



# Falcon Series

## Frequency Converter Module

### X-Band Block Upconverter

**Typical applications:**

- Teleports & Earth Stations
- Satellite Operations
- Government & Defence applications
- Telemetry, Tracking & Command
- High Resilience applications

Converting L-band to X-band. The 1U chassis has the capacity for up to four hot-swap frequency converter modules. These can be all upconverters, all downconverters or a mix of both.

**Resilience** from dual redundant hot-swap power supplies & field replaceable CPU & HMI

**Local control & monitoring** via HMI high resolution touchscreen

**Compact** housed in a 1U high chassis with capacity for up to four modules

**Flexible Module Configurations** choose from a mixture of up and down converters with different operating frequencies.

**Hot Swap & replaceable RF** Frequency Converter modules

**Redundancy configurations** Field-replaceable 2+1 or 1+1 redundant configuration

**Field replaceable Internal 10MHz reference source** and external reference inject port with auto detection

**Secure protocols** with SNMPv3 and HTTPS

**Remote control & monitoring** via RJ45 Ethernet port with SNMP & web browser interface

**Chassis - Specification**

Dimensions / Weight / Colour	1U high x 550mm deep x 19" wide / < 10 kg / RAL9003—White (Semi-matte)
Capacity	Total of 17 module slots. Note that 1 slot may be used for fan (if required) and 1 slot may be used for 10 MHz EXT inject module (if required). Note actual modules may require >1 slot. Refer to required module spec table.
Temperature	Operating: 0°C to +45°C / Storage: -20°C to +75°C
Location / Humidity / Altitude	Indoor use only / 20 to 90% non-condensing / 10,000 feet AMSL (Operational) 30,000 feet AMSL (Storage) <i>Above Mean Sea Level</i>
Control & Monitoring	Local: HMI touch screen Remote: Ethernet via RJ45, 10BaseT/100 BaseTx. TCP/IP, SNMP V3 & HTTPS & Web browser interface HMI and CPU field replaceable. Each module independently monitored and reported.
MTTR	20 minutes (15 minutes to retrieve spare part and 5 mins to replace) Applies to LRUs only and assumed in house stock
AC Input / Consumption	85-264Vac 50/60Hz / 150W
PSU Redundancy	Dual redundant and alarmed Diode OR. Hot swappable
Input & Output Connectors	Dependant upon module fitted





# ETL Systems

Excelling in RF Engineering

Model Number:  
FN-U-X3L1-24147-XXS5



**Frequency Converter Module**  
Compact form factor allowing multiple modules to be housed in 1U chassis. Each module uses 4 slots in the chassis.

Frequency Upconverter Module - RF Parameters		Redundancy Module - RF Parameters	
Model Numbers	FN-U-X3L1-24147-XXS5	SWF-G1S-KX-109	SWF-G1S-KX-115
Size	4 slots wide	4 slots wide	4 slots wide
Redundancy	Standalone module	1+1 (Note: This column denotes specs 24147 in 1+1 configuration)	2+1 (Note: This column denotes specs 24147 in 2+1 configuration)
Input Frequency Range	950—1450 MHz		
Output Frequency Range	7900—8400 MHz		
Fixed LO	6950 MHz		
Conversion Gain	Max 30 ± 2 dB / Min 0 ± 2 dB	Max 28.8 ± 2.3 dB / Min -1.2 ± 2.3 dB	Max 29 ± 2.6 dB / Min -1 ± 2.6 dB
Gain Steps	0.25 ± 0.15 dB		
Gain Flatness (50 Ohm)	Full L-band: ±1.00 dB Any 40 MHz: ±0.25 dB	Full L-band: ±1.3 dB Any 40 MHz: ±0.55 dB	Full L-band: ±1.6 dB Any 40 MHz: ±0.85 dB
Input Return Loss (L-Band, 50 Ohm)	Typ -18 dB / Min.-16 dB	Typ -15 dB / Min.-13 dB	Typ -15 dB / Min.-13 dB
Output Return Loss (X-Band, 50 Ohm)	Typ. -16 dB / Min.-12 dB	Typ -11 dB / Min.-9 dB	Typ -11 dB / Min.-9 dB
Noise Figure (At max gain)	Typ. 12 dB / Max. 15 dB	Typ. 13.8 dB / Max. 16.9 dB	Typ. 14.8 dB / Max. 18.0 dB
Maximum Operational Input Level	-35 dBm (At max gain)		
OP1dB (At max gain)	Typ. +15 dBm / Min.+12 dBm	Typ. +12.2 dBm / Min.+9.2 dBm	Typ. +10.7 dBm / Min.+7.7 dBm
OIP3 (At max gain)	Typ. +27 dBm / Min.+25 dBm	Typ. +24.7 dBm / Min.+22.7 dBm	Typ. +23.2 dBm / Min.+21.2 dBm
Internal Reference Stability	±5x10 <sup>-8</sup> over 0 to 50°C		
Phase Noise (Typical values)	@10Hz offset	-50 dBc / Hz	
	@100Hz offset	-70 dBc / Hz	
	@1KHz offset	-80 dBc / Hz	
	@10KHz offset	-90 dBc / Hz	
	@100KHz offset	-100 dBc / Hz	
	@1MHz offset	-110 dBc / Hz	
Spurs In-band	Carrier related	<-60 dBc	
	Non-carrier related	<-75 dBm	
Spurs Out-of-band	Carrier related	<-60 dBc	
	Non-carrier related	<-75 dBm	
LO Breakthrough	<-60 dBm (TBC)		
Image Rejection	> 60 dB typ		
External Reference	Input Freq. 10 MHz. Auto detection. 1 required per chassis		
External Ref. Input Level	+3 dBm ± 3dB		
Mute	60 dB		
Number of conversion stages	Single		
Spectral Inversion	Non-inverting		
Spec version	0.2	1.0	0.1

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.  
 Note 3: All specs are for 50 Ohm connectors unless detailed otherwise.

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