



## VSAT Fibre System

ETL's VSAT fibre 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.

The downlink path also provides 13/18 VDC and 22KHz tone for LNB powering and the uplink provides 24V 2A BUC powering. The unit features an Ethernet over fibre port to enable remote M&C of the ODU and external antenna mounted equipment (optional). A non-optical Ethernet version is also available.

### Typical applications:

- Fibre connectivity between VSAT antenna to a remote control room.
- For links up to 10 km.

### Outdoor



**850 - 2450 MHz** operating frequency range for up & downlinks.



**10 MHz Reference Signal** for up & downlinks.



**LNB & BUC Powering**  
13/18V, 500mA, 22kHz tone (LNB) 24V, 2A (BUC)



**IP65 rated** weatherproof housing



**Optical Ethernet**  
bi-directional, Gigabit Ethernet connection.

### Indoor



**850 - 2450 MHz** operating frequency range for up & downlinks.



**10 MHz Reference Tone** extracted from uplink.



**Remote control & monitoring of ODU** via optical Ethernet link

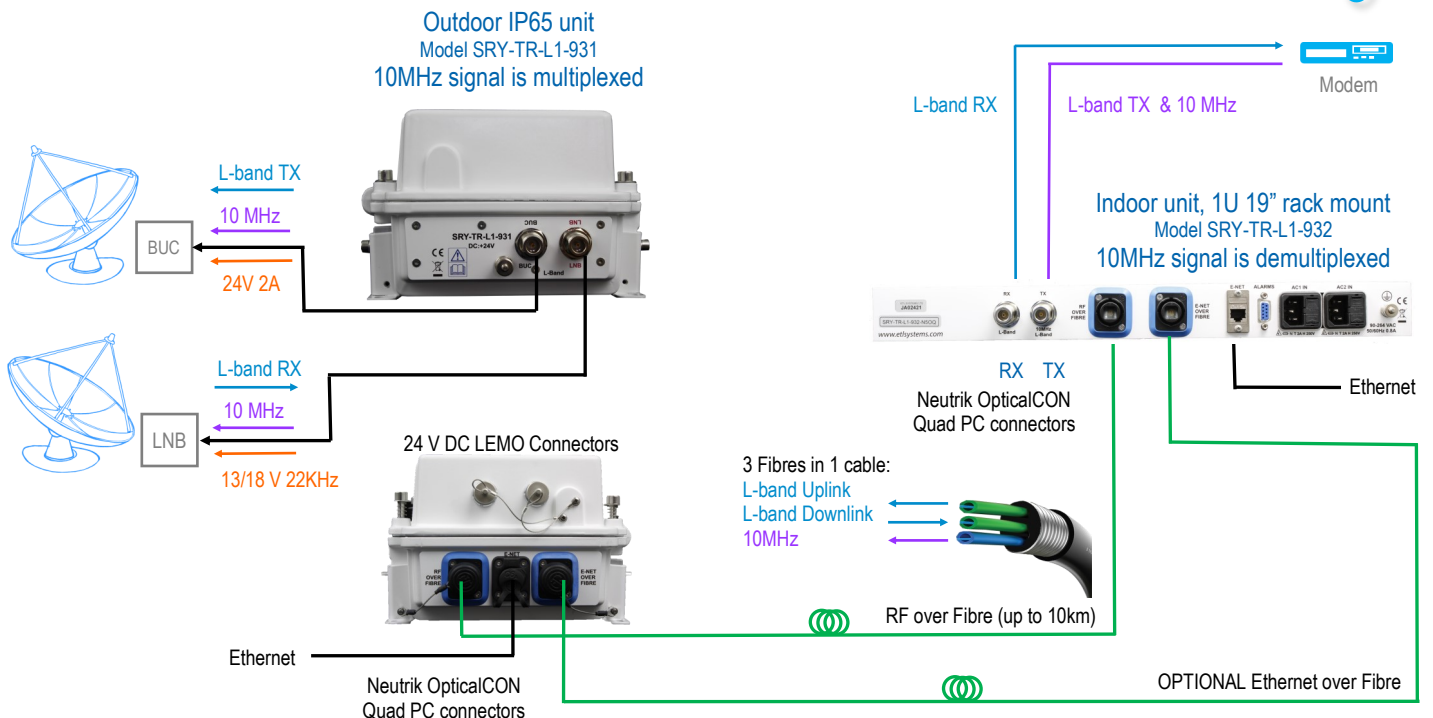


**Resilience** from dual redundant power supplies (IDU & ODU)



**Local control & monitoring** via front panel push buttons & display

### System Schematic





RF Parameters			
Frequency Range		850 to 2450 MHz (Extended L-Band)	
Flatness	850 to 2450 MHz	±1.5 dB (N-Type)	
		±2.0 dB (F-Type)	
	Any 36MHz, 850-2450MHz	±0.4 dB	
Return Loss	50 ohm N-type	18 dB typical	10 dB minimum
	75 ohm F-type	12 dB typical	8 dB minimum
Input 1 dB Gain Compression Point		+6 dBm typical	
OIP3	Typical	20 dBm	
	Worst case	17 dBm	
IMD3		-84 dBc typical	
CNR (in any 36MHz)		-74 dB typical	
Noise Figure	Typical	24 dB	
	Worst case	27 dB	
Group Delay variation	Over full band	2 ns	
	Over any 36MHz	1 ns	
SFDR	Typical	112 dB/Hz <sup>2/3</sup>	
	Minimum	108 dB/Hz <sup>2/3</sup>	
10 MHz Level		-5 to +5 dBm	
L-Band Link Phase Noise (Additive)	10 Hz	<-70 dBc/Hz	
	100 Hz	<-80 dBc/Hz	
	1 kHz	<-90 dBc/Hz	
Single side-band Phase Noise	10 kHz	<-100 dBc/Hz	
	100 kHz	<-110 dBc/Hz	
	1 MHz	<-120 dBc/Hz	
10MHz Ref Link Phase Noise (Additive)	10 Hz	<-110 dBc/Hz	
	100 Hz	<-120 dBc/Hz	
	1 kHz	<-130 dBc/Hz	
Single side-band Phase Noise	10 kHz	<-135 dBc/Hz	
	100 kHz	<-145 dBc/Hz	
	1 MHz	<-145 dBc/Hz	
Max RF Input		0 dBm (total power) Operational level	
MGC range		+30 dB	0.25 dB steps
Absolute Max RF input		+16 dBm total power	Damage level, NOT operational.

Optical Parameters		
Laser Type	DFB	Two stage isolator for improved performance
Optical Wavelength	1310 ± 10 nm	
Optical Power Output	+6 ± 2.5 dBm	
Link Loss Budget	4 dB	Maximum recommended optical loss
Optical Connectors	Neutrik opticalCON QUAD PC	Single mode fibre Use PC connectors only
Power		
PSU	Dual Redundant Power Inputs	
Power Connectors	LEMO EEL.1k.302.CLD	
Power Input Voltage	24V DC	
Power Consumption	15W	No LNB and BUC power
Max Power	75W	Max LNB and BUC
BUC Power	24V, 2A	Switchable. Short circuit protected
LNB Power	13/18V, 500mA, 22kHz tone	Switchable. Short circuit protected
System Control		
Remote Control	Via Ethernet, TCP/IP, SNMP, Web browser	
Local RJ45 Ethernet	10/100/1000BASE-T	Neutrik etherCON IP65 shell
Fibre Ethernet	1000BASE-LX	Neutrik opticalCON QUAD two positions used
Environmental		
Operating Temperature	-40°C to +60°C	
Storage Temperature	-40°C to +90°C	
Environmental Rating	IP65 rated. Weatherproof for outside operation	Connectors are weatherproof to IP65 when mated
Humidity	20 to 90% non-condensing	Relative Humidity
Altitude	10,000 ft AMSL operational 30,000 ft AMSL storage/transport Above Mean Sea Level	
Physical		
Dimensions	300x206x131mm	
Weight	3.5 kg	
RF connectors	50Ω N-type and 75Ω F-type	

Note 1: The specification is subject to regular reviews and will be updated from time to time as part of our continuing product development and improved spec accuracy.  
Note 2: Operation beyond the quoted limits stated above may cause instantaneous and



Model SRY-TR-L1-931-xxxxxx  
IP65 rated unit



RF Parameters			
Frequency Range		850 to 2450 MHz (Extended L-band)	
Flatness	850 to 2450 MHz	±1.5 dB (N-Type) ±2.0 dB (F-Type)	
	Any 36MHz, 850-2450MHz	±0.4 dB	
Return Loss	50 ohm N-type	18 dB typical	10 dB minimum
	75 ohm F-type	12 dB typical	8 dB minimum
All RF connectors are female DC power may be present on connectors Do not connect to power source			
Input 1 dB Gain Compression Point		+6 dBm typical	
Measured with SRY-TR-L1-931, 1m fibre, 0dB link gain, 1950 MHz			
OIP3	Typical	20 dBm	
	Worst case	17 dBm	
Test condition: SRY-TR-L1-931, 1m fibre, 10dB gain, -22 dBm tones at 2150 and 2152 MHz			
IMD3		-84 dBc typical	
Test condition: SRY-TR-L1-931, 1m fibre, 0dB gain link, -22dBm tones at 2150 and 2152 MHz			
CNR (in any 36MHz)		-74 dB typical	
Test condition: SRY-TR-L1-931, 1m fibre, 0 dBm RF i/p power, 0 dBm RF o/p total power.			
Noise Figure	Typical	24 dB	
	Worst case	27 dB	
Test condition: SRY-TR-L1-931, 1m fibre, 0 dBm RF i/p power, 0 dBm o/p power <b>N.B 0dB gain</b>			
Group Delay variation	Over full band	2 ns	
	Over any 36MHz	1 ns	
Test condition: SRY-TR-L1-931, 1m fibre, 0 dBm RF i/p power, 0 dBm o/p power			
SFDR	Typical	112 dB/Hz <sup>2/3</sup>	
	Minimum	108 dB/Hz <sup>2/3</sup>	
Test condition: SRY-TR-L1-931, 1m fibre, 0dB gain, -22 dBm tones at 2150 and 2152 MHz			
10 MHz Level		-5 to +5 dBm	
10MHz Ref Link Phase Noise (Additive)	10 Hz	<-110 dBc/Hz	
	100 Hz	<-120 dBc/Hz	
	1 kHz	<-130 dBc/Hz	
	10 kHz	<-135 dBc/Hz	
Single Side-band	100 kHz	<-145 dBc/Hz	
	1 MHz	<-145 dBc/Hz	
Measured Phase Noise performance is typically 10dB better			
L-band Link Phase Noise (Additive)	10 Hz	<-70 dBc/Hz	
	100 Hz	<-80 dBc/Hz	
	1 kHz	<-90 dBc/Hz	
Single Side-band	10 kHz	<-100 dBc/Hz	
	100 kHz	<-110 dBc/Hz	
	1 MHz	<-120 dBc/Hz	
Test condition: SRY-TR-L1-931, 1m fibre, 0 dBm RF i/p power, 0 dBm o/p power			
Measured Phase Noise performance is typically 10dB better			
Max RF Input		0 dBm (total power) Operational level	
MGC range		+30 dB	0.25 dB steps
Range of max i/p level for optimised 0 dB link **		0 to -30 dBm	With SRY-TR-L1-931
Absolute Max RF input		+16 dBm total power	Damage level, NOT operational.
BUC / LNB power		None	

Optical Parameters		
Laser Type	DFB	Two stage isolator for improved performance
Optical Wavelength	1310 ± 10 nm	
Optical Power Output	+6 ± 2.5 dBm	
Link Loss Budget	4 dB	Maximum recommended optical loss
Optical Connectors	Neutrik opticalCON QUAD PC	Single mode fibre

Power		
PSU	Dual Redundant Power Supplies	Not hot swap
Power Input Voltage	85 to 264 VAC 50/60 Hz	
Power Consumption	15W	

System Control		
Remote Control	Via Ethernet, TCP/IP, SNMP, Web browser	
Local RJ45 Ethernet	10/100/1000BASE-T	
Fibre Ethernet	1000BASE-LX	
Temperature monitors	Internal temperature monitor	
Monitoring includes	Laser Optical Output Power RF power at input & at laser Status of amplifier stages	Each RF over Fibre channel

Environmental		
Operating Temperature	0°C to +50°C	
Storage Temperature	-40°C to +90°C	
Location	Indoor use only	
Humidity	20 to 85% non-condensing	Relative Humidity
Altitude	10,000 ft AMSL operational 30,000 ft AMSL storage/transport Above Mean Sea Level	

Physical	
Dimensions	1U high x 350mm deep
Weight	3 kg
RF connectors	50Ω N-type and 75Ω F-type

Note 1: The specification is subject to regular reviews and will be updated from time to time as part of our continuing product development and improved spec accuracy.  
Note 2: Operation beyond the quoted limits stated above may cause instantaneous and permanent damage.



Model SRY-TR-L1-932-xxxxxx  
Indoor unit

