

QO-100 Amsat-DL Downconverter V3

Serial data output

The Amsat downconverter version 3 has a serial interface on the connector of the GPS module. The GPS module is programmed via this interface. In addition, diagnostic messages are also 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 transmission of the entire content of the OLED display. By evaluating these messages, the OLED display can be simulated on a PC or e.g. Raspberry. A wonderful job for amateur programmers!

Data format:

OLD_XX_YY_text completed with newline.

It means:

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

_ ... spaces

XX ... x position of the text on the display (column)

_ ... spaces

YY ... y position of the text on the display (line number)

_ ... spaces

text ... text to be printed

With a little skill you can extract all the information and use it for other purposes. Just as an example: the GPS coordinates could be used to calculate the azimuth and elevation of the QO-100 dish and much more. A huge playground for Raspberry PI hobbyists.

Here is a selection of information that is output:

XX	YY	Description
00	00	Amsat-DL greeting after switching on, title, heading
80	01	Firmware version
48	03	active special function

88	04	Status of the LNB power supply after switching on. OK or error description
88	05	Lock status of the central PLL Si5328 after switching on LOCK or wait
88	06	Lock status of the ADF4351 LO synthesizer after switching on LOCK or wait
56	05	Number of currently received GPS satellites
48	05	Number of currently received GPS satellites (alternative to the above message)
80	50	GPS lock status
80	00	Clock source: TCXO, OCXO, GPS or ext. 10 MHz reference clock
00	01	GPS time
48	04	LNB LO frequency in MHz
64	04	possibly the decimal places for the above 48 04
72	01	QTH Locator
48	06	GPS latitude
40	07	GPS longitude

there is more information, it is also possible that the XX YY values are changed.

It is best to print out the output in a terminal and look for the information you need.

The simulation of the OLED display is easy. You define a display with 128 columns and 8 lines (each line has 8 pixels because the font is 8x8).

In this simulated display, you simply write all OLD messages at the XX YY positions and you have an original image like on the real display.

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