PROTEUS- PLUS User Manual

Version V2.12 May 24, 2020

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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.

Numerous apps have been developed to enhance this product. Customers have found them to be useful like the apps available for iPhone. The existent of these apps should not discourage any customer from considering this product for basic text, logo and GPS data insertion.

PROTEUS 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 PLUS.

FEATURES		PROTEUS		
		ESSENTIAL	PLUS	
Insert Texts, Images, Time/Date, GPS data, POS Laser Scanner Code	V	V	V	
Insert values from CSV sentences via RS232 & Ethernet		V	V	
Insert values from NMEA0183 sensors via RS232		V	V	
Insert values from NMEA2000 sensors via CAN		v	V	
Numerous APPs + Widgets + Device drivers		v	V	
2 x Quadrature inputs		v	V	
4 x Analog inputs		v	V	
Insert IRIG-B timecode		V	٧	
Insert Network SNTP timecode		v	V	
Tilt sensor		v	V	
30+ Drawing commands via RS232 & Ethernet		v	V	
Superimpose composite (NTSC/PAL) video input over HD video input (PIP)		v	V	
Geotagging + KML File			V	

TYPICAL INTERCONNECT DIAGRAM

Diagram below illustrates a few the possible applications.





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GLOSSARY TERMS

Term	Definition
SCS	Software Communication Specification
CSV	Comma Separated Values
ТВ	Terminal Block
UM	User Manual

COMMUNICATION

COM PORTS

PROTEUS provides 3 x serial ports for communication with the external devices:

COM PORT	Location			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
СОМЗ	Mini-USB:	Front panel		Standard USB Device

COM PORTS: BAUD RATES

- COM1 & COM2 are fixed for N, 8, 1. However, baud rates can be set to 4800, 9600, 19200, 38400, 57600,115200,230400,460800.
- COM3 is USB Device CDC-ACM class. It allows a USB host (PC) to communicate with the device (Proteus) as a serial device. There is no baud rate associated with this interface and transfer speed of 1.7 Mbit/s to 4.1Mbit/s can be achieved.

COM PORTS: DEVICE TYPES

COM1-2 ports can be interfaced to various sensors. Table below shows a few examples and their corresponding Device Type setting.

Attach Sensor/Device	Corresponding Device Type setting
Any device transmitting CSV sentences i.e. GPS, IMU, laptop, etc.	CSV1, CSV2, CSV3, CSV4, SSV3, SSV4 (See <u>CSV formats</u> for more detail)
All NMEA-0183 compatible devices i.e. GPS Modem, Sounder, etc.	CSV1, CSV2, CSV3, CSV4, SSV3, SSV4
Serial Terminal program such as PuTTY, Tera Terminal, etc.	CSV1, CSV2, CSV3, CSV4, SSV3, SSV4
Vector NAV IMU	VectorNav
General Dynamic CINEFLEX	CINEFLEX

COM PORTS: CONFIGURATION

Press F9 to display the Main Menu. Follow *Figure 1-Figure 2* to configure COM ports for desire baud rate & device.

Main Menu	Edit (COM Ports
Display: Texts	COM1 (DB9) Device	CSV1 (\$Header,Dn*CS)
Display: Graphics	COM1 (DB9) Baud	115200
Display: Device data	COM2 (INT) Device	CSV1 (\$Header,Dn*CS)
App: Quadrature Counters	COM2 (INT) Baud	4800
App: Analog Inputs	Sentence A Header	\$SentenceA
App: Geotagging	Sentence B Header	\$SentenceB
App: Plane Situation Awareness	Sentence C Header	\$SentenceC
App: XY Measurement	Sentence D Header	\$SentenceD
App: Reticle	COM2 mode	RS232
App: Count up Timer	\$PTSAG ID	0
App: Misc widgets	Proteus IP Address type	STATIC
Edit: Texts	SNTP	DISABLE
Edit: System Setting	SNTP Server IP Address	192.168.1.120
Config: Load	Proteus IP Address	192.168.1.131
Config: Save Delete	Enter or Type= Ed	it Esc=Abort F10=Save

Figure 1



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, when using COM1, a NULL modem cable is required to interface PROTEUS to a PC.

This port can be used to receive remote commands defined in SCS (Software Communication Specification) or connect any RS232 sensor/device that transmits <u>CSV1, CSV2, CSV3, CSV4, SSV3, SSV4 data formats.</u>

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.

This port can also be used to receive remote commands defined in SCS (Software Communication Specification) or connect any RS232 sensor/device that transmits <u>CSV1, CSV2, CSV3, CSV4, SSV3, SSV4 data formats</u>.

COM3: USB DEVICE PORT

When connected to a PC, it will enumerate as a COM port. This port can be used to receive remote commands defined in SCS (Software Communication Specification) or <u>CSV1 only type formats</u>. This port is also used to upgrade the internal firmware.

USB HOST PORTS

PROTEUS has 2 USB host ports. Typical devices connected to these ports are USB keyboard and USB Flash drive for storing KML data.

CSV FORMATS

A CSV is an ASCII sentence composed of a unique header, followed by up to 12 comma separated values and a checksum.

\$Header,VAL1,VAL2,VAL3,VAL4,VAL5,VAL6,VAL7,VAL8,VAL9,VAL10,VAL11,VAL12*CS

\$	Signifies start of the sentence.
Header	Sentence header. Follow <i>Figure 1-2</i> to define your unique sentence header.
VALn	Each sentence contains multiple values (VALn) delimited by commas.
*	The asterisk serves as checksum delimiter.
CS	The checksum field contains two ASCII characters which indicate the hexadecimal value of the checksum.

PROTEUS supports 4 different CSV (Comma Separate Values) and 2 different SSV (Space Separate Values) sentence:

Туре	Sentence includes	Sentence Structure	Example	Location of parsed VALn
CSV1	\$Header, Values, Checksum	\$HEADER,VAL1,VAL2,VAL3,VALn*CS	\$STEVE,45,315,200,100*XX	In sentence A,B,C,D
CSV2	\$Header, Values	\$HEADER,VAL2,VAL3,	\$BRIAN,45,315,200,100	In sentence A,B,C,D
CSV3	\$Values,	\$VAL1,VAL2,VAL3,	\$45,315,200,100	In sentence A
SSV3	\$Values	\$VAL1 VAL2 VAL3	\$45 315 200 100	In sentence A
CSV4	Values,	VAL1,VAL2,VAL3,	45,315,200,100	In sentence A
SSV4	Values	VAL1 VAL2 VAL3	45 315 200 100	In sentence A

Upon reception of a **CSV** sentence and confirmation of the sentence header (only CSV1), PROTEUS parses the sentence. Parsed values (VAL1 ... VAL12) are sequentially stored in <u>Registers</u> # 40 through 87. Any widgets linked to these registers will automatically get updated. CSV sentences vary in length, but each VALn is limited to 40 characters or less.

For more detail on how to use CSV sentences, see Display values from any csv sentence

The checksum field is the last field in a sentence and follows the checksum delimiter character "*". The checksum is the 8-bit exclusive OR of all characters in the sentence, including "," delimiters, between but not including the "\$" and the "*" delimiters. The hexadecimal values of the most significant and least significant 4 bits of the result is converted to two ASCII characters (0-9, A-F (upper case)) for transmission. The most significant character is transmitted first. Example: \$GPGLL,5057.970,N,00146.110,E,142451,A*27<CR><LF>

In C checksum computation would be written as:

Although not recommended, for CSV1 type sentences, checksum computation can be bypassed by replacing CS with XX.

ETHERNET PORT

This port can be used to receive remote commands defined in SCS (Software Communication Specification) or any other CSV1 type data formats.

- 10M/100M auto sensing network interface
- Networking: Static or DHCP IPv4 addressing
- Subnet Mask: Configurable. Default 255.255.255.0
- Default Gateway: 0.0.0.0
- UDP protocol. Port 9999

To configure Ethernet port, press *F9* and select "*Edit: COM Port Setting*". Follow *Figure 3 - Figure 5* to enable Ethernet port and select IP address. Following any changes to the Ethernet setting, power must be recycled for the change to take effect.

Edit COM Ports		Edit (COM Ports	Edit (COM Ports
COM1 (DB9) Device CSV1 (\$He COM1 (DB9) Baud 115200 COM2 (INT) Device CSV1 (\$He COM2 (INT) Baud 4800 Sentence A Header \$Sentence Sentence B Header \$Sentence Sentence C Header \$Sentence Sentence D Header \$Sentence COM2 mode RS232 \$PTSAG ID 0 Proteus IP Address type DISABLE Enter or Type= Edit Esc=Abo	ader,Dn*CS) ader,Dn*CS) A DISABLE STATIC DHCP	COM1 (DB9) Device COM1 (DB9) Baud COM2 (INT) Device COM2 (INT) Baud Sentence A Header Sentence B Header Sentence C Header COM2 mode \$PTSAG ID Proteus IP Address type SNTP SNTP Server IP Address Proteus IP Address Enter or Type= Ed	CSV2 (\$Header,Dn) 115200 CSV1 (\$Header,Dn*CS) 4800 \$SentenceA \$SentenceB \$SentenceC \$SentenceD R5232 0 Enter IP Address STATIC DISABLE 192.168.1.120 192.168.1.131 it Esc=Abort F10=Save	COM1 (DB9) Device COM1 (DB9) Baud COM2 (INT) Device COM2 (INT) Baud Sentence A Header Sentence B Header Sentence C Header COM2 mode \$PTSAG ID Proteus IP Address type SNTP SNTP Server IP Address Enter or Type= Ed	CSV3 (\$Dn) 115200 CSV1 (\$Header,Dn*CS) 4800 \$SentenceA \$SentenceB \$SentenceC \$SentenceC RS232 0 DHCP DISABLE 192.168.1.120 it Esc=Abort F10=Save

Figure 3

Figure 4

Figure 5

If DHCP is selected, *PROTEUS's IP address can be viewed by pressing* **Alt-h** (several times) as shown in Figure 6.



Figure 6

Free utility *Packet Sender* can be used to send commands to Proteus.

Follow *Figure* **7** to configure Packet Sender only **once**.

	🚔 Packet Sender - IPs: 169.254.114.94, 192.168.0.97, 2600.8802.3800.13e3:5999, 2600.8802.3800,13e3:5999, 2600.8802,13000,13e3:5999, 2600.8802,13000,13e3:5999, 2600.8802,13000,13e3:5999, 2600.8802,13000,13e3:5999, 2600.8802,13000,13e3:5999, 2600.8802,13000,13e3:5999, 2600.8802,13000,13e3	
	File Tools Multicast Help	
	Name	
	ASCIE (ASCII) representation	
	HKX EDvrepresentation Load File	
	Address 192.153.1.131	
	Search Saved Packets Delete Saved Packets	
	Send Name Resend(sec) To Address To Port Method ASCII Hex	
	Clear Log Traffic Save Log Save Traffic Padet Copy to Opboard	
	Time From IP From Port To IP To Port Method Error ASCII Hex	
	۲	
	LDP-3838 M TCP Server Dashed M 59, Server Dashed IP-490de	
Figure 7		

Follow *Figure 8 - Figure 9* to send commands to Proteus. For example, use any text editor i.e. *Notepad++* and open file "*0-TestCommands.txt*" located in the Script folder. Copy all 19 commands as shown in *Figure 8* and paste it into the *ASCII* Edit box shown in *Figure 9* and press **Send**. The result should appear on your video screen as shown in *Figure 10*. If multiple commands are sent in one packet, each command must end with \r\n. If a single command is sent per packet \r\n is optional.

C:\VideoLogix-V\Script\0-TestCommands.txt - Notepad++	🚔 Packet Sender - IPs: 169.254.114.94, 192.168.0.97, 2600.8802.3800.13e3:5999, 2600.8802.3800.13e3:6ce:19c8:3293.6d5c, 2600.8802.3800.13e3:ac –	
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Winc	File Tools Multicast Help	
[] 🔒 🖶 🕞 🕞 🖕 🖌 👘 🎁 ⊃ ⊂ m 🏂 ≪ ≪ 🖫 🖾 1 🎼 🥃	Note Test	
🔚 ImageList.txt 🖸 🔚 new 2 🖸 🔚 0-TestCommands.txt 🖸	ASCIT [bit 13/600,600,400,300,7,1,3,16,32,1,0,Lower Left*70(rph113,600,600,400,300,9,1,3,16,33,0,0,Lower Right*X0(rph113,600,600,400,300,3),2,16,33,0,0,Lopen 2 HEX [bit 24 56 4c; 34 33 2c; 35 32 2c; 31 41 2c; 32 2c; 33 33 2c; 34 34 34 2c; 35 35 35 2c; 35 36 36 36 36 2c; 37 37 37 37 2c; 38 38 38 38 38 38 38 38 38 38 38 38	
1 \$VL13,600,600,400,300,7,1,3,16,32,1,0,Lower Left*XX	Address 192,198,1,131	
2 \$VL13,600,600,400,300,9,1,3,16,33,0,0,Lower Right*XX		
3 \$VL13,600,600,400,300,3,1,3,16,33,0,0,Upper Right*XX	Search Saved Packet: Persistent TOP	
4 \$VL13,600,600, 0, 0,0,1,3,16,32,0,0,Upper Left*XX	Send Name Resend (sec) To Address To Port Method ASCII Hex	
5 \$VL13,600,600,400,300,5,3,3,16,32,0,0,Center*XX		N
6 \$VL25,6,1300,600,3*XX		
7 \$VL52,100,100,300,50,300,300,5,1,1,5*XX		
8 \$VL55,400,100,1000,300,28,1,1,4*XX		
9 \$VL54,300,300,200,-45,15,29,1*XX		
10 \$VL53,400,475,100,-180,20,20,30,1,1,0*XX		
11 \$VL47,1350,900,1500,900,3,0,0,32*XX	Terrar Annual	
12 \$VL47,1350,910,1500,910,3,1,0,32*XX	Cear Log I ramo: Save Log Save Tramo Packet, Copy to Oppoard	Upper Left Upper Right
13 \$VL47,1350,920,1500,920,3,2,0,32*XX	Time From IP From Port To IP To Port Method Error ASCII Hex	
14 \$VL47,1350,930,1500,930,3,3,0,32*XX		
15 \$VL47,1350,940,1500,940,3,4,0,32*XX		Center
16 \$VL47,1350,950,1500,950,3,5,0,32*XX		
17 \$VL47,1350,970,1500,970,3,10,0,32*XX		
18 \$VL47,1350,990,1500,990,3,15,0,32*XX		Lower Left Lower Right
19 \$VL43,52,1A,2,33,444,5555,666666,77777,8888888*XX	s >	
20	1/109-8888 Int T/P Gener Disabled Int State	
Figure 8	Figure 9	Figure 10

VIDEO INPUT & OUTPUT



PROTEUS provides the following video input & output:

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

PROTEUS 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 selects a video input based on the following priorities:

- 1. HD-SDI
- 2. HDMI

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

VIDEO FRAME RATES

PROTEUS 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

VIDEO DELAY

All OSD functions are superimposed into the video "on-the-fly." As a result, there is no degradation in video quality and the delay from the video input to the video output is < 290 nsec.

IRIG INPUT

This interface can be used to input an external unmodulated IRIG-B signal. PROTEUS can decode IRIG-B time & date code. This interface can also be used to input a composite video NTSC (M, J, 4.43) or PAL (B,D,G,H,I,M,N,CN) for purpose of superimposing it on a HD video as PIP.

COMPOSITE INPUT (PIP)

IRIG input can also be used to input a composite video NTSC (M, J, 4.43) or PAL (B,D,G,H,I,M,N,CN) for purpose of superimposing it on a HD video. To enable PIP follow the pictures below. Composite video (as shown below as colorbar) can be superimposed anywhere on the 1920 x 1080.

N4 ' N4				
Main Menu	System Setting	System Settings		
Display: Texts	Time (hh:mm:ss)	18:00:49		
Display: Graphics	Date (mm/dd/yy)	10/01/19		
Display: Device data	CMT offect (HHIMM)	00.00		
App: Quadrature Counters		-00:00		
App: Analog Inputs	Date format			
App: Geotagging	Autosync RTC to GPS	On		
App: Plane Situation Awareness	System of unit	Meter		
App: ROV Situation Awareness	Show RTC_HH:MM:SS.mmm	Off		
App: XY Measurement	Show IRIG HH:MM:SS mmm	Off		
App: Reticle	Show GPS HH:MM:SS.mmm	Off		
App: Count un Timer				
App: Misc widgets	Alpha biend	25		
Edit: Texts	Colorbar options	SMPTE CBAR1		
Edit: System Setting	Composite PIP	On		
Edit, COM Part Setting	Composite Video Standard	NTSC M		
Configured	Composite PIP (X,Y) position	1400.100		
	Enter or Type - Edit Esc - Ab	ort E10-Save		
Config: Save Delete	Enter of Type= Edit Esc=At	0101110-0046		

BAR1



LOAD CONFIGURATION

PROTEUS supports up to 16 configuration files. When loading a configuration file i.e. *ROV.bin*, Proteus copies its content into *Config.bin* and all subsequent changes will be stored into *Config.bin* and **not** original *ROV.bin*. Follow figures below to load a configuration file. In order to avoid losing your modified configuration by accidental overwrite, highlight *ROV.bin* and press F10 as described in the next section and current/active *Config.bin* will be stored into *ROV.bin*

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awarenes
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Select File
Text
GPS Demo
Blank Screen
Barcode Scanner
XY Measurment
Analog
Config
CSV
CSV-DEMO
KML
Plane
Quadrature
Reticle
ROV
Slider

STORE CONFIGURATION

PROTEUS stores 16 different configurations. Follow figures below to save your configuration.

To save i.e. *backup* your current configuration, type in *a new file name* in an empty field or *highlight an existing file name* (*overwrite*) and press F10. To delete an existing configuration, *highlight the file name* and press Ctrl + Alt + F10.

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Save	e Config
Config File# 1:	Text
Config File# 2:	GPS Demo
Config File# 3:	Blank Screen
Config File# 4:	Barcode Scanner
Config File# 5:	XY Measurment
Config File# 6:	Analog
Config File# 7:	Config
Config File# 8:	CSV
Config File# 9:	CSV-DEMO
Config File# 10:	KML
Config File# 11:	Plane
Config File# 12:	Quadrature
Config File# 13:	Reticle
Config File# 14:	ROV
Config File# 15:	Slider
Type= Edit Es	=Abort F10=Save

TEXT, LOGO AND DATA INSERTER

QUICK TUTORIAL

DISPLAY TIME, DATE

- 1. Press F9 to display main menu
- 2. Follow *Figure 11 Figure 13* to insert the desired parameter
- 3. On *Figure 13*, use ¹ arrow keys to select "RTC Time"
- 4. Press d to select "On"
- 5. RTC time will appear on the screen and *flashing*.
- 6. Use <u>shortcuts</u> keys to change the field attributes as described below:

"Font select, field Width, text Justification, text Color, text Background and Ctrl or Alt + ↓↔ text position"

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

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Figure 11



Miscellaneous Parameters When to display Always On RTC Time Off RTC Date Off **RIG** Time Off RIG Date Off Barcode scanner result Off Digital Inputs Off NTP Time & Date Buffer Off NTP Unix Epoch Off Enter=Select Ctrl or Alt + Arrow=Move Font Width Justify Color Backcolor Esc=Abort F10=Save

Figure 12

Figure 13

DISPLAY TEXT

Press F9 to display Main Menu. Follow Figure 14 - Figure 15 to type-in or edit pre-exiting texts.



Edit Text (PgDn)		
Text# 1:	This is Font#1	
Text# 2:	This is Font#2	
Text# 3:	This is Font#3	
Text# 4:	This is Font#4	
Text# 5:	This is Font#5	
Text# 6:	This is Font#6	
Text# 7:	This is Font#7	
Text# 8:	This is Font#8	
Text# 9:		
Text# 10:	Real Time Annotation	
	Type= Edit Esc=Abort F10=Save	

Figure 15

Figure 14

Follow *Figure 16 - Figure 17* to display text on video.

Main Menu	
splay: Texts	
isplay: Graphics	Insert
Display: Device data	When to display
pp: Quadrature Counters	This is Font#1
	This is Font#2
pp: Geotagging	This is Font#3
App: Plane Situation Awareness	This is Font#4
upp: XV Measurement	This is Font#5
nn: Reticle	This is Font#6
pp: Count up Timer	This is Font#7
App: Misc widgets	This is Font#8
dit: Texts	
dit: System Setting	
dit: COM Port Setting	Enter=Select Ctrl or
Config: Load	Font Width Justify
Config: Save Delete	Esc=Abort



Figure 17

While in *Figure 17*, use ¹ arrow keys to select desire text. Press ¹ to select "On". Use <u>shortcuts</u> keys to format the text as described below:

Font select, field Width, text Justification, text Color, text Background and Ctrl or Alt + ↓↔ text position

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





18

DISPLAY IMAGES

Please review *Appendix D – images* on how to prepare images for use with PROTEUS.

Press F9 to display Main Menu. Follow *Figure 18 - Figure 19* to display images.

Main Menu		
Display: Texts		
Display: Graphics		
Display: Device data	Inser	t Image (PgDn)
App: Quadrature Counters	When to displa	iy Always On
App: Analog Inputs	01: ArrowGH	Off
App: Geotagging	02: ArrowGV	Off
App: Plane Situation Awareness	03: ArrowSH	Off
App: KOV Situation Awareness	04: ArrowSV	Off
App. AT Measurement	05: Bubble30	Off
App: Count un Timer	06: Crosshair	Off
App: Count up Time App: Misc widgets	07: Ring Heli	Off
Edit: Texts	08: Ring Rov	Off
Edit: System Setting	09: Ring100	Off
Edit: COM Port Setting	10:	Off
Config: Load	Enter=Select	Ctrl or Alt + Arrow=Move
Config: Save Delete	Esc=	Abort F10=Save
Figure 18		Figure 19

While in *Figure 19*, use \uparrow to select a desire image. Press \downarrow to select "On". Use Ctrl or Alt + $\uparrow \leftrightarrow$ to position the image on screen.

DISPLAY GPS DATA

- Two independent GPS modems can be connected to COM1 & COM2 at the same time.
- COM ports are fixed for N, 8, 1. 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. To load it, press F9, go to "Config: Load" and select "GPS-COM1" or "GPS-COM2".



1	GPS data	Obtained directly from GPS modem
2	Circular Compass	Controlled via GPS heading
3	Rolling Compass	Controlled via GPS heading
4	Misc. Parameters	Title, Logo. Fully configurable by the user

To customize the sample file to meet your needs, follow *Figure 20 - Figure 22*.

Main Menu			
Display: Texts		COM2 GPS Parameters	
Display: Texts Display: Graphics Display: Device data App: Quadrature Counters App: Analog Inputs App: Geotagging App: Plane Situation Awareness App: ROV Situation Awareness App: XY Measurement App: Reticle App: Count up Timer	 Select Device GPS - COM1 GPS - COM2 Miscellaneous NMEA 0183 	COM2 GPS Paramete When to display Latitude (ddd.ddddd°) Latitude (ddd°mm.mmmm') Latitude (dd°mm'ss") Longitude(dd.dddddd°) Longitude(dd°mm.mmmm') Longitude(dd°mm'ss") Altitude Time Date	Always On Off Off On Off Off Off On On On On
App: Count up Finie App: Misc widgets Edit: Texts Edit: System Setting Edit: COM Port Setting Config: Load Config: Save Delete	NMEA 0185 NMEA 2000 CSV Sentence-A CSV Sentence-B CSV Sentence-C CSV Sentence-D	Heading (0360°) Speed Sequence ID Enter=Select Ctrl or Alt + A Font Width Justify Color E Esc=Abort F10=Sa	On On Off Off rrow=Move Backcolor ve
Figure 20	Figure 21	Figure 22	

While in *Figure 22*, use [↑] to select desire GPS parameter. Press [↓] to select "On". Use <u>shortcuts</u> keys to format the text as described below: Font select, field Width, text Justification, text Color, text Background and Ctrl or Alt + [↑]↔ text position

DISPLAY NMEA 0183 DATA

- PROTEUS intrinsically supports many NMEA sentences such as \$GPRMC, \$GPGGA, \$PTSAG, \$GPWPL, \$GPGSA, \$GPGSV, \$GPGGL, \$SDDPT, \$SDDBT, \$WIMTW, \$WIMWV, \$VNINS, \$VNIMU, \$VNYPR, \$PTNTHPR, \$HCHDG, \$HCHDT, \$HCC, \$DBS, \$PCIT, \$PCIPR, etc.
- For above messages, just configure <u>COM port</u> and PROTEUS is ready to receive messages & manage your visual data. Follow *Figure 23-Figure 25* and *Figure 20 Figure 22* to display NMEA parameters.
- You may come across a NMEA sentence that is not intrinsically supported by PROTEUS for example **\$PTCF**. To configure PROTEUS to receive this sentence, follow *Figure 1 Figure 2* and replace **\$SentenceA** with **\$PTCF**. Upon reception of **\$PTCF** sentence, PROTEUS parses the sentence and parsed values (VAL1..VAL6) are sequentially stored in Registers # 40-45 as shown below:

\$PTCF	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6
Register	40	41	42	43	44	45
Values	HHH.H	Т	+RRR.R	+PPP.PP	+rrr.rr	+ppp.pp

\$PTCF,HHH.H,T,+RRR.R,+PPP.P,+rrr.rr,+ppp.pp*CS

For more detail on how to display each value, please see Display values from any csv sentence

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Figure 23

Select Device
GPS - COM1
GPS - COM2
Miscellaneous
NMEA 0183
NMEA 2000
CSV Sentence-A
CSV Sentence-B
CSV Sentence-C
CSV Sentence-D

NMEA Parame	ters
When to display	Always On
DBT Depth	Off
DPT Depth	Off
DPT Offset	Off
DPT Range	Off
MTW Temperature	Off
MWV Angle	Off
MWV Reference	Off
MWV Speed	Off
MWV Unit	Off
Heading	Off
Pitch	Off
Roll	Off
Altitude	Off
Enter=Select Ctrl or Alt Font Width Justify Co Esc=Abort F10=	+ <mark>Arrow</mark> =Move lor <mark>B</mark> ackcolor =Save

Figure 24

Figure 25

DISPLAY VALUES FROM ANY CSV SENTENCE DISPLAY VALUES FROM ANY UNSUPPORTED NMEA SENTENCE

A CSV (Comma Separated Values) is an ASCII sentence composed of a unique header, followed by up to 12 comma separated values and a checksum.

\$Header,VAL1,VAL2,VAL3,VAL4,VAL5,VAL6,VAL7,VAL8,VAL9,VAL10,VAL11,VAL12*XX

- All NMEA-0183 messages are CSV
- PROTEUS intrinsically supports many of the NMEA-0183 messages i.e. \$GPRMC, \$GPGGA, \$PTSAG, \$GPWPL, \$GPGSA, \$GPGSV, \$GPGGL, \$SDDPT, \$SDDBT, \$WIMTW, \$WIMWV, \$VNINS, \$VNIMU, \$VNYPR, \$PTNTHPR, \$HCHDG, \$HCHDT, \$HCC, \$DBS, \$PCIT, \$PCIPR, etc.
- For these messages, just configure <u>COM port</u> and PROTEUS is ready to receive messages & manage your visual data
- There may be instances where you want to send your own CSV message or support a new NMEA message
- You can configure PROTEUS to receive up to 4 customize CSV messages (A, B, C, D)
- Upon reception of a CSV sentence, PROTEUS verifies checksum & parses the message
- For each message, parsed values (VAL1.. VAL12) are stored in Registers # 40-87 as shown below:

\$Header-A	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6	VAL7	VAL8	VAL9	VAL10	VAL11	VAL12
Register	40	41	42	43	44	45	46	47	48	49	50	51
\$Header-B	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6	VAL7	VAL8	VAL9	VAL10	VAL11	VAL12
Register	52	53	54	55	56	57	58	59	60	61	62	63
\$Header-C	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6	VAL7	VAL8	VAL9	VAL10	VAL11	VAL12
Register	64	65	66	67	68	69	70	71	72	73	74	75
\$Header-D	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6	VAL7	VAL8	VAL9	VAL10	VAL11	VAL12
Register	76	77	78	79	80	81	82	83	84	85	86	87

EXAMPLE

\$Header-A,1,22,333,4444,55555,6666666,7777777,888888888*XX

\$Header-A	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6	VAL7	VAL8
Register	40	41	42	43	44	45	46	47
Values	1	22	333	4444	55555	666666	7777777	88888888

\$Header-C,This,is,an,,,Example*XX

\$Header-C	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6
Register	64	65	66			67
Values	This	is	an			Example



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

1	Sentence-A values	VAL1VAL8
2	Sentence-B values	VAL1VAL4
3	Sentence-C values	VAL1VAL4
4	Sentence-D values	VAL1VAL4
5	Misc. Parameters	Texts, RTC Time & Date, Logo. Fully configurable by the user

Upon transmission of the following sentences (use PuTTY @115K, N,8,1), their values should appear as shown in *Figure 26*.

\$SentenceA,1,22,333,4444,55555,6666666,7777777,888888888*XX
\$SentenceB,A,BB,CCC,DDDD*XX
\$SentenceC,Pitch,Roll,Yaw,Heading*XX
\$SentenceD,This,is,an,Example*XX





Any individual value can also be updated by sending command **\$VL43**. For example:

- To change VAL7 from SentenceA to 777 send: \$VL43,46,777*XX.
- To change VAL6, VAL7, VAL8 from SentenceA to 777, 8888, 99999 accordingly, send: \$VL43, 45, 777, 8888, 99999*XX.

To customize the sample file to meet your needs, follow *Figure 27-Figure 32*.

Display: Texts Display: Graphics Display: Device data App: Quadrature Counters App: Analog Inputs App: Geotagging App: Plane Situation Awareness App: ROV Situation Awareness App: ROV Situation Awareness App: ROV Situation Awareness App: Reticle App: Reticle App: Count up Timer App: Misc widgets Edit: Texts Edit: System Setting Edit: COM Port Setting Config: Load Config: Save Delete	Main Menu	
Display: GraphicsDisplay: Device dataApp: Quadrature CountersApp: Quadrature CountersApp: Analog InputsApp: GeotaggingApp: Plane Situation AwarenessApp: ROV Situation AwarenessApp: ROV Situation AwarenessApp: ROV Situation AwarenessApp: Row Situation AwarenessApp: ReticleApp: Count up TimerApp: Misc widgetsEdit: TextsEdit: System SettingEdit: COM Port SettingConfig: LoadConfig: Save Delete	Display: Texts	
Display: Device dataApp: Quadrature CountersApp: Analog InputsApp: GeotaggingApp: Plane Situation AwarenessApp: ROV Situation AwarenessApp: ROV Situation AwarenessApp: ROV Situation AwarenessApp: Row Situation AwarenessApp: ReticleApp: Count up TimerApp: Misc widgetsEdit: TextsEdit: System SettingEdit: COM Port SettingConfig: LoadConfig: Save Delete	Display: Graphics	
App: Quadrature CountersApp: Analog InputsSelect DeviceApp: Analog InputsGPS - COM1App: GeotaggingGPS - COM2App: Plane Situation AwarenessMiscellaneousApp: ROV Situation AwarenessMiscellaneousApp: ReticleNMEA 0183App: Count up TimerNMEA 2000App: Misc widgetsCSV Sentence-AEdit: TextsCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-CConfig: Save DeleteDelete	Display: Device data	
App: Analog InputsGPS - COM1App: GeotaggingGPS - COM2App: Plane Situation AwarenessGPS - COM2App: ROV Situation AwarenessMiscellaneousApp: XY MeasurementNMEA 0183App: Count up TimerNMEA 2000App: Misc widgetsCSV Sentence-AEdit: TextsCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-CConfig: Save DeleteDelete	App: Quadrature Counters	Select Device
App: GeotaggingApp: Plane Situation AwarenessApp: ROV Situation AwarenessApp: ROV Situation AwarenessApp: ROV Situation AwarenessApp: Row Situation AwarenessApp: Row Situation AwarenessApp: ReticleApp: Count up TimerApp: Misc widgetsEdit: TextsEdit: System SettingEdit: COM Port SettingConfig: LoadConfig: Save Delete	App: Analog Inputs	GPS - COM1
App: Plane Situation AwarenessGFS - COM2App: ROV Situation AwarenessMiscellaneousApp: XY MeasurementNMEA 0183App: ReticleNMEA 2000App: Count up TimerNMEA 2000App: Misc widgetsCSV Sentence-AEdit: TextsCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-D	App: Geotagging	CRS - COM2
App: ROV Situation AwarenessMiscellaneousApp: XY MeasurementNMEA 0183App: ReticleNMEA 2000App: Count up TimerNMEA 2000App: Misc widgetsCSV Sentence-AEdit: TextsCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-D	App: Plane Situation Awareness	GPS - COMZ
App. XF MeasurementNMEA 0183App: ReticleNMEA 0183App: Count up TimerNMEA 2000App: Misc widgetsCSV Sentence-AEdit: TextsCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-CConfig: Save DeleteCSV Sentence-D	App: ROV Situation Awareness	Miscellaneous
App: Count up TimerNMEA 2000App: Misc widgetsCSV Sentence-AEdit: TextsCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-CConfig: Save DeleteCSV Sentence-D	App: Ar Medsurement	NMEA 0183
App: Misc widgetsCSV Sentence-AEdit: TextsCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-CConfig: Save DeleteCSV Sentence-D	App: Count up Timer	NMEA 2000
Edit: TextsCSV Sentence-AEdit: System SettingCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-CConfig: Save DeleteCSV Sentence-D	App: Misc widgets	NMLA 2000
Edit: System SettingCSV Sentence-BEdit: COM Port SettingCSV Sentence-CConfig: LoadCSV Sentence-CConfig: Save DeleteCSV Sentence-D	Edit: Texts	CSV Sentence-A
Edit: COM Port Setting CSV Sentence-C Config: Load CSV Sentence-D Config: Save Delete CSV Sentence-D	Edit: System Setting	CSV Sentence-B
Config: Load CSV Sentence-C Config: Save Delete CSV Sentence-D	Edit: COM Port Setting	CSV Sentence-C
Config: Save Delete CSV Sentence-D	Config: Load	
	Config: Save Delete	CSV Sentence-D







While in *Figure 29- Figure 32*, use [↑] to select desire CSV value. Press ↓ to select "On". Use <u>shortcuts</u> keys to format the text as described below: Font select, field Width, text Justification, text Color, text Background and Ctrl or Alt + [↑]↔ text position.

DISPLAY NMEA 2000 DATA

Follow *Figure 1* and *Figure 2* to enable CAN communication by setting "COM2 mode" to CAN. Sensor signals "CAN-H" and "CAN-L" must be connected to the internal terminal block J48 as shown in *PCB specification*.

Follow Figure 33 - Figure 35 to display NMEA2000 messages.



Figure 33

Figure 34

PROTEUS supports PNG messages 129025, 128259, 128267, 129029, 130323. VideoLogix will continuously add new messages per customer request and free of charge.

DISPLAY TILT SENSOR

Proteus has a built-in 3D accelerometer. Follow *Figure 36 - Figure 38* and to display the sensor data:

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

0		ere
Fi	gure	36

Select Device
GPS - COM1
GPS - COM2
Miscellaneous
NMEA 0183
NMEA 2000
CSV Sentence-A
CSV Sentence-B
CSV Sentence-C
CSV Sentence-D

Figure 37

Miscellaneous Parameters		
When to display	Always On	
RTC Time	Off	
RTC Date	Off	
IRIG Time	Off	
IRIG Date	Off	
Barcode scanner result	Off	
Digital Inputs	Off	
NTP Time & Date Buffer	Off	
NTP Unix Epoch	Off	
Development	Off	
ATC Time	Off	
Target Lat	Off	
Target Lon	Off	
Proteus IMU Pitch	Off	
Proteus IMU Roll	Off	
Enter=Select Ctrl or Alt + Font Width Justify Cold	Arrow=Move	



REAL TIME ANNOTATION

Follow Figure 39 and Figure 40 to enable "Real time annotation".

The default settings for annotation is:

- Upper left corner (x, y) is 100, 100
- Font size #2
- Text color yellow
- Text background color blue

To change the default setting, visit *Display text* and follow *Figure 14* through *Figure 17* to <u>display</u>, <u>position</u> and <u>format</u> **Text #10**. Once complete, remove Text #10 as shown in *Figure 17*.

Once annotation is enabled, your keyboard entries will appear as shown in the picture below. Press Esc to clear the text.



APPEND MILLISECOND COUNTER TO IRIG, GPS, RTC TIME

Follow *Figure 39 - Figure 40* 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

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Figure 39

System Settings	
Time (hh:mm:ss)	09:15:55
Date (mm/dd/yy)	11/27/19
GMT offset (-HH:MM)	-07:00
Date format	MM/DD/YY
Real time annotation	On
Autosync RTC to GPS	On
System of unit	Feet
Show RTC HH:MM:SS.mmm	On
Show IRIG HH:MM:SS.mmm	Off
Show GPS HH:MM:SS.mmm	Off
Alpha blend	25
Colorbar options	SMPTE CBAR1
Composite PIP	Off
Composite video standard	NTSC_M
Composite PIP (X,Y) position	100,400
Enter or Type= Edit Esc=Ab	ort F10=Save

Figure 40

SNTP

SNTP (Simple Network Time Protocol) synchronizes PROTEUS built-in RTC with a server that has already been synchronized by a source such as a radio, satellite receiver or modem.

PROTEUS SNTP Client operates in unicast to obtain time over the network. It polls its SNTP Server on regular interval and waits to receive a reply from that Server. When one is received, it verifies that the reply contains a valid update by applying a set of 'sanity check' recommended by RFC 4330. It then applies Server clock directly to its local clock (RTC).

Follow *Figure 41 - Figure 42* to configure SNTP.

Main Menu		
Display: Texts		
Display: Graphics	Edit	COM Ports
Display: Device data	COM1 (DB9) Device	CSV1 (\$Header,Dn*
App: Quadrature Counters	COM1 (DB9) Baud	115200
App: Analog Inputs	COM2 (INT) Device	CSV1 (\$Header,Dn*
App: Geotagging	COM2 (INT) Baud	4800
App: Plane Situation Awareness	Sentence A Header	\$SentenceA
App: ROV Situation Awareness	Sentence B Header	\$SentenceB
App: XY Measurement	Sentence C Header	\$SentenceC
App: Reticle	Sentence D Header	\$SentenceD
App: Count up Timer	COM2 mode	RS232
App: Misc widgets	\$PTSAG ID	0
Edit: Texts	Proteus IP Address type	STATIC
Edit: System Setting	SNTP	ENABLE
Edit: COM Port Setting	SNTP Server IP Address	192.168.1.120
Config: Load	Proteus IP Address	192.168.1.131
Config: Save Delete	Enter or Type= E	dit Esc=Abort F10=Save

Figure 41

Figure 42

CSV1 (\$Header, Dn...*CS)

CSV1 (\$Header, Dn...*CS)

APPS

QUADRATURE OR SIMPLE COUNTERS

- Two Quadrature counters.
- Counters are 26-bits wide. Maximum count 67,108,863 or ±33,554,431
- Configurable line resolution *x*1, *x*2, *x*4. See diagram below for additional detail
- Dedicated RESET pins
- Raw counter value can be converted to any unit (distance, speed, etc.) using *mapped_count* = *m* * *raw_count* + *b*
- Counter values can be used to control "XY Measurement app" or "Reticle app"
- Interface compatible with Mechanical, Hall effect & Optical rotary encoders



The counters can be configured as Quadrature or Simple counters.

Terminal Block (J52-J53) Pins	As Quadrature Counters	As Simple Counters
DIN1	RESET for Counter 1.	RESET for Counter 1
DIN2	RESET for Counter 2	RESET for Counter 2
DIN3	Quadrature Counter 1 inputs	Simple Counter 1 input
DIN4		-
DIN5	– Quadrature Counter 2 inputs	Simple Counter 2 input
DIN6		-



Typical wiring connection for Simple Counters



Typical wiring connection for Quadrature Counters

CONFIGURE COUNTERS

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



1	Raw count	$raw_count = 67,108,863 \text{ or } \pm 33,554,431$
2	Mapped count	$mapped_count = m * raw_count + b$
3	Misc. Parameters	Title, Time & Date, Logo. Fully configurable by the user

To customize the sample file to meet your needs, follow *Figure 43 - Figure 45*

Main Menu Display: Texts Display: Graphics Display: Device data App: Quadrature Counters App: Analog Inputs App: Geotagging App: Plane Situation Awareness		
App: ROV Situation Awareness App: XY Measurement App: Reticle App: Count up Timer App: Misc widgets Edit: Texts Edit: System Setting Edit: COM Port Setting Config: Load Config: Save Delete	C Select Counter Config: Counter 1 Config: Counter 2 Display: Counters	Configure Counterounter typeQuadratureine Resolution (Quadrature)x4ount mode (Quadrature)± Countlope2.000000ntercept0.000000uffixMetersEnter or Type= Edit Esc=Abort F10=Save
Figure 43	Figure 44	Figure 45
Follow Figure 46 - Figure 47 to display map and	l raw counts.	
	Select Counter Config: Counter 1 Config: Counter 2 Display: Counters	When to displayAlways OnCounter 1 RawOnCounter 1 MapOnCounter 2 RawOnCounter 2 MapOnCounter 2 MapOnEnter=Select Ctrl or Alt + Arrow=MoveFont Width Justify Color BackcolorEsc=Abort F10=Save
	Figure 46	Figure 47

EXAMPLE

Configure counter 1 for 0.0023 inch/count and display result.

- Follow *Figure 43 Figure 45* to set Counter 1 *"Slope"* and *"Intercept"* to 0.0023 and 0 respectively.
- Follow Figure 43, Figure 46 Figure 47 to display "Counter 1 Map"

ANALOG DATA

- Four Analog inputs
- Input range 0..3.3V
- Internal low pass RC filter (24Ω, 5600pF)
- 12-Bit ADC. Analog signals are *Sampled* at 1KHz. Each ADC *Sample* is average of 4 consecutive (2µs apart) samples
- *ADC_{raw}* is average of 1 to 64 (user selectable) most recent *Samples*.
- For example n=1 displays the most recent sample and n=8 displays average of the most recent 8 samples
- Analog signals can be converted to any unit using $ADC_{mapped} = m * ADC_{raw} + b$
- *ADC_{mapped}* and *ADC_{raw}* are placed in video frame on falling edge of VSYNC. See diagram below for additional detail
- Analog signals can also be used to control "XY Measurement app" or "Reticle app"



 $ADC_{mapped} = m * ADC_{raw} + b$

TB: J50	Description	Range	Corresponding 12-bit ADC Value
Pin 1	GND	-	-
Pin 2	Analog Input CH1	03.3V	04095
Pin 3	Analog Input CH2	03.3V	04095
Pin 4	Analog Input CH3	03.3V	04095
Pin 5	Analog Input CH4	03.3V	04095
Pin 6	GND	-	-
1714 Analog Inputs Demo 1714.00 Meters Ain1: Ain2: 2299 2299.00 Microns 1 2 2160.00 Km/Hr Ain3: 2160 554 554.00 Kg Ain4: 05:36:47 **Video**Logix 3 3 09/28/19

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

1	Raw Analog values	$ADC_{raw} = 04095$
2	Mapped Analog values	$ADC_{mapped} = m * ADC_{raw} + b$
3	Misc. Parameters	Title, Time & Date, Logo. Fully configurable by the user

To customize the sample file to meet your needs, follow *Figure 48 - Figure 50*:

Main Menu			
Display: Texts			
Display: Graphics			
Display: Device data			
App: Quadrature Counters			
App: Analog Inputs			
App: Geotagging			
App: Plane Situation Awareness			
App: ROV Situation Awareness			
App: XY Measurement			
App: Reticle			
App: Count up Timer		Config Analog In	out
App: Misc widgets	Analog Inputs	Clone	1 000000
Edit: Texts	Config: Analog CH1	Siope	1.000000
Edit: System Setting	Config: Analog CH2	Intercept	0.000000
Edit: COM Port Setting	Config: Analog CH3	Number of samples to average	32
Config: Load	Config: Analog CH4	Suffix	Meters
Config: Save Delete	Display: Parameters	Enter or Type= Edit Esc=Ab	ort F10=Save

Figure 48

Figure 49

Figure 50

Follow *Figure 51 - Figure 52* to display map and raw values.

	Analog Param	eters
	When to display	Always On
	Analog Input#1 Map	On
	Analog Input#2 Map	On
	Analog Input#3 Map	On
	Analog Input#4 Map	On
	Analog Input#1 Raw	On
Analog Inputs	Analog Input#2 Raw	On
Config: Analog CH1	Analog Input#3 Raw	On
Config: Analog CH2	Analog Input#4 Raw	On
Config: Analog CH3	Enter=Select Ctrl or Alt	+ Arrow=Move
Config: Analog CH4	Font Width Justify Co	lor Backcolor
Display: Parameters	Esc=Abort F10	=Save

Figure 51

Figure 52

EXAMPLE 1

Configure analog channel 1 to convert 0-3.3V input to display 0 - 667.5 feet.

Input 3.3V	ADC Count	Represent (feet)
0	0 ——	→ 0
3.3	4095 —	→ 667.5



Follow *Figure 48 - Figure 50* to set CH1 *"Slope"* & *"Intercept"* to 0.163 and 0.0272 respectively.

Follow Figure 51 - Figure 52 to display "Analog Input #1 Map"

To quickly get familiar with this app, please watch our short tutorial video "Tutorial Analog Inputs" on our web site.

XY MEASUREMENT

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



1	Markers	x1, x2, y1, y2 markers. Can be moved via Analog inputs, quadrature inputs, RS232 command, arrow keys
2A	Delta X	DX = x2 - x1
2B	Calibrated DX	CX = mx * DX + bx
3A	Delta Y	DY = y2 - y1
3 B	Calibrated DY	CY = my * DY + by
4	Border	Border can be a bracket, box or none. Adjustable line width & color
5	Area	The width and height are adjustable up to 1920 x 1080
6	Misc. Parameters	Title, Time & Date, Logo. Fully configurable by the user

To customize the sample file to meet your needs, follow *Figure 53 - Figure 55*:

Main Menu		Configu	ire Marker
Display: Texts		When to display	Always On
Display: Graphics		Markers move with	Quadrature inputs
Display: Device data		Width	1400
App: Quadrature Counters		Height	700
App: Analog Inputs		Border thickness	7
App: Geotagging		Border color	Index 35
App: Plane Situation Awareness		Border type	Bracket
App: ROV Situation Awareness		Marker thickness	2
App: XY Measurement		Marker color	Index 33
App: Reticle		X-Slope (mx)	100.000000
App: Count up Timer		X-Intercept (bx)	0.00000
App: Misc widgets		Y-Slope (my)	100.000000
Edit: Texts		Y-Intercept (by)	0.00000
Edit: System Setting		X Suffix	micron
Edit: COM Port Setting	Video Marker	Y Suffix	micron
Config: Load	Configure Marker	Enter or Type= Edit C	trl or Alt + Arrow = Move
Config: Save Delete	Display Marker Parameters	Esc=Abor	t <mark>F10</mark> =Save

Figure 53

Figure 54

Figure 55

There are 4 options for X1, X2, Y1, Y2 marker movement:

Analog Inputs	Apply 0-3.3V to CH1-CH4
Quadratura Inputa	Connect incremental encoder switches to quadrature inputs# 1,2.
	(Toggle INO to select between horizontal & vertical marker pair)
RS232 Command	Send command \$VL43,157,x1,x2,y1,y2*XX to set registers #157,158,159,160
Keyboard Arrow	Use \hookrightarrow to move 1-pixel resolution. Use Ctrl + \Leftrightarrow to move 25 pixels. Press \downarrow to select next marker.

To quickly get familiar with this app, please watch our short tutorial video *"Tutorial Video XY Measurement"* on our web site.

RETICLE

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



1	Reticle position	Reticle X&Y position. Center is at 0,0
2	Reticle style	Reticle can be a PNG image, adjustable crosshair or square box. See a few examples below.
		If an image is selected, it must reside on the microSD card. Image must be <u>converted</u> to BMP and
		named Crosshair.BMP
		Reticle can be moved by via Analog inputs, quadrature inputs, RS232 command, arrow keys
3	Border	Border can be a bracket, box or none. Adjustable line width & color
4	Area	The width and height are adjustable up to 1920 x 1080
5	GPS	Latitude & Longitude
6	Misc. parameters	Title, Time & Date, Logo. Fully configurable by the user



To customize the sample file to meet your needs, follow *Figure 56 - Figure 58*

Main Menu Display: Texts Display: Graphics Display: Device data App: Quadrature Counters App: Analog Inputs App: Geotagging			
App: Plane Situation Awareness		Configu	ire Reticle
App: ROV Situation Awareness	Reticle	When to display	Always On
App: XY Measurement		Reticle move with	Quadrature inputs
App: Reticle		Width	1400
App: Count up Timer		Height	800
App: Misc widgets		Border thickness	1
Edit: Texts		Border color	Index 33
Edit: System Setting		Border type	Bracket
Edit: COM Port Setting		Crosshair style	Image
Config: Load	Configure Reticle	Enter or Type= Edit C	trl or Alt + Arrow =Move
Config: Save Delete	Display Reticle Parameters	Esc=Abor	t F10=Save

Figure 56

Figure 57

Figure 58

There are 4 options for Reticle movement:

Analog Inputs	Apply 03.3V to CH1-CH2
Quadrature Inputs	Connect two incremental encoder switches to quadrature inputs# 1,2
RS232 Command	Send command \$VL43,155,x,y*XX to set registers #155,156
Keyboard Arrow	Use \hookrightarrow to move 1-pixel resolution. Use Ctrl + \Leftrightarrow to move 25 pixels

To quickly get familiar with this app, please watch our short tutorial video "*Tutorial Reticle*" on our web site.

PLANE SITUATION AWARENESS

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



1	GPS data	Read from GPS attach to COM1 or COM2
2	Plane Situation Widget	Please see below for detail description
3	Compass	Rolling compass widget
4A, 4B, 4C	Sliders	4A depict pitch, 4B roll and 4C Altitude
5	Timer	A count up timer with msec resolution
6	CSV Sentence-A values	VAL1 = Heading, VAL2 = Bearing, VAL3 = Roll, VAL4=Pitch, VAL5 = Depth
7	Misc. parameters	Title, Logo. Fully configurable by the user

PLANE SITUATION AWARENESS WIDGET

As shown in *Figure 59*, Plane situation awareness widget depicts parameters such as heading, bearing (relative or magnetic), roll, pitch, azimuth, elevation. The size of the widget is governed by the background image shown in *Figure 60*. Larger image will result in a larger widget. Background image resides on the microSD and can be replaced by a user-provided image for different size and look & feel. The image must be named "Ring Plane".





Follow *Figure 61 - Figure 62* to configure the widget.

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Figure 61

Aircraft Situation Awarene	ess
When to display	Always On
REG: Heading°	40
REG: Bearing®	41
REG: Roll ^e	42
EG: Pitch°	43
REG: Gimbal Azimuth°	44
REG: Gimbal Elevation ^o	45
REG: Lens	46
nvert: Heading°	Off
nvert: Bearing°	Off
nvert: Roll ^o	Off
nvert: Pitch°	Off
nvert: Azimuth°	Off
nvert: Elevation°	Off
Relative Bearing°	Off
ext color	Index 32
Enter or Type= Edit Ctrl or Alt + A	rrow =Move
Esc=Abort F10=Save	

Figure 62

Follow *Figure 62* to specify what register are associated with each parameter. For example, table below shows available options for heading:

Register # associated with Heading	Description
89	Heading is provided by attaching Garmin GPS modem to COM1 port
114	Heading is provided by attaching Vector NAV INS sensor to any COM port
40	Heading is provided by transmitting a CSV sentence A to any COM port. Heading would be VAL1
89	Do not display heading

The device (GPS, INS ...) specific registers are updated automatically when it is connected to PROTEUS. When the content of a register changes, any widget (text or graphic) that is linked to that register is **automatically** updated.

The content of any register can also be changed by sending Set Register Command. Assuming register 40 is linked to heading, command below will set the heading to 85°. Therefore, all widgets linked to register 40 will be updated automatically.

\$VL43,40,85*XX

Figure 63 demonstrates the relation between heading, relative vs magnetic bearing:



Figure 63

To customize the sample file to meet your needs, please visit the corresponding section in this document to learn about the specifics.

ROV SITUATION AWARENESS





1	GPS date	Read from GPS attach to COM1
2	ROV Situation Widget	Please see below for detail description
3	Compass	Rolling compass widget
4A, 4B, 4C	Sliders	4A depict pitch, 4B roll and 4C Depth
5	Timer	A count up timer with msec resolution
6	CSV Sentence-A values	VAL1 = Heading, VAL2 = Bearing, VAL3 = Roll, VAL4=Pitch, VAL5 = Depth
7	Misc. parameters	Title, Logo. Fully configurable by the user

ROV SITUATION AWARENESS WIDGET

As shown in *Figure 64*, ROV situation awareness widget depicts parameters such as heading, bearing (relative or magnetic), range to target, roll and pitch. The size of the ROV widget is governed by the background image shown in *Figure 65*. Larger image will result in a larger widget. Background image resides on the microSD and can be replaced by a user-provided image for different size and look & feel. The image must be named "Ring Rov".





Follow *Figure 66-Figure 67* to configure the widget.

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Figure 66

Rov Situation	Awareness		
When to display	Always On		
REG: Heading [•]	40		
REG: Bearing [®]	41		
REG: Roll [®]	42		
REG: Pitch°	43		
REG: Range	44		
Invert: Heading°	Off		
Invert: Bearing [®]	Off		
Invert: Roll°	Off		
Invert: Pitch° Off			
Relative Bearing°	Off		
Text color 🚽	Index 32		
Enter or Type= Edit Ctrl or Alt + Arrow = Move			
ESC=ADOIL F	TO=Save		

Figure 67

Follow *Figure 67* to specify what register is associated with each parameter. For example, table below shows available options for heading:

Register # associated with Heading	Description
89	Heading is provided by attaching Garmin GPS modem to COM1 port
114	Heading is provided by attaching Vector NAV INS sensor to any COM port
40	Heading is provided by transmitting a CSV sentence A to any COM port. Heading would be VAL1.
00	Do not display heading

The device (GPS, INS ...) specific registers are updated automatically when it is connected to PROTEUS. When the content of a register changes, any widget (text or graphic) that is linked to that register is **automatically** updated.

The content of any register can also be changed by sending Set Register Command. Assuming register 40 is linked to heading, command below will set the heading to 85°. Therefore, all widgets linked to register 40 will be updated automatically.

\$VL43,40,85*XX

To customize the sample file to meet your needs, please visit the corresponding section in this document to learn about the specifics.

SLIDERS

PROTEUS provides 4 fully configurable sliders. Follow *Figure 68- Figure 70* to configure the sliders.



Slider must be linked to a register. Registers are updated via associated sensors or through RS232 commands. When the linked register receives a new value, associated slider is automatically updated.

Assuming slider is linked to register **#40**, RS232 command **\$VL43,40,30*XX** will set slider to 30.



Figure 71

COMPASS

PROTEUS provides a rolling compass and simple circular compass as shown below.



Follow Figure 72 - Figure 74 to configure each compass.



Misc Widgets	Rolling Compass		Circular C	ompass
Slider 1	When to display Link to register	Always On 40	When to display	Always On
Slider 2	Visible span°	90°	REG: Heading ^o	40
Slider 3	Tick color	Index 33	Invert Heading ^e	Off
Slider 4	l ext color Center line color	Index 32 Index 32	Arrow style	Half arrow
Circular Compace	Legend style	-180°+180° NSEW	Arrow color	Index 32
Rolling Compass	Enter or Type= Edit	Ctrl or Alt + Arrow = Move	Enter or Type= Edit Ctri Esc=Abort F	10=Save
Figure 72		Figure 73	Figure	74

Compass data is provided via "link to register". For example, if VAL1 of CSV Sentence-A contains heading, use 40. Appendix-A of the *Proteus-V SCS.pdf* provides register values of all CSV sentences.

Rolling compass provides 4 visible spans $(30^{\circ}, 45^{\circ}, 60^{\circ}, 90^{\circ})$ with 4 different legends described below:

- 0..360⁰
- 0..360[°] NSEW
- -180[°]...+180[°]
- -180[°]...+180[°] NSEW

The size of the circular compass widget is governed by its background image. Larger image will result in a larger compass. Background image resides on the microSD and can be replaced by a user-provided image for different size and look & feel. The image must be named "Ring100".

GEOTAGGING & KML GENERATION

Geotagging is the process of syncing geographical data such as latitude and longitude coordinates, time and date, video time code (VTC), altitude, bearing, camera gyro (pitch, roll, azimuth) etc. to your video in real time. This produces geotagged media (KML file) that can be viewed in Google Earth so you can see the exact location where video was taken.

During geo recording, operator can drop unique place markers (red marker #1, #2) to bring attention to monitoring staff.



Figure 75

RECORDING SETUP

The purpose of ethernet cable is for Proteus to obtain Video Recorder's Time Code (VTC) and embed it in each KML's place marker. If this feature is not required, the ethernet cable can be removed.



PLAYBACK SETUP

The purpose of ethernet cable is for monitoring staff to click on any place marker and have the video player jump (jog) to the exact instant video was recorded. This feature (jog) will be available in the future release.



CONFIGURATION

Press F9 and follow figures below to configure the geotagging.

Main Menu	Geotag Settings
Display: Texts Display: Graphics Display: Device data App: Quadrature Counters	KML File GenerationOnREG: Gyro Pitch115REG: Gyro Roll116
App: Analog Inputs App: Geotagging App: Plane Situation Awareness App: ROV Situation Awareness App: XY Measurement App: Reticle App: Count up Timer App: Misc widgets Edit: Texts	REG: Gyro Yaw 114 REG: Heading 89 REG: Latitude 93 REG: Longitude 94 REG: Altitude 117 KML File Name Video File Name
Edit: System Setting Edit: COM Port Setting Config: Load Config: Save Delete	Include Video Time Code On Video Recorder IP Address 192.168.1.149 Enter or Type= Edit Esc=Abort F10=Save

Settings	Description
REG: Gyro Pitch	Enter PROTEUS register# where values are read from.
REG: Gyro Roll	
REG: Gyro Azimuth	 For example, for Pitch: If a Vector NAV IMU is attached to PROTEUS, enter <u>115</u> If user provides pitch value via CSV Sentence-A (VAL2) enter <u>41</u> If not required, enter 0
REG: Heading	
REG: Latitude	
REG: Longitude	
KML File Name	This field will be used in the future release
Include Video Time Code (VTC)	If enable, video recorded must be connected to PROTEUS via Ethernet cable
Video Recorder IP address	Enter IP address of the video recorder. This is necessary when needing to include VTC in place markers.

You can easily customize what information is over laid on your video in real time. In the sample screen shown in Figure 76:

- GPS time, date, latitude and longitude are superimposed on the upper left.
- A rolling compass in the center.
- Current Video Time Code (VTC) and current place marker # on the upper right.

As show in Figure 75, the default place maker is green. When F3 or F4 is pressed, red place marker #1 or #2 is inserted once. Alternative place markers can be used to quickly bring attention to locations requiring in depth analysis.

To start KML recording, press F1. To stop KML recording, press F2.

As show in Figure 75, during KML recording, the red icons located on the upper right flashes once per second to confirm recording is in process.



COUNT UP TIMER

PROTEUS provides Count Up timer. Follow *Figure 77-Figure 78* to configure the timer.

Main Menu
Display: Texts
Display: Graphics
Display: Device data
App: Quadrature Counters
App: Analog Inputs
App: Geotagging
App: Plane Situation Awareness
App: ROV Situation Awareness
App: XY Measurement
App: Reticle
App: Count up Timer
App: Misc widgets
Edit: Texts
Edit: System Setting
Edit: COM Port Setting
Config: Load
Config: Save Delete

Figure 77

Count L	Jp Timer
Timer format	D HH:MM:SS.mmm
When to Display	Always On
When to Remove	Off
Enter=Select Ctrl c	or Alt + Arrow=Move
Font Width Justi	fy Color Backcolor
F11 C48 Esc=Abort	F10=Save B16

Figure 78

CLOCK SOURCE

Source	Description
Internal 27MHz	Source for 1msec pre-scaler

EXTERNAL CONTROLS

GPI	Description
IN1	0 = Pause Timer, 1 = Resume Timer
IN2	0 = Reset Timer. Reset occurs within 10nsec.

TIMER FORMAT

Timer format is "D HH:MM:SS.mmm" where D is number of days and mmm is milliseconds

PROTEUS commands

Aside from supporting various connected devices, PROTEUS provides over 30 powerful commands to overlay crisp and clear texts, graphics and telemetry generated information into an incoming HD & SD video in real time. Refer to the Software Communication Spec (SCS) for the detail description of each command.

TRANSMIT A COMMAND SCRIPT

- 1. Connect PROTEUS to your monitor. Connect RS232 cable from your PC to the PROTEUS. Power on PROTEUS.
- 2. Run *PROTEUSApp* located in folder *C:\VideoLogix-V\utility*.
- 3. Use *File*, *Select Com Port* to assign a com port.
- 4. Go to "Demo/Tutorial" tab.
- 5. Click *Run Script Now* button and load *C:\VideoLogix-V\Script\O-TestCommands*.
- 6. A demo should appear on your video monitor.

PROTEUS REGISTERS

PROTEUS system contains a collection of registers used for configuring the system and accessing the data it produces. These registers may be read or written to using the Read Register and Write Register commands (refer to SCS for detail). The table in *Appendix A of the "Proteus-V SCS.pdf"* provides a quick reference for all the registers and their associated properties. The device specific (Cineflex, IMU, GPS ...) registers are automatically updated when the associated device is connected to PROTEUS. Widgets that are linked to a register are updated automatically when the content of the register changes.

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	Temperature	Humidity	
Operating	0° C to 65° <i>C</i>	10 to 90% RH Non-Condensing	
Storage Temperature	-10° C to 80° <i>C</i>	10 to 90% RH	

WEIGHT & DIMENSION

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

FRONT PANEL LED

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

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

PCB SPECIFICATION





ENCLOSURE DIMENSION



APPENDIX A – KEYBOARD COMMANDS

KEYBOARD COMMANDS

Keyboard command	Description
F8	Shortcut to "Edit: User Texts"
F9	Launch Main-Menu
F10	Save changes & exit Sub-Menu
ESC	Abort changes and exit Sub-Menu
Enter or Ctrl + Enter	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		•
С	or	Ctrl + C	Color:	Change text foreground color
F	or	Ctrl + F	Font:	Change font type
W	or	Ctrl + W	Width:	Change width of the field
J	or	Ctrl + J	Justify text:	Left, center or right justification text within field
В	or	Ctrl + B	Background color: Change text background color	
Ctrl + Arrow	or	Alt + Arrow	Move text location. Hold Ctrl to move the field 30 pixels and Alt to move the field 2 pixels.	

APPENDIX B – UPDATING FIRMWARE

This section assumes you have already installed 'Renesas Flash Programmer' described in Appendix C.

- 1. Toggle CFG switch in the rear panel to the lower position
- 2. Cycle power to PROTEUS
- 3. Connect mini USB cable from your PC to PROTEUS
- 4. Your PC should acknowledge PROTEUS with a beep. Alternatively, Device Manager will add the following:

Ports (COM & LPT)
 Synergy USB Boot (COM5)

 Start Renesas Flash Programmer. As shown below, ensure <u>Current Project</u> is GVO.rpj. If confirmed, go to step 6. If not, go to File, Open Project and load it from the folder established in Appendix C i.e. C:\VideoLogix-V\Firmware. To avoid repeating this step in the future, go to File and Save Project.

File D	evice Information	Help				
Operation	Operation Settings	Block Settings	Connect Settings	Unique Code		
Projec Cum Micr	t Information ent Project: G1 ocontroller: Re	VO.rpj enesas Synergy				
Progra	am File					
D:W	D:\GVO2018\Debug\Exe\ProteusV2P38-Alcon.srec Browse CRC-32 : F8963384					
Flash	Operation					
Era	se >> Program >> Ve	rify				
	Start					
Renesas Fl oading Pro	ash Programmer V: bject (C:¥VideoLogi;	3.05.01 [3 Sep 2 <-V¥Firmware¥(018] (Free-of-cha 3VOrpj)	arge Edition)		

6. Follow instruction below to load the firmware into Proteus.

File Divice Information Help	Kenesas Flash Programmer V3.05.01 (Free-of-charge Edition) — 🗌 🗙
	File Device Information Help
Operation Operation Settings Block Settings Connect Settings Unique Code	Operation Operation Settings Block Settings Connect Settings Unique Code
Communication	
Tool COM V Interface 2 wire UART V Speed 921,600 V bps	Project Information
Tool Detaile Num: COM5	Current Project: GVO.rpj
Tour Details	Microcontroller: Renesas Synergy
Tool Details (COM) - X	Program File
Calent Teal	Contract Dire \ Destaure \ \/dDD area
Select root	Crojecibil Arioteus-Virusiec
	CRC-32 : B2364FBD
COM5 : Synergy USB Boot	Flash Operation
	Erase >> Program >> Verfy
	Start OK
Renesas Flash Programmer VS Loading Project (C#V/ideoLogix	
	Code Flash 1] 0x0000000 - 0x003FFFFF size : 4.0 M
	[Data Flash 1] 0x40100000 - 0x4010FFFF size : 64 K
	Writing data to the target device [Code Flash 1] 0x00000000 - 0x0000000FF size : 256
OK Cancel	[Code Flash 1] 0x00000400 - 0x00041DFF size : 262.5 K
	Verifying data [Code Flash 1] 0x00000000 - 0x000000FF size : 256
	[Code Flash 1] 0x00000400 - 0x01041DFF size : 262.5 K
	Disconnecting the tool
	operation completed.
Clear status and message	· · · · · · · · · · · · · · · · · · ·
	Clear status and message

- 7. After 'Operation completed', Toggle CFG switch in the rear panel to the upper position
- 8. Cycle power to PROTEUS and you are done.

APPENDIX C – INSTALL RENESAS FLASH PROGRAMMER

Copy the content of the microSD card into a PC folder i.e. *C*:*Videologix-V*. Alternatively, download it from <u>MicroSD FOLDERS – DOWNLOAD</u> and unzip it into a folder i.e. *C*:*Videologix-V*.

Go to folder *C:\Videologix-v\Utilities* and launch program '*Renesas_Flash_Programmer_Package_V30501*'. Follow instruction below:

0 - 	staller [Select Components]		×
	Component Selection		
	Product Name	Size	^
	Renesas Flash Programmer V3.05.01	6852KB	
	USB Driver for E1/E20 emulators V1.01.00	3386KB	
	USB Driver for Renesas MCU Tools V2.76.01	4792KB	
	The USB driver for USB Boot MCU TypeA V1.00.02	3386KB	
	The USB driver for USB Boot MISU TypeR V1 01 00	4737KR	¥
	Explanation:	Drive: C: Free space: 389,082,80 Required space 6,85	0KB ce: 2KB
	Install location		
	C:\Program Files (x86)\Renesas Electronics\	Browse	
í	RENESAS <back< td=""><td>Next > Ca</td><td>ancel</td></back<>	Next > Ca	ancel

APPENDIX D – IMAGES

PROTEUS 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.



How to Add an Image

- 1. Store your image (JPG or 32-bit BMP from Pixelformer Utility) in the folder Images on the microSD card.
- 2. Edit "ImageList.txt" file located in Images folder to add your image name with an ID 1..30.
- 3. Insert microSD back into Proteus and cycle power.
- 4. You image can be display via *Display Images* menu or command \$VL25

APPENDIX E – CREATE CUSTOM FONTS

FONTO through FONT7 can be customized by the user. To create your own fonts, follow steps below:

- 1. Start PROTEUSApp. *This app is in utility folder on microSD card*.
- 2. Go to Font + Bitmask tab.
- 3. Click Select Font button and select your desire font type & style.
- 4. Click Create Font File button.
- 5. Select your desire ISO Character set template from C:\videologix-V\Fonts\ISO8859-9 Latin1.txt
- 6. Type a file name for your font and press save.
- 7. Your new font will be stored in folder C:\videologix-V\Fonts\
- 8. Edit file FontList.txt to add your new font file.
- 9. Copy FontList.txt and new font file to the folder 'Fonts' on microSD card.

APPENDIX F – TERMINAL BLOCKS

Care must be taken when inserting wire into terminal blocks. Do not insert thick screwdriver into terminal block as it will permanently damage the internal spring-loaded contacts. In general, any blade with 0.4mm x 2mm cross section is appropriate. Digikey P#1205202 is factory approved.

We have learned that X-ACTO Knife shown below works best.





APPENDIX H – FORMAT MICROSD

Disable power before removing or inserting microSD card.

- The following instructions only apply to firmware version V2.24 or higher.
- microSD card capacity is limited to 2GB, 4GB, 8GB, 16GB, 32GB.
- Follow the diagram below to *format* your microSD card. Select *FAT32* as File System and Allocation unit size of *8192 bytes*.
- After microSD format, copy the folders shown below into your microSD card.
- Always *eject* the microSD card (as shown below) to complete the write operation.

