

# PROTEUS-LITE User Manual

Version V2.00  
Oct 1, 2019

# TABLE OF CONTENTS

<b>GENERAL OVERVIEW .....</b>	<b>4</b>
<b>TYPICAL INTERCONNECT DIAGRAM.....</b>	<b>5</b>
<b>GLOSSARY TERMS.....</b>	<b>6</b>
<b>COMMUNICATION .....</b>	<b>6</b>
COM PORTS .....	6
COM PORTS: BAUD RATES.....	6
COM PORTS: DEVICE TYPES .....	7
COM PORTS: CONFIGURATION .....	7
COM1 .....	7
COM2 .....	8
USB DEVICE PORT .....	8
USB HOST PORTS.....	8
<b>VIDEO INPUT &amp; OUTPUT.....</b>	<b>9</b>
VIDEO FRAME RATES .....	10
<b>IRIG INPUT.....</b>	<b>10</b>
<b>LOAD CONFIGURATION.....</b>	<b>11</b>
<b>STORE CONFIGURATION.....</b>	<b>11</b>
<b>TEXT, LOGO AND DATA INSERTER.....</b>	<b>12</b>
QUICK TUTORIAL .....	12
DISPLAY TIME, DATE .....	12
DISPLAY TEXT .....	13
DISPLAY IMAGES.....	15
DISPLAY GPS DATA.....	16
DISPLAY NMEA DATA .....	18
DISPLAY BARCODE.....	19
ADD MILLISECOND COUNTER TO IRIG, GPS, RTC TIME .....	20
<b>SPECIFICATIONS .....</b>	<b>21</b>
MAXIMUM INPUT VOLTAGE .....	21
INPUT CONNECTOR .....	21
ENVIRONMENTAL .....	21
WEIGHT & DIMENSION .....	21
FRONT PANEL LED .....	21
<b>APPENDIX A – KEYBOARD COMMANDS .....</b>	<b>22</b>

KEYBOARD COMMANDS .....	22
KEYBOARD SHORTCUTS .....	22
<b>APPENDIX D – IMAGES.....</b>	<b>23</b>
JPG .....	23
PNG .....	23
LOCATION .....	23

# GENERAL OVERVIEW

**Video Overlay** is a method by which computer-generated images are superimposed on video. Properly transformed images appear as if they are an integral part of the scene without impeding the video of the actual environment.

The primary purpose of PROTEUS is to provide the ability to insert text, logos and GPS data.

PROTEUS-LITE provides capability to overlay crisp and clear texts, graphics into an incoming HD & SD video in real time.

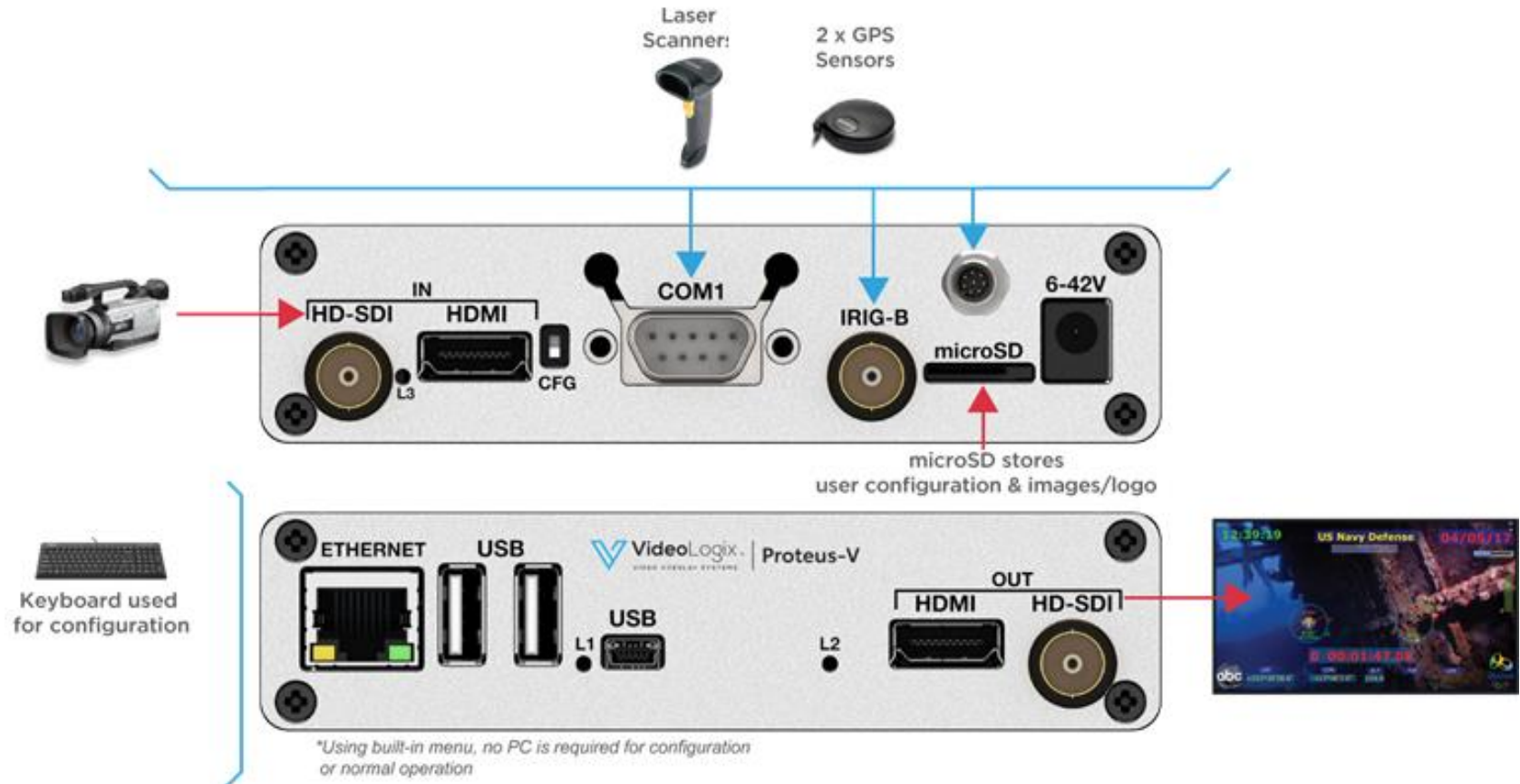
PROTEUS-LITE supports both HD-SDI, HDMI input & output. It does not need to be connected to a computer for normal operation.

PROTEUS is available in 3 editions and the table below provides a comparison. **This User Manual is for PROTEUS LITE.**

FEATURES	PROTEUS		
	LITE	ESSENTIAL	PLUS
Insert Texts, Images, Time/Date, GPS data, POS Laser Scanner Code	√	√	√
Insert values from CSV sentences via RS232 & Ethernet		√	√
Insert values from NMEA sensors via RS232		√	√
Numerous APPs + Widgets + Device drivers		√	√
2 x Quadrature inputs		√	√
4 x Analog inputs		√	√
Insert IRIG-B timecode		√	√
Insert Network SNTP timecode		√	√
MEMS based Compass, Gyroscope		√	√
30+ Drawing commands via RS232 & Ethernet		√	√
Superimpose composite (NTSC/PAL) video input over HD video input (PIP)		√	√
Geotagging + KML File			√

# TYPICAL INTERCONNECT DIAGRAM

Diagram below illustrates a few the possible applications.



## GLOSSARY TERMS

Term	Definition
CSV	Comma Separated Values
TB	Terminal Block
UM	User Manual
COM	RS232 Communication port
GPS	Global Position System

## COMMUNICATION

### COM PORTS

PROTEUS-LITE provides 2 x serial ports (COM1 & COM2) for communication with the external devices:

COM PORT	Alternative 1	Alternative 2	Pin assignments
COM1	RS232: Rear Panel DB9	-	2=RX, 3=TX, 5=GND
COM2	RS232: Internal J54 & J16		J54: 1=RX, 2=GND, 3=TX

### COM PORTS: BAUD RATES

- COM ports are fixed for N, 8, 1. However, baud rates can be set to 4800, 9600, 19200, 38400, 57600 or 115200.

## COM PORTS: DEVICE TYPES

COM ports can be interfaced to various sensors. Table below shows the current list and their corresponding Device type setting.

Attach Sensor	Corresponding Device Type
Any sensor transmitting CSV sentence	CSV1, CSV2, CSV3, CSV4
All NMEA-0183 compatible sensors i.e. GPS Modem, Sounder, etc.	CSV1, CSV2, CSV3, CSV4
PuTTY or similar program	CSV1

PROTEUS-LITE supports 4 different CSV sentences:

Type	Sentence includes	Sentence Structure
CSV1	\$Header, Values..., Checksum	\$HEADER, VAL1, VAL2, VAL3, ... VALn*CS
CSV2	\$Header, Values...	\$HEADER, VAL2, VAL3, ...
CSV3	\$Values...	\$VAL1, VAL2, VAL3, ...
CSV4	Values ...	VAL1, VAL2, VAL3, ..

## COM PORTS: CONFIGURATION

Press F9 to display the Main Menu. Follow [Figure 1 - Figure 2](#) to configure the COM ports for desire baud rate & device type.



Figure 1



Figure 2

## COM1

COM1 (DB9) is configured as DTE (PC) i.e. RX=Pin2, TX=Pin3. Thus, sensors such as GPS can be directly connected to the DB9 without the need for NULL modem cable. However, a NULL modem cable is required to interface PROTEUS-LITE to a PC.

## COM2

COM2 is located internal. Signals TX & RX are provided at J16 connector (Compatible with Garmin GPS 18x LVC) as well as **Terminal Block** J54.

## USB DEVICE PORT

This port is used to upgrade the internal firmware. When connected to a PC, it will enumerate as a COM port.

## USB HOST PORTS

PROTEUS-LITE has 2 USB host ports. Typical device connected to these ports is a USB keyboard.



## VIDEO INPUT & OUTPUT



PROTEUS-LITE provides the following video input & output:

- SDI (HD & SD)
- HDMI (HD & SD)

PROTEUS-LITE does *not support* HDMI video with *HDCP*. It can only process one video input at a given time. If more than one input is connected at the same time, PROTEUS-LITE selects a video input based on the following priorities:

1. HD-SDI
2. HDMI

PROTEUS-LITE does not scale video and the output resolution follows the input. PROTEUS-LITE provides simultaneous video outputs.

## VIDEO FRAME RATES

PROTEUS-LITE is compatible with the following video formats:

1080i @ 50 / 60 Hz

1080p @ 23.98 / 24 / 25 / 29.97 / 30 Hz

1080PsF @ 23.98 / 24 Hz

720p @ 50 / 59.94 / 60 Hz

NTSC 480i @ 60 Hz

PAL 576i @ 50 Hz

## IRIG INPUT

This interface can be used to input an external unmodulated IRIG-B signal. PROTEUS-LITE can decode IRIG-B time & date code.

## LOAD CONFIGURATION

Press F9 to display Main Menu. Follow [Figure 3 - Figure 4](#) below to load a configuration file.



Figure 3



Figure 4

While in [Figure 4](#), use  $\uparrow\downarrow$  arrow keys to select the desire file and press “Enter” to load.

## STORE CONFIGURATION

PROTEUS-LITE stores 16 different configurations. Press F9 to display Main Menu and follow [Figure 5 - Figure 6](#) to save your configuration.

While in [Figure 6](#), type in the new file name in an empty field or select a file name (overwrite) and press F10 to **Save** file.

While in [Figure 6](#), use  $\uparrow\downarrow$  to select the file and press **Ctrl + Alt + F10 Delete** file.

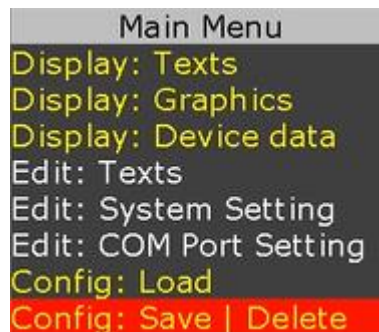


Figure 5

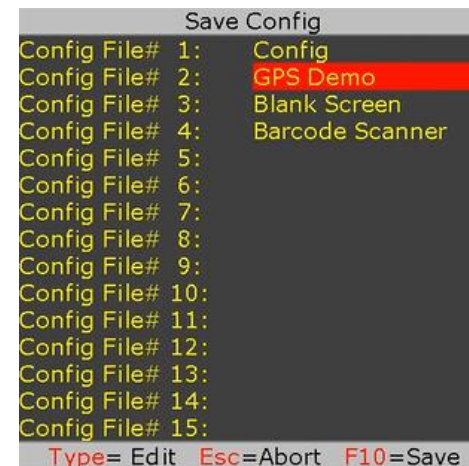


Figure 6

# TEXT, LOGO AND DATA INSERTER

## QUICK TUTORIAL

### DISPLAY TIME, DATE

1. Press F9 to display main menu
2. Follow [Figure 7 - Figure 9](#) to insert the desired parameter
3. While in [Figure 9](#), use  $\updownarrow$  arrow keys to select "RTC Time"
4. Press "Enter" to select "On"
5. RTC time will appear on the screen and *flashing*.
6. Use [shortcuts](#) keys to change the field attributes as described below:

"Font select, field Width, text Justification, text Color, text Background and Ctrl or Alt +  $\updownarrow$  text position"

7. Repeat steps 3 through 6 to display "RTC Date"
8. Press F10 to save and exit.

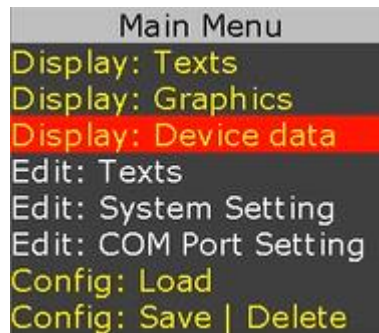


Figure 7

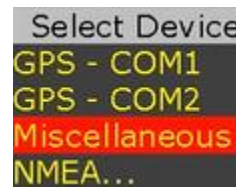


Figure 8

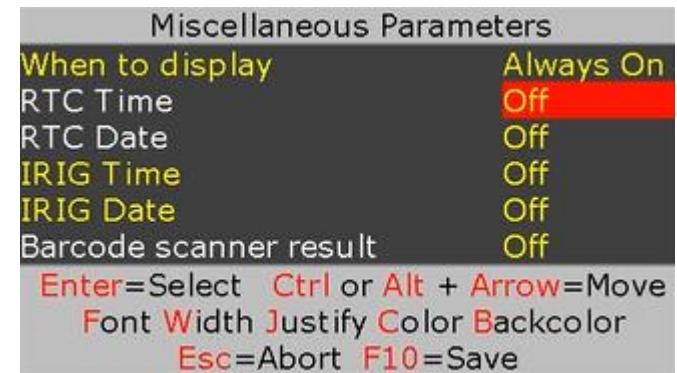


Figure 9

## DISPLAY TEXT

Press F9 to display Main Menu.

Follow [Figure 10 - Figure 11](#) to type-in new text or edit pre-existing texts.

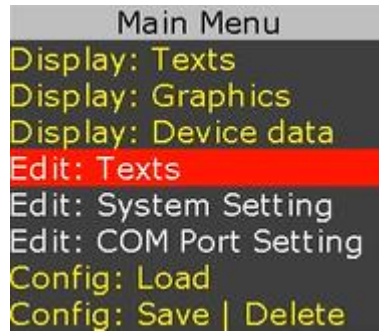


Figure 10



Figure 11

Follow [Figure 12 - Figure 13](#) to display text:



Figure 12



Figure 13

While in [Figure 13](#), use  $\updownarrow$  arrow keys to select the desire text. Press "Enter" to select "On". Use [shortcuts](#) keys to format the text as described below:

Font select, field Width, text Justification, text Color, text Background and Ctrl or Alt + $\updownarrow$ text position
--

Insert text

This is font#1

This is font#2

This is font#3

This is font#4

This is font#5

This is font#6

This is font#7

This is font#8





## DISPLAY IMAGES

Please review [Appendix D – images](#) on how to prepare images for use with PROTEUS-LITE.

Images must be placed in the folder “Images” on the microSD card.

Press F9 to display Main Menu. Follow [Figure 14](#) - [Figure 15](#) to display images.

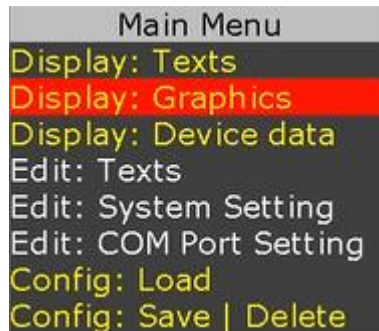


Figure 14



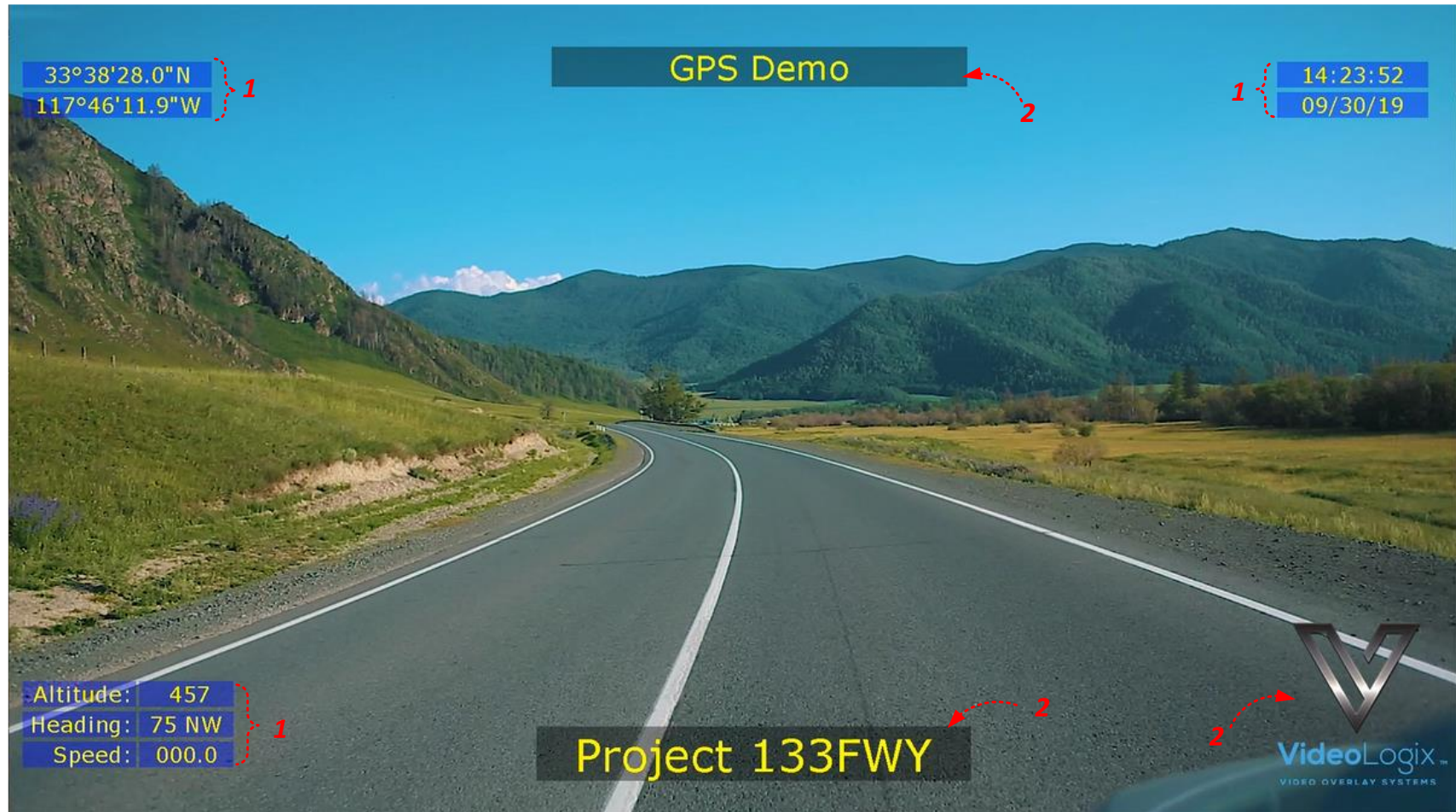
Figure 15

While in [Figure 15](#), use  $\updownarrow$  arrow keys to select a desire image. Press “Enter” to select “On”. Use **Ctrl** or **Alt** +  $\updownarrow\leftrightarrow$  to position the image on screen.

## DISPLAY GPS DATA

- Two independent GPS modems can be connected to COM1 & COM2 at the same time.
- Follow [Figure 1](#) - [Figure 2](#) to configure for desire baud rate
- \$GPRMC, \$GPGGA, \$PTSAG, \$GPWPL, \$GPGSA, \$GPGSV, \$GPGGL....

A *sample* GPS file is provided with your PROTEUS-LITE. To load it, press F9, go to “*Config: Load*” and select “*GPS*”.



- 1 GPS data
- 2 Misc. Parameters

Obtained directly from GPS modem attached to COM port  
Title, Logo. Fully configurable by the user



To customize the sample file to meet your needs:  
 Follow [Figure 16 - Figure 18](#) to edit GPS parameters.  
 Follow [Figure 10 - Figure 13](#) to edit texts:

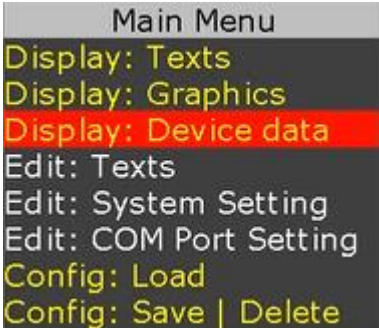


Figure 16



Figure 17



Figure 18

While in [Figure 18](#), use [↕](#) arrow keys to select the desire parameter. Press “Enter” to select “On”. Use [shortcuts](#) keys to format the text as described below:

Font select, field Width, text Justification, text Color, text Background and Ctrl or Alt + <a href="#">↕↔</a> text position
--

## DISPLAY NMEA DATA

- PROTEUS-LITE intrinsically supports many NMEA sentences such as \$GPRMC, \$GPGGA, \$PTSAG, \$GPWPL, \$GPGSA, \$GPGSV, \$GPGGL, \$SDDBT, \$SDDPT, \$WIMTW, \$WIMWV, \$VNINS, \$VNIMU, \$VNYPR, \$PTNTHPR, \$HCHDG, \$HCHDT, etc.
- For above messages, just configure [COM port](#) and PROTEUS -LITE is ready to receive messages & manage your visual data
- Follow [Figure 19-Figure 21](#) and [Figure 16 - Figure 18](#) to insert NMEA parameters.

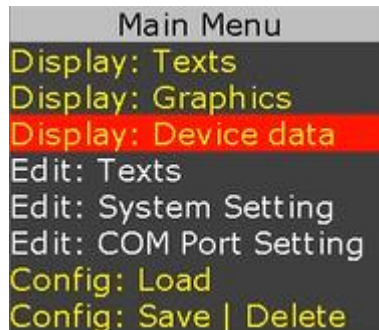


Figure 19



Figure 20

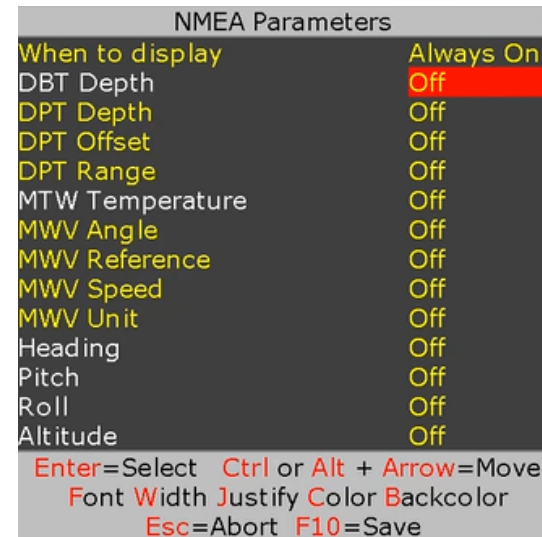


Figure 21

## DISPLAY BARCODE

A *sample* Barcode file is provided with your PROTEUS-LITE. To load it, press F9, go to "*Config: Load*" and select "*Barcode*".

Sample file assumes barcode scanner LS2208 is attached to COM1. When using different barcode scanner, follow *Figure 1 - Figure 2* to set the require baud rate.



- |   |                  |   |
|---|------------------|---|
| 1 | Barcode          | Result of a barcode scan.                   |
| 2 | Misc. Parameters | Time & Date from a built-in Real Time Clock |
| 3 | GPS              | GPS coordinate if one is attached to COM2   |
| 4 | Misc. Parameters | 4 x Text & 1 x logo                         |

To customize the sample file to meet your needs, follow *Figure 7 - Figure 9* as well as *Figure 10 - Figure 13*

## ADD MILLISECOND COUNTER TO IRIG, GPS, RTC TIME

Follow [Figure 22](#) - [Figure 23](#) to append millisecond count to RTC, IRIB and GPS time. Millisecond counter is reset on second rollover. Once enable, the displayed time will refresh at video frame rate i.e. 30 time per second for 1080p@30

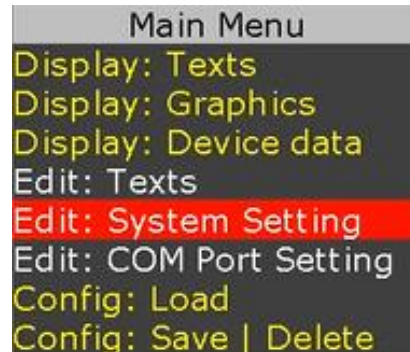


Figure 22

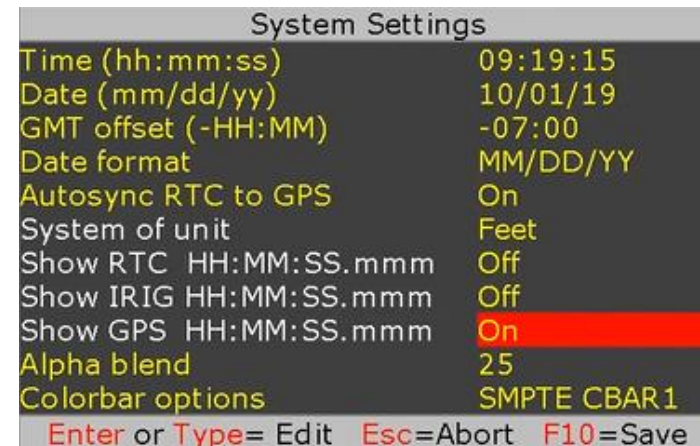


Figure 23

# SPECIFICATIONS

## MAXIMUM INPUT VOLTAGE

Min (DCIN)	Max (DCIN)	Power
6VDC	42VDC	4 watts

## INPUT CONNECTOR

DC power jack is standard 2 conductors, center pin positive, 2.1mm ID, 5.5mm OD.

## ENVIRONMENTAL

Specifications	Min	Max
Operating Temperature	0° C	65° C
Humidity	10-90% RH Non-Condensing	
Storage Temperature	-40° C	115° C

## WEIGHT & DIMENSION

Weight	1 lbs.
Dimension	125.30 x 105.23 x 30.51 (mm)

## FRONT PANEL LED

PROTEUS-LITE provides 3 LED's in the front & rear panel.

LED	Description
L1	<i>Flashes when a RS232 message is received</i>
L2	<i>Flashes when system is working properly</i>
L3	<i>Flashes when FPGA is working properly</i>
Ethernet LED	<i>Flashes when there is a write to the USB flash drive</i>

## APPENDIX A – KEYBOARD COMMANDS

### KEYBOARD COMMANDS

Keyboard command	Description
<b>F8</b>	Shortcut to “Edit: User Texts”
<b>F9</b>	Launch <b>Main-Menu</b>
<b>F10</b>	<b>Save</b> changes & exit <b>Sub-Menu</b>
<b>ESC</b>	<b>Abort</b> changes and exit <b>Sub-Menu</b>
<b>Enter</b> <b>or</b> <b>Ctrl + Enter</b>	Select an item from the picklist i.e. COM1, COM2...
Alt + G	Draw 60 x 60 pixel gridlines on video
Alt + H	Help

### KEYBOARD SHORTCUTS

The following keystrokes are used to format the text superimposed on video.

Browse			Description
Forward		Reverse	
<b>C</b>	<b>or</b>	<b>Ctrl + C</b>	<b>C</b> olor: Change text foreground color
<b>F</b>	<b>or</b>	<b>Ctrl + F</b>	<b>F</b> ont: Change font type
<b>W</b>	<b>or</b>	<b>Ctrl + W</b>	<b>W</b> idth: Change width of the field
<b>J</b>	<b>or</b>	<b>Ctrl + J</b>	<b>J</b> ustify text: Left, center or right justification text within field
<b>B</b>	<b>or</b>	<b>Ctrl + B</b>	<b>B</b> ackground color: Change text background color
<b>Ctrl + Arrow</b>	<b>or</b>	<b>Alt + Arrow</b>	Move text location. Hold <b>Ctrl</b> to move the field 30 pixels and <b>Alt</b> to move the field 2 pixels.

## APPENDIX D – IMAGES

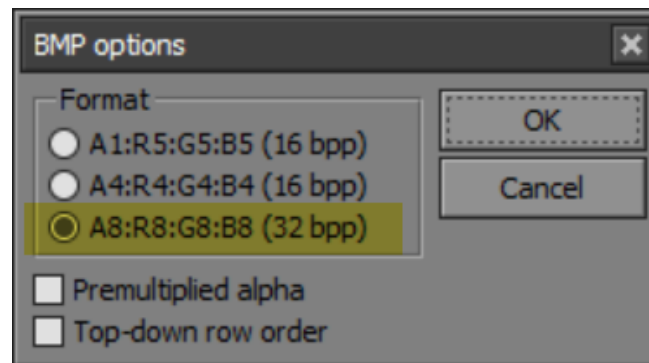
PROTEUS-LITE can display PNG and JPG images.

### JPG

Image width & height divisible by 32. For example, 32 x 32 or 64 x 32 or 224 x 192, 320 x 64, etc.

### PNG

PNG image must be converted to 32-bit BMP using Pixelformer utility. This utility will preserve pixel level alpha blending. [This program is in utility folder on microSD card](#). Use File-import to open PNG file and File-export to create the BMP file. When prompted, select A8:R8:G8:B8 as shown below.



### LOCATION

Store your images in the folder [Images](#) on the microSD card.