OSD-GPS+™ with GPS Carrier Board

On-screen composite video character and graphic overlay with GPS

Version 1.04

Description

OSD-GPS+™ with GPS Carrier Board is an on-screen composite video overlay device that overlays GPS (Global Positioning System) latitude, longitude, heading (track), speed, altitude, date, and time onto any incoming NTSC or PAL composite video source such as a color video camera. In addition to displaying GPS information, the OSD-GPS+™ with GPS Carrier Board can also display a user defined message as well as real-time distance and bearing to a user defined waypoint. The OSD-GPS+™ with GPS Carrier Board produces a self-generated screen if no video input source is available. OSD-GPS+™ with GPS Carrier Board includes a high precision internal GPS receiver and an external SMA GPS antenna connector.

Specifications

Dimensions:	2.5" L x 2.5" W x .7" H
Weight:	1.1 oz. (with OSD-GPS+™ module installed)
RoHS compliant:	Yes
Input voltage:	7.0 to 14.0 volts DC (200 ma max. without antenna)
Operating temperature:	-40C to +85C (extended temperature range standard)
Video format:	Composite video
Video level:	1 volt peak to peak
Video impedance:	Input 75 ohm, output 75 ohm resistively terminated
Speed format:	MPH, KPH, and knots
Altitude format:	Feet and meters
Heading (track) format:	Compass cardinal points (e.g. NW) and degrees
Time format:	UTC with user time zone adjustment
Date format:	mm/dd/yy and dd/mm/yy
User custom message length:	10 characters

Internal GPS Receiver Secifications

Receiver:	L1 C/A code, 65-channel
Position Accuracy:	2.5 meters CEP
Velocity Accuracy:	0.1 meters/sec
Time Accuracy:	300ns
Startup Time:	29 second warm/cold start under open sky (average)
Sensitivity:	-161dBm tracking
Update Rate:	1, 2, 4, 5 Hz (1 Hz default)
Dynamics:	4G (39.2m/sec2)
Operational Limits:	Altitude < 18,000 meters and velocity < 515 meters/sec (simultaneously)
External Antenna:	Active, 3.3 or 5.0 Volts DC with gain up to 30dB and noise figure less than 2db

Connection Solder Pads

Solder Pads: +12VDC (J1)

Pad	Description
+12VDC	7.0 to 14.0 volts DC input
GND	Ground

Solder Pads: VIDEO IN (J3)

Pad	Description
VIDEO IN	Video input
GND	Ground

Solder Pads: VIDEO OUT (J4)

Pad	Description
VIDEO OUT	Video output
GND	Ground

Solder Pads: Parallel Buttons (P1)

Note: P1 solder pad block is wired in parallel to the MENU, UP, DOWN, and ENTER buttons

DIP Switch Configuration

OSD-GPS+™ with GPS Carrier Board comes configured for NTSC video format and a 1 Hz (once per second) GPS update rate. Reconfigure these settings using the onboard DIP switches.

DIP #	Description
1 & 2	GPS update rate DIP 1 DIP 2 Baud OFF OFF 1 Hz OFF ON 2 Hz ON OFF 4 Hz ON ON 5 Hz
3	NTSC or PAL video format OFF = NTSC ON = PAL
4	Firmware flash update OFF = Normal operation ON = Firmware flash mode

Note: DIP switch inputs are only checked during power-up.

On-Screen Menu Configuration

At any time press the "MENU" button to enter the on-screen menu configuration. The "UP", "DOWN", and "ENTER" buttons move the cursor and change the settings. All configuration information is stored in non-volatile memory so information is retained even with loss of power to OSD-GPS+™ with GPS Carrier Board.

Main Menu:

Menu Option	Action / Setting
Enable GPS Overlay	• ON - Display the overlay text • OFF - Pass video through without displaying the overlay text
Display Options Menu...	Display the Options Menu
Field Formatting Menu...	Display the Field Formatting Menu
GPS Diagnostics...	Display raw GPS NMEA sentences
Save Changes and Exit	Save changes and exit the Main Menu
Discard Changes and Exit	Discard changes and exit the Main Menu

Display Options Menu:

Menu Option	Action / Setting
Screen Layout	Select an on-screen GPS field layout format • Standard - Fields are displayed on the top and bottom of the screen • Top - Fields are displayed on the top of the screen • Bottom - Fields are displayed on the bottom of the screen • Left - Fields are displayed on the left side of the screen • Right - Fields are displayed on the right side of the screen
Backgnd Frame	• ON - Draw a background frame behind the overlay text • OFF - Do not draw a background frame behind the overlay text
Show Status	• ON - Display the GPS receiver status on-screen • OFF - Do not display the GPS receiver status on-screen
Show Altitude	• ON - Display altitude on-screen • OFF - Do not display altitude on-screen
Show Ranging	• ON - Display distance and bearing to waypoint on-screen • OFF - Do not display distance and bearing to waypoint on-screen
Show User Msg	• ON - Display the user defined message on-screen • OFF - Do not display the user defined message on-screen
User Message	Enter an optional 10 character on-screen message • MENU button to decrement cursor position • ENTER button to increment cursor position • UP / DOWN buttons to cycle through characters
Main Menu	Return to Main Menu

Field Formatting Menu:

Menu Option	Action / Setting
Altitude	• Meters • Feet
Speed	• Knots • KPH • MPH
Heading	• Degrees (e.g. 90) • Compass (e.g. NW)
Ranging	• Meters • Feet
Date	• mm-dd-yy • dd-mm-yy
UTC Offset	Time offset from UTC (-12 through +12) e.g. -5 is EDT • ENTER button to increment value
Main Menu	Return to Main Menu

Operation

After power is applied OSD-GPS+™ with GPS Carrier Board performs the following operations:

1. Establish communications with the internal GPS receiver
2. Wait for the GPS receiver fix with a minimum of 4 satellites
3. Update the on-screen fields after each valid NMEA GPRMC and GPGGA sentence is received from the internal GPS receiver
4. Check for "MENU", "UP", and "DOWN" button presses

At any time press the "MENU" button to enter the on-screen menu configuration.

Status Icon:

If the "Show Status" option is enabled (by default) the following icons may appear:

Icon	Status
	No or invalid communications with the internal GPS receiver
	The internal GPS receiver does not have a satellite fix

"GPS FIX" LED:

The "GPS FIX" LED illuminates when the internal GPS receiver has a fix with a minimum of 4 satellites. A GPS fix is required for on-screen GPS information to update.

Distance and Bearing to Waypoint:

If the "Show Ranging" option is enabled then distance and bearing information from the current location to the user defined waypoint is displayed in real-time.

At any time while there is a GPS fix press the "UP" button to set the current location as the waypoint. Pressing the "DOWN" button will clear the waypoint. It is not necessary to clear the waypoint before setting it again.

Trouble Shooting Tips

Problem	Solution
Green Power LED will not illuminate OSD-GPS+™ with GPS Carrier Board will not turn on	• Verify power supply output (7.0 to 14 volts DC) • Verify polarity of supply to OSD-GPS+™ with GPS Carrier Board
Blinking Clock icon	• No valid communications with the internal GPS receiver • Verify no local RF interference
Blinking Satellite Dish icon Yellow "GPS FIX" LED off No GPS information on-screen or fields do not update	• The internal GPS receiver does not have a satellite fix • Verify external GPS antenna attached • Verify a clear view to the sky • If using an external video transmitter then increase antenna distance from GPS antenna • Wait up to 4 minutes for initial GPS receiver fix
On-screen text is difficult to read	• Verify that the OSD-GPS+™ with GPS Carrier Board "VIDEO IN" has a noise free video signal • Enable the Background Frame in the Display Options Menu

Warranty & Service

If the product fails to perform as described in our product description or specification, within 1 year from the date of shipment to the buyer, we will repair or replace the product and/or accessories originally supplied. Failure due to improper installation, misuse, abuse or accident is not covered by this warranty. Incidental and consequential damages are not covered by this warranty. The buyer must first obtain a Return Material Authorization number by calling (248) 588-4400, or send email to support@icircuits.com. Ship the defective product (with RMA number) to Intuitive Circuits, 3928 Wardlow Ct., Troy, MI 48083, freight prepaid.

Intuitive Circuits, LLC

3928 Wardlow Ct.
Troy, MI 48083
Voice: (248) 588-4400
Fax: (248) 588-4455
http://www.icircuits.com