

DATA SHEET

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RBUC-CP0402 C-band Block Up-Converter

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GENERAL DESCRIPTION:

The Block Up-Converter RBUC-CP0402 is designed for operation in MMDS TV broadcasting systems according to DVB-S/S2, DVB-C or DVB-T standards and provides up to 25 carriers output. This device has integrated matched CWT and can be used with regular RRL or broadcast antennas. Supported modulation types are 16APSK, 256QAM or COFDM. The local oscillator is locked by PLL with an internal frequency reference and has the best linearity parameters to ensure the stability of the output frequency and low IMD3 level – very important parameters for high quality modulation. The RBUC-CP0402 provides 4000 – 4200 MHz (or any 200 MHz in C-band by order) output frequencies for 470 – 670 MHz (other UHF or L-band option by order) input

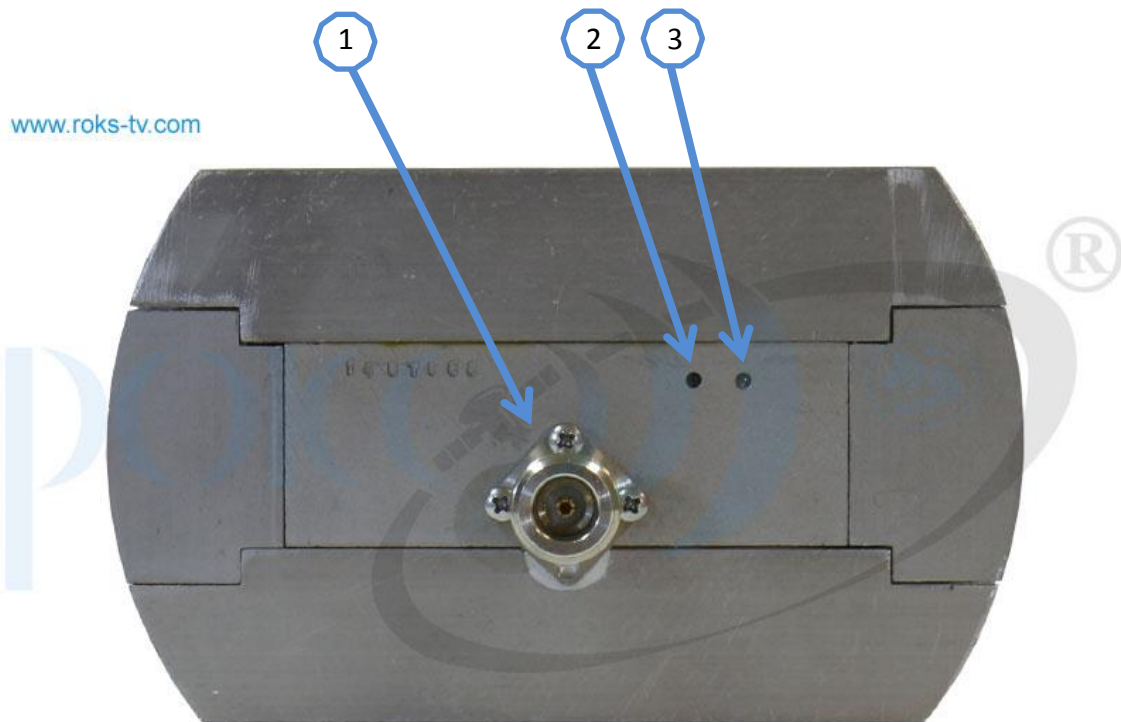
frequencies.

KEY FEATURES:

- Integrated matched CWT (Coaxial waveguide transition)
- Output power is 4W P1dB minimum
- Output frequencies: 4000 – 4200 MHz (or any 200 MHz in C-band by order)
- Input frequencies: 470 – 670 MHz (other UHF or L-band option by order)
- Min. gain: 60 dB
- Highly stable Internal reference
- LO is locked by PLL with an internal frequency reference.
- The lowest IMD3 level at ALC Output Power: -45dBc max
- Operates up to 25 carriers
- 256QAM and COFDM are supported
- Designed for operation in MMDS TV broadcasting systems

SPECIFICATION:

Input Parameters	
Input Frequency range	470 – 670 MHz (other UHF or L-band option by order)
Input impedance	50 Ohm
Input level, max	-10dBm
Input VSWR, max	1.5
Input interface	N-type Female
ALC range, min	25 dB
ALC threshold level	-35dBm
Local Oscillator	
LO frequency	3530 MHz (or by order)
LO Phase noise:	
@1 kHz	-80 dBc/Hz
@10 kHz	-90dBc/Hz
@100 kHz	-100dBc/Hz
LO instability	± 2ppm
Output parameters:	
Output frequency range	4000 – 4200 MHz (or any 200 MHz in C-band by order)
Output Power @P1dB	4 W
ALC Output Power	400mW
Gain, min	60 dB
IMD3 level at ALC Output Power, max	-45 dBc
Output interface	Waveguide WR229, Flange PDR40
Output VSWR, max	1.3
Frequency Response	
Flatness over Full Band	±1 dB
Spurious	
In-band @P1dB, max	-50dBc
Out-Band, max	-60dBc
LO leakage at ALC output power, max	40 dBm
Image rejection, min	60 dB
Power Supply	
Input voltage	18 VDC – 30 VDC, nominal 24 VDC
Power consumption, max	17W
Environmental	
Operating temperature	-40°C to +50°C (-40°F to +122°F)
Storage temperature	-60°C to +80°C (-76°F to +176°F)
Operating humidity	100%, non-condensing
Mechanical	
Dimensions (W x H x D)	130x80x175 mm
Weight	1.8 kg



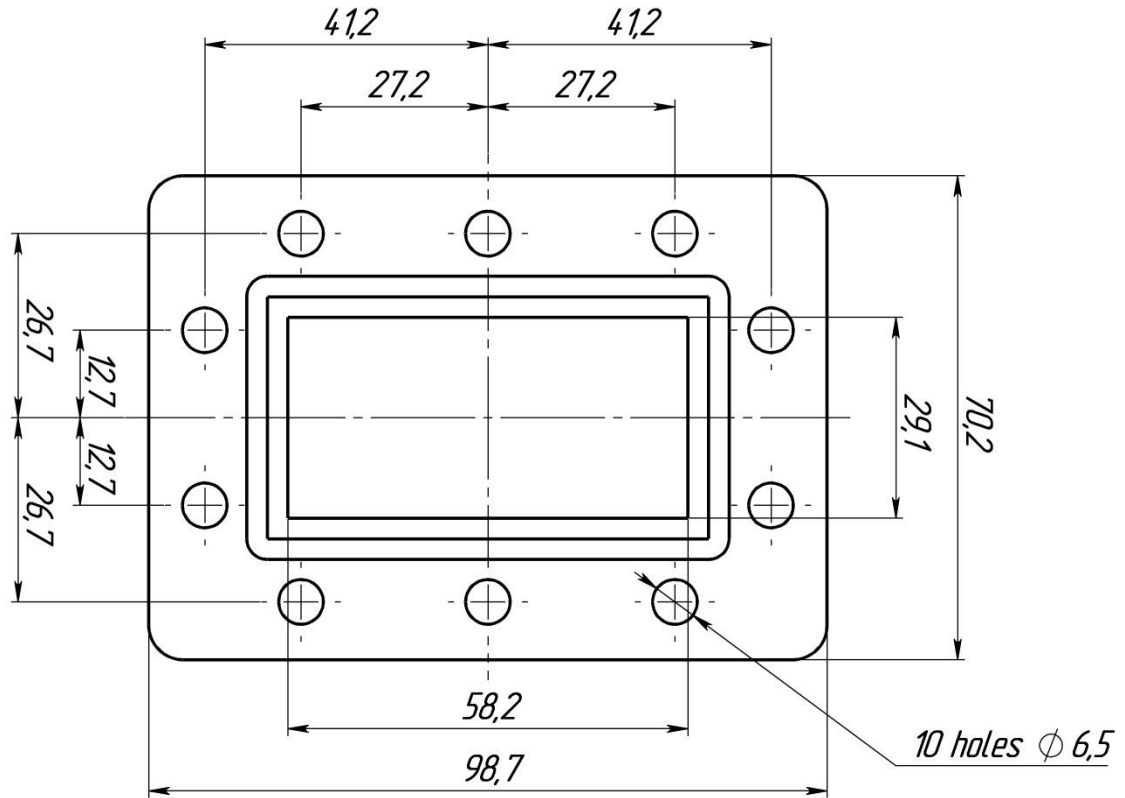
Pic.1 Rear side of RBUC-CP0402

1. Input connector, N-type. Combined input: radio frequency 470 – 670 MHz and Power Supply +24VDC (positive by central pin)
2. AGC locked LED. (Table 2. LEDs Status)
3. Alarm LED. (Table2. LEDs Status)

EXTERNAL INDICATION:

Table 2. LEDs Status

Alarm LED	
Off	No power
Red	Internal failure
Green	Normal operating
AGC locked LED	
Off	Low input power. $P_{in} < P_{ALC}$ threshold level
Yellow	AGC locked. Normal operating

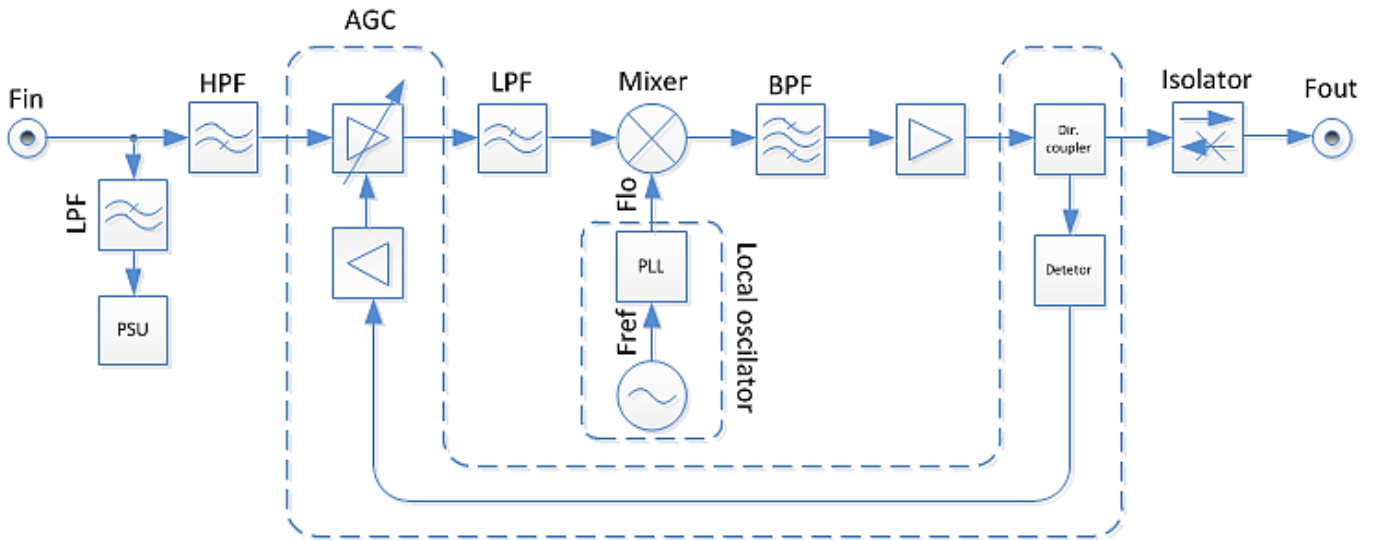


Pic.2 RBUC-CP0402 output interface. WR229 Waveguide, PDR 40 flange.
 Dimensions are given in millimeters.

Table 3. Flange parameters

Flange parameters	
Frequency range	3300 – 4900 MHz
Internal (waveguide) dimensions	58.170 x 29.083 mm
Waveguide designator	WR229
Flange designator	PDR 40

SIMPLIFIED BLOCK DIAGRAM:



Pic.3 RBUC-CP0402 simplified internal block diagram

LO calculation example:

If input frequencies are $F_{in} = 470 \dots 670 \text{ MHz}$ and local oscillator frequency is $F_{LO} = 3530 \text{ MHz}$ then output frequencies range is:

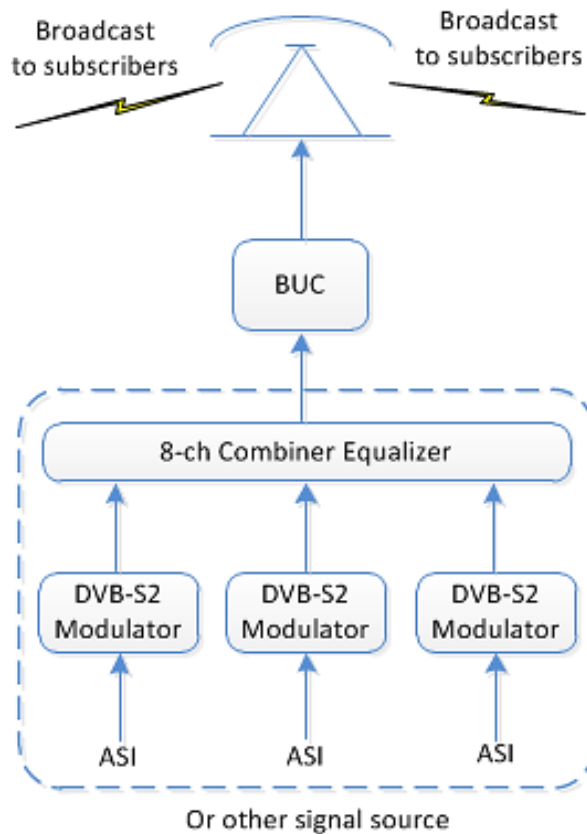
$$F_{out} = F_{in} + F_{LO} = (470 + 3530) \dots (670 + 3530) = 4000 \dots 4200 \text{ MHz}$$

OPERATING REQUIREMENTS:

- ✓ Input signal level must be in next range: $P_{ALC \text{ threshold level}} \leq P_{in} \leq P_{max \text{ input level}}$;
- ✓ RBUC-PC0402 generates a small amount of heat and has large heat sink surface area. It allows to use convection cooling. It is not necessary to use any coolers if the device has free air ventilation.

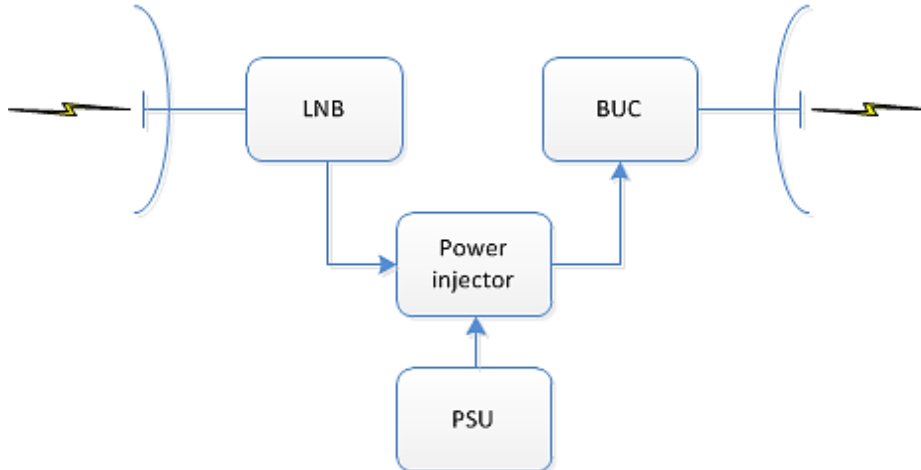
TYPICAL APPLICATIONS:

The first application of RBUC-CP0402 is the up-converter in a central station. The central station usually has the most powerful up-converters from 4 to 10 Watts because the common antenna is omnidirectional – a low-gain antenna compared to RRL. In this case, the power source often is a combiner or crossover, i.e. no external injector is needed.



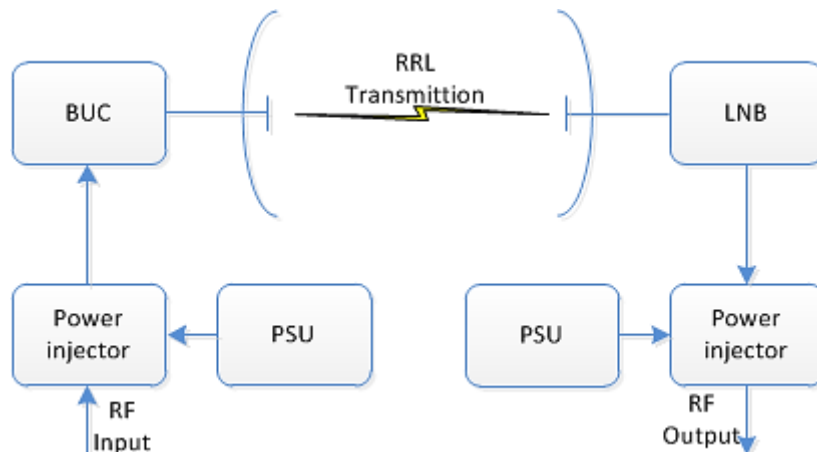
Pic.4 RBUC-CP0402 in a central station

The second application of RBUC-CP0402 is the up-convertor in a repeater. Particularly important parameter in this case is the minimal out-band radiation since transmitting and receiving parts of the repeater are not always good shielded from each other. RBUC-0402 up-convertor fully meets these requirements. Repeaters rarely include high-power BUC – it often is from 0.2 to 2 Watts. As an exception, the BUC with 4 Watts output power can be applied. A cost-effective repeater for covering a small district or village is able to be constructed on the basis of the BUC with 0.2 Watts of output power.



Pic.5 RBUC-CP0402 in a repeater

The third application of RBUC-CP0402 is the up-convertor in a radio relay line. Different combinations of transmitters and antenna's diameters allow to construct RRLs with lengths varied from few hundred meters to several tens of kilometers. Transmitter with power higher than 4 Watts is rarely used for RRL because of difficulty to find a line of sight at such far distance and use the high-power transmitter with small diameter antennas is not economically feasible.



Pic.6 RBUC-CP0402 in a RRL



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