

# Installation and Operating handbook

## PBD Series II Block DownConverter

Handbook Issue 5.1, 3rd August 2005



PEAK COMMUNICATIONS Ltd.  
Kirklees House, 22 West Park Street  
Brighouse, West Yorkshire  
HD6 1DU, England

Phone +44 (0)1484 714200  
Fax +44 (0)1484 723666



Certificate number 2400/00

**Peak Communications Ltd, Kirklees House, 22 West Park Street,  
Brighouse, West Yorkshire HD6 1 DU England  
Telephone 01484 714200, Fax 01484 723666  
Internet [www.peakcom.co.uk](http://www.peakcom.co.uk)**

**IMPORTANT NOTE: THE INFORMATION AND SPECIFICATIONS  
CONTAINED IN THIS DOCUMENT SUPERSEDE 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

## PBD Series II SHF to L-Band remote mounted Block Down Converters



### Unit description

The PBD Series II remote mounted Block Down Converters from Peak Communications are designed to be fully compatible with a wide range of L-Band modems and frequency converters. These high grade units are designed to accept the appropriate SHF signal and provide a further conversion to L-band. The PBD Series II units will connect to any system providing the correct DC and Reference parameters and accepting the correct input frequency range, such as the P7000 range of frequency converters.

The output is frequency locked to the indoor unit by the 10MHz reference typically provided by a P7000 series unit. The unit is packaged in a die-cast IP67 box with integral mounting lugs for easy mounting.

The PBU series are designed to operate over a wide range of 10MHz power level inputs. The unit is temperature compensated to avoid long warm up periods.

The internal construction of the unit is modular which give some flexibility in accommodating customers' requirements such as gain and frequency. The unit is powered from the output cable which carries the DC, 10MHz reference signal and L-band output. Levels of these are given in the unit specification. Where very long lengths of cable are used an additional gain can be incorporated as an option.

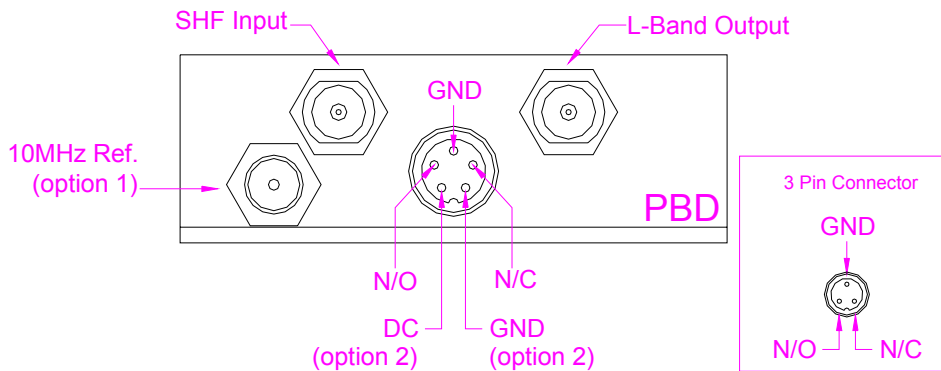
The amplifier fitted is a standard low noise unit and is output via an isolator to the N-type socket. With the losses incurred in the RF strip, the gain of the whole system with the amplifier is typically 30dB.

The third socket on the base of the unit is for an alarm cable. The 'Out of lock' signal from the DRO is passed to a relay which is powered when the DRO is in lock. Both the NO and NC sides of the relay are available on this 3 pin connector.

The PBD series was designed to be operated, using an external 10MHz reference signal generated by the P7000 series Down Converter or a station reference signal. This ensures the output frequency is as accurate as the external reference and that the stability is very high. In some cases it is not possible to supply the external reference signal to the PBD or if the external reference signal is lost during operation, there is an automatic reference detection system within the unit that detects a missing reference and enables the internal reference. The internal reference is in itself very stable and suitable for professional broadcast applications, details of performance are provided on the data sheet.

As an option, a fourth socket can be fitted which is for an external 10MHz reference and is usually a TNC connector. The operation for the 10MHz system is the same for a standard unit with the same alarms and internal reference detection circuitry. Also as an option the DC can be supplied on the alarms socket. The 3 way socket is replaced with a 5 way version and the DC and ground connection is placed on the extra pins. If the above options are fitted the composite arrangement of L-Band, 10MHz and DC being fed up the cable does not apply to the unit.

## Installation



Connection panel view of PBD Units

The unit has integral brackets on the box for attachment to a suitable fixture. The cables are all connected to one face which is the shorter side and the spacing of the four 5mm holes are 80mm apart and 190mm apart. The unit is cast aluminium and will break if excessive force is used.

Attach the N-type feed wire carrying the L-Band signal (plus 10MHz reference and DC, as appropriate) to the socket marked 'RF OUT'. Note that in very sensitive applications a clip-on ferrite on this line will ensure minimisation of any spurious signals. EMC tests show the unit to be very 'quiet' for radiation with the highest detectable single frequency to be 50MHz.

The SHF Input to the unit is via an N-type socket marked 'RF IN'. Check out all cables for shorts before connecting and ensure the connections are weatherproofed. The input to the unit has an isolator fitted which has a low DC tolerance and connecting the cables round the wrong way may cause damage.

### Note;

- Units are normally supplied with a 3-pin alarms connector, but an optional 5-pin connector is supplied if the 'separate DC' Option 2 is chosen.
- N/C (NORMALLY CLOSED) defined as; shorted to ground with no power, open circuit when working OK.
- N/O (NORMALLY OPEN) defined as; open circuit with no power, short to ground when working OK.

**The rating of the relay contacts is as follows;**

Switch Voltage (Max)	100V
Switch Current (Max)	0.5A
Switch Power (Max)	10W
Contact resistance	0.2 $\Omega$
Operate/release	0.5 ms

**Connections to a Peak P7000 series Synthesised Converter**

It is recommended that connections between the Block Down Converter and the P7000 series units are made with the connections as shown below;

<b>Block Down Converter (with 3-pin connector)</b>	<b>P7000 series Alarms connector</b>	
Function	Pin Number	Function
Ground	15	Ground
N/O	11	Ext Alarm (1)

<b>Block Down Converter (with 5-pin connector)</b>	<b>P7000 series Alarms connector</b>	
Function	Pin Number	Function
Ground	15	Ground
Ground (option 2)	User to supply	
DC Input (option 2)	User to supply	
N/O	11	Ext Alarm (1)

With this configuration a power failure or out of lock situation will give a non-grounding signal to pin 11 of the alarms D-Type connector which will cause the summary 'ALARM LED' to flash and show 'EXT ALARM' on the P7000 series display. See the P7000 series manual for more details of alarms.

**Operation**

Refer to the specification of the Block Down Converter with specific regard to signal levels. Ensure the alarm is not flashing on the P7000 series display.

All PBD series units are designed so that the lowest SHF frequency converts to 950MHz.

For convenience an SHF frequency can be input directly on the P7000 series. Ensure the SHF is turned ON to allow this frequency to be entered. The frequency limits will depend on the Local Oscillator frequency set. Please refer to the P7000 series manual for details of the SHF display facility.

With a gain of nominally 30dB and a maximum input of -25dBm the maximum output power is nominally +8dBm.

The 10MHz reference signal, if provided, should be 0dBm +/-3dB. Lock can be achieved down to -10dBm, but this gets progressively more susceptible to interference.

The Alarm output is normally configured as a summary of 'external reference disconnected' or 'LO alarm' ('DRO out of lock' or 'no power to the unit'). Special configurations are available for applications where the user does not want 'external reference disconnected' to trigger an alarm.

## Maintenance

The unit is maintenance free but the following should be considered.

If the unit has been opened for any reason and the unit is in a hostile atmosphere additional sealing of the box is advised.

The only monitoring position on the DRO is the monitor pin which should read 6 volts in lock position. Adjustment is made by the tune screw in the top of the DRO unit but the tuning is coarse and caution should be exercised as it is possible to make the unit lock to another frequency. For example the 6.3GHz DRO used for the X-band unit can be locked 50MHz either way. A spectrum analyser or frequency counter is required for this adjustment. On some DRO units the tune screw is glued to prevent movement during transit.

## Typical PBD Series II Specification

**Note this typical specification may not match exactly the specification on which a unit is sold or the current data sheet, please see web site for latest specification.**

### SHF Input

Frequency	dependant upon SHF frequency range
Connection	50Ω N-type
Return loss	>18dB
RF Input Power	-25dBm max.

### L-Band Output

Frequency	950-1450MHz
Connector	50Ω N-type
Return loss	>15dB
1 dB GCP	+ 8dBm

### Transfer Characteristics

Conversion gain	30dB ±1dB at band centre
Gain stability	±0.5dB from 0 to 40°C (-0.026dB per +°C)
Gain flatness	±1dB full band ±0.5dB across any 40MHz in band.
LO Frequency	dependant upon SHF frequency range
Noise	7dB max

### RF Performance

LO Phase noise (typical with good phase noise 10MHz ref)	-75dBc/Hz at 100Hz -92dBc/Hz at 1kHz -100dBc/Hz at 10kHz -107dBc/Hz at 100kHz -125dBc/Hz at 1MHz
Spurious	<-80dBm (in band non-carrier related) <-75dBc (in band carrier related)
3rd Order Intercept	>+18 dBm
LO leakage	<-80 dBm (always out of band)

### External Reference Input

Frequency	10MHz
Connection	Fed in on L-band cable (option 1; separate 50Ω TNC)
Level	0dBm +/-3dB
Locking delay	<2 minutes to stabilise
Internal back-up reference; Stability	<±5 x 10 <sup>-8</sup> (0 to +60°C)

Ageing <math>\lt; \pm 5 \times 10^{-9}</math> per day

### **Mechanical**

Width 123mm (4.85")  
Height 172mm (6.8"), plus connections & mounting flanges  
Depth 48mm (1.89")  
Construction Diecast Aluminium, IP67 rated  
Weight 1.35 kgs (3lbs)

### **Environmental**

Operating temp. -25°C to +70°C  
EMC EN 55022 part B & EN 50082-1  
Safety EN 60950

### **Power Supply**

Voltage +16.5 to +35VDC  
Current 500mA nom.  
Connection Fed in on L-band cable  
(option 2; Fed in on separate 5-pin alarms connection)

### **Control Interface**

Alarms Summary alarm contacts  
Connection 3-pin circular weatherproof (mating part supplied)

### **Options**

- 1) Separate external 10MHz reference input (using a TNC connector)
- 2) Separate DC input connection (using a 5-pin alarms interface connector)

