GPSBOX GPS Video Overlay Unit

The GPSBOX GPS video overlay unit provides a simple method for displaying the NMEA 0183 data from a GPS receiver (GPSR) over a video camera's composite video signal. The unit is compatible with any GPSR that transmits 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. Before connecting your GPSR to the unit please ensure that it has been correctly set up to transmit NMEA data. If you are doing this for the first time refer to the GPSR manufacturers instructions for the method to select NMEA output. If in any doubt we recommend that you connect your GPSR to your PC and open a PC terminal window, settings as above, and check the output data format. The table below shows the NMEA data sentences required. You may need to individually select the output of each sentence or a number of data sentences may be transmitted by your receiver once NMEA output is enabled. The GPSBOX unit requires the $GPRMC data sentence to generate the display of position, speed, heading, date and time. The altitude in metres is taken from the $GPGGA data sentence. The $GPVTG data sentence is required to display the speed in kilometres per hour. The unit ignores all other data sentences.

NMEA data sentences required

$GPGGA,123358,5130.2473,N,00004.5788,W,1,07,0.99,5.5,M,47.0,M,,*69
$GPRMC,123358,A,5130.2473,N,00004.5788,W,13.902,24.1,010506,2.6,W*73
$GPVTG,24.1,T,26.7,M,13.902,N,25.746,K*41

GPSBOX front panel connectors

Screen Display Elements

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

The GPSBOX front panel connectors are all clearly labelled. Video in and video out connections should be made before powering the system up. 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 GPSR's PC data cable should be connected to the upper, male DB9 serial connector labelled GPS in. The output of the lower, female, DB9 connector, labelled GPS out is the same as the input from the GPSR. 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 unit operates immediately power is turned on. There is an approximately 1.5 second delay before the screen display starts. With no valid GPS data the initial screen displays "GPS BAD" and the 9 character identification string. After ten seconds without activity on the serial line the display will be cleared. When valid GPS data is received the display will initially appear as shown above right.

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 GPSBOX 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 ❶, 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 ❷ 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 ❸ start to blink. Please note that if you want to navigate onto the altitude at position ❹ 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 ❹ 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 ❹ 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 ❺ 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 is 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.

GPSBOX 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 50mA

*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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