

Localino

QO-100 Upconverter-H

The Localino QO-100 Upconverter-H (upconverter) from DO5DSH converts a low frequency radio signal to the 13cm (2.4 GHz) band and is suitable for operation via the QO-100 satellite. The frequency band of the input signal can be selected from 10m, 6m, 2m, 70cm or 13cm. The input power can be between 10mW and 5W.

No additional mixing signals are required to upconvert the low frequency IF signals of your ham-radio transceiver. The Localino QO-100 Upconverter-H provides all signals internally via TCXO and high-precision PLL. The output signal has a high spectral purity; undesired mixing products are suppressed by additional filters.

The QO-100 Upconverter-H comes in an aluminum housing including internal passive cooling. All HF connections are SMA sockets. The power supply should be 10V to 24V, with typically 13.8V or 20V in operation, depending on desired output power. The current consumption in standby is about 60 mA @ 20V, TX operation draws approx. 900mA @ 20V.

Application

To become QRV on the QO-100 satellite, a clean RF signal on the 13cm band is required. An upconverter is used here so that existing ham radio transceivers can continue to be used. The transmission signal can be provided by a shortwave or VHF transceiver. The QO-100 Upconverter H from DO5DSH can be set to the 10m, 2m, 6m, 70cm or 13cm band input by jumper.

The QO-100 Upconverter-H works with a digital HF vox. Instead of an analogue VOX, a digital VOX ensures that the PA switches reliably even with low input power and dynamic input levels (such as is usual with SSB signals). In addition, no separate PTT line is required. The control power should be between 10mW and 5W. The output power of up to 10 W allows you to work directly with the satellite without an additional amplifier and small antenna dishes.

With the QO-100 Upconverter-H you can also work directly with e.g. ADALM PLUTO and 13cm signals, since the device has two 2.4 GHz inputs to the amplifier.

Technical Data

Article name	QO-100 Upconverter-H
Brand	Localino
Supply voltage	10V – 24V
Current consumption (standby,	60 mA @ 20V
Current consumption (PA standby,	120 -130 mA @ 20V
Current consumption (TX, typ.)	up to approx. 900 mA at 20V
Dimensions W x H x D	W x H x D 100 x 80 mm
Output power (typ.)	up to 10W on 13cm (2.4 GHz)
13 cm input (optional)	Yes (can be used as a standalone PA)
VOX	digital
Frequency inputs	10m, 6m, 2m, 70cm, 13cm
HF connector types	SMA
Low Power Input	SMA, 10-17dBm
High Power Input	SMA, 30-37dBm
10MHz reference Input	SMA, 0-5 dBm

Features

- Up to 10W output power
- 4 factory pre-programmed frequency LOs for 4 IF inputs from 10m to 70cm
- Clean and stable output signal
- Low Spurious emissions
- Two IF inputs (low and high power) for 10m to 70cm signals
- Standby function with digital VOX for dynamic input signals, e.g. SSB
- Function indicators (Power, PLL Lock, Power Transmission)
- High power / overdrive input protection (short duration only!) and overdrive warning LED

Jumper and LEDs

RF output	Power [+ -] 12 - 24VDC	10 MHz Ref (optional)	IF Input (low pwr) max 17dBm	IF Input (high pwr) max 37dBm
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Localino® Q0 - 100 Upconverter - H

Jumper Settings	LED	IF Input: 10m, 6m, 2m, 70cm RF output: 2.4GHz, up to 40dBm
10 MHz Ref 70cm 2m 6m 10m	IF In Warn RF Out PTT LO Lock Power	Heuel & Löher GmbH & Co. KG by D05DSH, www.localino.net

Figure 1 Sticker on the „backside“ of the enclosure, where the heatsink connection is

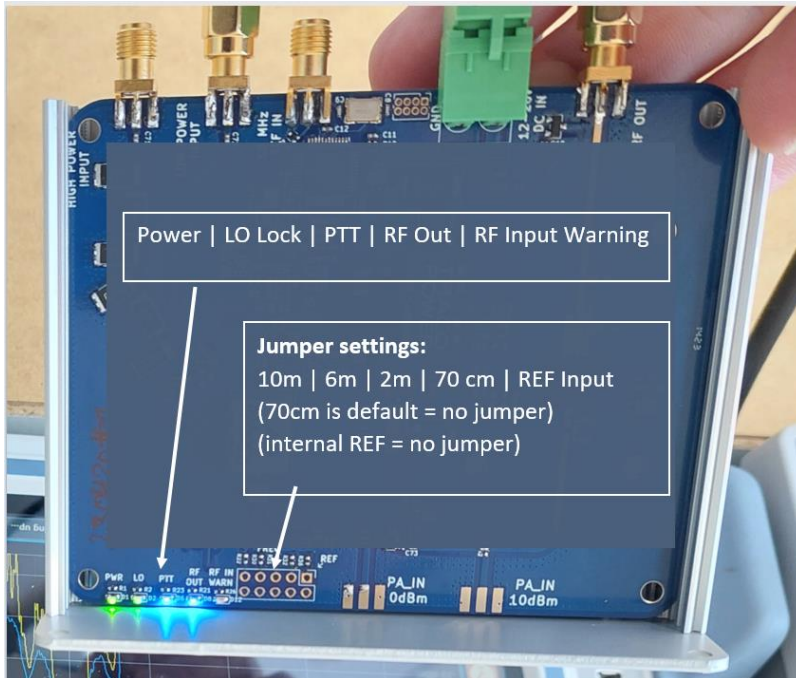


Figure 2 PCB (note the reverse order of the LED description as this side faces to the bottom when in the enclosure)

Caution



Even though the IF input is protected, you should not overdrive it. Maximum input power levels must be taken care of! Measure your power level at the IF Input of the Upconverter-H before operation (your transceiver TX power at the end of the cable).



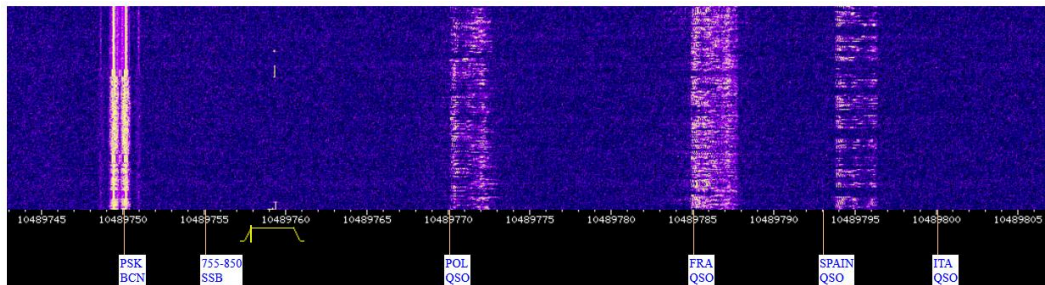
Take care of your SWR (S11, reflectivity) of your 2.4 GHz antenna. It must be ensured to have a good SWR (SWR < 1.9 / S11 < -10 dB). The power amplifier may break if you operate on bad antenna SWR.



Depending on your input signal quality and the output power level the output RF signal can become instable. This will show up as RF signal starts to sound noisy (no stable RF carrier anymore). Leave one side of the enclosure open or close with a 3D printed plastic lid to mitigate.



With a typical POTY or helix feed, 80cm dish antenna and optimal input power levels the RF signal power of the Upconverter-H can exceed the nominal power level at the QO-100 satellite and cause LEILA to trigger. In this case, lower the IF input power levels of your signal or DC supply voltage. Please take care when using QO-100 Upconverter-H.



Frequency: **10489757.80** kHz Mode: USB2.5
 -500Hz -100Hz -30Hz +30Hz +100Hz +500Hz
 Or tune by clicking/dragging/scrollwheel on the frequency scale.

Bandwidth: 2.54 kHz @ -6dB; 3.00 kHz @ -60dB
 wider CW USB2.7
 narrower CWN USB2.5
 USB-D1 USB3.1

Waterfall view: *To enlarge the window spectrum (Hold Left CTRL and + or - key)*
 zoom out zoom in max out max in reset spectrum

Sig: -59.3 dBm Peak: -59.0 dBm
 Noise: -87.0 dBm SNR: 28.0 dB

Volume: [Slider]

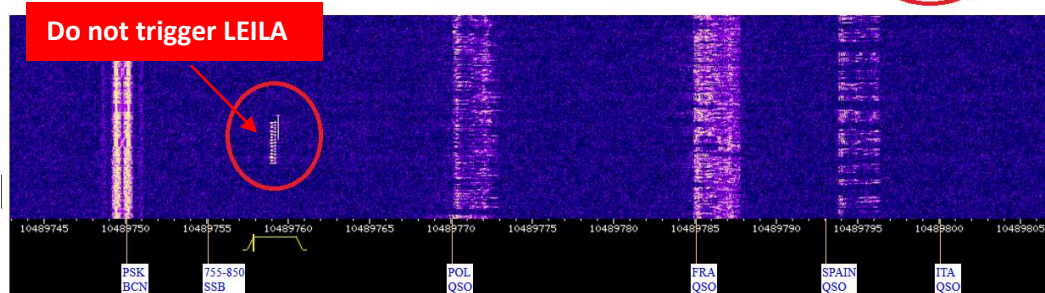




Figure 3: QO-100 Upconverter-H

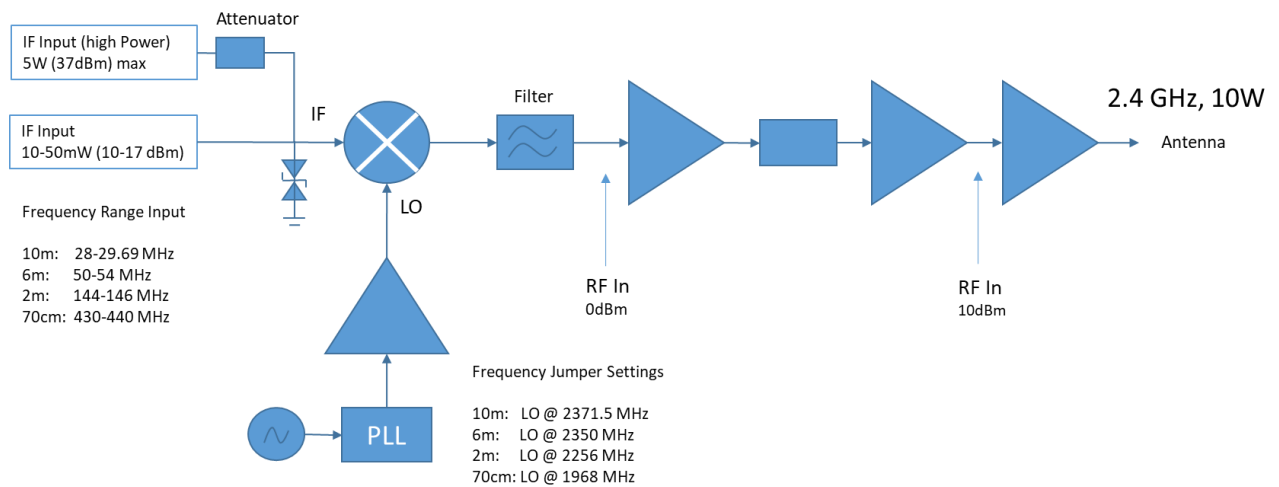


Figure 4: Signal path



Figure 5: High Power Input S11

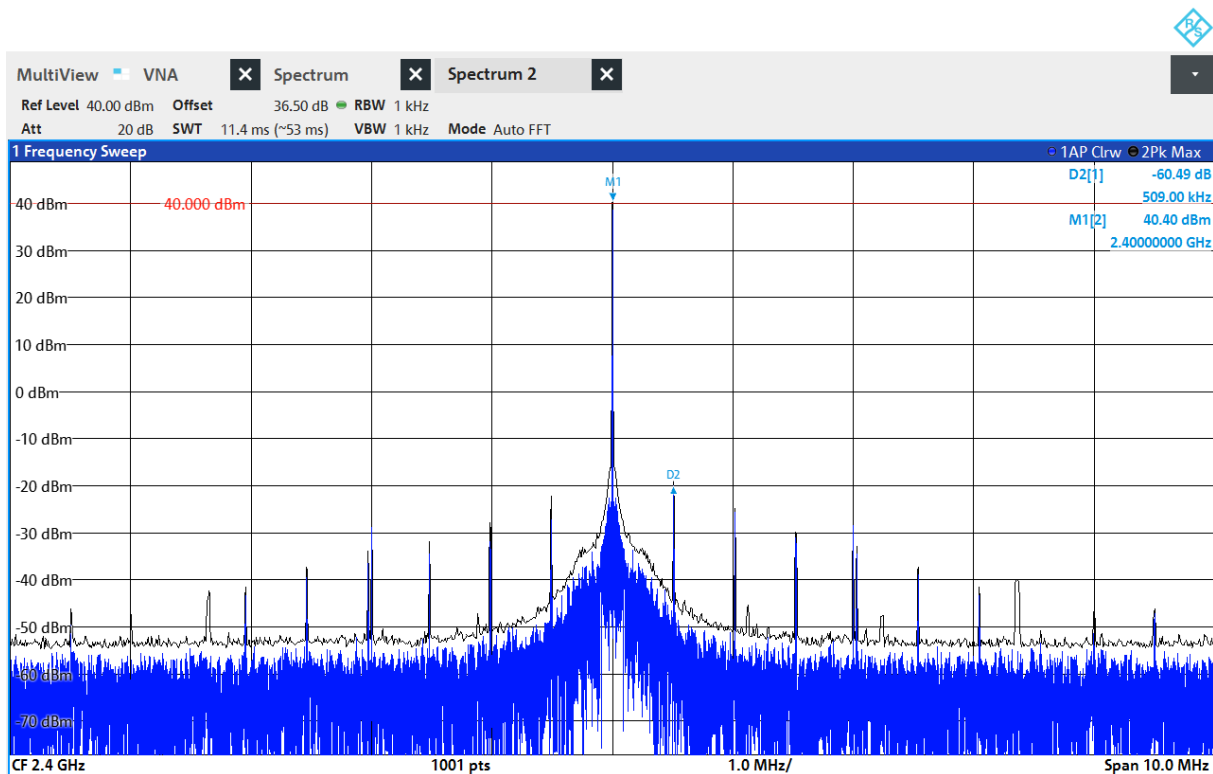


Figure 6: Output Spectrum

CAUTION:

PCBs have been fully tested and calibrated by factory. Handle the PCB with care.

Technical drawings

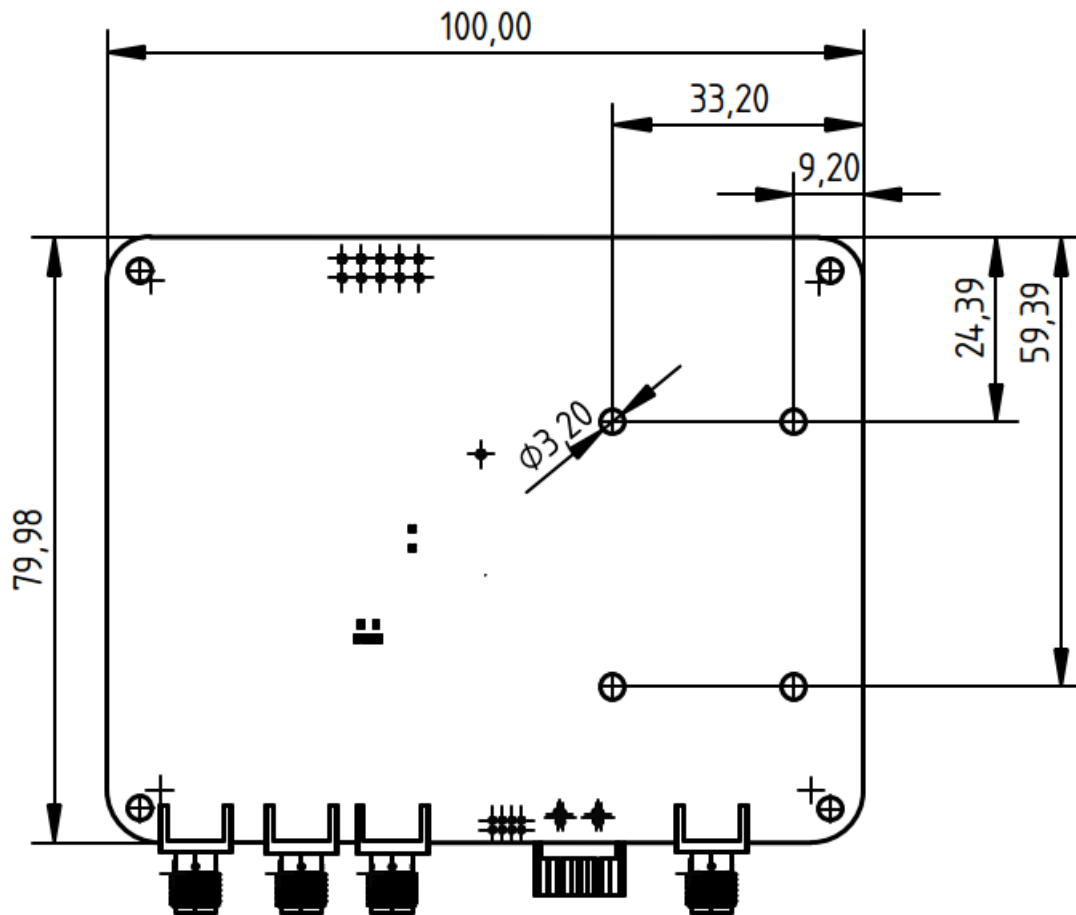


Figure 7: PCB cooling block layout and screw holes

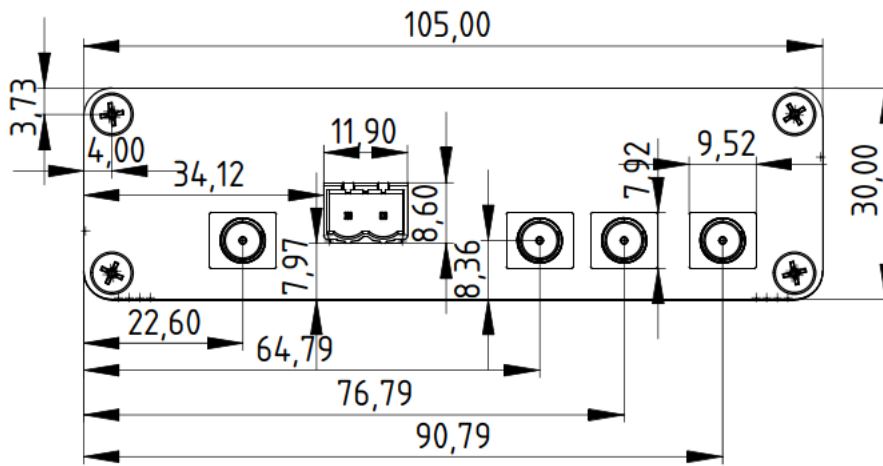
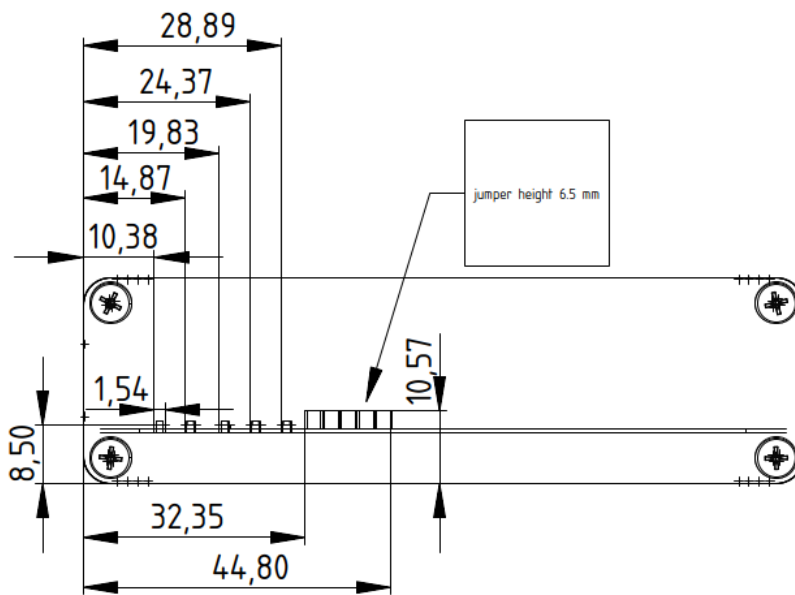


Figure 8: Enclosure



holes back

Figure 9: Enclosure holes front

About

Heuel & Löher GmbH & Co. KG (Germany) specializes in the development of RF technology for digital processes in Industry 4.0. With Localino they have created a brand that is used in indoor localization, track and trace and process optimization. Heuel & Löher also develops devices for amateur radio. DO5DSH has developed the new packet radio "NPR-H", a 70cm transceiver, which is used as a "last mile" entry to 70cm in the HAMNET. With the QO-100 Upconverter-H, a unique device has succeeded, which combines upconverter and PA for the use of various amateur radio devices with QO-100.