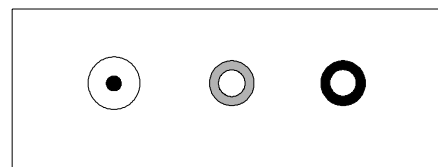# GPS Video Overlay Unit

The GPS video overlay unit provides a simple method for displaying the NMEA 0183 data from a GPS receiver (GPSR) over the picture from a video camera.

The serial line, video in and video out connections should be made before powering the system up. The unit is supplied with two DB9 serial cables both terminated with a 3.5mm jack plug. These connect to the unit via the jack socket on the right of the enclosure. The 0.5m male DB9 connector cable is provided to connect the GPSR's PC data cable to the unit. The 1.2m male DB9 connector cable is provided to connect the unit to a PC. **Do not remove or replace the 3.5mm serial connector while the unit is powered.**

The unit operates immediately power is connected. 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 12 character identification string. After ten seconds without activity on the serial line the display will be cleared. The identification string is set via a user command which is sent via the serial link from any serial terminal program on a PC or other computer. The terminal settings should be 4800 baud, 8 data bits, no parity, 1 stop bit. Connect the female serial cable to the 3.5mm jack socket on the right of the enclosure and then to the PC serial port. Please note that the unit does not display a prompt when connected and that the characters that you type will not be echoed. All the commands use the alt key and the numeric keypad to generate non ascii command characters. Alt character sequences are used to avoid conflict with valid ascii characters in the NMEA checksums. If using a laptop you may need to refer to its documentation for the method required to emulate the numeric keypad. Follow single character commands with a **RETURN.** It is recommended that the commands are used to set the unit up immediately after it is switched on. If commands are not acknowledged type **RETURN** to reset the input. The command settings are stored in the unit when it is switched off.

9 - 12V DC Regulated   video in   video out

Front panel connectors

Command Table	
Command	**Function**
ALT + 0219	This command sets the ID string. Hold down the ALT key and type 0219 on the keyboard's numeric keypad (**ALT + 0219**). Release the ALT key and type up to 12 characters. Strings under 12 characters in length should be terminated by a carriage return.
ALT + 0220	This command toggles the character background on and off. Please note that the character background change will affect the next characters written to the screen.
ALT + 0221	This command sets the time zone offset between UTC and the time displayed. Type **ALT + 0221** followed by either a minus or plus character, '-' or '+', for the sign of the time zone then the actual offset as two digits. For example enter -05 for EDT or +01 for CET. The time zone will be displayed on the screen when the command is entered as an offset from 00:00:00 UTC. Entering +05 will be acknowledged by the display of 05:00:00 U+05.
ALT + 0222	This commands toggles the display of the date between the DD/MM/YY standard format and the MM/DD/YY format used in the USA, and maybe elsewhere. Entry of this command is acknowledged by display of the date 31/01/01 in the format selected.
ALT + 0223	This command selects whether the altitude is taken from the $GPGGA data sentence and displayed in metres or taken from the $PGRMZ sentence and displayed in feet. When entered this command is acknowledged by the display of an M or F on the screen. Please check your receiver is able generate the $PGRMZ sentence before selecting this option.
ALT + 0224	This command selects between the display of speed in knots or mph. When mph is selected the value displayed is calculated from the speed in knots from the $GPRMC sentence. The command is acknowledged by the display of K or M on the screen.
ALT + 0225	Display line 1 & 2 only.
ALT + 0226	Display lines 1, 2, & 3.
ALT + 0227	Display lines 1, 2, 3, & 4.
ALT + 0228	Display line 1 only.

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

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. We recommend that you connect your GPSR receiver to your PC and open a PC terminal window, settings as above, and check the output data format. You may need to select the output of each sentence individually or a number of data sentences may be transmitted by your receiver once NMEA output is enabled. The unit parses the $GPRMC data sentence to generate the display of position, speed, heading, date and time. The

NMEA data sentences
$GPGLL,5227.3690,N,00004.2495,W,100826,A,A*5B
$GPBOD,,T,,M,,*47
$PGRME,25.0,M,50.0,M,55.9,M*15
$PGRMZ,-45,f,2*06   [Optional for altitude in feet]
$GPRTE,1,1,c,*37
$GPRMC,101328,A,5227.3688,N,00004.2494,W,0.0,0.0,301100,3.1,W,A*12
$GPRMB,A,,,,,,,,,,,,,A,A*0B
$GPGGA,101328,5227.3688,N,00004.2494,W,1,03,2.6,-13.8,M,47.1,M,,*4A
$GPGSA,A,2,02,08,,,,,,26,,,,,2.8,2.6,1.0*32
$GPGSV,3,1,10,02,56,114,00,08,34,064,44,09,18,245,00,10,35,186,00*79
$GPGSV,3,2,10,15,08,340,00,17,19,287,00,23,19,319,00,26,67,295,46*7A
$GPGSV,3,3,10,27,04,066,00,31,08,027,00*76

altitude in metres is taken from the $GPGGA data sentence. If you have a Garmin GPSR which outputs the $PGRMZ data sentence the altitude may be displayed in feet. The altitude is displayed in metres or feet dependent on the option selected with the **ALT + 0223** command described above. The unit ignores all other data sentences. The table above shows the NMEA output from a Garmin eTrex GPSR with the sentences parsed by the unit shown in bold.

Once you have confirmed that your receiver is correctly set up to transmit NMEA data it can be connected to the unit. The data from the GPSR will be displayed immediately it is connected and the display will be updated each time a complete data sentence is received. If invalid data is indicated by the data sentence's quality markers the data display is cleared and the message "GPS BAD" is displayed. If the GPSR is switched off, after 10 seconds of inactivity on the serial line the program will clear the display.

Compatible with colour and mono composite video signals. 1Vp-p. PAL or NTSC*
Dimensions 110 x 65 x 28mm LxWxH
Power supply 9 - 12dc via on board regulator or 9V PP3 backup battery
Power consumption 50mA

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

WARRANTY

The BlackBoxCamera^{TM} 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^{TM} 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^{TM} 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^{TM} Company.

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