in conjunction with any of ETL's other products.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.

APPLICATIONS

- Telecom infrastructures
- Satellite systems
- Microwave links
- Test and instrumentation
- Military communications
- Radar networks

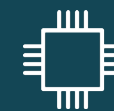


New technologies
in RF distribution

UK Office:
Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



Equalisers / Multiplexers / Impedance Transformers



Equaliser



Components manufactured in ESD anti-static environment at ETL's purpose built facility



Multiplexer



Impedance Transformer

Equalisers

ETL's L-band series of Equalisers are available with either 50Ω or 75Ω impedances and are specifically tailored to the respective connector types, with fixed positive slope of 1 to 10dB or custom slope options available.

Their main function is to compensate for inherent negative slope versus gain frequency characteristics.

Multiplexers

ETL L-band Multiplexers are designed to multiplex L-band, 10MHz and DC in a number of alternative configurations.

Impedance Transformers

ETL passive impedance transformers are one of ETL's most popular products and cover either an L-band frequency range, of 850 to 2150MHz, or an S-band frequency range of 500 to 2500MHz.

These transformers have low insertion loss for converting from 50Ω to 75Ω, and visa versa.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.

APPLICATIONS

- Telecom infrastructures
- Satellite systems
- Microwave links
- Test and instrumentation
- Military communications
- Radar networks

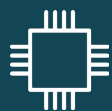


New technologies
in RF distribution

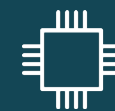
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Email: info@etlsystems.com

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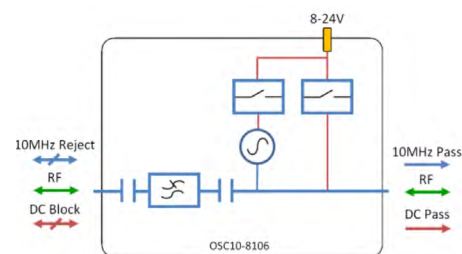
10MHz Oscillators / Frequency Convertors



Switches / Isolators / Circulators



10MHz Oscillator with DIL Switch



10MHz Oscillator Mux Tee diagram

10MHz Oscillators

ETL's 10 MHz oscillators are ovenised, 10MHz reference frequency generators with excellent frequency stability over time and temperature, with built in harmonic rejection filters.

Options include:

- Single Output Port
- L-band Multiplexing
- Externally Powered
- In-Line Powered
- Preset 10MHz Output Power Levels
- Settable 10MHz Output Levels
- Switchable DC and 10MHz Injection (On/Off)

APPLICATIONS

- VSAT
- TVRO Marine
- SNG Broadcast



Block Down Converter



Block Up Converter

Frequency Convertors

ETL's range of Block Up/Down Convertors include fixed LO, external reference and synthesised covering L, S, C, X, Ku and Ka-band frequencies in compact housings.

Options include:

- 0dB Or 10dB Conversion Gain
- External or In Line Bias
- External or Internal 10MHz Reference
- Centrally Located Or Off-Set RF Ports

APPLICATIONS

- VSAT
- UAV
- Microwave Links

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.

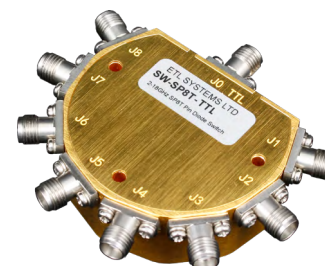
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Email: info@etlsystems.com

US Office:
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Power Over Ethernet L-band Switch



Pin Diode Absorptive Switch



Double Throw PIN Diode Switch



KU Band Isolator



C-band Circulator

Switches

ETL's switches cover a range of frequencies from 0.5 up to 18GHz.

Options include:

- PIN Diode
- Broadband PIN
- Power Over Ethernet (POE)
- Absorptive and Non Reflective

APPLICATIONS

- Telecom infrastructures
- Satellite Systems
- GPS & GNSS
- Microwave Links
- Test and Instrumentation

Isolators and Circulators

ETL's Isolators and Circulators cover the L, S, C, X, Ku and Ka-band frequencies. Units can be provided with 50Ω SMA or N-type connectors.

Options include:

- Custom Frequency Bands Available
- Coaxial or Waveguide
- Narrowband or broadband

APPLICATIONS

- Telecom infrastructures
- Satellite Systems
- Microwave Links
- Test and Instrumentation

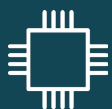
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Telephone: +44(0)1981 259020
Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com





Outdoor IP Rated Modules

ETL's range of IP rated outdoor modules are specifically designed for use where weatherproofing is required.

Options available in the range include:



Fibre ODU Module



Amplifier ODU Module



Splitter / Combiner ODU Module



Coupler ODU Module



Multiplexer ODU Module



Attenuator ODU Module

RF Over Fibre

Stand alone RF Over Fibre ODU modules available in L-band and Broadband frequencies. Housed in an IP65 rated outdoor unit.

Amplifiers

Housed in an IP65 rated outdoor box. Available in L-band and IF-band frequencies. Options include variable gain, low noise, DC and 10MHz pass and block.

Splitters / Combiners

Available in L-band and C-band frequencies. Options include DC and 10MHz pass and block. Housed in an IP65 rated outdoor box.

Couplers

Available in L-band frequency. Options include DC and 10MHz pass and block. Housed in an IP65 rated outdoor box.

Multiplexers

Available in L-band frequency. Options include DC and 10MHz pass and block. Housed in an IP67 rated outdoor box.

Attenuators

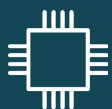
Available in broadband frequency. Housed in an IP65 rated outdoor casing.

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.

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Email: info@etlsystems.com

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StingRay RF Over Fibre

Options available in the range include:



Stand-Alone AGC Broadband Receive Fibre Converter



Outdoor GNSS Over Fibre Module



VSAT ODU Fibre Module



Outdoor Rated Power Supply - Single and Dual Redundant

StingRay 400 Series

ETL's StingRay range of stand-alone RF Over Fibre (RoF) products are compact and offer excellent value for money. The 400 series is designed to deliver long distance L-band and Broadband over fibre between the satellite dish and control room decoders. With optical input to 10MHz signal output for timing applications also available.

APPLICATIONS

- Telecom infrastructures
- Satellite Systems
- Microwave Links
- Test and Instrumentation

StingRay 900 Series

ETL's StingRay 900 series offers GPS (GNSS) over fibre units as well as wireless extending, for cameras and microphones and VSAT applications; all in a compact IP65 rated weatherproof housing.

Designed to work with ETL's weatherproof outdoor ready power supply units (PSU), available as either single module or dual redundant.

APPLICATIONS

- Telecom infrastructures
- Satellite Systems
- GPS & GNSS
- Microwave Links
- Test and Instrumentation
- VSAT

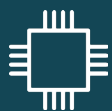
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Filters / Waveguides



IF-Band LC Filter



Cavity Bandpass Filter



Waveguide Components

Filters

ETL is able to offer custom RF and Microwave filters for 50 Ω or 75 Ω impedances and various connector types.

Options available range from 100MHz to 40GHz, waveguide cavity bandpass filters and also microstrip filters, including suspended substrate technologies, for broadband performances covering frequencies within DC to 20GHz.

New designs can be delivered on short time scales and provide great value for money.

Waveguides

ETL's range of precision made Waveguide components are made to the highest quality standards and use international flange styles and finishes to suit.

Available in aluminium, brass or copper waveguide with aluminium or brass flanges covering frequency ranges up to 40 GHz, & WR-650 to WR-22.

Options include:

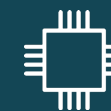
- Flex / Twist
- Pressure Windows
- Terminations / Loads
- Multi-bends
- Adaptors
- Couplers
- Straights
- Bends
- Twists
- Gaskets

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.

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Email: ussales@etlsystems.com

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Email: menasales@etlsystems.com



Cable Assemblies / Power Supplies / Terminators



Cable assembly



Outdoor 12V Single ODU PSU



Components manufactured in ESD anti-static environment at ETL's purpose built facility

Cable Assemblies

ETL accessories include a variety of cable assemblies for molex DC connector options, available on any module with DC filter con or biasing point. Available as male & female in 1M or 2M lengths.

Power Supplies

ETL offers a range of power supply modules for indoor and outdoor applications with various voltages.

Options include:

- Fixed 12V
- Variable 12-24V Selectable Output
- Fixed 48V
- Fixed 12V IP65 Rated Single Module
- Fixed 12V IP65 Rated Dual Redundant

Terminators

ETL's 9800 series of male terminators are suitable for providing load to unused RF connector ports.

Operating frequencies range from DC to 18 GHz. Available in 50 Ω or 75 Ω SMA, N-type, F-type or BNC.



12V Single Outdoor PSU



Terminators

For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com/catalogue/rf-components.

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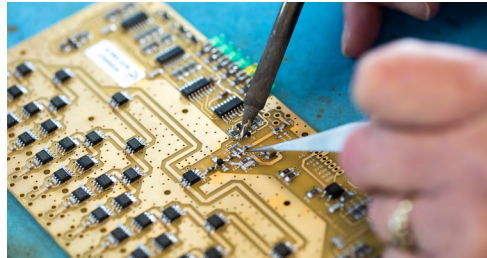
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Custom Build RF Solutions

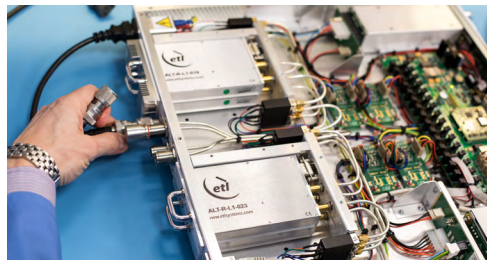
Atlantic Microwave



ETL has an extensive product range and many products are the result of custom build requirements. This is the essence of ETL's RF skill set and we fully understand that no two satellite operators have the same challenges.

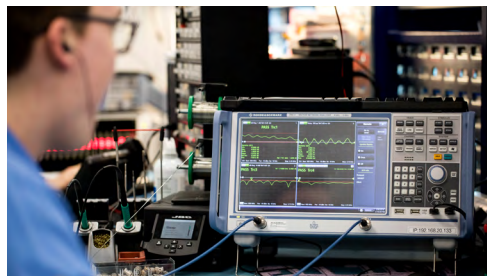
Did you know... that over half of our top 50 orders annually are specifi cally engineered to meet customer requirements.

Our dedicated RF design and engineering team can work with you to solve your RF signal handling challenges. We have over 25 years' experience of providing solutions, such as extra redundancy, specific RF performance or even building a chassis to fit certain architecture.



How do I get a custom RF product?

Whether you require an RF component or rack system, contact us directly and together we can define the product or technical specifications you require.



When contacting ETL, please remember to include important specifications like RF connectors, impedances, dual or single PSU's, remote control ports, and any special RF parameters, such as insertion or return loss, isolation, and flatness, if you know them.

For more information about our custom build products please visit our website www.etlsystems.com/custom-build.



Frequency Converter



Amplifier



VSAT RF Over Fibre Indoor Unit

About Atlantic Microwave

Atlantic Microwave manufacturers a wide range of microwave and RF components, equipment and interconnects from their headquarters and R&D base in Braintree, England, UK. With over 30 years' experience, their product range and capability include both standard and custom equipment, as well as multi-function modules and sub-assemblies.

Atlantic supply globally to the Aerospace, Telecommunications, Defence & Military and Scientific Research markets via representatives and distributors worldwide. Atlantic Microwave offer a range of complementary RF products to ETL and are also very focused on customisation of its RF range.



RF Testing and Satellite Simulation

For Satcom RF testing.
Product range includes;

- Test Loop Translators
- Satellite Simulators
- Noise & Signal Generators
- Converters, amplifiers & splitters



Quantum Cryogenic Components

For cryogenic & quantum computing. Products for this application include;

- Attenuators
- Cable Assemblies
- Isolators & Circulators
- Pin Diode Switches



High Frequency RF Components

Product range includes;

- Cryogenic components
- High frequency components
- Cable Assemblies
- Oscillators
- Active & Passive Components
- Control Components
- Switches

Custom build RF components, RF testing and satellite simulation options are also available. For more information and up to date RF specifications visit www.atlanticmicrowave.com.

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Email: info@etlsystems.com

US Office:
Telephone: +1 703 657 0411
Email: ussales@etlsystems.com

UAE Office:
Telephone: +971 4 428 0918
Email: menasales@etlsystems.com



UK Headoffice:
Telephone: +44(0)1376 550220
Email: sales@atlanticmicrowave.co.uk

UK Address:
40A Springwood Drive, Braintree,
Essex, CM7 2YN, England



Notes

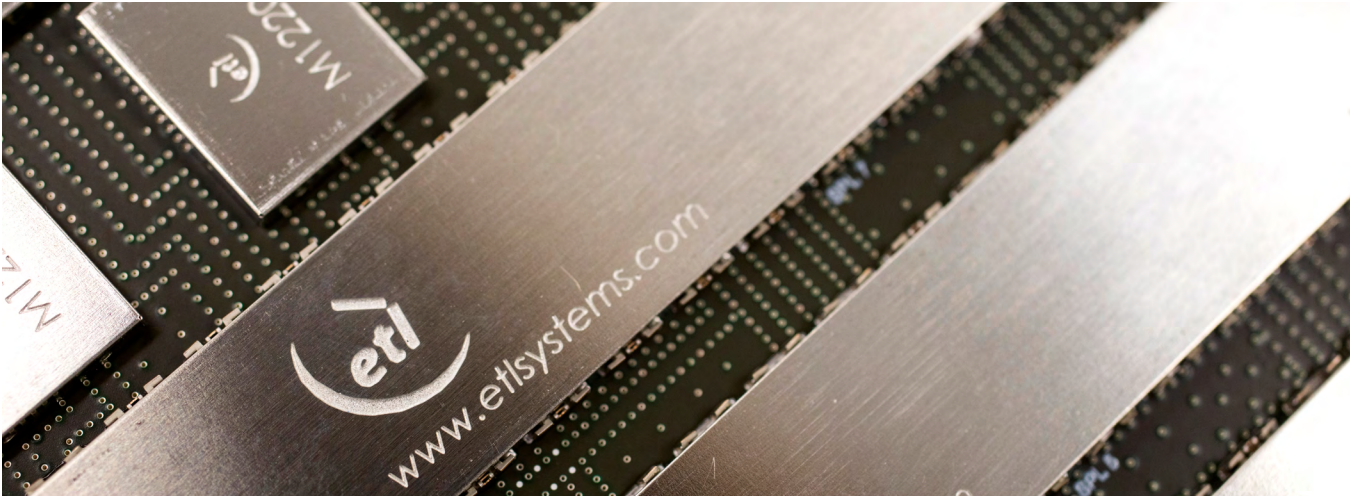
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Ph. (801) 598-8305

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Web: <http://www.rangeco.net>



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UK Office:

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