

# **Installation and Operating handbook**

## **IBU140 L to Ku Band Upconverter**

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**EN 55022 CLASS B**  
**EN 50082-1**  
**EN 60950**



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**IMPORTANT NOTE: THE INFORMATION AND SPECIFICATIONS  
CONTAINED IN THIS DOCUMENT SUPERCEDE ALL PREVIOUSLY  
PUBLISHED INFORMATION CONCERNING THIS PRODUCT**

PEAK COMMUNICATIONS Ltd maintains a continuing programme of product improvement and therefore reserves the right to change specifications without notice

## INTRODUCTION

The IBU140 L to Ku Band Upconverter is a high grade unit which can be applied to many situations where good stability and phase noise is required.

The unit consists of an RF strip which is a mixer, filter and amplifier stage and a control PCB to monitor the system and provide a stable reference for the Local Oscillator.

The unit is housed in 19 inch 1'U' high chassis, suitable for rack mounting, is 400 mm deep and may be fitted with rack slides if required.

## SPECIFICATION

Output Frequency	14.0 – 14.5 GHz
Input Frequency	950 - 1450 MHz
Local Oscillator	13.05 GHz
Conversion Gain	17dB $\pm$ 1, 27 $\pm$ 1dB Optional
Gain stability	$\pm$ 0.5 dB from 0 to 40 <sup>0</sup> C, $\pm$ 0.1 dB per week, constant temp
Gain flatness	$\pm$ 1.0 dB, full band, $\pm$ 0.5 dB, across any 40 MHz band within output frequency.
1 dB Compression point	+ 7 dBm output, +18dBm optional
3rd Order Intercept point	>+18 dBm standard
Output phase noise	-75 dBc/Hz @ 100 Hz -92 dBc/Hz @ 1 kHz -100 dBc/Hz @ 10 kHz -107 dBc/Hz @ 100 kHz -125 dBc/Hz @ 1 MHz
Input connector	SMA female 50 ohms (N-type optional)
Output connector	SMA female 50 ohms (N-type optional)
Input return loss	>15 dB
Output return loss	>15 dB
Operating temperature	0°C to +50°C
Weight	4.5 Kg approx.
Group delay response fc $\pm$ 5 MHz compliant with IESS 309 and IESS 306	<0.05 nS

## Specification - Continued

Recommended input levels	-10 dBm, absolute max,
Output harmonics	better than -50 dBc
Output spurious	<-75 dBc
LO leakage at TX port	-80 dBm (always out of band)
Output frequency stability	$\pm 5 \times 10^{-8}$ from 0 to 40 <sup>0</sup> C, (after 10 minute warm up period)
Ageing	Better than $\pm 1 \times 10^{-9}$ per year
Alarms	LO lock failure. Power supply failure Amplifier failure
Fail relays	Form C dry contact closure
Mechanical	1U chassis - 400mm deep approx
Weight	4.5 kgs
EMC	Compliant to EN 55022 part B and EN 50082-1
Safety	Compliant to EN 60950 safety requirements
Power supply	230 volts AC $\pm 10$ %, 115 volts AC $\pm 10$ % (switch selectable) 50 Watts max

## **EMC AND SAFETY**

### **EMC**

The IBU140 Ku Band Upconverter has been designed to comply with the following standards;

Emissions : EN 55022 Class B; Limits and methods of measurement of radio interference characteristics of Information Technology Equipment.

Immunity : EN 50082 Part 1; Generic immunity standard, part 1: Domestic, commercial and light industrial environment.

The equipment must be operated with its lid on at all times. If it is necessary to remove the lid for routine servicing or fault finding then it is essential that the lid is fitted back correctly before normal operation.

For the Alarm and Remote Control data interfaces all 'D' type connectors must have grounding fingers on the plug shell to guarantee continuous shielding. The back-shells must comply to the requirements of VDE 0871 and FCC 20708, providing at least 40 dB of attenuation from 30 MHz to 1 GHz.

Connecting cables must be of the shielded type

**Operation of the equipment in a non standard manner will invalidate compliancy to these standards.**

### **Safety**

To ensure safety of operator the IBU140 Ku Band Upconverter unit has been designed to comply with the following safety standard;

EN 60950 Safety of information technology equipment, including electrical business machines.

Before operation the user must ensure that the installation complies with the information given.

The equipment is designed to operate in a static 19 inch rack system conforming to IEC 297-2. Operation of the equipment in transportable vehicles equipped with the means of providing a stable environment is permissible. Operation of the equipment on board vehicles, ships or aircraft without means of environmental conditioning will invalidate the safety compliancy; please contact the factory for further advice. Operation of the

equipment in an environment other than that stated in the specifications will also invalidate the safety compliancy. The equipment must not be operated above 2000 metre altitude, extremes of temperature; excessive dust, moisture or vibration; flammable gases; corrosive or explosive atmospheres.

### **Installation**

The equipment is classified in EN 60950 as a pluggable equipment class A for connection to the mains supply, as such it is provided with a mains inlet cord suitable for use in the country of operation. In normal circumstances this will be of an adequate length for installation in the rack. If the mains cord proves to be too short then any replacement must have a similar type fuse (if fitted) and be manufactured to similar specification: check for HAR, BASEC or HOXXX-X ratings on the cable. The connector ends should be marked with one of the following : BS1636A (UK free plug 13 amp); BSI, VDE, NF-USE, UL, CSA, OVE, CEBEC, NEMKO, DEMKO, SETI, IMQ, SEV and KEMA-KEUR for the IEC 6 amp free socket. Schuko and North American free plugs must have similar markings.

The installation of the equipment and the connection to the mains supply must be made in compliance to local or national wiring regulations for a category II impulse over voltage installation. The positioning of the equipment must be such that the mains supply socket outlet for the equipment should be near the equipment and easily accessible or that there should be another suitable means of disconnection from the mains supply.

The equipment is designed to operate from a TN type power supply system as specified in EN 60950. This is a system that has separate earth, line and neutral conductors. The equipment is not designed to operate with an IT power system which has no direct connection to earth.

## UNIT DESCRIPTION

### Front panel indicator

The IBU140 Ku Band Upconverter front panel has 5 indicator lights which are as follows

<b>STATUS</b>	Normally lit GREEN but will turn RED with any internal failure causing an alarm
<b>ON LINE</b>	Lit GREEN only when unit selected or external adapter is fitted
<b>POWER</b>	Lit GREEN when status of 5 Volt supply is OK
<b>LOCKED</b>	Lit GREEN when the Upconverter is correctly locked on frequency
<b>EXT REF</b>	Lit YELLOW if 10MHz External Reference is in use (Option may not be fitted)

An Internal alarm is caused by Power failure, Amplifier failure or Unit out of lock.

### Rear panel connections

<b>INPUT</b>	Input at L Band in the frequency range 950 to 1450 MHz. Maximum input should not exceed -10dBm
<b>OUTPUT</b>	Output in the frequency range 14.0 to 14.5 GHz. Calculation of the relative frequencies at L and Ku band is $L \text{ Band frequency} + 13.05 \text{ (LO)} = \text{Ku band frequency}$
<b>INTERFACE</b>	Digital interface with the following signals

Ground	1	9	PSU OK - N/Closed
PSU Common	2	10	LO OK - N/Closed
LO Common	3	11	Amp OK - N/Open
Amp common	4	12	Unit select input
Not used	5	13	Not used
Audio Alarm enable	6	14	Not used
Audio Alarm enable	7	15	Not used
Not used	8		

### Notes

To disable the internal audible alarm remove short from pins 6 and 7

## **OPERATION**

Ensure the voltage selector on the rear of the panel is set to the correct setting. The unit is factory set at 230 Volts

On switching on the unit the STATUS indicator on the front of the unit should turn GREEN if all is OK.

If an alarm condition continues to show check alarm conditions on the rear panel

Connect the signal in to the INPUT SMA connector taking note of the power of the signal being input.

Output from the unit at Ku Band is from the output marked OUTPUT. The output SMA connector is rated to 18GHz and is a precision connector. Ensure a good quality connector is used to avoid poor contacts.

### **Alarms**

The PSU and LO failure relay contacts used are open when the unit is not powered or has a fault. In normal operating conditions the relays are energized and the contacts are closed.

The Amplifier failure relay contacts used are closed when the unit is not powered or has a fault. In normal operating conditions the relays are not energized and the contacts are open.

The PSU and LO alarms on the D type connector can be chained to give a summary alarm. A typical configuration could be to link pin 3 to pin 9 then connect a piece of twin wire to pins 2 and 10. In normal conditions these 2 wires should show continuity.

Typically if pins 1 and 2 are joined in addition to the above an alarm indication would be a non grounding signal

Alarms are due to the following reasons

1. 5 Volt rail drops to 0 Volts. The unit will indicate a PSU failure.
2. DRO is out of lock. The unit will alarm when the DRO phase volts drop below 2 Volts or exceed 12 Volts.
3. Amplifier not taking any current.

### **Internal adjustments**

1. Internal frequency reference adjust (factory set) is a potentiometer on the PCB