



PRODUCT CATALOGUE

Edition 4



Rack Systems



RF Components



RF Test &
Measurement



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.

A full service provider, we offer a complete ground segment solution from the antenna to the modem, as well as test equipment for your ground segment.

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), which support our customers in 112 countries.

Many of our products are custom built and benefit from our in-house RF testing facilities, software design, automated circuit board assembly, concept design areas, and pick & 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.

In 2019 we acquired Atlantic Microwave Ltd, a leading provider of satellite communication test equipment, microwave components and quantum cryogenics. Atlantic Microwave manufacture and supply a comprehensive range to the Satcom, Telecommunications, Broadcast, Aerospace, Defence and Scientific Research industries. **For more information visit page 79.**



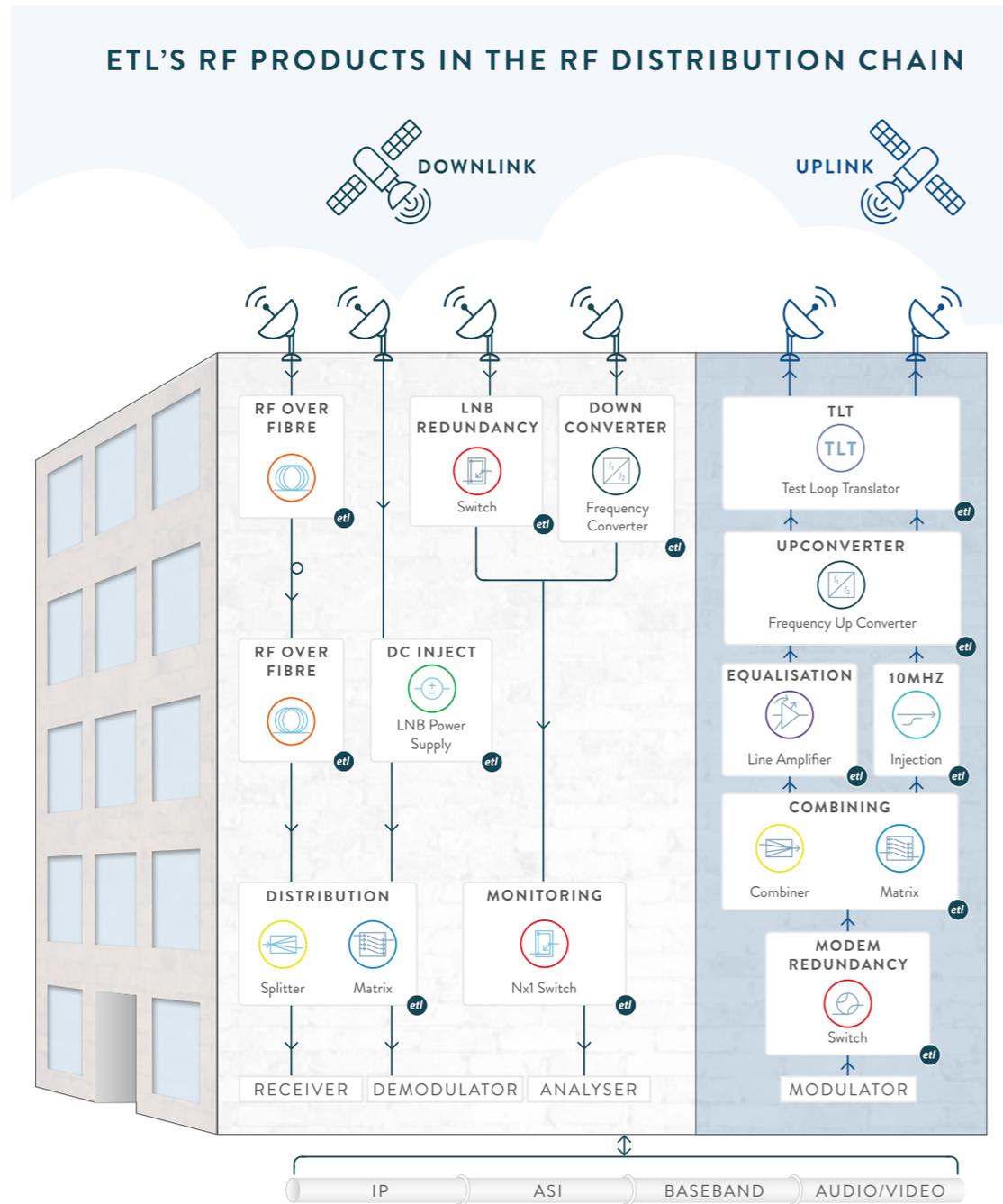
Our Focus

Reliability, resilience, and RF performance are at the heart of all ETL designs. These and the need for adaptable, scalable technology in a growing Satcom market, drive our innovation and product development.

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



Our product range covers DC- 40GHz and includes Matrix Routers, Switches, Splitters, Combiners, and 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.



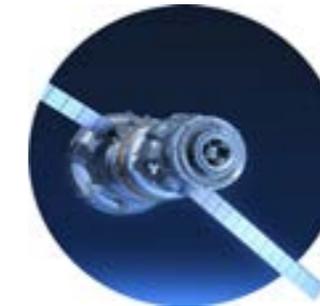
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www.etlsystems.com

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 playout centres, news gathering and sports events, as well as other applications that require rapid changing of services.



Satellite Operator

All 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

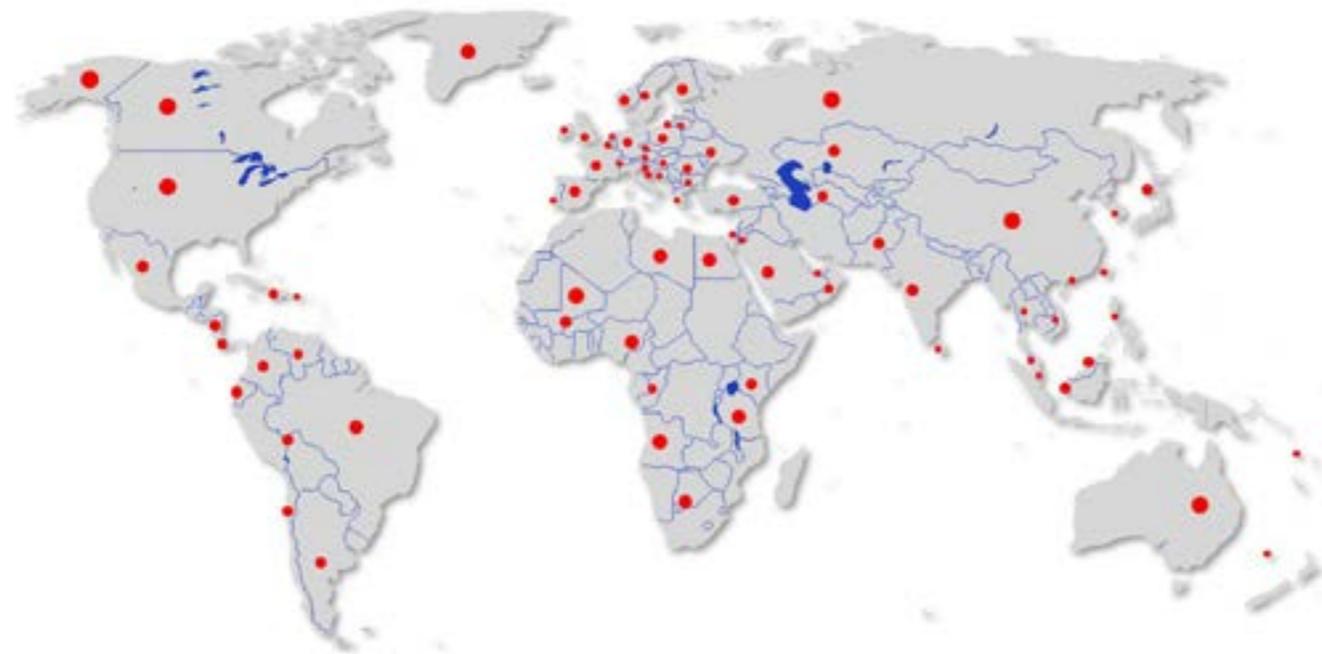
Telecoms companies with traditional satcoms use our splitters and combiners, as well as LNB service shelves and other equipment. ETL has also provided both straight RF distribution via splitters, and full fan-out switch matrices for more demanding IPTV applications.



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.

We ship to 112 countries, and have a team of experts handling your equipment through customs and shipping. ETL's 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 three pick and place (SMT) lines

100% testing at sub-assembly and finished product levels

Matrix / Routers

RF Matrix / Router Overview	Page	10
256 x 256 Havoc Matrix / Router	Page	12
128 x 128 Harrier Matrix / Router	Page	13
128 x 128 Vulcan Matrix / Router	Page	14
64 x 64 Hurricane Matrix / Router	Page	15
64 x 64 Vortex Matrix / Router	Page	16 - 17
32 x 32 Enigma Matrix / Router	Page	18
32 x 32 Ensign Matrix / Router	Page	19
16 x 16 Victor Matrix / Router	Page	20
4 x 16 / 4 x 32 / 4 x 64 Optimus Matrix / Router	Page	21
Matrix / Router Larger Systems	Page	22

Genus Modular RF Distribution System

Genus Modular RF Distribution System Overview	Page	23 - 27
Genus Hawk Matrix / Router	Page	28
Genus StingRay RF over Fibre - up to 10km	Page	29 - 31
Genus StingRay RF over Fibre CWDM - up to 50km	Page	32
Genus Falcon Frequency Converter	Page	33 - 36
Genus Alto Amplifier	Page	37 - 38
Genus Swift Switch	Page	39 - 40
Genus Splitter & Combiner	Page	41
Genus Piranha DC Injector	Page	42
Genus Timing Frequency Distribution	Page	43
Genus Instrumentation & Measurement	Page	80

RF over Fibre

StingRay RF over Fibre Overview	Page	44 - 45
StingRay RF over Fibre DWDM - up to 500km	Page	46 - 48
VSAT RF over Fibre	Page	49

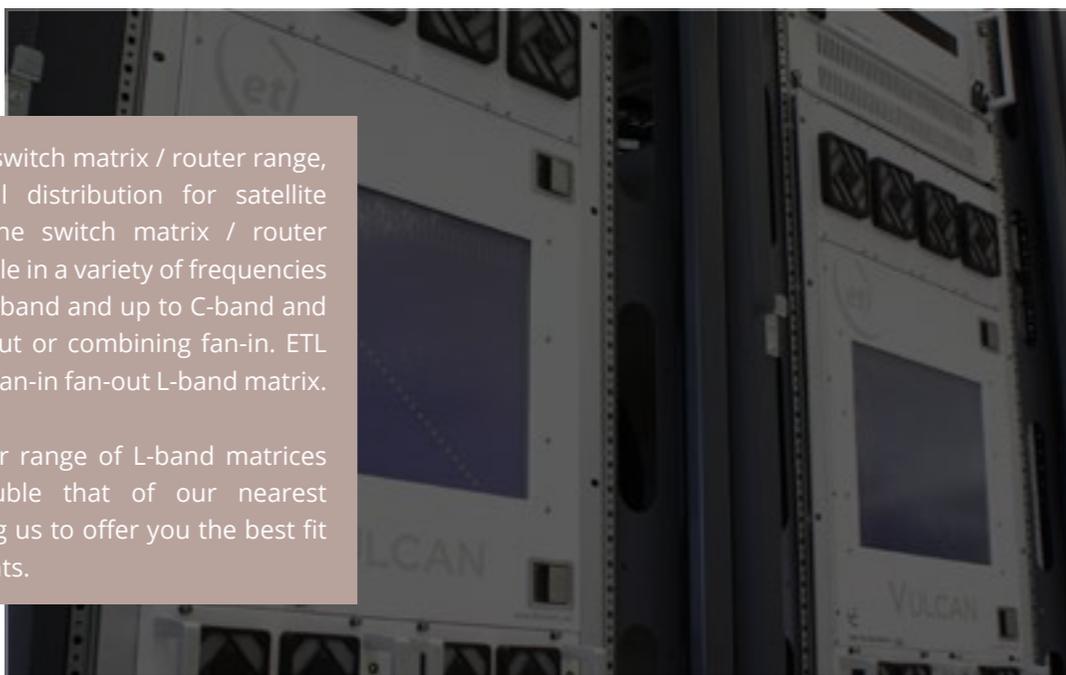
Splitter & Combiner

Splitter & Combiner Overview	Page	50 - 51
Dextra Splitter & Combiner Range	Page	52 - 55
Distribution Amplifier / Splitter Range	Page	55
LD Series Splitter & Combiner Range	Page	56

Switch		
Switch Overview	Page	57
Griffin LNB & Modem RF & Optical Redundancy Switch	Page	58 - 59
Redundancy Switch Range	Page	60
LS Series Switch Range	Page	61
SHF Switch Range	Page	62
Yacht VSAT Antenna Switch Range	Page	63
Amplifier		
Alto Amplifier Overview	Page	64
Manual Control Amplifier	Page	65
SMART Amplifier	Page	66
AGC Amplifier	Page	67
Redundant Amplifier	Page	68 - 75
RF Components		
RF Components Overview	Page	76 - 78

Instrumentation & Measurement		
Instrumentation & Measurement Overview	Page	79
Genus Modular System		
Genus Modular System Overview	Page	80 - 82
Genus Test Loop Translator	Page	83
Genus Noise Generator	Page	84
Genus Signal Generator	Page	85
Satellite Simulator		
Satellite Simulator Overview	Page	86
ODU Satellite Simulator System	Page	87
Test Loop Translator - Classic Range		
Test Loop Translator Overview	Page	88
Noise Generator - Classic Range		
Noise Generator Overview	Page	89
ANG Series Benchtop Instrument Noise Generator	Page	90
RNG Series 19" Rack Mount Noise Generator	Page	91
Splitters - High Frequency		
SDT Series Splitter	Page	92
Amplifiers - Test		
BSL Series Benchtop Amplifier	Page	93

SWITCH MATRIX / ROUTER



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 up to C-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 Range

ETL's RF Router range provides options with hot-swap of all active components - such as RF cards, CPU, PSU - and expandable systems for future requirements. For larger applications, our scalable multi-module matrix systems are available for sizes up to 1024 inputs x 1024 outputs.



Multi-module RF matrix switch systems where a large number of satellite feeds is required up to 1024 inputs x 1024 outputs, using matrix system splitters and combiners (see page 22).



Large capacity RF matrix switches for high-volume RF signal routing. From 64 inputs x 64 outputs in a 4U chassis, up to 256 inputs x 256 outputs in a 16U chassis.



Small capacity RF matrix switches for LEO constellations, small teleports, HTS and uplink and downlink applications. From 32 inputs x 32 outputs in a 6U chassis to Dual 8 inputs x 8 outputs in a 1U chassis.

Matrix Range Comparison Table

Model	HAV	HAR	VCN	HUR	VTX-100	NGM	NSN	VTR	OPT	HWK
Frequency (MHz)	850-2450	850-2450	40-2150	850-2450	850-2450	50-4000	850-2450	50-2500	850-2150	850-2450
Capacity	256 x 256	128 x 128	128 x 128	64 x 64	64 x 64	32 x 32	32 x 32	16 x 16	Quad 4x16 Dual 4x32 Single 4x64	4x4 Dual 8x8 Distributive/ Combining
Max System Size	1024 x 1024	1024 x 1024	1024 x 1024	512 x 512	512 x 512	512 x 512	512 x 512	32 x 32	4 x 64	16 x 8 8 x 16
Chassis Height	16U	10U	16U	4U	5U	6U	6U	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Enhanced RF Performance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auto RF Redundancy*	✓	✓	✓	✓	-	-	-	-	-	-
Variable Gain	-	✓	✓	✓	✓	✓	✓	✓	-	-
RF Detect	-	✓	✓	✓	-	-	-	✓	-	-
LNB Power	-	✓	-	✓	-	-	-	✓	✓	-
Fibre Inputs	-	✓	-	✓	-	-	-	-	-	-
Page Number	12	13	14	15	17	18	19	20	21	28

* 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.

256 x 256 Havoc Matrix / Router

A new, ultra compact distributive (fan-out) 256 x 256 L-band Matrix/Router.

Expandable in blocks of 16 from 16 x 16 up to 256 x 256. Multi-chassis expansion available up to maximum of 1024 x 1024.

BENEFITS & APPLICATIONS

- Ultra compact high capacity 256 x 256 routing in a 16U chassis.
- Extended L-band frequency for Ka-band & HTS applications.
- Reliability in service with quad redundant PSUs, dual redundant CPU modules & hot-swap active components.
- Secure communications with SNMPv3, HTTPS & IPSEC for future proof secure protocols.
- Applications include growing teleports with multiple input feeds.



PRODUCTS	
Model	HAV-80
Frequency (MHz)	850-2450 (Extended L-band)
Matrix Type	Distributive (Fan-out)
Capacity	256 inputs x 256 outputs
Hot-Swap	RF Matrix Cards, CPUs, PSUs & Fans
Redundant CPUs & PSUs	✓
Redundant Mid Matrix Paths	As standard
Dimensions	16U high x 850mm deep x 19" wide
RF Connectors & Impedances	50Ω SMA

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

128 x 128 Harrier Matrix / Router

A distributive (fan-out) 128 x 128 L-band Matrix/Router.

Features to suit individual RF needs for each satellite feed, with configurable input and output module options (IO modules).

Expandable in blocks of 8 from 8 x 8 up to 128 x 128.

BENEFITS & APPLICATIONS

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



PRODUCTS						
Model	HAR-40					
Frequency (MHz)	850-2450 (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 Model Numbers	H-IO-01	H-IN-02	H-IN-03	H-IN-04	H-IN-05	H-OP-08
H-Series IO Module Options	Standard passive input or output module	Variable gain input module	Optical fibre input module	LNB power module	Variable gain & LNB Power input module	Variable gain output 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

A distributive (fan-out) 128 x 128 L-band Matrix/Router.

Expandable in blocks of 8 from 8 x 8 up to 128 x 128. Multi-chassis expansion available up to maximum of 1024 x 1024.

BENEFITS & APPLICATIONS

- Compact 128 x 128 routing in a 16U chassis.
- 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- swap active components.
- Applications include Government & large commercial teleports with multiple antennas. RF content acquisition for TVRO & IPTV head-ends, remote controlled unmanned satcom sites & telecoms.



PRODUCTS		
Model	VCN-11	VCN-12
Frequency (MHz)	850-2150 (L-band)	40-200 (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	

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

64 x 64 Hurricane Matrix / Router

A distributive (fan-out) 64 x 64 L-band Matrix/Router. Features to suit individual RF needs for each satellite feed, with configurable input and output module options (IO modules).

Expandable in blocks of 8 from 8 x 8 up to 64 x 64.

BENEFITS & APPLICATIONS

- Ultra compact 64 x 64 routing in a 4U chassis.
- 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- swap active components.
- Minimal impact from failure as all settings are retained after a communications / power failure.
- Applications include teleports requiring input gain/ fibre inputs.



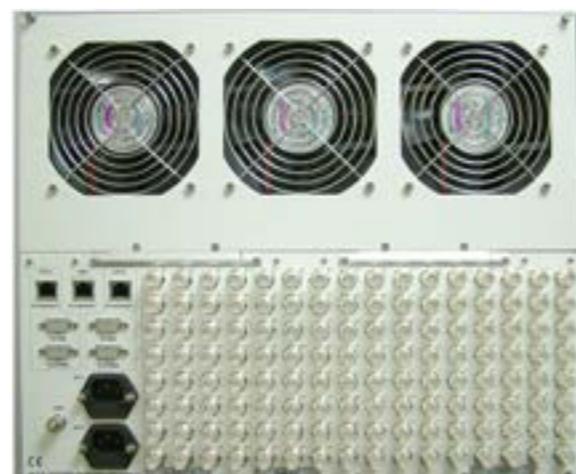
PRODUCTS						
Model	HUR-10					
Frequency (MHz)	850-2450 (Extended L-band)					
Matrix Type	Distributive (Fan-out)					
Capacity	64 inputs x 64 outputs					
Hot-Swap	As standard					
Dual Redundant CPUs & PSUs	As standard					
LNB Power	✓					
H-Series IO Module Model Numbers	H-IO-01	H-IN-02	H-IN-03	H-IN-04	H-IN-05	H-OP-08
H-Series IO Module Options	Standard passive input or output module	Variable gain input module	Optical fibre input module	LNB Power input module	Variable gain & LNB Power input module	Variable gain output module
Dimensions	4U high x 650mm deep x 19" wide					
RF connectors & impedance	50Ω BNC, 50Ω SMA, 75Ω BNC & 75Ω F-type					

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

64 x 64 Vortex Matrix / Router

A distributive (fan-out) 64 x 64 Matrix/Router available in either extended L-band (50-2450MHz) or IF-band (50-200MHz) models.

Expandable in blocks of 16 from 16 x 16 up to 64 x 64. Multi-chassis expansion available up to maximum of 512 x 512.



BENEFITS & APPLICATIONS

- 64 x 64 routing in an 8U chassis.
- Further expansion of RF matrix to 1024 x 1024.
- Self diagnostics with continuous monitoring & reporting of all active components.
- Reliability in service with hot-swap active components.
- Applications include RF content acquisition for TVRP & IPTV head-ends, remote controlled unmanned satcom sites & broadcasters.

PRODUCTS

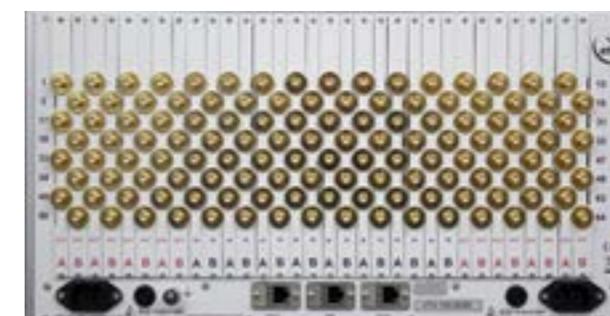
Model	VTX-30	VTX-31
Frequency (MHz)	50-200 (IF)	50-2450 (Extended L-band)
Matrix Type	Distributive (fan-out)	Distributive (fan-out)
Capacity	64 inputs x 64 outputs	
Dual Redundant CPU's & PSUs	As standard	
Hot-Swap	RF Matrix Cards, CPUs, PSUs & Fans	
Dimensions	8U high x 650mm deep x 19" wide	
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type	

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

64 x 64 Vortex-100 Matrix / Router

The next-generation, distributive (fan-out) 64 x 64 Vortex Matrix/Router. With improved RF performance and a more compact design.

Expandable in blocks of 16 from 16 x 16 up to 64 x 64. Multi-chassis expansion available up to maximum of 512 x 512.



BENEFITS & APPLICATIONS

- Compact 64 x 64 routing in a compact 5U chassis.
- Improved RF performance including noise figure, return loss, OIP3 & isolation.
- Reliability in service with hot-swap active components.
- New capacitive touchscreen for ease of use & durability.
- Continuous monitoring and reporting of all active components.
- Secure communications with SNMPv3 & HTTPS.
- All settings are retained after a communications power failure.
- Applications include RF content acquisition for TVRP & IPTV head-ends, remote controlled unmanned satcom sites & broadcasters.

PRODUCTS

Model	VTX-100	VTXC-100	VTXC-101
Frequency (MHz)	850-2450 (extended L-band)	850-2450 (extended L-band)	850-2150 (L-band)
Matrix Type*	Distributive (fan-out)	Combining (fan-in)	Combining (fan-in)
Capacity	64 inputs x 64 outputs		
Matrix Expansion	✓		
Dual Redundant CPUs & PSUs	As standard		
Hot-Swap	RF Matrix Cards, CPUs, PSUs & Fans		
Dimensions	5U high x 550mm 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

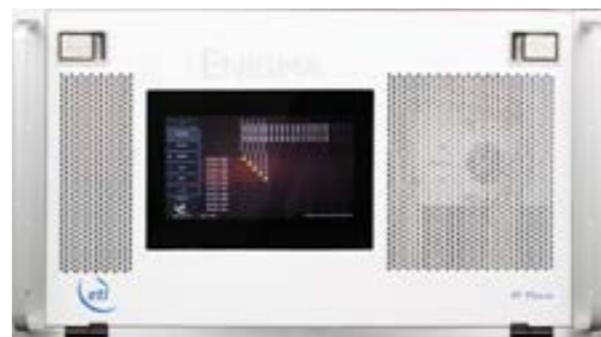
32 x 32 Enigma Matrix / Router

A distributive (fan-out) or combining (fan-in) 32 x 32 L-band Matrix/Router. The fourth generation of Enigma matrices, with enhanced RF performance and a more compact form factor.

Expandable in single increments up to 32 x 32. Multi-chassis expansion available up to maximum of 512 x 512.

BENEFITS & APPLICATIONS

- 32 x 32 routing in a 6U chassis.
- Improve resilience & minimise the risk of downtime with single input & output cards.
- Ease of use & durability with new capacitive touchscreen (NGM-1xx).
- Self diagnostics with continuous monitoring & reporting of all active components (e.g amplifiers).
- Reliability in service with hot-swap active components.
- Applications include live news & sport traffic, satellite communications & signal monitoring of satellite traffic.



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

PRODUCTS

Model	NGM -23	NGMC -23	NGM -28	NGM -29	NGM -46	NGMC -47	NGM -48	NGMC -48	NGM -50	NGM -101	NGMC -101	NGM -102	NGMC -102	NGM -103	NGMC -103	NGM -105	NGMC -105	NGM -106	NGMC -106
Frequency (MHz)	850-2150	850-2150	50-1000	50-1000	1000-2000	1000-2000	1500-4000	1500-4000	850-2450	850-2150	850-2150	850-2450	850-2450	500-3150	500-3150	50-2450	50-2450	50-200	50-200
Matrix Type*	D	C	D	D	D	C	D	C	D	D	C	D	C	D	C	D	C	D	C
Capacity	32 inputs x 32 outputs																		
Matrix Expansion	✓																		
Dual Redundant CPUs & PSUs	As standard																		
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																		

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

32 x 32 Ensign Matrix / Router

A FIFO distributive and combining (fan-in/fan-out) 32 x 32 L-band Matrix/Router, designed for routing Transmit and Receive RF signals in one chassis.

Expandable in single increments up to 32 x 32. Multi-chassis expansion available up to maximum of 512 x 512.

BENEFITS & APPLICATIONS

- Compact 32 x 32 routing in a 6U chassis.
- Switching flexibility with ability to split & combine feeds at the same time.
- Improve resilience & minimise the risk of downtime with single input & output cards.
- Ease of use & durability with new capacitive touchscreen.
- Self diagnostics with continuous monitoring & reporting of all active components (e.g amplifiers).
- Reliability in service with hot-swap active components.
- Applications include VSAT traffic distribution, RF distribution in cruise liners or luxury yachts, downlink & uplink applications.



PRODUCTS

Model	NSN-102	NSN-103
Frequency (MHz)	850-2450 (Extended L-band)	500-3150 (Extended L-band)
Matrix type	Distributive & Combining / Fan-in Fan-out (FIFO)	
Capacity	32 inputs x 32 outputs	
Gain	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	

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

16 x 16 Victor Matrix / Router

A distributive (fan-out) or combining (fan-in) 16x 16 L-band Matrix/Router.

Expandable via software keys in single increments from 4 x 4 up to 16 x 16.

BENEFITS & APPLICATIONS

- Compact 16 x 16 routing in a 1U chassis, ideal for restricted rack space.
- Signal balancing with variable gain on each input.
- Signal strength monitoring with RF detection.
- Reliability in service with dual redundant power supplies & hot-swap fan modules.
- Integrated LNB Powering options.
- Applications include TVRO, marine, SNG trucks & mobile satcoms.



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

PRODUCTS							
Model	VTR-71	VTRC-71	VTR-80	VTR-100	VTRC-100	VTR-101	VTRC-101
Matrix Type	Distributive (fan-out)	Combining (fan-in)	Distributive (fan-out)	Distributive (fan-out)	Combining (fan-in)	Distributive (fan-out)	Combining (fan-in)
Frequency (MHz)	50-2500 (IF to Extended L-band)			850-2450 (Extended L-band)			
Capacity	16 inputs x 16 outputs	16 inputs x 16 outputs	16 inputs x 16 outputs	8 inputs x 24 outputs	24 inputs x 8 outputs	16 inputs x 16 outputs	16 inputs x 16 outputs
Dual Redundant PSUs				✓			
Variable Gain				✓			
LNB Power	-	-	✓	-	-	-	-
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						

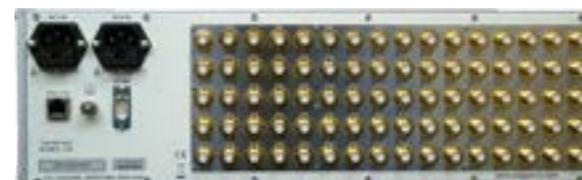
For our full range, along with up-to-date RF specifications, please visit our website www.etsystems.com.

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

A distributive (fan-out) quad 4 x 16, dual 4 x 32 or single 4 x 64 L-band Matrix/Router. Configurable depending on the number of modems to be linked.

BENEFITS & APPLICATIONS

- Configurable as quad 4 x 16, dual 4 x 32 or single 4 x 64 matrices in a 1U chassis.
- Choice of multiswitch or RF matrix mode.
- Ensures optimal performance with LNB current monitoring.
- Reliability from dual redundant power supplies.
- Minimised risk of failure with hot-swap active components.
- Applications include RF content acquisition for TVRO & IPTV headends, bulk distribution of satellite transponders & RF distribution in cruise liners or luxury yachts.



PRODUCTS	
Model	OPT-20
Matrix Type	Distributive (fan-out)
Frequency (MHz)	850-2150 (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 Power & 22KHz tone	✓
Dimensions	3U high x 500mm deep x 19" wide
RF Connectors & Impedances	50Ω SMA 50Ω BNC 75Ω BNC 75Ω F-type

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

Larger Matrix / Router Systems

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

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



128 x 256 Vulcan Matrix System

PRODUCTS

Matrix	Victor	Optimus	Valiant	Ensign	Enigma	Hurricane	Vortex	Harrier	Vulcan	Havoc
Module Capacity	16x16	Quad 4x16 Dual 4x32 Single 4x64	16x32	32x32	32x32	64x64	64x64	128x128	128x128	256x256
Maximum System Size	32x32	4x64	16x32	512x512	512x512	512x512	512x512	1024x1024	1024x1024	1024x1024

Matrix Module Expansion

Satellite ground stations constantly change and expand their satellite feeds, requiring equipment that is scalable.

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



GENUS MODULAR RF DISTRIBUTION SYSTEM

High density, 1U, 2U, 3U, Bench Top and ODU universal chassis holding multiple RF module types, providing configurable and flexible RF signal management to match customer requirements.

The modular design can house any combination of compatible modules:

- Frequency Converters
- RF Over Fibre
- Matrices
- Amplifiers
- Splitters and Combiners
- DC Injectors



Genus Range

BENEFITS & APPLICATIONS

- **Configurable:** choose to mix & match RF modules depending on your application.
- **Future proof:** scalable chassis expandable for growing teleports.
- **Rack space saving:** compact & smart chassis design.
- **Resilience** from dual redundant hot-swap PSUs & field serviceable RF Modules, HMI & CPU for minimal downtime.
- **Secure communications** with SNMPv3 & HTTPS for future proof secure protocols.
- **Applications** include teleports, ground stations, maritime, high resilience applications & unmanned sites, redundancy applications for remote satellite teleports, signal distribution & LEO Gateways.



Build a distribution system to meet your specific RF needs

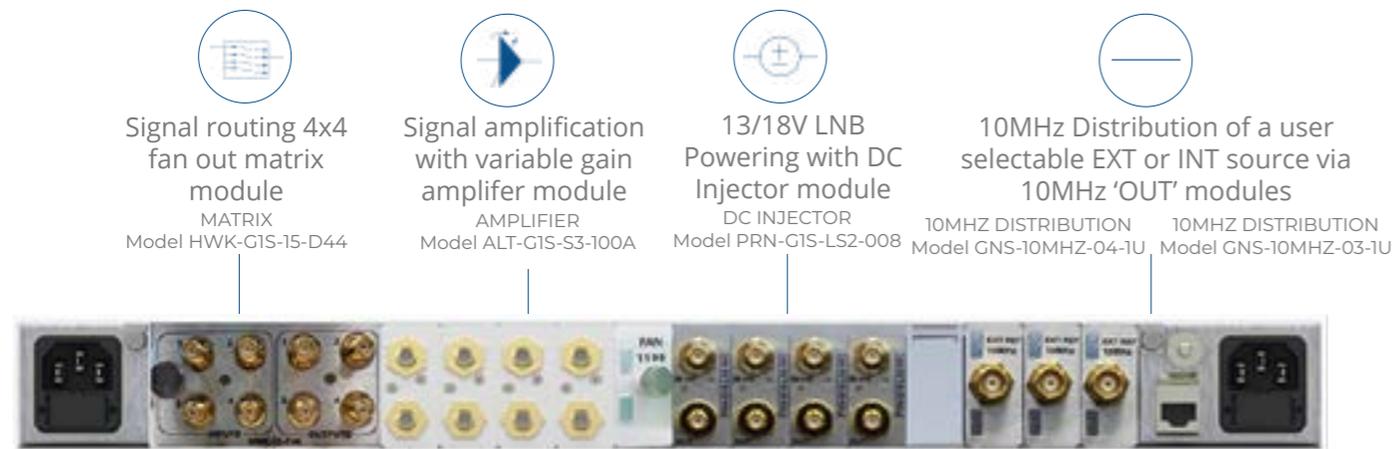
See the example below showing how easy it is to build your own multiple module RF distribution chassis.

The need for a small form factor solution for the RF distribution of 4 signals in a deployable terminal where space was at a premium.

SYSTEM REQUIREMENTS:

- LNB Powering
- Signal Amplification
- Fan-out Signal Routing
- 10MHz Distribution from a back-up INTERNAL Reference Source

NEW GENUS SOLUTION: A configured system design to meet customer requirements.



FAN Model GNS-FAN-06-1U

ETL Classic Solution



Using the Genus Modular Chassis provides a rack space saving of 3U

Rack space saving with 1U compact and smart chassis

Streamlined running costs by reducing the number of chassis required to house an equivalent configuration of modules.

Resilience from dual redundant hot-swap PSUs & field serviceable RF Modules, HMI & CPU for minimal downtime.

CHASSIS Model GNS-196-1U

Genus RF Module Range



Matrix

A distributive (fan-out) or combining (fan-in) L-band Matrix/Router. Available in a range of configurations from 4 x 4 up to 32 x 8. See Page 28



RF over Fibre

Up to 10km short distance RF over Fibre links and up to 50km medium distance CWDM RF over Fibre links. Timing and Reference and Redundancy options. See Page 29



Frequency Converter

Agile up converters (AUC), agile down converters (ADC), block up converters (BUC) or block down converters (BDC). See Page 33



Amplifier

SMART Ethernet Remote Control and Monitoring and Redundancy Amplifier modules. See Page 37



Switch

1 x N General Purpose and Redundancy Switch modules. See Page 39



Splitter / Combiner

4-way Splitter and Combiner modules with gain, slope and LNB powering options. See Page 41



DC Injectors

LNB DC Injector modules with 10MHz injection and variable voltage options. See Page 42



Instrumentation & Measurement

Test Loop Translator, Satellite Simulator, Noise Generator and Signal Generator modules for I&M applications. See Page 80

Genus Chassis Range



1U Genus Chassis

1U high indoor chassis with internal 10MHz source option. Houses a mix of up to 17 RF modules including:

- Matrices
- RF over Fibre
- Frequency Converters
- Amplifiers
- Switches
- DC Injectors
- I&M Modules



2U Genus Chassis

2U high indoor chassis with internal 10MHz source option. Houses a mix of up to 17 RF modules including:

- Matrices
- RF over Fibre



3U Genus Chassis

3U high indoor chassis with internal 10MHz source option. Houses a mix of up to 17 RF modules including:

- Splitters
- Combiners



Benchtop Instrumentation Chassis

Benchtop Instrumentation chassis with internal / external 10MHz source option. Houses a mix of up to 10 RF modules including:

- RF over Fibre
- Frequency Converters
- Switches
- DC Injectors
- I&M Modules



Outdoor Unit (ODU)

ODU with internal / external 10MHz source option. Additional option of air-conditioning units for higher operating temperature environments. Houses a mix of up to 19 RF modules including:

- RF over Fibre
- Frequency Converters
- Amplifiers
- Switches
- DC Injectors

BENEFITS

- **HIGH DENSITY** - Genus chassis range accommodates from 10 up to 19 RF modules.
- **FLEXIBLE** - RF modules can be all or a mix of different types.
- **RESILIENT** - Dual redundant, hot-swap power supplies, field serviceable RF modules, HMI, CPU and optional user replaceable internal and external 10MHz reference source.
- **SECURE** - Improved security protocols with SNMPv3 and HTTPS. Remote control and monitoring via RJ45 Ethernet port with web browser interface.

CHASSIS PRODUCTS											
Chassis Model	GNS-106-1U	GNS-196-1U	GNS-102-2U	GNS-192-2U	GNS-103-3U	GNS-193-3U	GNS-301-ODU	GNS-301-ODU-A	GNS-111	GNS-112	
Capacity	17 RF Modules	17 RF Modules	17 RF Modules	17 RF Modules	17 RF Modules	17 RF Modules	19 RF Modules	19 RF Modules	10 RF Modules	10 RF Modules	
Height	1U	1U	2U	2U	3U	3U	500mm	500mm	Benchtop	Benchtop	
Location	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor	Outdoor	Outdoor	Indoor	Indoor	
Remote Control & Monitoring	RJ45 Ethernet, Tx, ETL TCP/IP protocol, SNMPv3 & Web Browser Interface										
Local Control & Monitoring	Front panel capacitive HMI touchscreen							-	-	Front panel capacitive HMI touchscreen	
Internal 10MHz Reference Source	-	✓	-	✓	-	✓	Optional	Optional	-	✓	
Hot-swap Active Components	PSU modules								-		
Field Replaceable Active Components	RF modules, HMI & CPU								RF modules & HMI		
Dual Redundant PSUs	✓										
Secure Communications	SNMPv3, HTTPS										
Temperature Rating	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Extended with AC	Standard	Standard	

Genus Chassis & Module Compatibility Table

CHASSIS & MODULE COMPATIBILITY											
Chassis Model		GNS-106-1U	GNS-196-1U	GNS-102-2U	GNS-192-2U	GNS-103-3U	GNS-193-3U	GNS-301-ODU	GNS-301-ODU-A	GNS-111	GNS-112
Capacity		17 RF Modules	17 RF Modules	17 RF Modules	17 RF Modules	17 RF Modules	17 RF Modules	19 RF Modules	19 RF Modules	10 RF Modules	10 RF Modules
RF Module Compatibility	Matrix	Page 28	✓	✓	✓	✓	-	-	-	-	-
	RF over Fibre	Pages 29-32	✓	✓	✓	✓	-	-	✓	✓	✓
	Frequency Converter	Pages 33-36	✓	✓	-	-	-	-	✓	✓	✓
	Amplifier	Pages 37-38	✓	✓	-	-	-	-	✓	✓	✓
	Redundancy Switch	Pages 39-40	✓	✓	-	-	-	-	✓	✓	✓
	Splitter & Combiner	Page 41	-	-	-	-	✓	✓	-	-	-
	LNB/BUC Power Supply	Page 42	✓	✓	-	-	-	-	✓	✓	✓
Instrumentation & Measurement	Pages 80-87	✓	✓	-	-	-	-	-	-	✓	✓

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

Hawk Matrix / Router Genus series

A distributive (fan-out) or combining (fan-in) L-band Matrix/Router. Available in a range of configurations from 4 x 4 up to 32 x 8.



Touchscreen & user-friendly HMI



HWK matrix fitted to GNS 1U chassis



Field-serviceable matrix modules



Ideal for LEO gateways & smaller teleports

BENEFITS & APPLICATIONS

- Providing routing solutions with a combination of distributive & combining modules in a 1U Genus chassis.
- Dual redundant, hot-swap power supplies.
- Field serviceable matrix modules.
- Touch screen & user-friendly HMI
- Applications include LEO satellite constellations, small teleports with multiple modems & one or two antennas, uplink & downlink systems.

Hawk Switch Matrix Range

PRODUCTS

Model	HWK-G1S-10	HWK-G1S-10-D816	HWK-G1S-10-C168	HWK-G1S-11	HWK-G1S-15	HWK-GS2-20-D832	HWK-GS2-20-C328	HWK-GS2-21-D832	HWK-GS2-21-C328
Matrix Type	Distributive (fan-out) or Combining (fan-in)	Distributive (fan-out)	Combining (fan-in)	Distributive (fan-out) or Combining (fan-in)	Distributive (fan-out) or Combining (fan-in)	Distributive (fan-out)	Combining (fan-in)	Distributive (fan-out)	Combining (fan-in)
Frequency (MHz)	500-2450 (Extended L-band)				500-3150 (Extended L-band)	500-2450 (Extended L-band)			
Capacity	Dual 8 x 8	8 x 16	16 x 8	Dual 8 x 8	4 x 4	8 x 32	32 x 8	8 x 32	32 x 8
Variable Gain	-	-	-	✓	-	-	-	✓	✓
Variable Slope	-	-	-	-	-	-	-	✓	✓
RF Detection	-	-	-	-	-	-	-	✓	✓
LNB Power	-	-	-	-	-	-	-	✓	✓
Compatible Chassis	GNS-106-1U GNS-196-1U					GNS-102-2U GNS-192-2U			

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

StingRay RF over Fibre Up to 10km - Short Distance Genus series

RF over Fibre links to convert high-quality RF signals to optical for transfer across distances up to 10 km.

Genus StingRay RF over Fibre modules are housed in the modular Genus chassis, providing teleports with a scalable, flexible and modular solution which can be configured with different RF modules depending on requirements.



BENEFITS & APPLICATIONS

- Configurable solution housing StingRay RF over Fibre, as well as other RF modules in the same chassis.
- Extra functionality with the addition of Manual Gain Control, Fixed Gain and Automatic Gain Control mode as standard on all RF over Fibre modules.
- Resilient design including hot-swap and field replaceable active components.
- Intuitive user interface (touch screen / web browser).
- Weatherproof enclosures to withstand harsh weather conditions.
- StingRay fibre links use high quality DFB lasers with a two-stage optical isolator, stopping reflections and back-scattered light from the fibre degrading the performance of the laser.
- Applications include distribution of comms traffic across smaller ground stations with minimal loss.

Support is still provided for legacy StingRay short distance and CWDM products.



StingRay RF over Fibre Up to 10km - Short Distance Genus series



1U StingRay RF over Fibre Module

Genus StingRay Fibre Range

PRODUCTS			
Fibre Module Model	SRY-G1S-TS6-161 / SRY-G1S-RS6-162	SRY-G1S-TCX-167 / SRY-G1S-RCX-168	SRY-G1S-TB3-171 / SRY-G1S-RB3-172
Module Type	Fibre Tx & Rx	Fibre Tx & Rx	Fibre Tx & Rx
Frequency Range (MHz)	500-3150	500-3150	50-3150
Dual Module	-	-	-
Manual Gain (MGC)	✓	✓	✓
Fixed Gain (FG)	✓	✓	✓
Automatic Gain (AGC)	✓	✓	✓
LNB Power	✓	✓	✓
10MHz options	✓	✓	✓
Optical Ethernet	-	-	-
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A		

PRODUCTS					
Fibre Module Model	SRY-G1S-DA-165	SRY-GS2-TS6-311 / SRY-GS2-RS6-312	SRY-G2S-TS6-313 / SRY-G2S-RS6-314	SRY-G2S-TB3-317 / SRY-G2S-RB3-318	SRY-G2S-DA-320
Module Type	Fibre Ethernet	Fibre Tx & Rx	Fibre Tx & Rx	Fibre Tx & Rx	Fibre Ethernet
Frequency Range	-	500-3150	500-3150	50-3150	-
Dual Module	-	-	✓	-	✓
Manual Gain (MGC)	-	✓	✓	✓	-
Fixed Gain (FG)	-	✓	✓	✓	-
Automatic Gain (AGC)	-	✓	✓	✓	-
LNB Power	-	✓	✓	✓	-
10MHz options	✓	✓	✓	✓	✓
Optical Ethernet	✓	-	-	-	✓
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A				

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

Compatible Genus Chassis information can be found on page 26.

StingRay RF over Fibre Up to 10km - Short Distance Genus series



Timing & Reference

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).

PRODUCTS		
Model	SRY-GR-Y-163 / SRY-GR-Y-164	SRY-G2S-TY-315 / SRY-G2S-RY-316
Type	Fibre Tx & Rx	Fibre Tx & Rx
Frequency (MHz)	10	10
Automatic Gain (AGC)	✓	✓
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A	

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

Redundancy Systems

1+1 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.

Genus StingRay redundancy is achieved by using a Splitter and Switch module within the chassis.

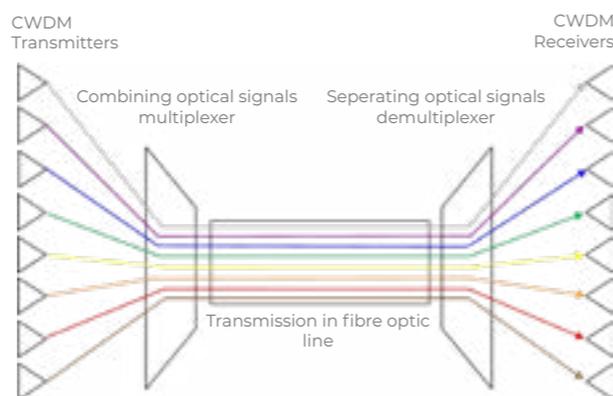


PRODUCTS		
Model	SRY-GS2-DS6-401 / SRY-GS2-SS6-402	SRY-G2S-DY-403 / SRY-G2S-SY-404
Type	RF Splitter & Switch For 1+1 Redundancy	RF Splitter & Switch For 1+1 Redundancy
Frequency (MHz)	500-3150 (S-band)	10
Compatible Chassis	GNS-102-2U / GNS-192-2U / GNS-301-ODU / GNS-301-ODU-A	

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

StingRay RF over Fibre Up to 50km - Medium Distance CWDM (Coarse Wavelength Division Multiplexing) Genus series

The CWDM range transmits RF signals up to 50km in distance. It comprises transmit modules and a multiplexer module to combine up to 8 wavelengths onto 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.



Long Distance (DWDM) RF over Fibre products on pages 46 - 48.

BENEFITS & APPLICATIONS

- **Configurable solution** housing StingRay RF over Fibre, as well as other RF modules in the same chassis.
- **Extra functionality** with the addition of **Manual Gain Control, Fixed Gain and Automatic Gain Control** mode as standard on all RF over Fibre modules.
- **Resilient design** including hot-swap and field replaceable active components.
- **Intuitive user interface** (touch screen / web browser).
- **Applications** include the distribution of comms traffic across sites, up to 50km in distance, with minimal loss.

Genus CWDM StingRay Module Range

PRODUCTS	
Model	SRY-G1S-TXXS6-173 / SRY-G1S-RS6-174 SRY-G2S-TXXS6-321 / SRY-G2S-RS6-322
Type	Fibre TX & RX Fibre TX & RX
Frequency (MHz)	500-3150 (S-band) 500-3150 (S-band)
Gain	Manual, Fixed & Auto Gain Options
LNB DC	✓ ✓
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A GNS-102-2U / GNS-192-2U / GNS-301-ODU / GNS-301-ODU-A

MUX / DEMUX PRODUCTS				
Model	SRY-G1S-OCM-08-201	SRY-G1S-OCD-08-202	SRY-G2S-OCM-08-203	SRY-G2S-OCD-08-204
Type	Mux	Demux	Mux	Demux
Capacity	8 wavelengths			
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A		GNS-102-2U / GNS-192-2U / GNS-301-ODU / GNS-301-ODU-A	

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

Falcon Frequency Converter Genus series

Frequency Converters to translate a band of signals from one frequency to another. Falcon modules downconvert or upconvert RF signals, including Ka-band, Ku-band, L-band, C-band and S-band.

Available as agile up converters (AUC), agile down converters (ADC) or block up converters (BUC) or block down converters (BDC).

Genus Falcon Frequency Converter modules are housed in the Genus chassis, providing teleports with a scalable, flexible and modular solution. It offers market-leading density, with up to 5 converters in one 1U chassis.

BENEFITS & APPLICATIONS

- **Configurable solution** housing both upconverters & downconverters, as well as other RF modules in the same chassis.
- **Resilience** with integrated hot-swap 1+1 and 2+1 redundancy configurations. A separate chassis for redundancy is not required.
- **Save rack space** with ultra compact 1U chassis, housing up to 5 frequency converters.
- **Reliability in service** with dual redundant hot-swap power supplies, hot-swap converter modules and field replaceable CPU & HMI.
- **Integrated 10MHz reference source** for external/internal options.
- **Applications** include teleports and earth stations, satellite operations, government and defence, telemetry, tracking & command.



Compatible Genus Chassis information can be found on page 26.

Falcon Frequency Converter Genus series



Falcon Frequency Converter Range

DOWNCONVERTERS AGILE												
Input Frequency (MHz)		L-band		S-band	C-band	X-band	Ku-band		K-band			Ka-band
		850-2450	850-3150	1950-2450	3600-4800	7250-8400	10700-12750	12750-13500	17300-18400	18400-20100	20100-21200	29250-31000
Output Frequency (MHz)	L-band	950-1450	-	-	FN-D-L1L1-24164	-	-	-	-	-	-	-
		950-1950	-	-	-	FN-D-C1L1-24136	-	FN-D-K1L1-24210	FN-D-K3L1-24130	FN-D-KXLI-24131	FN-D-KXLI-24132	FN-D-KXLI-24133
	IF	70 ± 20	FN-D-L1F2-24204	-	-	-	FN-D-K4L1-24201	-	-	-	-	-
		70 ± 140	-	FN-D-S6F2-24134	-	FN-D-C1F2-24135	-	-	FN-D-KXLI-24122	-	-	-
Compatible Chassis		GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A										

DOWNCONVERTERS BLOCK											
Input Frequency (MHz)		L-band	C-band	Ku-band		K-band	Ka-band				
		850-2150	3400-4800	10700-12750	12750-14500	20100-21200	17300-18400	17300-21200	18400-20100	29000-31000	
Output Frequency (MHz)	L-band	950-1950	-	FN-D-C1L1-24226	-	FN-D-K3L1-24120	FN-D-KXLI-24123	-	-	-	FN-D-K4L1-24201
		950-2000	-	-	FN-D-K1L1-24200	-	-	-	-	-	-
		950-2050	-	-	-	-	-	FN-D-KXLI-24121	-	-	-
		950-2150	-	-	-	-	-	-	FN-D-K4L1-24224	FN-D-KXLI-24122	-
		1050-1350	FN-D-L1F2-24214	-	-	-	-	-	-	-	-
Compatible Chassis		GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A									

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

UPCONVERTERS AGILE							
Input Frequency (MHz)		IF			L-band		
		70 ± 20	70 ± 140	140 ± 20	850-2150	950-1950	
Output Frequency (MHz)	L-band	850-2450	FN-U-L1F2-24205	-	FN-U-L1F2-24205	-	-
		850-3150	-	FN-U-S6F2-24150	-	-	-
	C-band	5725-6725	FN-U-C2F2-24106	-	-	-	-
		10700-12750	-	-	-	FN-U-K1F2-24152	-
	Ku-band	12750-14500	-	-	-	-	FN-U-K3L1-24212
		K-band	17300-18400	-	-	-	-
Ka-band	24750-27500		-	-	-	-	FN-U-KXLI-24151
	27500-31000	-	-	-	-	-	FN-U-K4L1-24113
Compatible Chassis		GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A					

UPCONVERTERS BLOCK							
Input Frequency (MHz)		L-band					
		950-1450	950-1950	950-2000	950-2050	950-2150	
Output Frequency (MHz)	L-band	1950-2450	FN-U-L1L1-24115	-	-	-	
	C-band	5725-6725	-	FN-U-C2L1-24240	-	-	
		X-band	7900-8400	FN-U-X3L1-24147	-	-	-
	Ku-band	10700-12750	-	-	FN-U-K1L1-24202	-	-
		12750-14500	-	FN-U-K1L1-24207	-	-	-
	K-band	17300-18400	-	-	-	FN-U-K1L1-24108	-
Ka-band		20000-21000	-	FN-U-KXLI-24143	-	-	-
	24750-27500	-	FN-U-KXLI-24141	-	-	-	
	27000-31000	-	-	-	-	FN-U-K4L1-24203	
	27500-29500	-	-	-	-	-	FN-U-K4L1-24142
Compatible Chassis		GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A					

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

Redundancy Systems

1+1 and 2+1 redundancy can be integrated into a 1U Falcon Frequency Converter system by adding a 1+1 or 2+1 Swift redundancy switch module.



- **Integrated converter redundancy** - each Falcon redundancy module uses 6 slots of an available 17 per 1U chassis, to be used alongside our Falcon upconverter and downconverter modules.
- **Hot-swap & field-replaceable** - modules, CPUs and PSUs are hot-swappable to minimise downtime
- **Converter redundancy options** - 1+1 or 2+1 redundant configuration options, with standby input / output.
- **Resilience** - the redundant switch module is hot-swap and field replaceable by the user, minimising downtime.
- **Genus chassis compatible** - The Swift range of modules can be used for other redundancy configurations within the Genus chassis family.

Swift Redundancy Switch module options can be found on pages 39 - 40.



Alto Amplifier Genus series



Amplifiers to offset signal loss from long runs of cables and passive splitters and combiners by providing gain.

Genus Alto Amplifier modules are housed in the Genus chassis, providing teleports with a scalable, flexible and modular solution which can be configured with different RF modules depending on requirements.



BENEFITS & APPLICATIONS

- **Optimise RF signals** with gain, slope, low noise & high linearity options.
- **Configurable solution** housing amplifiers as well as other RF modules in the same chassis.
- **Resilience in service** with hot-swappable active components.
- **Applications** include redundancy for remote satellite teleports.

Genus Alto Amplifier Range

SMART Low Noise

Amplifiers with variable gain and variable slope options.

PRODUCTS									
Model	ALT-G1S-B3-170	ALT-G1S-S3-174	ALT-S-G1S-L1-104	ALT-G1S-S3-100A	ALT-G1S-S3-102	ALT-G1S-S3-180	ALT-G1S-S6-110	ALT-G1S-S3-200	ALT-G1S-S6-112
Module Type	Attenuator	Attenuator	Amplifier	Amplifier	Amplifier	Amplifier	Amplifier	Amplifier	Amplifier
Frequency (MHz)	500-6000 (Broadband)	500-3000 (Broadband)	850-2150 (L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-3150 (S-band)	1750-2450 (S-band)	850-3150 (S-band)
Variable Gain	-	-	0 to 28dB	-4 to 45dB	-4 to 45dB	-15 to 25dB	0 to 42dB	15 to 44dB	0 to 42dB
Variable Attenuation	-5 to 55dB	-5 to 55dB	-	-	-	-	-	-	-
Slope Compensation	-	-	0 to 8dB	0 to 8dB	-	0 to 8dB	0 to 10dB	-	-
Low Noise	-	-	✓	✓	✓	✓	✓	✓	✓
High Linearity	-	-	-	✓	✓	✓	✓	✓	✓
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A								

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

Alto Amplifier Genus series

Redundant

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.

PRODUCTS					
Model	ALT-G1R-S3-101	ALT-G1R-S3-103	ALT-G1R-S3-105	ALT-G1R-S3-111	ALT-G1R-S3-113
Frequency (MHz)	850-2450	850-2450	850-2150	850-3150	850-3150
Gain Range - Min	-4dB	-4dB	0dB	-4dB	-4dB
Gain Range - Max	45dB	45dB	30dB	48dB	48dB
Slope Compensation	0-8dB	-	0-8dB	0-10dB	-
Low Noise	✓	✓	✓	✓	✓
High Linearity	✓	✓	✓	✓	✓
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-111 / GNS-112				

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

Compatible Genus Chassis information can be found on page 26.

More Amplifier products can be found on pages 64 - 75.

Swift Switch Genus series

Signal switching for general purpose, monitoring and mission critical (redundancy) applications.

Genus Switch modules are housed in a modular Genus chassis, providing teleports with a scalable, flexible and modular solution which can be configured with different RF modules depending on requirements.



BENEFITS & APPLICATIONS

- Flexibility with bidirectional switch modules.
- Redundancy switch modules for mission critical applications.
- Genus is a new high capacity RF Distribution System which houses a range of RF modules, including Genus Swift Switches.
- Resilient design including hot-swap and field replaceable active components.
- Intuitive user interface (touch screen / web browser).
- Configurable with the ability to mix with other RF module types e.g. Falcon frequency converters.
- Applications include Teleports & Earth Stations, Satellite Operations, Government & Defence, Telemetry, Tracking & Command, high resilience applications.

Genus Switch Range

Bidirectional 1xN & Nx1

Bidirectional 1xN and Nx1 switches for general purpose and monitoring applications.

PRODUCTS									
Model	SWF-G1S-CX-202-S5S5	SWF-G1S-K1-203-S5S5	SWF-G1S-QX-205-K5K5	SWF-G1S-CX-207-S5S5	SWF-G1S-K1-208-S5S5	SWF-G1S-QX-210-K5K5	SWF-G1S-CX-212-S5S5	SWF-G1S-K1-213-S5S5	SWF-G1S-QX-215-K5K5
Frequency (GHz)	DC-6	DC-18	DC-40	DC-6	DC-18	DC-40	DC-6	DC-18	DC-40
Switch Type	SPDT Coax Reflective	SPDT Coax Reflective	SPDT Coax Reflective	SP4T Coax Reflective	SP4T Coax Reflective	SP4T Coax Reflective	SP6T Coax Reflective	SP6T Coax Reflective	SP6T Coax Reflective
Capacity	1x2 or 2x1	1x2 or 2x1	1x2 or 2x1	1x4 or 4x1	1x4 or 4x1	1x4 or 4x1	1x6 or 6x1	1x6 or 6x1	1x6 or 6x1
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A								
Field Replaceable	✓								

Swift Switch Genus series

Redundancy

Designed to automatically switch between a main and a standby satellite antenna if signal failure is detected.

PRODUCTS							
Model	SWF-G1S-CX-111A	SWF-G1S-KX-109A	SWF-G1S-QX-108A	SWF-G1S-CX-110A	SWF-G1S-KX-107A	SWF-G1S-QX-106	SWF-G1S-KX-231
Redundancy	1+1	1+1	1+1	2+1	2+1	2+1	2x2 Transfer
Frequency (GHz)	DC-6	DC-18	DC-40	DC-6	DC-18	DC-40	DC-18
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A						
Field Replaceable	✓	✓	✓	✓	✓	✓	✓

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

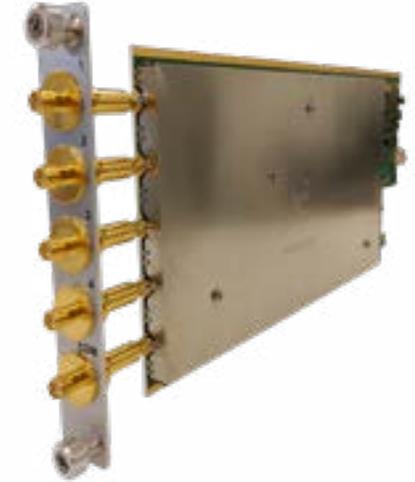
Compatible Genus Chassis information can be found on page 26.



Splitter & Combiner Genus series

RF distribution with Splitters and Combiners whilst maintaining high quality signals.

Genus Splitter and Combiner modules are housed in a modular chassis, providing teleports with a scalable, flexible and modular solution which can be configured with different RF modules depending on requirements.



BENEFITS & APPLICATIONS

- **Optimise RF signals** with gain, slope & LNB powering options.
- Genus is a **new high capacity RF Distribution System** which houses a range of RF modules, including Genus Swift Switches.
- **Resilient design** including hot-swap and field replaceable active components.
- **Intuitive user interface** (touch screen / web browser).
- **Configurable** with the ability to mix with other RF module types e.g. Falcon frequency converters.
- **Applications** include redundancy for remote satellite teleports

Compatible Genus Chassis information can be found on page 26.

Genus Splitter & Combiner Range

PRODUCTS					
Model	DIV-G3-L1-403	DIV-G3-S6-401	COM-G3-L1-403	COM-G3-S6-401	COM-G3-S6-402
Module Type	Splitter	Splitter	Combiner	Combiner	Combiner
Frequency (MHz)	850-2150 (L-band)	850-3150 (L-band)	850-2150 (L-band)	850-3150 (L-band)	850-3150 (L-band)
Capacity	4-way	4-way	4-way	4-way	4-way
Variable Slope Compensation	✓	✓	✓	✓	✓
Fixed Gain	-	-	-	-	-
Variable Gain	✓	✓	✓	✓	✓
LNB Power & 22KHz tone	✓	✓	-	-	-
RF Detection	✓	✓	✓	✓	✓
RF Output Power Limiting	-	-	-	-	✓
Compatible Chassis	GNS-103-3U GNS-193-3U				

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

Piranha DC Injector Genus series

Powering LNBS for downlinks and BUC's for uplink transmissions.

Genus Piranha modules are housed in a modular chassis, providing teleports with a scalable, flexible and modular solution which can be configured with different RF modules depending on requirements.



Compatible Genus Chassis information can be found on page 26.

BENEFITS & APPLICATIONS

- **Selectable & custom voltage** with 10MHz injection options.
- Genus is a **new high capacity RF Distribution System** which houses a range of RF modules, including Genus Piranha DC Injector.
- **Resilient design** including hot-swap and field replaceable active components.
- **Intuitive user interface** (touch screen / web browser).
- **Configurable** with the ability to mix with other RF module types e.g. Falcon frequency converters.
- **Applications** include Teleports & Earth Stations, Satellite Operations, Government & Defence, Telemetry, Tracking & Command.

Genus DC Injector Range

PRODUCTS				
Model	PRN-G1S-LS2-101	PRN-G1S-LS2-102	PRN-G1S-LS2-106	PRN-G1S-LS2-107
Frequency	850-2450 MHz Extended L-band	850-2450 MHz Extended L-band	850-2500 MHz Extended L-band	850-2500 MHz Extended L-band
LNB Power	✓	✓	✓	✓
BUC Power	-	-	-	-
10MHz	Inject Switchable on/off to port 1	-	Inject Switchable on/off to port 1	-
Variable Voltage	0/13/18Vdc & 22kHz tone selectable port 1	0/13/18Vdc & 22kHz tone selectable port 1	13/18/24Vdc & Custom Vdc (13V to 24V in 1V steps) selectable port 1	13/18/24Vdc & Custom Vdc (13V to 24V in 1V steps) selectable port 1
RF Power Detect	-45 to 0 dBm	-50 to -10 dBm	-50 to -10 dBm	-50 to -10 dBm
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A			

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

10MHz Timing & Reference Genus series

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

Genus 10MHz modules are housed in a modular chassis, providing teleports with a scalable, flexible and modular solution which can be configured with different RF modules depending on requirements.



Compatible Genus Chassis information can be found on page 26.

BENEFITS & APPLICATIONS

- **Switchable** reference source between on-board ovenised 10MHz oscillator or customer supplied external reference, with auto detect.
- Genus is a **new high capacity RF Distribution System** which houses a range of RF modules, including Genus 10MHz Reference modules.
- **Resilient design** including hot-swap and field replaceable active components.
- **Intuitive user interface** (touch screen / web browser).
- **Configurable** with the ability to mix with other RF module types e.g. Falcon frequency converters.
- **Applications** include Teleports & Earth Stations, Satellite Operations, Government & Defence, Telemetry, Tracking & Command.

Genus 10MHz Timing & Reference Range

PRODUCTS						
Model	GNS-10MHZ-02-1U	GNS-10MHZ-03-1U	GNS-10MHZ-04-1U	GNS-10MHZ-08-1U	GNS-10MHZ-10-ODU	GNS-FANREF-07-1U
10MHz	10MHz distribution with internal 10MHz only	10MHz feed in card for use with Genus Frequency Reference	10MHz feed out card for outputting Genus Chassis 10MHz reference to user at rear of unit, slots 1-16	10MHz feed in cards for use with Genus Frequency Reference, for high power reference inputs	10MHz internal / external reference option for Genus ODU chassis	10MHz input module with fan
Integrated Fan	-	-	-	-	-	✓
Compatible Chassis	GNS-106-1U / GNS-196-1U / GNS-102-2U / GNS-192-2U / GNS-111 / GNS-112 / GNS-301-ODU / GNS-301-ODU-A					

STINGRAY RF OVER FIBRE Up to 500km - Long Distance

ETL's StingRay RF over Fibre links are used to 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.



Fibre vs Coax

- RF over Fibre **supports growth in teleports** with higher information carrying capacity than coax. By using wavelength division multiplexing, StingRay solutions can place up to 8 feeds on a single fibre (CWDM solution) and up to forty feeds on a single cable (DWDM solution).
- Fibre offers **low signal loss** compared to coax cables.
- Utilising RF over Fibre technology ensures **better signal security** as light signals cannot be intercepted without breaking the cable.
- **Long distance signal carrying** with CWDM (up to 50km) and DWDM (up to 500km) solutions.
- Fibre cables offer **signal continuity** during harsh weather conditions as they are cables are non-conductive, providing resilience from lightning strikes. StingRay RF over Fibre solutions also offer weatherproof enclosure solutions.



Optical Fibre Connectors

ETL use APC connectors (Angle Polished Connectors) as they provide improved optical return loss, resulting in better RF system performance.

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)

RF over Fibre Range

ETL's StingRay RF over Fibre range offers low loss signal transmission for short distance (up to 10km), medium distance (up to 50km) and long distance (up to 500km) applications.

Short Distance

See pages 29 - 31

StingRay Genus short distance fibre links cover distances up to 10km. The StingRay Fibre modules are housed in a range of Genus chassis for both indoor and outdoor applications and offer 10MHz inject, LNB DC and Redundancy options.

Medium Distance

See page 32

StingRay Genus CWDM (Course Wavelength Division Multiplexing) fibre links cover distances up to 50km, with eight wavelengths on a single fibre cable.

Long Distance

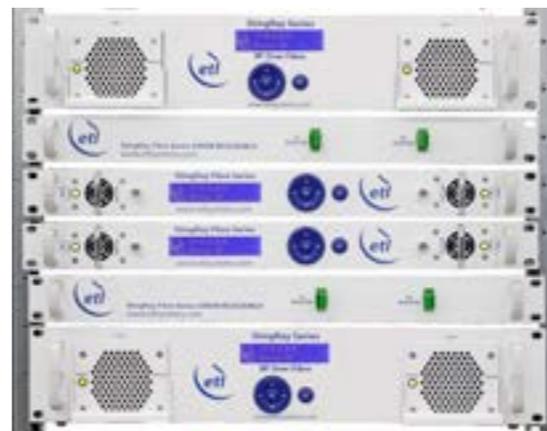
See pages 46 - 48

StingRay DWDM modules (dense wavelength division multiplexing) provide greater than 50km transmission, using optical amplification (EDFA), with up to 40 wavelengths on a single fibre cable.

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

The StingRay DWDM system transmits RF signals up to 500km in distance, for diverse sites. It is comprised of 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 or over 100km. A demultiplexer module and receive modules are then used to split the separate wavelengths.



DWDM Fibre System in a rack

DWDM StingRay Module Range

PRODUCTS							
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
Type	Fibre TX	Fibre TX	Fibre RX	Fibre TX	Fibre RX	Fibre TX	Fibre RX
Frequency (MHz)	850-2450 (Extended L-band)			50-2450 (Broadband)		10	
Gain	AGC	Fixed	AGC	AGC	AGC	AGC	AGC
LNB DC	✓	✓	-	✓	-	-	-
Enhanced Performance	+10 dBm output power	-	-	-	-	-	-

MUX / DEMUX PRODUCTS						
Model	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	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	-	-	-	-	-	-

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

OPTICAL AMPLIFIER PRODUCTS						
Model	SRY-OAC-13-801-SA	SRY-OAC-22-802-SA	SRY-OAC-18-803-SA	SRY-OAC-13-804-SA	SRY-OAC-18-805-SA	SRY-OAC-22-806-SA
Type	Optical Amplifier	Optical Amplifier	Optical Amplifier	Optical Amplifier	Optical Amplifier	Optical Amplifier
Capacity	1 slot within chassis	1 slot within chassis	1 slot within chassis	2 slots within chassis	2 slots within chassis	2 slots within chassis
Gain	13 dB	22 dB	18 dB	13 dB	18 dB	22 dB
Compatible Chassis	SRY-C800-1U	SRY-C800-1U	SRY-C800-1U	SRY-C201-2U	SRY-C201-2U	SRY-C201-2U

DWDM StingRay Chassis Range

PRODUCTS		
Model	SRY-C201-2U	SRY-C800-1U
Capacity	Up to 16 modules	Up to 2 Optical Amplifier modules
Redundancy Options	1+1 redundancy configuration available with modules SRY-L1-DIV213 & SRY-L1-SW214	-
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	Power supplies, fibre modules & fan modules	Power supplies & amplifier modules



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

A DWDM RF over Fibre system to meet your individual needs

See the example below showing how ETL can define a DWDM RF over Fibre solution for long-distance signal transmission across a diverse site.

CUSTOMER SCENARIO:

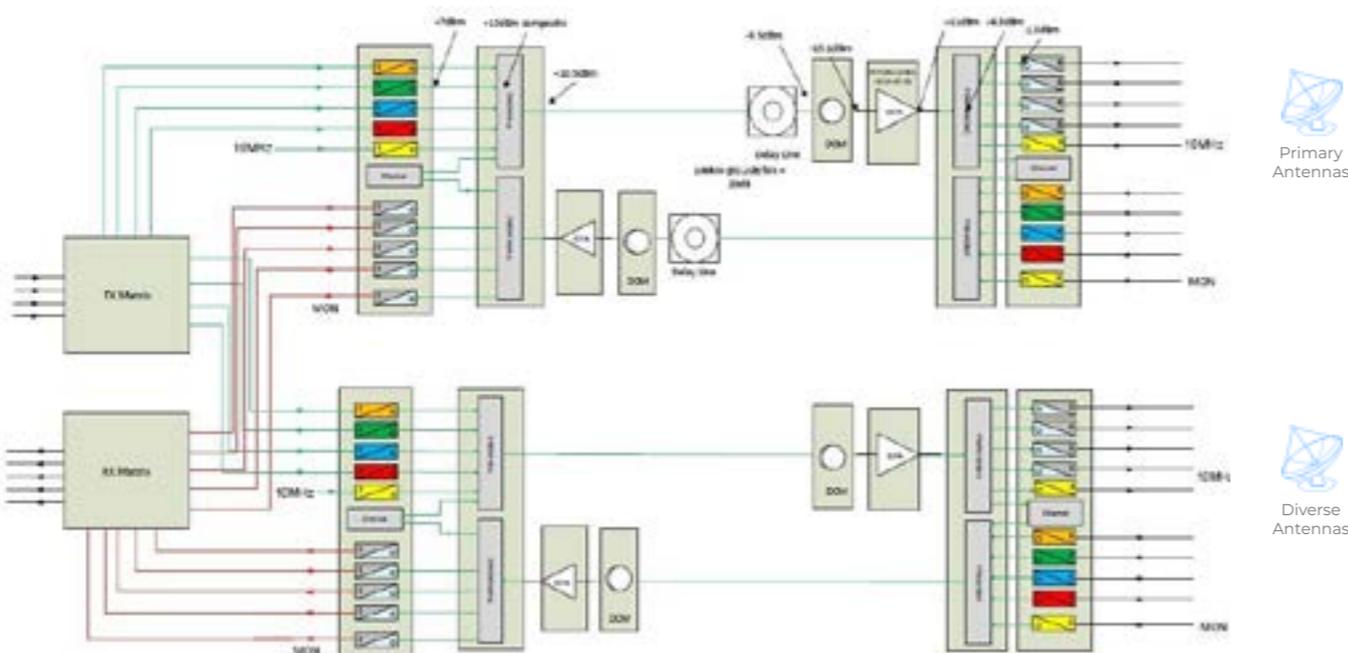
The below schematic shows a typical application for DWDM fibre optic transmission. This is a Ka-band gateway with two remote antenna sites for site diversity, enabling the customer to have backup transmission and reception sites in case of adverse weather conditions that can seriously attenuate transmission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

STINGRAY DWDM SOLUTION:

- RF MATRIX SWITCH to perform the diversity switching for both transmit and received signals between the two sites **OR** the switching can be performed in the optical domain, using ETL's GRIFFIN OPTICAL SWITCHES, which are designed to be housed in the Griffin modular switch chassis.
- OPTICAL AMPLIFIERS (EDFA)
- OPTICAL MULTIPLEXER / DEMULTIPLEXER
- OPTICAL DELAY LINES
- OPTICAL TRANSMIT / RECEIVE RF OVER FIBRE MODULES
- DISPERSION COMPENSATION MODULES

CUSTOM DWDM SYSTEM DESIGN
ETL can design a DWDM system to meet all your individual requirements.

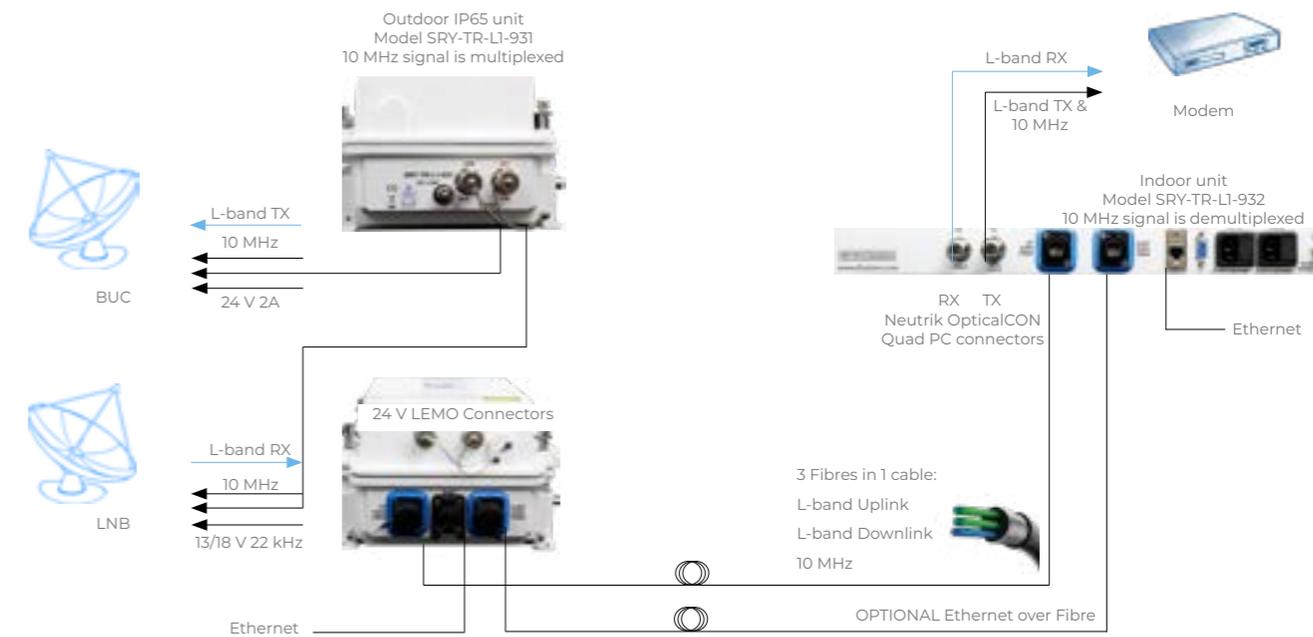
A TYPICAL DWDM APPLICATION:



StingRay VSAT Fibre

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

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.



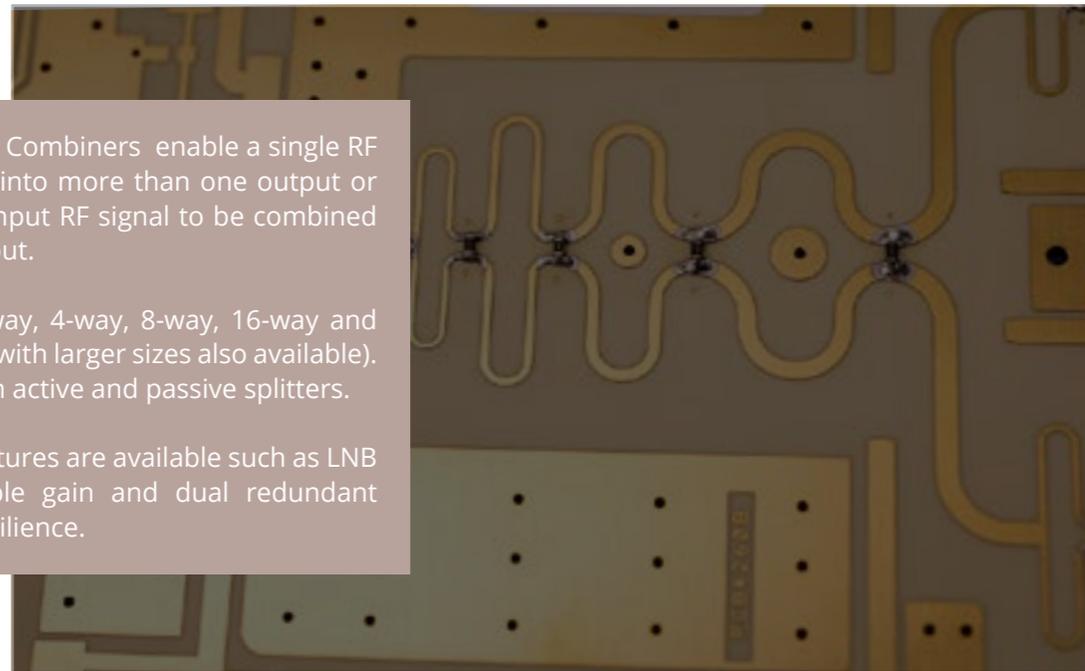
FEATURES		
Model	SRY-TR-L1-931	SRY-TR-L1-932
Type	Outdoor - IP65 rated	Indoor
Dual Redundant PSUs	✓	✓
LNB / BUC	✓	x
10 MHz Reference	✓	✓
Ethernet over Fibre	Optional	

SPLITTER & COMBINER

ETL's Splitter and Combiners enable a single RF input to be split into more than one output or more than one input RF signal to be combined into a single output.

Available as 2-way, 4-way, 8-way, 16-way and 32-way splitters (with larger sizes also available). ETL supplies both active and passive splitters.

Additional RF features are available such as LNB Powering, variable gain and dual redundant amplifiers for resilience.



Splitter & Combiner Range

ETL's RF splitter and combiner ranges are designed to provide compact RF distribution to maximise rack space. Smaller splitters are often grouped into multiple splitters per 19" shelf.

Single	Dual	Hybrid	Distribution Amplifier	Modular
See pages 53 - 54	See pages 53 - 54	See page 55	See page 55	See page 41
1 splitter or combiner in a 19" shelf.	2 splitters or combiners in a 19" shelf.	1 splitter and 1 combiner in a 19" shelf.	1 splitter in a 19" shelf with 10MHz reference signal and timecode distribution.	Up to 8 or 16 splitters or combiners per compact 19" shelf (can be part populated)



Splitter & Combiner Range Comparison Table

Model	DEXTRA	LD
Page Number	52 - 55	56
Frequency (MHz)	5-1000 850-2450	850-2150
Capacity	4-way / 8-way / 16-way	4-way / 8-way / 16-way
Chassis Height	1U	1U
Single	✓	✓
Dual	✓	-
Hybrid	✓	-
Active	✓	✓
PSU Redundancy	✓	✓
Web Control & Monitoring	✓	-
Dual Redundant Amplifiers	✓	-
Fixed Gain	✓	✓
Variable Gain	✓	-
Variable Attenuation	✓	-
LNB Power*	✓	✓
10MHz Pass	✓	-
DC Pass	✓	-

* Splitters only

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



Dextra Splitters & Combiners

Active splitters and combiners for high resilience RF distribution and combining of uplink and downlink satellite signals. Available as 4-way (single & dual), 8-way (single & dual) and 16-way.

Advanced functionality including web enabled control and monitoring, switchable LNB powering and an option for dual redundant amplifiers for added resilience.



BENEFITS & APPLICATIONS

- **Highly resilient** solution minimising the risk of expensive downtime for the satcoms user.
- **Peace of mind** for mission critical applications with extensive remote monitoring facilities.
- **Resilience** from optional dual redundant amplifiers.
- **Compact** 1U 19" chassis.
- **Signal monitoring** via -20dB monitor port.
- **Improved RF performance** using latest components.
- **Suitable** for markets including satellite operators, VSAT, teleports and broadcasters. Also ideal for high-resilience RF distribution and Ka-band and HTS applications.



Dextra Web Browser Interface Screen showing remote control and monitoring options

Dextra Splitters



Single Splitter Range

PRODUCTS										
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 (MHz)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	5-1000 (IF)	5-1000 (IF)	5-1000 (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*	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 Splitter Range

PRODUCTS						
Model	D0104D1ULA-22411	D0108D1ULA-22413	D0104D1ULA-22451	D0108D1ULA-22453	D0104D1UIA-22471	D0108D1UIA-22473
Frequency (MHz)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	5-1000 (IF)	5-1000 (IF)
Size	4-way	8-way	4-way	8-way	4-way	8-way
Dual Redundant Amps*	Optional					
10MHz Pass	-	-	✓	✓	-	-
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

Dextra Combiners



Single Combiner Range

PRODUCTS									
Model	C0401SIULA-22418	C0401SIULA-22455	C0801SIULA-22420	C0801SIULA-22457	C1601SIULA-22422	C1601SIULA-22459	C0401SIUIA-22475	C0801SIUIA-22477	C1601SIUIA-22479
Frequency (MHz)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	5-1000 (IF)	5-1000 (IF)	5-1000 (IF)
Size	4-way	4-way	8-way	8-way	16-way	16-way	4-way	8-way	16-way
Dual Redundant Amps*	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 Combiner Range

PRODUCTS						
Model	C0401DIULA-22419	C0801DIULA-22421	C0401DIULA-22456	C0801DIULA-22458	C0401DIUIA-22476	C0801DIUIA-22478
Frequency (MHz)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	850-2450 (Extended L-band)	5-1000 (IF)	5-1000 (IF)
Size	4-way	8-way	4-way	8-way	4-way	8-way
Dual Redundant Amps*	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 Hybrid Splitters & Combiners

Hybrid Splitter & Combiner Range

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

PRODUCTS					
Model	H0104DIULA-22430	H0108DIULA-22431	H0104DIULA-22460	H0108DIULA-22461	H0104DIULA-22544
Frequency (MHz)	850-2450 (Extended L-band)				850-2150 (L-band)
Size	4-way	8-way	4-way	8-way	4-way
Dual Redundant Amplifiers *	Optional				-
10MHz Reference Source	-	-	-	-	✓
10MHz Pass	-	-	✓	✓	-
DC Pass**	-	-	Optional	Optional	-
Dual Redundant PSUs	✓				-
LNB Powering	✓	✓	✓	✓	✓
BUC 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

Distribution Amplifiers

Distribution Amplifier Range

10MHz reference signal and timecode distribution for communication systems.

PRODUCTS					
Model	D0216SIUIA-22512	D0216SIUIA-22509	D0216SIUIA-22482	D0116SIUIA-22441	D0232S2UIA-22517
Frequency	IRIG / 10MHz / PPS	5-20MHz	5-20MHz	5-20MHz	5-20MHz
Size	Dual 16-way	Dual 16-way	Dual 16-way	16-way	Dual 32-way
Variable Gain	✓	✓	✓	✓	✓
RF Level Monitoring	✓	✓	✓	✓	✓
Dual Redundant Amplifiers	-	✓	✓	✓	✓
Dual Redundant PSUs	✓				
Hot-swap	PSU's	PSU's	-	-	PSU's
Remote Control & Monitoring	RJ45 Ethernet port, SNMP & Web Browser Interface				

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

LD Series Splitters & Combiners

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.



Rear view 4-way splitter, Model D0104S1ULA-22239



Rear view 8-way splitter, Model D0108S1ULA-22245



Rear view 16-way splitter, Model D0116S1ULA-22235

BENEFITS & APPLICATIONS

- **Affordable** RF distribution.
- **Resilient design**, with dual redundant power supplies minimising the risk of expensive downtime for the satcoms user.
- **Compact** 1U high chassis.
- **Applications** include satellite operators, VSAT, teleports, broadcasters and high resilience RF distribution.

LD Series Splitter & Combiner Range

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

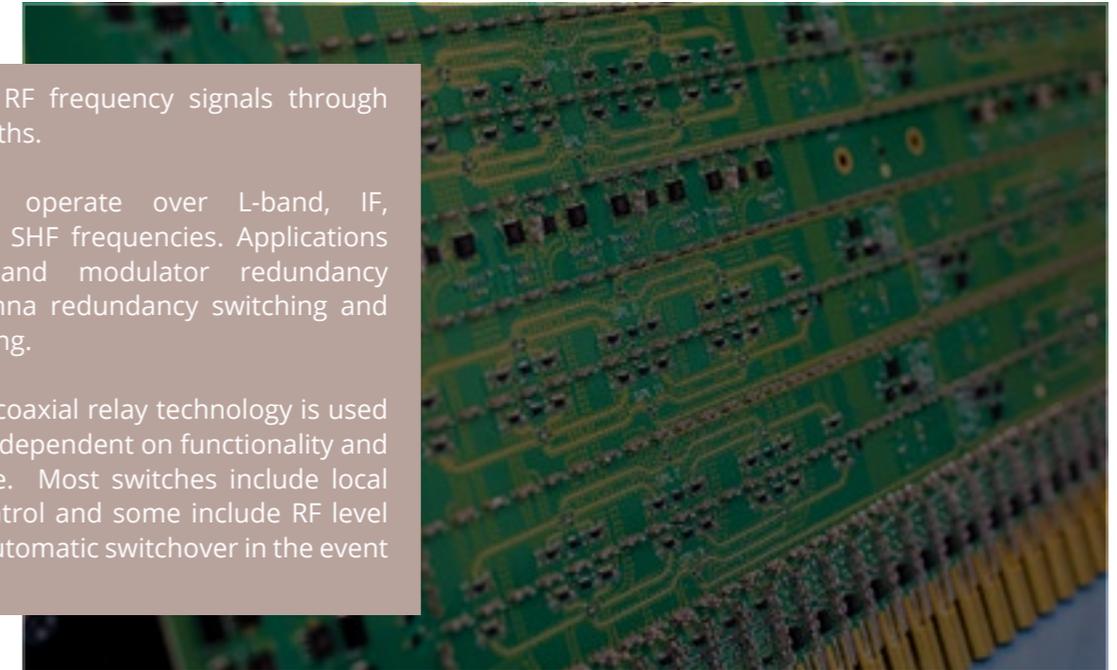
For our full range, along with up-to-date RF specifications, please visit our website www.etlsystems.com.

SWITCH

Switches route RF frequency signals through transmission paths.

ETL's switches operate over L-band, IF, Broadband and SHF frequencies. Applications include LNB and modulator redundancy switching, antenna redundancy switching and carrier monitoring.

Solid State and coaxial relay technology is used in our switches, dependent on functionality and frequency range. Most switches include local and remote control and some include RF level detection and automatic switchover in the event of a level drop.



Switch Range

ETL's switch ranges include the Genus Swift Switches, Griffin Switches and LS series Switches for the following typical applications:

LNB Redundancy	Modem Redundancy	1 x N General Purpose	Monitoring N x 1	Yacht Antenna Redundancy
See pages 58 - 60	See pages 58 - 60	See page 61	See pages 61 - 62	See page 63
LNB redundancy switches provide an automatic means of moving a signal to a back-up LNA. when there is LNB failure on a satellite antenna.	Modem redundancy switches automatically switch signals from a failed modem to a standby modem if an equipment failure or undesired signal condition occurs.	L-band and SHF RF signal switching from one input to many outputs. e.g. 1x8, 1x16 and 1x32 switches.	L-band and SHF RF signal switching from many inputs to one output e.g. 8x1, 16x1 and 32x1 switches.	VSAT antenna redundancy switches or arbitrators are designed to switch TX and RX feeds between two antennas, where blocking requires automatic switching between the antennas.

Griffin Switch

LNB & Modem Redundancy

RF & Optical

Flexibility in managing RF, ASI and optical signals for redundancy requirements in teleports and ground stations.



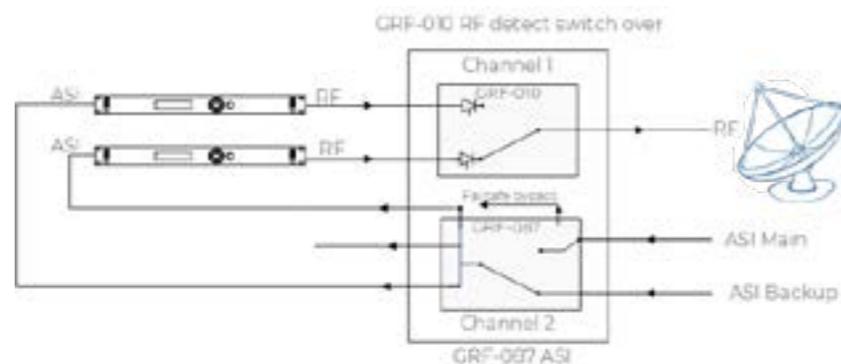
The modular design comprises a 1U chassis with 2 switch module slots. Different switch modules can be fitted dependent on application, and can be switched independently (individual mode) or together (simultaneous mode).



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

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
- Applications include satellite modulator, teleports, LNB/downconverter & modems.



Griffin switch fitted with a GRF-010 module and a GRF-087 module (ASI redundancy and no RF detect)

Griffin Module Range

RF SWITCH PRODUCTS						
Model	GRF-010-xxxx	GRF-011-xxxx	GRF-050-xxxx	GRF-087-B7B7	GRF-200-xxxx	GRF-201-xxxxxx
Capacity	2 inputs, 1 outputs	2 inputs, 1 outputs	2 inputs, 1 outputs	2 inputs, 3 outputs	1 input, 2 output	2 input, 1 output
Function	RF Redundancy Switch			ASI Redundancy Switch	RF Redundancy Switch	RF Redundancy Switch
Frequency (MHz)	850-2450	DC-850	DC-2450	ASI/SD-SDI/HD-SDI/3G-SDI	850-2150	850-2150
Switch Type	Latching relay switch			NON Latching & failsafe bypass	Solid state switch	Solid state switch
Compatible Chassis	GRF-C900-1U				GRF-C910-1U	GRF-C910-1U

OPTICAL SWITCH PRODUCTS		
Model	GRF-202-xxxxxx	GRF-204-xxxxxx
Capacity	2 inputs, 1 outputs	2 inputs, 2 outputs
Function	Optical Redundancy Switch	Optical Redundancy Switch
Optical Wavelength	1240nm to 1640nm	1240nm to 1640nm
Switch Type	Latching relay switch	
Compatible Chassis	GRF-C900-1U	



GRF-010 L-band Latching RF Redundancy Switch



GRF-087 Non Latching ASI Redundancy Switch



GRF-202 Optical Redundancy Switch for RF over Fibre DWDM system

Griffin Chassis Range

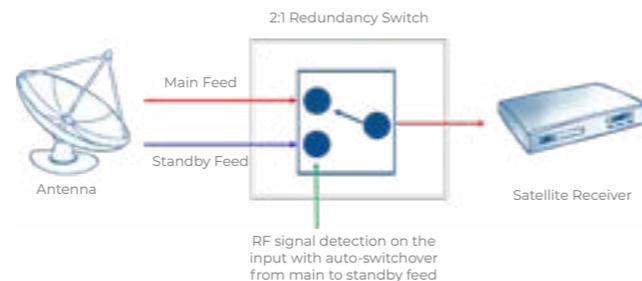
PRODUCTS		
Model	GRF-C900-1U	GRF-C910-1U
Capacity	Up to 2 switch modules	Up to 2 switch modules CAN ONLY USE GRF-200 & GRF-201 MODULES
Remote Control & Monitoring	Via RS232/RS485, RJ45 Ethernet and web browser interface	Switches on receipt of a +24VDC pulse and sends out feedback via dry contact relay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

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

Redundancy Switches

Redundancy switching is a critical feature for many satellite ground stations.

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.



Typical application for a 2:1 redundancy switch

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.
- Applications include signal carrier monitoring of satellite feeds, redundancy switching from main & standby satellite dishes.

Our newest range of Swift Redundancy switches for the Genus Modular RF Distribution System can be found on pages 39 - 40.

Redundancy Switch Range

PRODUCTS				
Model	23116	23235	23192	23177
Frequency (MHz)	850-2150 (L-band)	50-2150 (IF-L-band)	850-2150 (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	Front panel push buttons			
Dual Redundant PSUs	✓	✓	✓	✓

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

LS Series Switch General Purpose & Monitoring

Designed principally for satellite signal carrier monitoring applications. Available in various sizes and can be linked together for larger number of feeds.



Rear view 8 x 1 Model 23225



Rear view 16 x 1 Model 23226



Rear view 32 x 1 Model 23227

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 signal carrier monitoring of satellite feeds, redundancy switching for main applications, remote controlled unmanned satcom sites and routing signals to multiple IRDs.

LS Series Range

1 x N GENERAL PURPOSE SWITCH PRODUCTS			
Model	23228	23229	23230
Frequency (MHz)	50-2450 (IF - Extended L-band)		
Switch Type	Solid state		
Capacity	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	LCD & push buttons		
Dual Redundant PSUs	✓	✓	✓

N x 1 MONITORING SWITCH PRODUCTS			
Model	23225	23226	23227
Frequency (MHz)	50-2450 (IF - Extended L-band)		
Switch Type	Solid state		
Capacity	8 x 1	16 x 1	32 x 1
Remote Control & Monitoring	RS232 or RS422/485 Serial port, Ethernet (RJ45-100BASE-TX) on rear panel		
Local Control	LCD & push buttons		
Dual Redundant PSUs	✓	✓	✓

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

SHF Switch

Redundancy & Monitoring

Operating between DC to 40GHz, ETL's SHF Switches 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.

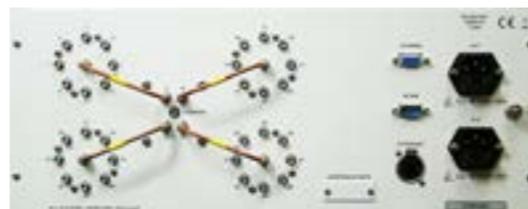
Choose between either 1U, 2U or 3U solid state or coaxial relay switches, which both benefit from long life and excellent RF performance.

BENEFITS & APPLICATIONS

- High operating frequency range (up to 40 GHz).
- Switch variants: Coaxial relay or PIN diode based.
- 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 & redundancy switching for upconverters & downconverters.



Front view Model 23265



Rear view Model 23199



Front view Model 23177

Our newest range of Swift Redundancy switches for the Genus Modular RF Distribution System can be found on pages 39 - 40.

SHF Switch Range

PRODUCTS										
Model	23268	23177	23237	23221	23265	23213	23259	23207	23208	23199
Frequency (GHz)	DC-3 / DC-40	DC-6	DC-18	DC-22	DC-40	DC-18	DC-18	DC-22	DC-22	DC-22
Switch Type	Redundancy	Redundancy	Redundancy	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Capacity	2 + 2	2 + 2	2 + 2	4 x 1	8 x 1	12 x 1	16 x 1	16 x 1	24 x 1	32 x 1
Latching Coaxial Relays	✓	-	-	✓	-	-	✓	✓	✓	✓
Non-Latching Coaxial Relays	-	✓	-	-	-	-	-	-	-	-
Dual Redundant PSUs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

YACHT VSAT Antenna Switch

Redundancy

Dual 2x1 L-band VSAT antenna redundancy switch, designed to switch TX and RX feeds between two antennas. For use on yachts or ships, where blocking requires automatic switching between the antennas.

The redundancy switch contains two 2:1 switches (one for TX and one for RX) and both are simultaneously switched, by a dry (voltage free) contact signal from the antenna controllers (ACU).

The switches pass from DC and 10MHz from the modem for LNB and BUC powering and referencing (for the active antenna only).

BENEFITS & APPLICATIONS

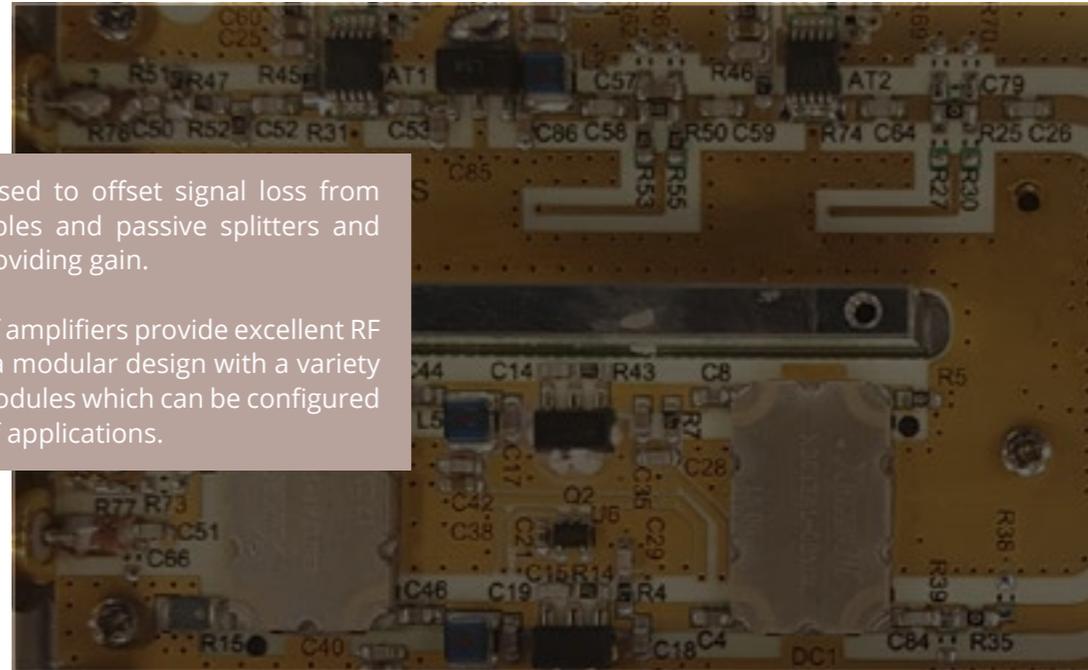
- RF signal redundancy: redundant switching of signal if blocked.
- Switching modes: operated in auto or manual modes
- Resilience in service with dual redundant power supplies.
- Applications include RF switching for yachts, ships & other marine applications.



Yacht VSAT Antenna Switch Range

PRODUCTS	
Model	23192
Frequency (MHz)	850-2150
Switch Type	Redundancy
Capacity	Dual 2 x 1
Control	Via external navigation or antenna control system & locally via front panel push buttons
LNB Power	18 VDC 500mA nominal passed from modem to active antenna only
BUC Power	24 VDC 3A nominal passed from modem to active antenna only
10MHz	For TX & RX passed from modem to active antenna only
Dual Redundant PSUs	✓

AMPLIFIER



Amplifiers are used to offset signal loss from long runs of cables and passive splitters and combiners by providing gain.

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.

Amplifier Range

The Alto range offers the following amplifier types:

Manual Control Amplifiers

See page 65

Local control only, with dip switches for gain control.

SMART Amplifiers

See page 66

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

Automatic Gain Control (AGC) Amplifiers

See page 67

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

Redundant Amplifiers

See pages 68 - 75

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

Alto Amplifiers Manual Control



1U Local Control Chassis Front Panel



2U Local Control Chassis Front Panel

Local control amplifiers with dip switches for gain control.

BENEFITS & APPLICATIONS

- Compact 1U chassis houses up to 8 amplifier modules & 2U chassis houses up to 16 amplifier modules.
- Control & Monitoring via module DIP switches & front panel LEDs.
- Resilience in service with 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.



Alto amplifier module with dip switches

Manual Control Amplifier Range

CHASSIS			
Model	ALT-C100-1U	ALT-C101-2U	ALT-C102-2U
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)
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

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

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

Alto Amplifiers

SMART Ethernet Remote Control & Monitoring

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

BENEFITS & APPLICATIONS

- Compact 1U chassis houses up to 8 amplifier modules & 2U chassis houses up to 16 amplifier modules.
- Control & Monitoring via Ethernet, SNMP & Web Browser.
- Resilience in service with 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.



Model ALT-C200-1U Chassis with 8 modules



Model ALT-C202-2U Chassis with 16 modules



Model ALT-C204-2U Chassis with 16 modules

SMART Amplifier Range

CHASSIS						
Model	ALT-C200-1U	ALT-C201-2U	ALT-C202-2U	ALT-C203-2U	ALT-C204-2U	ALT-C205-2U
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					
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

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-S555
Frequency (MHz)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	10.70-12.75 GHz (Ku-band)
Variable Gain	✓	✓	✓	✓	-
Variable Attenuation	-	-	-	-	✓
Slope Compensation	✓	✓	✓	✓	-
LNB Power	-	✓	-	-	-
High Linearity	-	-	✓	-	-
DC & 10 MHz Pass	-	-	-	✓	-

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

Alto Amplifiers

Automatic Gain Control (AGC) Amplifiers

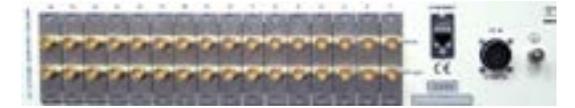
AGC amplifiers are used where an output level is required at a constant. The AGC amplifier circuit will adjust the gain to ensure the output signal level remains at a set constant.

BENEFITS & APPLICATIONS

- Compact 1U chassis houses up to 8 amplifier modules & 2U chassis houses up to 16 amplifier modules.
- Constant output level with Automatic Gain Control.
- Control & Monitoring via Ethernet, SNMP & Web Browser.
- Resilience in service with 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.



Model ALT-C207-1U Chassis with 8 modules



Model ALT-C203-2U Chassis with 16 modules



Model ALT-C208-2U Chassis with 16 modules

AGC Amplifier Range

CHASSIS					
Model	ALT-C202-2U	ALT-C203-2U	ALT-C205-2U	ALT-C207-1U	ALT-C208-2U
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		
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

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

Alto Amplifiers Redundant

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.



Model ALT-C200-1U chassis with redundant amplifier modules



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.

+1 Redundancy With Standby Output Range

CHASSIS						
Model	ALT-25700	ALT-25701	ALT-C301-1U-x5x5	ALT-C318-1U-x5x5	ALT-C319-1U-x5x5	ALT-C401-2U-x5x5
Frequency (MHz)	850-2150 (L-band)	850-2150 (L-band)	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 AMPLIFIER MODULES FOR CHASSIS ALT-C301-1U-x5x5							
Model	ALT-R-LI-020	ALT-R-LI-078	ALT-R-LI-012	ALT-R-LI-032	ALT-R-LI-038	ALT-R-LI-087	ALT-R-LI-097
Frequency (MHz)	Applicable to all models above: 850-2150 (L-band)						
Gain Range - Min	1dB	-2dB	9dB	9dB	9dB	-11dB	9dB
Gain Range - Max	31dB	21dB	39dB	39dB	39dB	39dB	39dB
Slope Compensation	✓	✓	✓	✓	✓	-	-
High Linearity	-	-	-	✓	✓	✓	✓

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

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

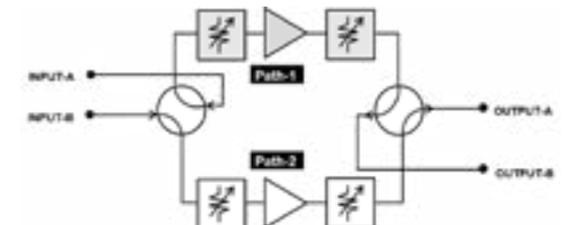
COMPATIBLE AMPLIFIER MODULES FOR CHASSIS ALT-C319-1U-x5x5										
Model	ALT-R-LI-012	ALT-R-LI-019	ALT-R-LI-021	ALT-R-LI-032	ALT-R-LI-038	ALT-R-LI-043	ALT-R-LI-044	ALT-R-LI-075	ALT-R-LI-079	ALT-R-LI-087
Frequency (MHz)	Applicable to all models above: 850-2150 (L-band)									
Gain Range Min	13dB	13dB	7dB	13dB	13 dB	10 dB	15 dB	15 dB	7 dB	-7 dB
Gain Range Max	43dB	43dB	34dB	43dB	43 dB	40 dB	44 dB	45 dB	37 dB	43 dB
Slope Compensation	✓	✓	-	-	✓	-	✓	✓	✓	-
High Linearity	-	✓	✓	-	-	-	-	✓	-	-

COMPATIBLE AMPLIFIER MODULES FOR 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 (GHz)	2.0-1.8 (Wideband)	6.0-18 (Wideband)	2.0-8.0 (Wideband)	2.0-10 (Wideband)	2.0-13 (Wideband)	2.0-16 (Wideband)
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	-	-	-	-	-	-

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



Typical amplifier applications include redundancy teleport sites



1+1 Redundancy Without Standby Output Range

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 AMPLIFIER MODULES FOR CHASSIS ALT-C320-1U-x5x5										
Model	ALT-R-L1-020	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	ALT-R-S2-076
Frequency (MHz)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	50-200 (IF-Band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2850 (S-band)
Gain Range Min	7dB	4dB	15dB	9dB	15dB	9dB	15dB	15dB	7dB	4dB
Gain Range Max	37dB	27dB	45dB	39dB	45dB	36dB	45dB	45dB	37dB	37dB
Slope Compensation	✓	✓	✓	-	✓	-	✓	✓	✓	✓
High Linearity	-	-	-	✓	✓	✓	-	-	-	-

COMPATIBLE AMPLIFIER MODULES FOR 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 (GHz)	2.0-18 (Wideband)	6.0-18 (Wideband)	2.0-8.0 (Wideband)	2.0-10 (Wideband)	2.0-13 (Wideband)	2.0-16 (Wideband)
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	6.5dB	6dB	6dB	6dB	6.5dB

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Front and rear view Model ALT-C320-1U



Rear view Model ALT-C402-2U

2+1 Redundancy

CHASSIS							
Model	ALT-25104	ALT-25702	ALT-25703	ALT-C303-2U	ALT-C313-2U	ALT-C315-2U	ALT-C400-2U
Frequency (MHz)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	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 Tx 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 AMPLIFIER MODULES FOR CHASSIS ALT-C303-2U-x5x5								
Model	ALT-R-L1-020	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 (MHz)	850-2150 (L-band)							
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.



Front & rear view Model ALT-25104



Rear view Model ALT-C313-2U

2+1 Redundancy

COMPATIBLE AMPLIFIER MODULES FOR CHASSIS ALT-C313-2U-x5x5

Model	ALT-R-							
	L1-020	L1-078	L1-012	F2-013	L1-019	L1-021	L1-023	L1-032
Frequency (MHz)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	50-200 (IF Band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)
Gain Range Min	6dB	3dB	14dB	8dB	14dB	8dB	14dB	14dB
Gain Range Max	36dB	26dB	44dB	38dB	44dB	35dB	44dB	44dB
Slope Compensation	✓	✓	✓	-	✓	-	-	✓
High Linearity	-	-	-	✓	✓	✓	-	-

Model	L1-038	L1-043	L1-044	L1-087	L1-097	S2-076	S2-092
	Frequency (MHz)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2850 (S-band)
Gain Range Min	14dB	9dB	13dB	-6dB	14dB	3dB	8dB
Gain Range Max	44dB	39dB	43dB	44dB	44dB	36dB	42dB
Slope Compensation	✓	-	✓	-	-	✓	✓
High Linearity	-	-	-	-	-	-	✓

COMPATIBLE AMPLIFIER MODULES FOR CHASSIS ALT-C315-2U-x5x5

Model	ALT-R-												
	L1-020	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 (MHz)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	50-200 (IF Band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)	850-2150 (L-band)
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 AMPLIFIER MODULES FOR 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 (GHz)	2.0-18 (Wideband)	6.0-18 (Wideband)	2.0-8.0 (Wideband)	2.0-10 (Wideband)	2.0-13 (Wideband)	2.0-16 (Wideband)
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

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4+2 Redundancy

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 AMPLIFIER MODULES FOR CHASSIS ALT-C304-2U-x5x5

Model	ALT-R-L1-020	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 AMPLIFIER MODULES FOR CHASSIS ALT-C304-2U-x7x7

Model	ALT-R-L1-020	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	✓	✓	✓	-	✓	✓	-	-



Rear view Model ALT-C304-2U

Dual 1+1 Redundancy

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 AMPLIFIER MODULES FOR CHASSIS ALT-C310-1U-x5x5

Model	ALT-R-													
	L1-020	L1-078	L1-012	F2-013	L1-019	L1-021	L1-023	L1-032	L1-038	L1-044	L1-075	L1-087	L1-097	L1-076
Frequency	850-2150 MHz (L-band)	850-2150 MHz (L-band)	850-2150 MHz (L-band)	50-200 MHz (IF-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 (L-band)	850-2850 MHz (S-band)
Gain Range Min	7dB	4dB	15dB	9dB	15dB	9dB	15dB	15dB	15dB	15dB	15dB	-5dB	15dB	4dB
Gain Range Max	37dB	27dB	45dB	39dB	45dB	36dB	45dB	45dB	45dB	44dB	45dB	45dB	45dB	37dB
Slope Compensation	✓	✓	✓	-	✓	-	-	✓	✓	✓	✓	-	-	✓
High Linearity	-	-	-	✓	✓	✓	-	✓	✓	-	✓	-	-	-

COMPATIBLE AMPLIFIER MODULES FOR CHASSIS ALT-C310-1U-x7x7

Model	ALT-R-L1-020	ALT-R-L1-078	ALT-R-L1-012	ALT-R-F2-013	ALT-R-L1-019	ALT-R-L1-023
Frequency	850-2150 MHz (L-band)	850-2150 MHz (L-band)	850-2150 MHz (L-band)	50-200 MHz (IF-band)	850-2150 MHz (L-band)	850-2150 MHz (L-band)
Gain Range Min	7dB	4dB	15dB	9dB	9dB	15dB
Gain Range Max	37dB	27dB	45dB	39dB	45dB	45dB
Slope Compensation	✓	✓	✓	✓	✓	-
High Linearity	-	-	-	✓	✓	-

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Quad 4+1 Redundancy

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	Module dependent		
Capacity	16 active + 4 standby amplifiers (Quad 4 + 1 redundancy)		
Power Supplies	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 AMPLIFIER MODULES FOR CHASSIS ALT-C305-5U-x5x5

Model	ALT-R-L1-020	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	850-2150 MHz (L-band)							
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 AMPLIFIER MODULES FOR CHASSIS ALT-C306-2U-x5x7

Model	ALT-R-L1-020	ALT-R-L1-078	ALT-R-L1-012	ALT-R-L1-023	ALT-R-L1-087	ALT-R-L1-097
Frequency	850-2150 MHz (L-band)					
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 AMPLIFIER MODULES FOR CHASSIS ALT-C307-2U-x7x7

Model	ALT-R-L1-020	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	850-2150 MHz (L-band)						
Gain Range Min	1dB	-2dB	9dB	9dB	9dB	-12dB	8dB
Gain Range Max	31dB	21dB	39dB	39dB	39dB	38dB	38dB
Slope Compensation	✓	✓	✓	-	-	-	-

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RF COMPONENTS

Covering DC to 40GHz, ETL's RF Components are at the heart of many of the 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.

BENEFITS & APPLICATIONS

- 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 & weatherproof IP65 rated outdoor enclosures that can withstand harsh weather conditions.
- Order via our website with no minimum order charge.

ETL RF Component Range



<p>Broadband Microwave</p>	<p>Filters</p>	<p>Outdoor IP Rated Modules</p>	<p>Ku & Wideband Passives</p>	<p>Stand Alone RF Over Fibre</p>	<p>Active & Passive Splitters & Combiners</p>
<p>Passive splitter/combiners, couplers, isolators, circulators & absorptive PIN diode switches covering 0.5 - 18 GHz, 18 - 40 GHz & 1 - 40 GHz</p>	<p>Custom & standard RF & Microwave filters from 100MHz to 40 GHz. Cavity, microstrip & suspended substate technologies.</p>	<p>IP rated RF splitter/combiners covering wideband frequency (700-2700 MHz). Available in 2, 3 & 4 way capacities.</p>	<p>Passive splitter/combiner range covering KU & Wideband frequencies: 2-8 GHz, 2-18 GHz, 6-18 GHz, 10-15 GHz, 18-40 GHz & 1-40 GHz. Available in 2, 3, 4 & 8-way capacities.</p>	<p>Interfacility fibre links transmit & receive an entire L-band/ Broadband polarisation over single mode fibre, from an antenna to reception equipment up to 10 km away.</p>	<p>Covering a range of frequencies including L-band, GPS, IF, S-band, C-band & DBS. Available in 2, 3, 4, 6, 8 & 16 way capacities.</p>



<p>Components Mounting System</p>	<p>Amplifiers</p>	<p>Impedance Transformers</p>	<p>Couplers</p>	<p>Block Frequency Converters</p>	<p>10MHz Oscillators</p>
<p>Compact mounting system for ETL's Scorpion range of passive L-band splitter/combiners, amplifiers & RF Over Fibre stand alone components.</p>	<p>Available as Gain blocks with flat or positive frequency response, slopes, AGC, LNAs & digitally controlled variable gain amplifiers. Covering IF, L-band, C-band, Ku & Ka-band frequencies.</p>	<p>Low loss passive impedance transformers covering either an L-band frequency range of 850MHz to 2150MHz or an S-band frequency range of 500MHz to 2500MHz.</p>	<p>Available as proximity couplers & Directional couplers covering Covering IF, L-band, C-band, S-band, Ku & Ka-band frequencies.</p>	<p>Block Up Converters & Block Down Converters which cover a range of frequencies. Other options include 0dB or 10dB Conversion Gain, External or In-line bias, External or Internal 10MHz reference & centrally located or off-set RF ports.</p>	<p>High stability 10 MHz ovenised oscillator with L-band & DC multiplexer. Switchable 10 MHz & DC external or inline powered options.</p>



<p>Passive RF Components</p>	<p>Waveguide Components</p>	<p>Switches</p>	<p>GPS & GNSS</p>	<p>Equalisers</p>
<p>Passive component ranges including Bias Tees, fixed & custom attenuators, DC-40 GHz, multiplexers & DC blocks.</p>	<p>WR-650 to WR-28 Flex/Twist Straights, Bends, Twists, Couplers, Adaptors, Transitions.</p>	<p>Reflective & absorptive PIN diode & Power over Ethernet (PoE) switches.</p>	<p>GPS Splitters, GPS Amplifiers, GPS Lightning Arrestors, GPS Attenuators & GPS over Fibre.</p>	<p>Passive positive slope equalisers 1dB to 10dB in L, IF & S-band frequencies.</p>

I&M RF Component Range



Antennas

Horn, Patch & Spiral Antennas show uniform gain through their frequency span, resulting in excellent performing characteristics.



Amplifiers

Miniature & Drop-in Amplifiers from 0.3GHz - 30GHz (IF, C, S, L, Ku, Ka) & broadband frequency ranges.



Attenuators

Attenuators reduce the amplitude level of an incoming signal for DC - 40GHz frequency ranges.



Bias Tees

Allow DC bias to be either added to or subtracted from an RF signal line without affecting the RF signal.



DC Blocks

Prevent the flow of DC & audio frequencies whilst permitting RF signals to flow with minimum interference up to 40GHz.



Synthesisers

Operate over a range of frequency ranges with internal & external reference options.



Couplers

Directional & hybrid couplers, with 3, 6, 10, 20 & 30dB coupling factor options.



Circulators

Coaxial circulators are designed for low power applications.



Detectors

Tunnel diode & zero bias detectors.



Filters

Low pass, high pass, band pass & band stop for a range of frequencies.



Isolators

Coaxial, drop-in, low frequency & VHF isolators.



Cable Assemblies

Coaxial & test cable assemblies to suit your requirements.



Terminations

Power absorbing loads properly matched to the characteristic impedance of a transmission line to prevent signals from reflecting off the end.



Switches

Coaxial & PIN Diode switches are available as transfer, SPST, SPDT, SP4T, SP6T, SPXT & DPDT.



Oscillators

Phase locked oscillators available with internal & external reference & a range of output frequency options.



Signal Generators

Miniature signal generators provide USB Control Interface connection to an unpowered hub with coaxial power input.



Passive Splitters

Power splitters cover a range of frequencies up to 40GHz & are available in 2-way, 4-way & 8-way.

Atlantic Microwave

A Division of ETL Systems

In 2019, ETL expanded its range to include instrumentation and measurement equipment for the set up and testing of RF chains through its acquisition of Atlantic Microwave Ltd.

Now, Atlantic Microwave operates as a Division of ETL Systems, offering a broad range of RF test products to meet the different satellite simulation and loop back testing requirements of the industry. Combining Atlantic Microwave's 30-year heritage as leaders in satcom RF testing equipment with ETL Systems' in-house design and manufacture capability has delivered a range of high-quality satcom RF test products for all markets.

Our I&M products cover all bands from L to Ku, DBS, Ka and Q. Because testing can be required anywhere, we supply equipment in a wide variety of housings, including some weatherised, portable and battery powered options.



SNG Testing

Testing a Satellite News Gathering system by providing a loopback test for a vehicle mounted Ku-band Antenna without the need to access a satellite.

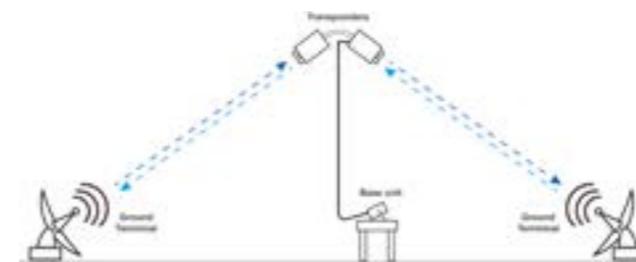


HAPS (High Altitude Pseudo Satellite) Testing

HAPS (High Altitude Pseudo Satellite) systems can be modelled using our bespoke Satellite Simulators. Suitable for many high altitude testing applications.

Multi-path RF Signal Testing

Multi-path Satellite Simulators enable the simultaneous testing of two satellite terminals by taking the Uplink/Transmit carrier from one ground system to the Downlink/Receive carrier of another and then offering a return path to test the complete system.



GENUS MODULAR SYSTEM

High density, 1U, 2U, 3U, Bench Top and ODU universal chassis holding multiple RF module types, providing configurable and flexible RF signal management to match customer requirements.

The modular design can house any combination of compatible modules:

- Test Loop Translators
- Noise Generators
- Signal Generators
- RF Distribution modules (e.g. RF over Fibre, Matrices, Frequency Converters. See page 23)



Genus Range

BENEFITS & APPLICATIONS

- **Configurable:** Choose to mix & match RF modules depending on your application.
- **Future proof:** scalable chassis expandable for growing teleports.
- **Rack space saving:** Compact & smart chassis design.
- **Resilience** from dual redundant hot-swap PSUs & field serviceable RF Modules, HMI & CPU for minimal downtime.
- **Secure communications** with SNMPv3 & HTTPS for future proof secure protocols.
- **Applications** include teleports, ground stations, maritime, high resilience applications & unmanned sites, redundancy applications for remote satellite teleports, signal distribution & LEO Gateways.



Genus I&M Module Range

Test Loop Translator

TLT modules with synthesised local oscillator. C-band, L-band, Ka-band and Ku-band frequencies. See page 83.

Noise Generator

Noise Generator module, providing white Gaussian noise for broadband frequencies. See page 84.

Signal Generator

Signal Generator modules covering VHF, UHF, L, C, X, Ku, DBS, Ka, Q, and V-band frequencies. See page 85.

RF Distribution

RF distribution modules for Satellite Communications applications including Matrices, RF over Fibre, Frequency Convertors, Amplifiers, Switches, Splitters/Combiners and DC Injectors. See page 23.

Genus I&M Chassis Range



1U Genus Chassis

1U high indoor chassis with internal 10MHz source option. Houses a mix of up to 17 modules including:

- Test Loop Translators
- Noise Generators
- Signal Generators
- RF Distribution Modules



Benchtop Instrumentation Genus Chassis

Benchtop Instrumentation chassis with internal / external 10MHz source option. Houses a mix of up to 10 modules including:

- Test Loop Translators
- Noise Generators
- Signal Generators
- RF Distribution Modules

BENEFITS

- **HIGH DENSITY** - Genus chassis range accommodates from 10 up to 17 modules.
- **FLEXIBLE** - RF modules can be all one type or a mix of different functions.
- **RESILIENT** - Dual redundant, hot-swap power supplies, field serviceable RF modules, HMI, CPU and optional user replaceable internal and external 10MHz reference source.
- **SECURE** - Improved security protocols with SNMPv3 and HTTPS. Remote control and monitoring via RJ45 Ethernet port with web browser interface.

CHASSIS PRODUCTS				
Chassis Model	GNS-106M-1U	GNS-196M-1U	GNS-111M	GNS-112M
Capacity	17 RF Modules	17 RF Modules	10 RF Modules	10 RF Modules
Height	1U	1U	Bench Top	Bench Top
Location	Indoor	Indoor	Indoor	Indoor
Remote Control & Monitoring	RJ45 Ethernet, Tx, ETL TCP/IP protocol, SNMPv3 & Web Browser Interface			
Local Control & Monitoring	Front panel capacitive HMI touchscreen		Front panel capacitive HMI touchscreen	
Internal 10MHz Reference Source	-	✓	-	✓
Hot-swap Active Components	PSU modules		-	
Field Replaceable Active Components	RF modules, HMI & CPU		RF modules & HMI	
Dual Redundant PSUs	✓		-	
Secure Communications	SNMPv3, HTTPS			
Temperature Rating	Standard	Standard	Standard	Standard

Genus I&M Chassis & Module Compatibility Table

CHASSIS & MODULE COMPATIBILITY					
Chassis Model		GNS-106M-1U	GNS-196M-1U	GNS-111M	GNS-112M
Capacity		17 RF Modules	17 RF Modules	10 RF Modules	10 RF Modules
Module Compatibility	Test Loop Translator	Page 83 ✓	✓	-	-
	Noise Generator	Page 84 ✓	✓	✓	✓
	Signal Generator	Page 85 ✓	✓	✓	✓
	RF Distribution Modules	Page 23 ✓	✓	✓	✓

Test Loop Translator Genus series

Test Loop Translators (TLTs) are designed to evaluate the performance of satellite earth stations, allowing analysis, alignment and system testing by replacing satellite links. The Genus range covers Ka, Ku, L, C, Q, S, X and DBS bands.

Modules have 60dB attenuation and synthesised LO frequency, independently controlled via local or remote control.

Genus TLT modules are housed in a modular chassis with capacity for up to 2 TLT modules. The chassis can also hold a mixture of other I&M modules or RF distribution modules, providing teleports with a scalable, flexible and modular solution which can be configured depending on requirements.

BENEFITS & APPLICATIONS

- **Cost effective test solution** without incurring satellite airtime costs.
- **Configurable solution** housing TLTs as well as other I&M & RF distribution modules in the same chassis.
- **Resilience in service** with hot-swappable active components.
- **Applications** include SNG testing, Satcoms & Teleports testing.



Genus Test Loop Translator Range

PRODUCTS				
Model	TLT-D-C3L1-1005-S5S5	TLT-D-C2C1-1002-S5S5	TLT-D-K3K1-1003-S5S5	TLT-D-K4KX-1004-K5K5
Operating Input Frequency (GHz)	5.725-6.725	5.725-6.725	12.75-14.5	27.0-31.0
Operating Output Frequency (GHz)	0.95-1.95	3.4-4.4	10.7-12.75	17.3-21.2
Translation Band	C-band input to L-band output	C-band input C-band output	Ku-band input to Ku-band output	Ka-band input to Ka-band output
Compatible Chassis	GNS-106M-1U / GNS-196M-1U / GNS-111M / GNS-112M			

Noise Generator Genus series



Noise Generators are used to generate white Gaussian noise at a particular frequency to mimic real-world environments for system performance evaluation.

Genus Noise Generator modules benefit from fine attenuation control and are housed in a modular chassis, which can also hold a mixture of other I&M or RF distribution modules. It provides teleports with a scalable, flexible and modular solution which can be configured depending on requirements.



BENEFITS & APPLICATIONS

- Mimic real-world environments to evaluate system performance.
- Configurable solution housing Noise Generators as well as other I&M & RF distribution modules in the same chassis.
- Resilience in service with hot-swappable active components.
- Applications include laboratory instruments, built-in system test facilities or Over-the-Air (OTA) Testing.

Genus Noise Generator Range

PRODUCTS	
Model	NG-G1S-B3-03
Operating Frequency (MHz)	50-2500
Compatible Chassis	GNS-106M-1U / GNS-196M-1U / GNS-111M / GNS-112M

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

Signal Generator Genus series



Signal Generators are used to produce different frequencies for a variety of test purposes.

Genus Signal Generator modules cover VHF, UHF, L, C, X, Ku, DBS, Ka, Q, and V-bands in 10KHz frequency steps. They are housed in a modular chassis, which can also hold a mixture of other I&M or RF distribution modules. It provides teleports with a scalable, flexible and modular solution which can be configured with a range of RF modules depending on requirements.



BENEFITS & APPLICATIONS

- Wide range of satellite bands.
- Configurable solution housing Noise Generators as well as other I&M & RF distribution modules in the same chassis.
- Resilience in service with hot-swappable active components.
- Applications include test purposes at remote locations, antenna sites, equipment cabins and laboratories related to satellite communications, radar systems, EW systems & scientific apparatus.

Genus Signal Generator Range

PRODUCTS						
Model	SG-G1S-QX-04-K5	SG-G1S-KX-03-S5	SG-G1S-B3-01-S5	SG-G1S-KAX-05-K5	SG-G1S-QX-06-K5	SG-G1S-CX-02-S5
Operating Frequency	20GHz-52GHz	50MHz-20GHz	50MHz-3GHz	50MHz-40GHz	50MHz-52GHz	50MHz-6GHz
Compatible Chassis	GNS-106M-1U / GNS-196M-1U / GNS-111M / GNS-112M					

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

SATELLITE SIMULATOR

Satellite Simulators enable cableless RF testing of indoor or in-field mobile satellite communication systems, providing a loop-back test for Satcom terminals without the need to access the satellite.

As well as Genus Satellite Simulators, Atlantic offer a classic range of systems operating from Ka, Ku, DBS, Q-band/K-band to X-band. We also supply a Quadband Satellite Simulator system covering C, X, Ku and Ka-band.

Synthesised, variable and fixed local oscillator (LO) options available.



BENEFITS & APPLICATIONS

- **Cableless test solution** without the need to access the satellite.
- **Applications** include SNG testing, Satcoms & Teleports testing.

CUSTOM BUILD
Contact us for custom designs to meet your requirements.

Satellite Simulator Range



Genus ODU Series

Quad & Tri Band with robust weatherproof IP65 enclosure with field replaceable modules. See page 87.



Quadband

Quad Band with all 4 bands active simultaneously. Indoor and outdoor IP65 enclosure.



Ruggedised

Two part system with weatherised Base Unit and Transponder.



Payload

Satcoms on the move testing. Drone mounting, UAV (unmanned aerial vehicle) & HAPS (high altitude platform).

ODU Satellite Simulator System

Genus series

A robust weatherproof IP65 rated enclosure which comprises field replaceable Genus Test Loop Translator and 10MHz reference modules, PSUs and CPUs.

The unit also benefits from remote control and monitoring via an RJ45 port with Web Browser Interface & SNMP.



BENEFITS & APPLICATIONS

- **Cableless test solution** without the need to access the satellite.
- **Resilience** with field replaceable TLT modules allowing for enhanced resilience and easier maintenance with no need to return to the manufactures in the event of a module failure.
- **Applications** include SNG testing, Satcoms & Teleports testing.

Genus ODU Satellite Simulator Range

PRODUCTS		
Model	GNS-SS-4-13158	GNS-SS-3-13003
Operating Frequency Bands	Quad Band C, X, Ku & Ka-bands	Tri Band X, Ku & Ka
Housing	IP65 Rated Outdoor Unit	
Remote Control & Monitoring	RJ45 Ethernet via RJ45, 10BaseT/100BaseTx, ETL TCP/IP protocol, SNMPv2/3 & Web Browser Interface	
Internal 10MHz Reference Source	✓	
Field Replaceable Modules	Test Loop Translator, PSUs, CPUs & 10MHz Reference modules	
Secure Communications	✓	

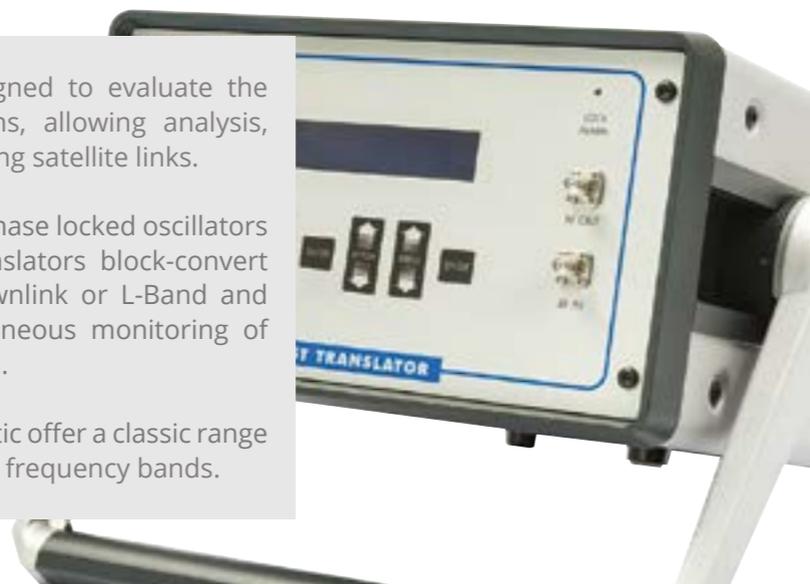
For our full range, along with up-to-date RF specifications, please visit our website www.atlanticmicrowave.com.

TEST LOOP TRANSLATOR

Test Loop Translators (TLTs) are designed to evaluate the performance of satellite earth stations, allowing analysis, alignment and system testing by replacing satellite links.

Incorporating fundamental frequency phase locked oscillators and double balanced mixers, the translators block-convert frequencies from Uplink to either Downlink or L-Band and from L-Band to Downlink for instantaneous monitoring of frequency, power levels and modulation.

As well as the modular Genus TLTs Atlantic offer a classic range operating in Ka, Ku, L, C, Q, S, X and DBS frequency bands.



BENEFITS & APPLICATIONS

- **Cost effective test solution** without incurring satellite airtime costs.
- **Applications** include SNG testing, Satcoms & Teleports testing.

CUSTOM BUILD
Contact us for custom designs to meet your requirements.

Test Loop Translator Range

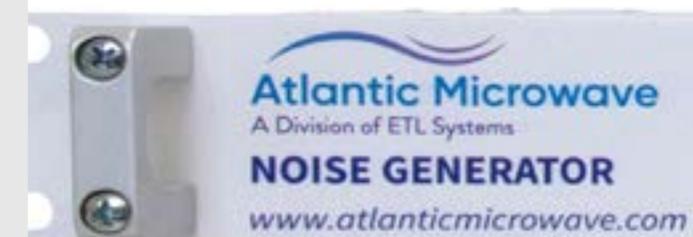
			
Genus Series Multi module 19" Rack Mount & Benchtop chassis option. Configurable chassis which can hold a mix of I&M and RF Distribution modules. See page 80.	LNI Series Noise Injection Loop Test Translator Systems with white symmetrical gaussian noise injection for simultaneous receiver and modem testing.	BLT Series Benchtop chassis with L-band, Ka-band and Ku-band frequency options.	ALR & ALT Series 19" Rack Mount chassis with remote and local control options. L-band, Ka-band and Ku-band frequencies.

NOISE GENERATOR

Noise Generators are used to generate white Gaussian noise at a particular frequency to mimic real-world environments for system performance evaluation.

The noise, which is diode generated, is amplified and the level can be varied. Atlantic Microwave's Noise Generators have operating frequencies ranging from 1 GHz to 18 GHz.

As well as the modular Genus Noise Generators, Atlantic offer a classic range.



Noise Generator Range

		
Genus Series Multi module 19" Rack Mount & Bench Top Chassis option. Configurable chassis which can hold a mix of I&M and RF Distribution modules. See page 84.	ANG Series Portable Benchtop Chassis. See page 90.	RNG Series 19" Rack Mount Chassis. See page 91.

TEST LOOP TRANSLATOR

NOISE GENERATOR

Noise Generators

ANG Series

Provides up to 1 watt of white Gaussian noise output over 10MHz to 18GHz frequency range.

The noise, which is diode generated, is amplified and the level can be varied in 1dB steps from 0 to 10dB or optionally in 0.1dB steps from 0 to 111dB.

A range of standard options are available as well as custom solutions for specific application requirements.



BENEFITS & APPLICATIONS

- Mimic real-world environments to evaluate system performance.
- Portable benchtop chassis.
- Applications include laboratory instruments, built-in system test facilities & Over-the-Air (OTA) Testing.

ANG Series Noise Generator Range

PRODUCTS					
Model	ANG-1609	ANG-1603	ANG-1612	ANG-2618	ANG-1810
Operating Frequency	100Hz-1GHz	10Hz-500KHz	1MHz-2GHz	2GHz-18GHz	2MHz-500MHz
Control & Monitoring	Local only via front panel				
Housing	Portable Bench Instrument				
Dimensions	370 x 110 x 300 mm				
RF Connectors & Impedances	50Ω SMA				

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

Noise Generators

RNG Series

Provides up to 1 watt of white Gaussian noise output over 10Hz to 18GHz frequency range. Custom-build options are available up to 40GHz

Control of the output level is either via a remote GUI or locally using the front panel controls and LCD screen. Select models also feature an output mute option.

19" x 1U rack mount.



BENEFITS & APPLICATIONS

- Mimic real-world environments to evaluate system performance.
- Control remotely via Ethernet port with GUI or via front panel.
- Applications include laboratory instruments, built-in system test facilities & Over-the-Air (OTA) Testing.

RNG Series Noise Generator Range

PRODUCTS					
Model	RNG-1624	RNG-1601	RNG-1609	RNG-1803	RNG-2618
Operating Frequency	2GHz-4GHz	10Hz-20KHz	100Hz-1GHz	500Hz-500KHz	2GHz-18GHz
Control & Monitoring	Local via front panel and push buttons & display Remote via TCP/IP over Ethernet RJ45 connector				
Housing	19" Rack Mount				
Dimensions	19" x 1U x 13.5"				
RF Connectors & Impedances	50Ω SMA				

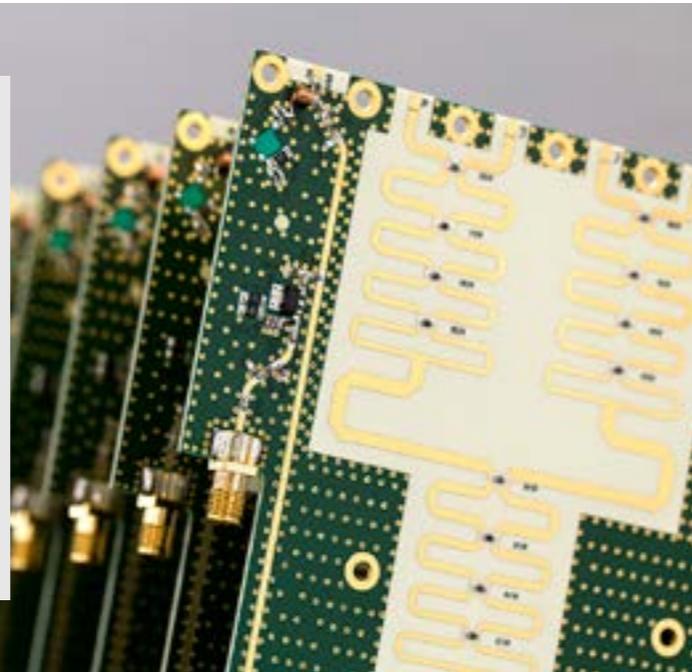
For our full range, along with up-to-date RF specifications, please visit our website www.atlanticmicrowave.com.

POWER SPLITTER / DIVIDER

Splitters / Dividers and Combiners enable a single RF input signal to be split and the power divided into more than one output or more than one input RF signal to be combined into a single output.

Atlantic's passive splitters are available from L, S, C, X, Ku, DBS, Ka to Q-band.

Standard divisions are 8, 16 or 32 ways but custom split ratios can also be economically provided. High isolation input and output options.



SDT Series Splitter / Divider Range

BENEFITS & APPLICATIONS

- High Frequency options.
- Applications include SNG testing, Satcoms & Teleports testing.



PRODUCTS

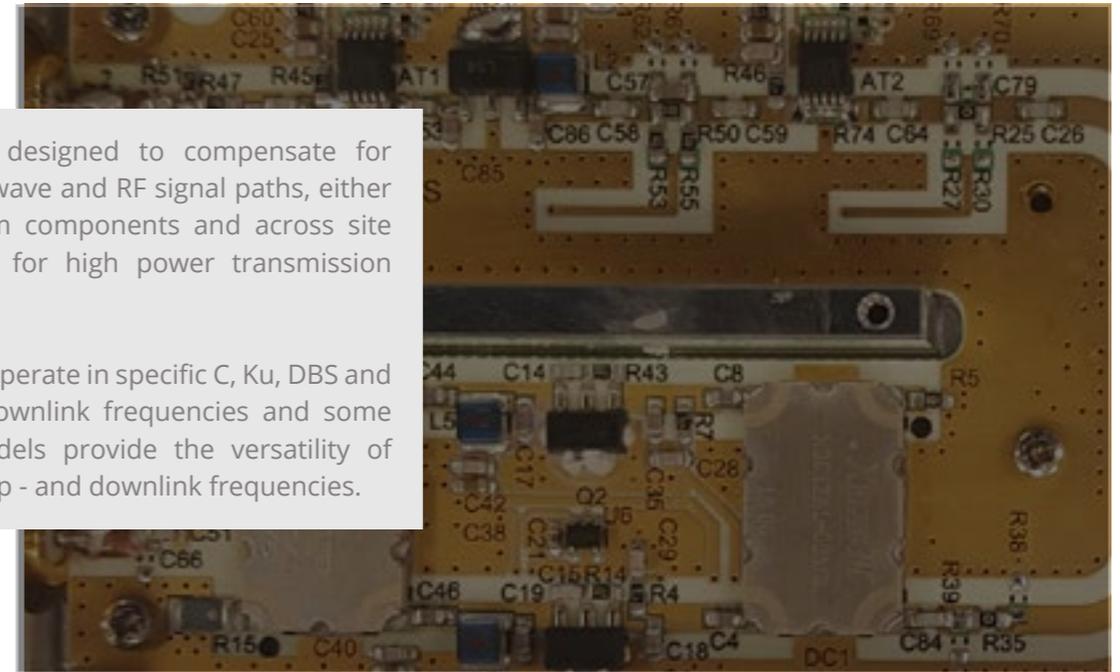
Model	SDT-07000850-16	SDT-17502150-32	SDT-27503150-16	SDT-12002000-16	SDT-00800260-16	SDT-40005000-16	SDT-03500650-16
Frequency (GHz)	7-8.5 (C-band)	17.5-21.5 (DBS band)	27.5-31.5(Ka-band)	12-20 (Ku-band)	0.8-2.6 (L-band)	40-50 (Q-band)	3.5-6.5 (S-band)
Housing	19" Rack Mount						
Dimensions	19" x 1U x 13.3" (343mm)	19" x 1U x 13.3" (343mm)	19" x 1U x 13.3" (343mm)	19" x 1U x 13.3" (343mm)	19" x 1U x 13.3" (343mm)	19" x 1U x 13.3" (343mm)	19" x 1U x 13.3" (343mm)
RF Connectors & Impedances	50Ω SMA	50Ω SMA	50Ω 2.92mm K-type 50Ω SMA	50Ω SMA	50Ω SMA	50Ω 2.4mm 50Ω SMA	50Ω SMA

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

AMPLIFIER

Amplifiers are designed to compensate for losses in microwave and RF signal paths, either between system components and across site or as a driver for high power transmission amplifiers.

The amplifiers operate in specific C, Ku, DBS and Ka uplink or downlink frequencies and some multi-band models provide the versatility of covering both up - and downlink frequencies.



BSL Series Amplifier Range

BENEFITS & APPLICATIONS

- High Frequency options for a range of applications.
- Versatility with multi-band options available.
- Portable benchtop chassis.
- Applications include SNG testing, Satcoms & Teleports testing.



PRODUCTS

Model	BSL-036042	BSL-177212	BSL-009017	BSL-072084	BSL-000002	BSL-127145
Translation Band	C-band	Ka-band	L-band	X-band	IF-band	Ku-band
Housing	Portable Bench Instrument					
Local Control & Monitoring	Local only via front panel					
Dimensions	260x110x360mm	260x110x360mm	260x110x360mm	260x110x360mm	260x110x360mm	260x110x360mm
RF Connectors & Impedances	50Ω SMA	50Ω 2.92mm K-type 50Ω SMA	50Ω SMA	50Ω SMA	50Ω SMA	50Ω SMA

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

Did you know... that over half of ETL's top 50 orders annually are specifically engineered to meet customer requirements.

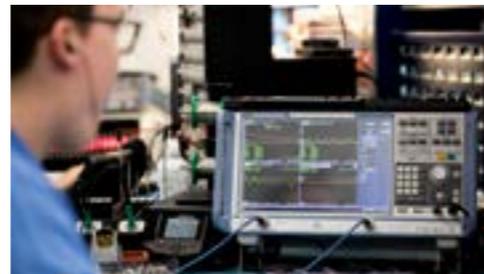
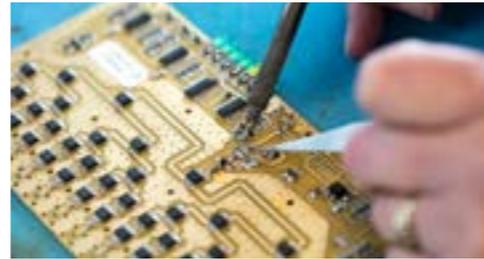
Our dedicated RF design and engineering team can work with you to solve your RF signal handling challenges. We have over 25 years' experience of providing solutions, such as extra redundancy, specific RF performance or even building a chassis to fit certain architecture.

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 us, 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.



Custom build Frequency Converter



Custom build Amplifier



Custom build VSAT RF over Fibre Indoor Unit



▶ AMPLIFY ▶

◻ ROUTE ◻

◉ SWITCH ◻

◻ SPLIT ◻

◻ COMBINE ◻

◉ FIBRE ◉

New technologies in RF Distribution

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