

GPSBOXPLUS GPS Video Overlay Unit

The GPSBOXPLUS GPS video overlay unit provides a simple method for displaying GPS position data over a video camera's composite video signal. The unit has an integral 20 channel GPS receiver which provides the data for the overlay. The GPS position data is also available from the unit in standard NMEA 0183 RS232 serial data format.



GPSBOXPLUS front panel connectors



Screen Display Elements

Line 1	LAT	LON
Line 2	TIME	DATE
Line 3	ID STRING	ALTITUDE
Line 4	SPEED	HEADING

The GPSBOXPLUS front panel connectors are all clearly labelled. Video in and video out connections should be made before powering the system up. The GPS active antenna supplied should be attached to the connector marked GPS in on the front panel. The antenna itself should be situated in a location with a relatively clear view of the sky. If testing the unit indoors this should be at least a window sill, preferably south facing. Optimal positional accuracy will result from the antenna being placed on a metal surface with a clear 360° view of the sky. The unit requires a 9 - 12V DC regulated power supply connected via the 2.1mm power connector at the top left of the unit. Press the red power button below the power connector to switch the unit on or off. The button will illuminate when the unit is on. The output of the female DB9 connector labelled GPS out is GPS data according to the standard NMEA 0183 RS232 serial data format at 4800 baud, 8 data bits, no parity, 1 stop bit with a once per second update rate. This output can be connected to a laptop, PDA or other device that requires NMEA RS232 GPS data either for data logging or satellite navigation. The position, altitude and speed data sentences, GPRMC, GPGLA and GPVTG are always transmitted. Output of the satellite signal data sentences GPGSA and GPGSV can be optionally enabled / disabled. See sats on / sats off below.

The unit operates immediately power is switched on. There is an approximately 1.5 second delay before the screen display starts. Initially, until the internal GPS receiver has obtained a satellite fix, the screen displays "GPS BAD" and the 9 character identification string. Once a fix is achieved the overlay display will initially appear as shown above right. The "GPS BAD" message will be displayed again at any time that the receiver does not have a fix. The time taken to achieve a fix depends on the placement of the antenna and its resulting the view of the sky, combined with the relative position of the visible satellites together with the time and distance the receiver has moved since the last valid fix. The screen display position, character size and data type position are fixed.

The red select button and green advance button control the screen display settings. Settings can only be changed when the unit is connected to a GPSR and receiving data. Both buttons have a strong tactile response and should be pressed firmly and released. The display is only updated once per second, therefore there will be a delay of up to one second following each button press before the result is displayed. There are two screen control modes, select mode and advance/select mode.

Normally the GPSBOXPLUS unit is in select mode. By pressing the red select button the screen display can be cycled through either display off, 1, 2, 3, or 4 lines. The grey character background will toggle on and off at the start of each cycle.

To enter advance/select mode press the green advance button. On the screen display, at position ①, U+00 will start to blink. This is the time zone offset between the GPSR derived UTC and the time displayed. While it is blinking press the red select button to select the desired time zone offset between -12 and +12. For example select -05 for EDT or +01 for CET. The time shown on the display will update as you select each offset if valid GPS data is being received. With no valid GPS data the time zone will be displayed on the screen as an offset from 00:00:00 UTC. Entering +05 will be acknowledged by the display of 05:00:00 U+05.

To move to screen display position ② press the advance button. The date will start to blink. Pressing the select button will toggle the display of the date between the DD/MM/YY standard format and the MM/DD/YY format used in the USA, and perhaps elsewhere. If valid GPS data is being received the current date is shown, otherwise the date 31/01/01 is shown in the format selected.

Pressing the advance button for a third time will make the user defined nine character ID STRING at position ③ start to blink. Please note that if you want to navigate onto the altitude at position ④ then you will need to press the select button with the whole ID STRING blinking. Otherwise when the whole ID STRING is blinking press the advance button, and the first character will blink to indicate that it is selected. Press the select button to change the selected character. Alphanumeric characters together with space, colon, minus sign and full stop can be chosen. Please note that space characters do not blink when selected. Press the advance button to select each character in the string. If the string you want to display is seven characters or less in length then if you select the remainder as spaces then only the first seven will be displayed when you finish editing the string. When you have the last character position selected and press the advance button the whole string will blink. At this point you can either navigate to the altitude at position ④ by pressing the select button or select the first character in the string again by pressing the advance button.

When selected, the altitude at position ④ can be toggled between being displayed in metres or displayed in feet by pressing the select button. The actual altitude data from the \$GPGGA data sentence is in metres so when display in feet is selected this is calculated from the value in metres. The calculated value is accurate to +/- 1.

The speed at position ⑤ can be toggled between knots, miles per hour and kilometres per hour by pressing the select button. The display of mph is calculated from the speed in knots and is accurate to +/- 1. The speed in kph is taken from the \$GPVTG data sentence and will only be displayed if this data sentence is present in the output of your GPSR. When the speed position is blinking pressing the advance button will make the unit leave advance/select mode. The unit will leave advance/select mode with any display position selected if no button is pressed within thirty seconds.

Sats on / Sats off

The serial output of the GPSBOXPLUS is composed of the GPRMC, GPGGA and GPVTG data sentences by default. These contain the GPS navigation data required for position logging or satellite navigation software. Optionally output of the GPGSA and GPGSV data sentences can be switched on or off. These sentences contain information about the position and signal strength of the satellites used in the fix that can be useful for debugging. To connect the unit to a PC use a DB9 male to female straight through cable. To connect to a PDA's PC data cable a male to male null modem cable or gender changer is required. To turn the output of the satellite information on, first turn off the GPSBOXPLUS unit. Press and hold the red select button, then turn the unit on and continue to hold the select button for 10 seconds. After ten seconds release the select button. The display will restart after a short delay. To turn the satellite information off repeat the procedure, but with the green advance button held down instead of the select button.

GPS Receiver

- SiRF StarIII high performance GPS Chip Set 20 channel all-in-view tracking.
- Very high sensitivity (Tracking Sensitivity: -159 dBm).
- Rapid Time To First Fix at low signal level, Cold start average <40 seconds, Hot start average 1 second.
- WAAS & ENGOS supported.
- Position Accuracy 10 meters 2D RMS, 5 meters 2D RMS WAAS enabled.
- Datum WGS-84.

For full details of the GPS receiver specification please see the data sheet available on our website.

GPSBOXPLUS GPS video overlay unit.

Compatible with colour and mono composite video signals. 1Vp-p. PAL or NTSC*

Dimensions 110 x 110 x 45mm LxWxH

Power supply 9 - 12dc regulated

Power consumption 150mA with antenna

Operating Temp. 0° - 85°C

*The unit is compatible with the video standard of the country from which you made your order.

WARRANTY

The BlackBoxCamera™ Company Ltd. warrants its products to be free of defects in materials and workmanship under normal use and service for a period of twelve months from the date of original purchase. The obligations of The BlackBoxCamera™ Company shall be limited within the warranty period, at its option, to repair or replace the product or any part thereof. The company shall not be responsible for dismantling and/or installation charges. To exercise the warranty the product must be returned carriage paid and insured. Under this limited warranty the maximum liability of The BlackBoxCamera™ Company shall not in any case exceed the purchase price of the product, which shall be fixed as liquidated damages and not as a penalty, and shall be the complete and exclusive remedy against The BlackBoxCamera™ Company.

This warranty does not apply in the following cases: Improper installation, misuse, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than The BlackBoxCamera™ Company.

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