



**ETL Systems**

New technologies  
in RF distribution

Model Number:  
FN-U-K3L1-24212-XXXX

# Falcon Series Frequency Converter Module L to Ku-Band Agile Upconverter

### Typical applications:

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

L-band to Ku-band frequency converter with variable gain and variable slope. 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.



**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.

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

Image for indication purposes only, actual units may be differ

**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

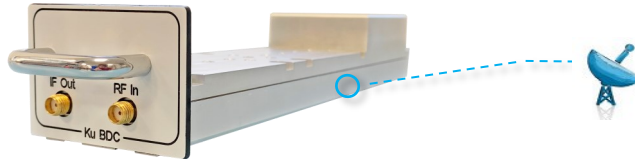
**Secure protocols** with SNMPv3 and HTTPS

**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 ports	Dependant upon module fitted





### 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-K3L1-24212-XXXX	SWF-G1S-KX-109A-xxxx	SWF-G1S-KX-115-xxxx
Size	3 slots wide	4 slots wide	4 slots wide
Redundancy	Standalone Module	1+1 (Note: This column denotes specs for 24212 in 1+1 configuration)	2+1 (Note: This column denotes specs for 24212 in 2+1 configuration)
Input Frequency Range	950 – 1950 MHz		
Output Frequency Range	12.75 – 14.50 GHz		
LO Frequency Step Size (min)	1 kHz		
Mean Conversion Gain	Max. 35 ± 1.5 dB / Min. 5 ± 1.5 dB	Max. 33.6 ± 1.8 dB / Min. 3.6 ± 1.8 dB	Max. 33.7 ± 2.2 dB / Min. 3.7 ± 2.2 dB
Gain steps	0.25 ± 0.15 dB		
Gain Flatness (50 Ohm)	Full IF band ±1.5 dB Any 40 MHz ±0.3 dB	Full IF band ±1.8 dB Any 40 MHz ±0.6 dB	Full IF band ±2.2 dB Any 40 MHz ±1.0 dB
Input Return Loss (L-band, 50 Ohm)	Typ. -18 dB / Min. -14 dB	Typ. -15 dB / Min. -11 dB	Typ. -15 dB / Min. -12 dB
Output Return Loss (Ku-band, 50 Ohm)	Typ. -15 dB / Min. -10 dB	Typ. -11 dB / Min. -8 dB	Typ. -11 dB / Min. -8 dB
Noise Figure At max. gain	Typ. 10 dB / Max 12 dB	Typ. 11.7 dB / Max 13.8 dB	Typ. 12.7 dB / Max 14.8 dB
Input Power Range	-75 to -30 dBm		
OP1dB At max. gain	Typ. +10 dBm / Min. +8 dBm	Typ. +8 dBm / Min. +6 dBm	Typ. +6.5 dBm / Min. +4.5 dBm
OIP3 At max. gain	Typ. +22 dBm / Min. +20 dBm	Typ. +20 dBm / Min. +18 dBm	Typ. +18.5 dBm / Min. +16.5 dBm
Slope Compensation	0-6 dB		
Slope Control Steps	1 dB		
Internal Reference Stability	± 5 x 10 <sup>-8</sup> over 0 to 50°C		
Phase Noise (Typical values)	@10Hz offset	-65 dBc / Hz	
	@100Hz offset	-75 dBc / Hz	
	@1KHz offset	-80 dBc / Hz	
	@10KHz offset	-80 dBc / Hz	
	@100KHz offset	-85 dBc / Hz	
	@1MHz offset	-110 dBc / Hz	
Spurs In-band	Non-carrier related	< -70 dBm	
	Carrier related	< -50 dBc	
Spurs Out-of-band	Non-carrier related	< -70 dBm	
		< -70 dBm	
LO Breakthrough	< -70 dBm		
Image Rejection	> 60 dB typical		
External Reference	Input Freq. 10MHz Input Level +3 dBm±3dB		
Mute	60 dB		
IF Monitor Port	Yes. Internal RF detector monitored		
Number of conversion stages	Dual		
Spectral Inversion	Non-inverting		
Spec Version	0.5	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.

