

# QO-100 Amsat-DL Upconverter V4.2

## Serial Data Format

The Amsat-Upconverter Version-4.2 has a serial interface on a 6-pin plug connector near the LED row. Diagnostic messages and measured values are output here:

**Level:** 3.3 volts (for connection to an RS232 interface a 3.3V - RS232 converter is ABSOLUTELY required!) **Baud rate:** 9600 Bd **Data bits:** 8 **Stop bits:** 1 **Parity:** none

The diagnostic messages are of no interest to normal users.

But what is particularly interesting is the output of measurement data:

### Data format:

UPC\_AA\_BB\_text completed with newline.

#### It means:

UPC ... 3 character header to indicate that display content follows. Lines that do not begin with UPC can be ignored.

\_ ... spaces

AA ... always twice 0, i.e. 00

\_ ... spaces

BB ... ID of the following data record

\_ ... spaces

text ... data content as ASCII text

### Here is a selection of information that is output:

BB	Description
00	PA temperature in degC
01	internal supply voltage after the 5V step-down converter in mV
02	a voltage that corresponds to the transmission power (forward power) followed by the dBm value (approximate value)
04	Status of the LOCK LED
05	Frequency of the mixer oscillator
06	Status of the PTT LED or the PTT input
07	Welcome message after switching on

08	Message when the synthesizer resynchronizes, e.g. after failure of an external reference frequency
09	LOCK status of the ADF4531 synthesizer
10	Input frequency of the upconverter, corresponding to jumpers M, N
11	Overtemperature alarm: ON or OFF (threshold: 75 degrees C) followed by temperature in degC
12	Undervoltage alarm (5V step-down converter): voltage in mV
13	Overvoltage alarm (5V step-down converter): voltage in mV

### Forwarding of messages from the downconverter:

The Amsat-DL downconverter also has corresponding serial messages. In order to be able to receive both with a single serial interface, downconverter and upconverter can be connected in series:

The serial output of the downconverter is connected to the serial input of the upconverter. The serial output of the upconverter is connected to a computer via a 3.3V RS232 level converter. All messages can then be read on the computer. The messages of the downconverter begin with the header "OLD", those of the upconverter with "UPC". See also [HERE](#).

### Evaluation of the forward power:

The performance is measured with an AD8312. The AD8312 is a logarithmic power detector. Its output voltage corresponds to the power in dBm.

If you want to measure the actual performance, a comparison must first be made. This means that the relationship between the measured output voltage and real power must be measured for two powers (one low and one high). Then you can convert each measured voltage into the associated power. It is not yet known whether this comparison has to be carried out for each individual circuit board or whether it can be made generally valid, because a larger number of circuit boards is required for this. If you need exact results, you have to carry out the comparison for the individual circuit board.

The evaluation of several boards showed that the measured values are very similar, so that a dBm accurate measurement should be possible. The above message UPC 00 02 outputs both the measurement voltage of the AD8312 and the estimated power in dBm. At the moment this "estimate" looks very precise, whether it stays that way will be seen after the production of a large number of circuit boards.

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