VERIF·i

User Manual for the

GPS Sync

GPS Time Stamp Unit

This manual is provided as an aid to use of the GPS Sync unit. Users of the software are free to print copies for the above purpose only. This manual may not be distributed to third parties without the prior consent of Verif-i Ltd.

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Revisions:

Rev.	Date	Page(s)	Change
0.1	5/5/19	5	Update of specifications
0.2	6/6/19	12	Help for missing mfc104.dll
0.3	12/6/19	15	Connector types wrong

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Introduction

The GPS Sync is a timestamp unit using GNSS signals to provide information to record the time of events with microsecond accuracy. The unit replaces Verif-i's successful GPS Synchroniser which has been used in the field for over ten years.

The unit obtains satellite timing information from the GPS and Glonass constellations using a supplied external antenna or alternatively the unit can be connected to a suitable fixed antenna using a splitter.

On receipt of a trigger signal, the time and position of the event are measured by the GPS Synchroniser and recorded on the internal SD card. The information is also output in real time on the USB and serial interfaces.

The system includes software, running on Windows operating systems which is used to set parameters in the device and download data stored on the internal SD card.

All data recorded during a day is recorded in a file whose filename is the current date. At midnight the file is closed and a new one created - data acquisition is uninterrupted.

Specifications

Size	:	3.5 x 9 x 16 cm (excluding connectors)
Weight	:	250 grams (excluding external cables)
Power supply	:	12 V at 100 mA or USB
Input Options	:	Opto Isolator
		Contact closure
		TTL
Memory	:	128 MB SD card
Satellites	:	GPS and Glonass
Positioning	:	Uncorrected Latitude and Longitude
Time Accuracy	:	5 µs
Time Resolution	:	1 ns
Retrigger time	:	1 ms
Maximum repetition	:	5 events per second
Baud Rate	:	115,200

Connections

Antenna

The GPS Sync requires a continuous GNSS signal supplied to the SMA connector on the top of the unit to operate correctly. The unit can use GPS and/or Glonass satellites using a suitable 2-band antenna, such as the one supplied - power is supplied to the external antenna through the SMA connector. Optionally an external antenna can be used; note that if the antenna is shared between different systems using a splitter then DC blocking should be used on all but one of the units to prevent power conflicts.

USB

The USB interface is used to programme the unit and to download data files via the Mini USB connector on the top of the unit. When the GPS Sync is connected to a computer using the supplied USB cable, power is supplied to the unit through the USB cable.

Auxiliary

The auxiliary connector is the 6 pin DIN connector on the base of the unit.

In normal operation the unit is powered from a 12 volt source through the auxiliary connector using the supplied cable.

The auxiliary connector also gives access to a PPS signal from the GPS module inside the GPS Sync and to an RS232 interface which outputs time and position data in real time.

Trigger

The unit can be triggered using one of three hardware interfaces available through the left hand DIN connector on the base of the unit.

By default, the GPS Sync is supplied with a cable connected to the opto-isolator input, but optional cables for TTL or closure inputs can be provided when the unit is ordered.

The unit should be triggered by a TTL level signal (3 to 5 V) for the TTL and opto-isolator inputs or a short circuit for the closure input.

The polarity of the trigger signal, i.e. whether the trigger occurs on the rising or falling edge of the trigger signal, can be selected in software

Operation

When power is connected to the unit, the GPS Sync searches for satellites. Satellite lock typically takes 20 to 30 seconds, more if the unit has been moved a significant distance since it was last switched on.

```
GPSSYNC
V1.14

WAITING FOR
GNSS LOCK
```

In this state the following message is shown on the front panel display:

When satellites have been identified and locked the display changes to the following:

```
13 SATS UTC
TRIGGER POS
WAITING
FOR FIRST
TRIGGER
```

13 SATS   The number of satellites being used
UTC   Universal Coordinated Time is being used
TRIGGER POS   The unit will trigger on the rising edge of the input signal

In this state the unit is ready to acquire data.

```
13 SATS UTC
TRIGGER POS
15:40:20
0.237535
```

When the trigger signal is received the display changes to the following:

This indicates that the trigger was received at 15:40:20.237535 UTC. The time is saved in memory (at a higher resolution) along with the Latitude and Longitude of the GNSS antenna and also output in real time on the USB and RS232 ports.

In this state the unit is ready for the next trigger event.

Software v1.15

The GPS Sync comes with a Windows app that allows trigger parameters to be set and allows data to be downloaded or erased from the SD card. The app consists of an application file "GPSSyncApp.exe" and a configuration file "GPSSyncApp.ini". These two files should be copied to any convenient location on the PC's hard drive (e.g. the Documents folder).

|			
GPSSyncApp	27/02/2019 16:38	Application	183 KB
GPSSyncApp	25/02/2019 17:04	Configuration sett...	1 KB

Connecting the GPS Sync to a Windows PC USB port automatically loads drivers and presents the GPS Sync to the operating system as a virtual serial port.

Launching the Device Manager (for Windows 10 type "Device Manager" in the Windows search bar next to the Start icon) and expanding the "Ports (COM & LPT)" field shows the COM port that has been assigned to the GPS Sync Prolific USB to Serial converter:
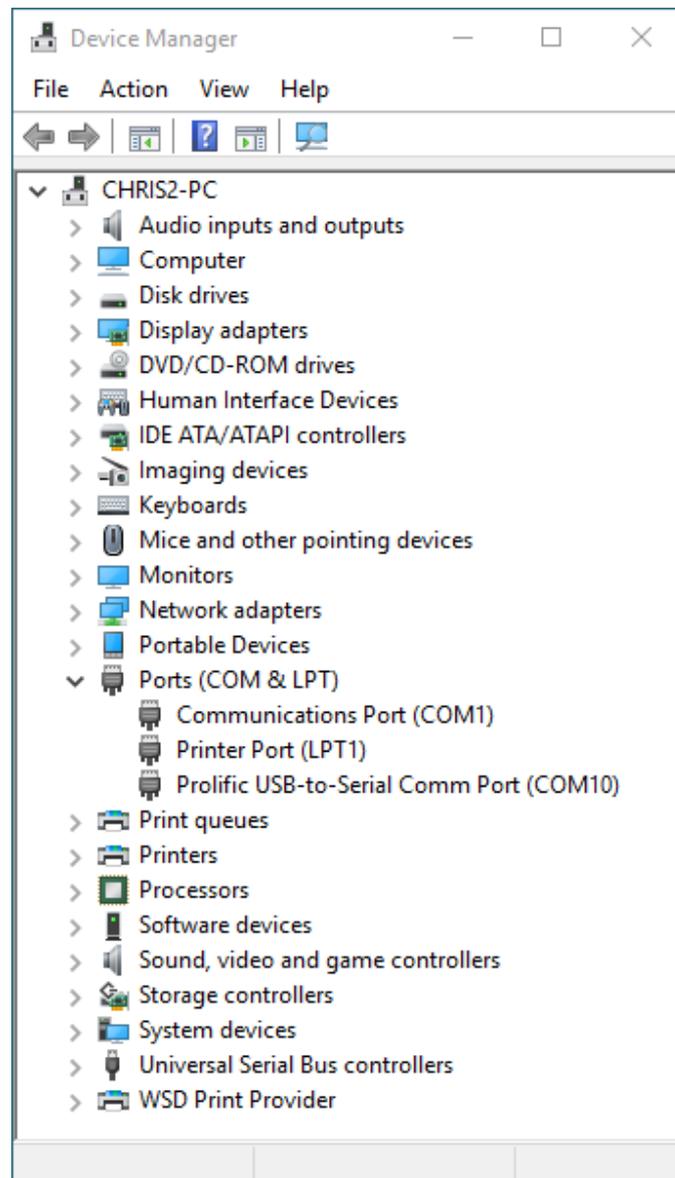
In this case the unit has been assigned COM port 10. Note that subsequently connecting the GPS Sync to the same USB port normally assigns the same COM port to the device.

In order for the app to communicate with the GPS Sync, the COM port number should be entered into the .ini file. Double clicking the .ini file opens it in Notepad by default and allows the number to be edited. Type in the number of the COM port and then Save the file.
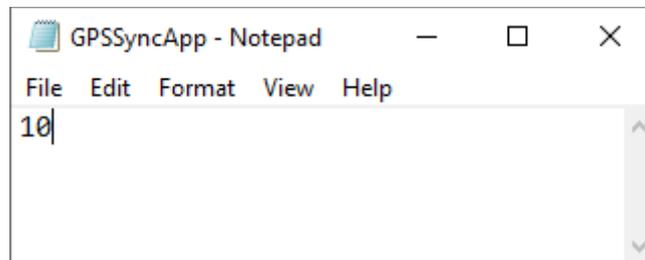

Double clicking the application "GPSSyncApp.exe" establishes communication with the GPS Sync.
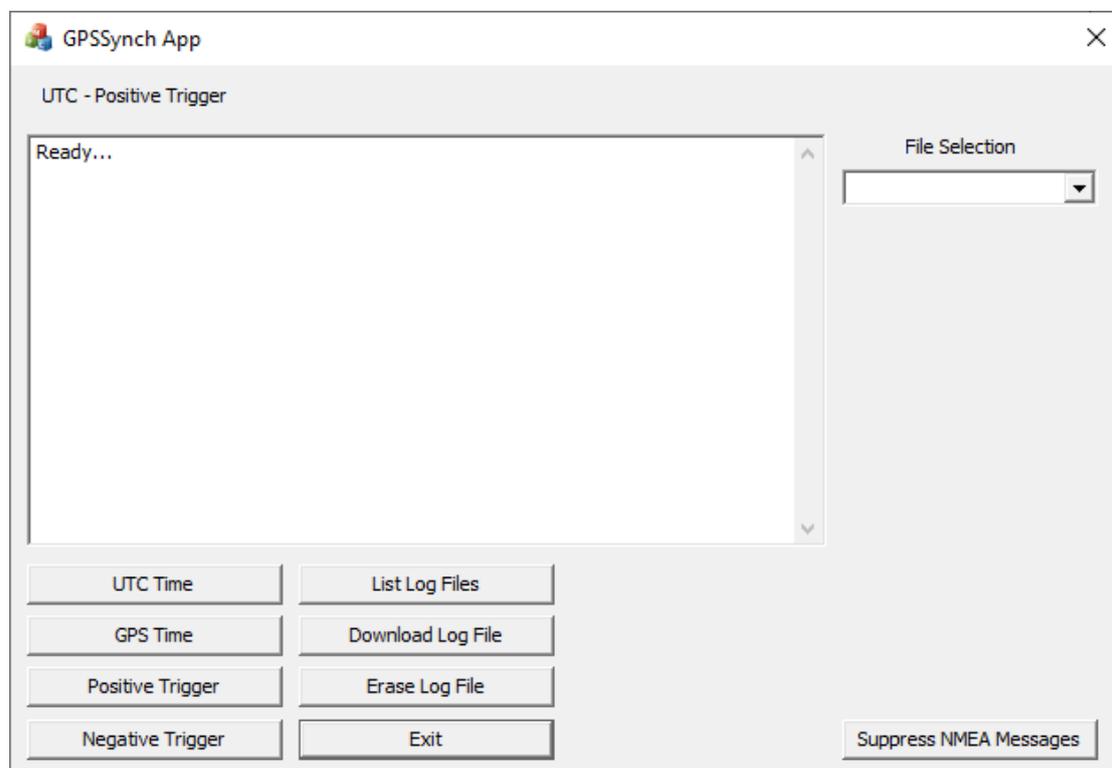

The top line of the Window immediately below the Menu bar shows the trigger status of the GPS Sync - in this case the time standard is UTC and the trigger is the positive edge of the input signal.

These settings can be changes using the four switches on the left at the bottom of the display, for example clicking the GPS Time switch sends a message to the GPS Sync to change the time standard to GPS time as shown below:
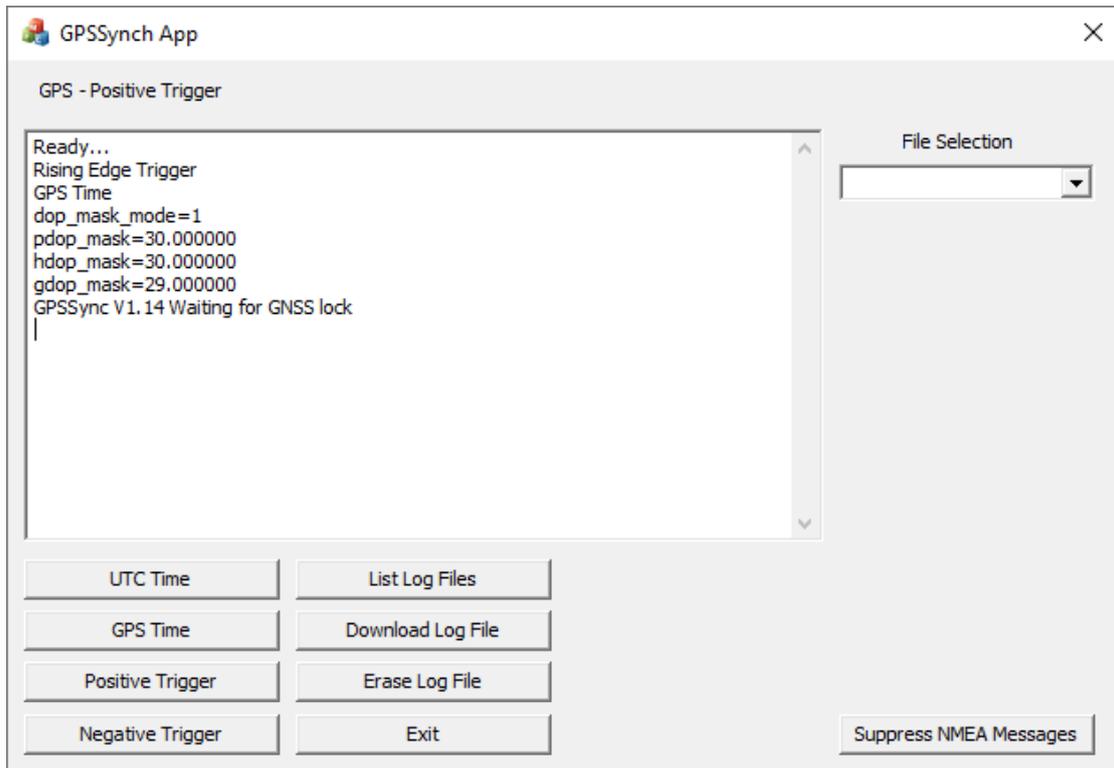
The next column of four switches are used to access data files that have already been recorded by the GPS Sync. The top button, labelled List Log Files shows a list of files currently in the SD card.
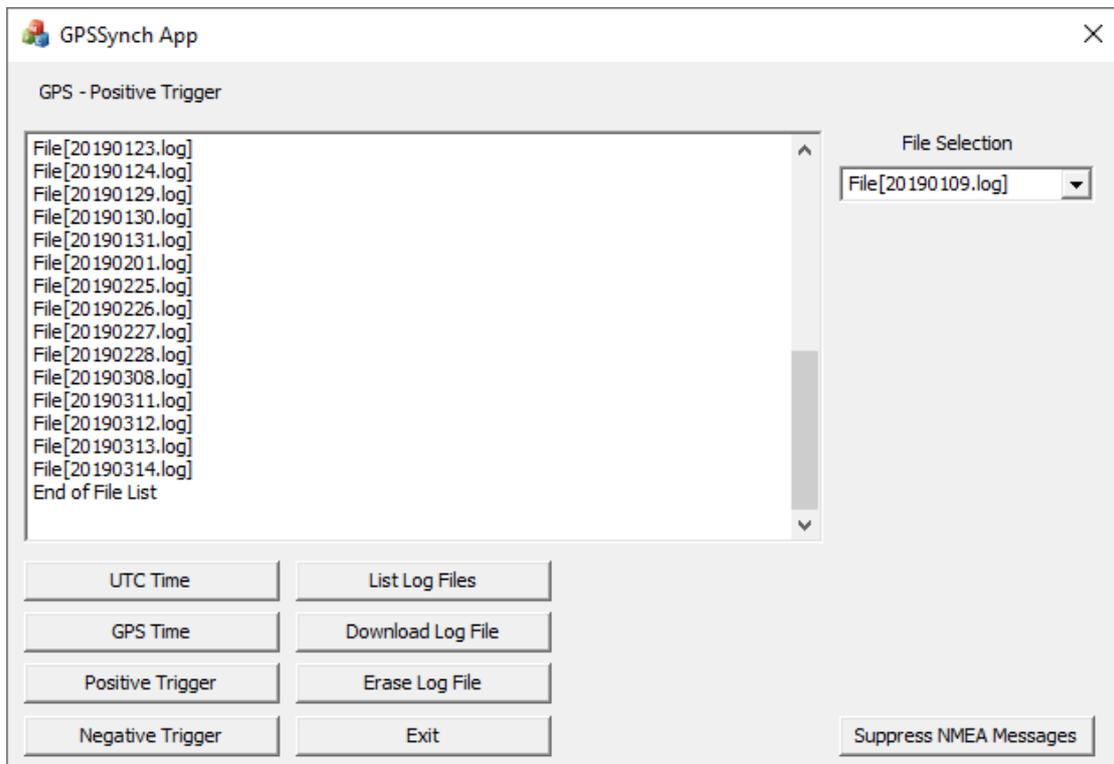

Note that the filename is automatically chosen by the GPS Sync as the day's date in the format: YYYYMMDD.log

All records recorded on a particular day are saved in a file with the day's data. At midnight a new file is automatically created, and data acquisition continues uninterrupted.

The pull-down list at the right of the Window allows one of the files to be selected. The selected file can then be either downloaded or deleted using the appropriate switches.

Clicking the Erase Log File switch simply deletes the selected file while clicking the Download Log File switch enables the user to select the location and filename in which to save the data.
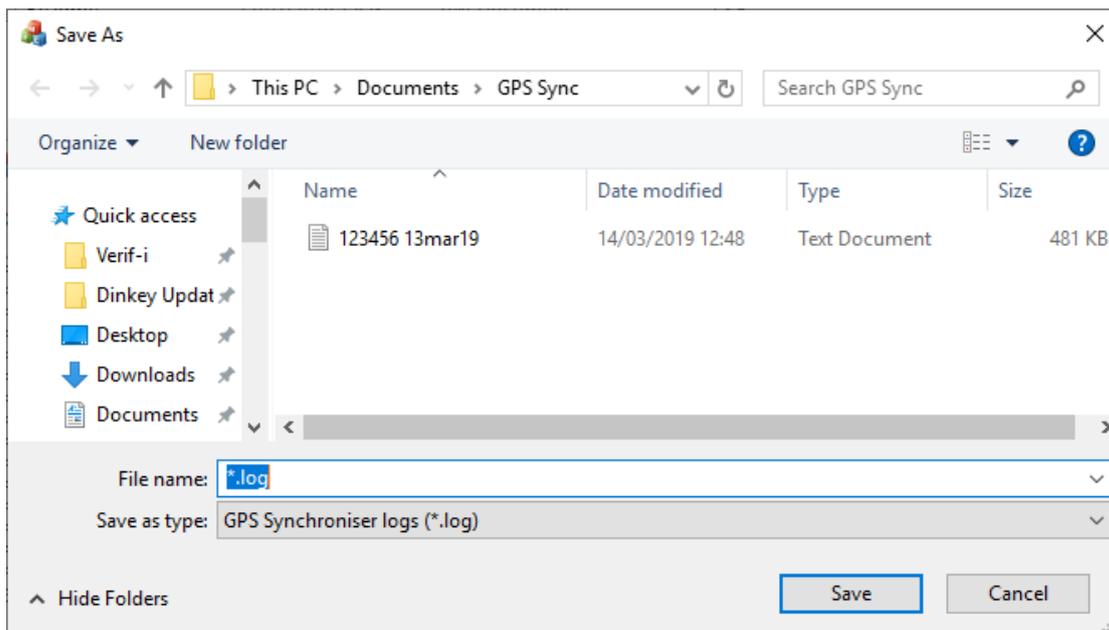

Entering a filename and clicking the Save button starts the download process. Data is downloaded in blocks of 250 records and each block takes approximately four seconds to download.
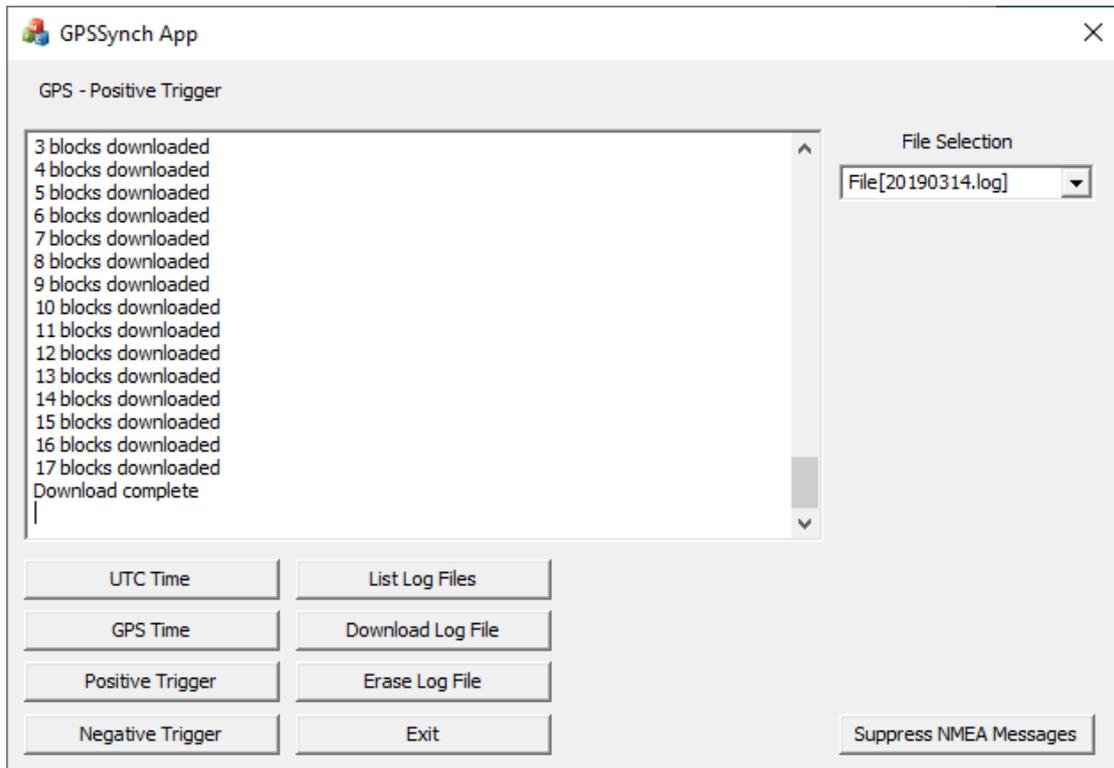
When all work is complete, the software should be closed using the Exit button BEFORE disconnecting the GPS Sync.

If communication with the GPS Sync is lost, the software gives the following error message:
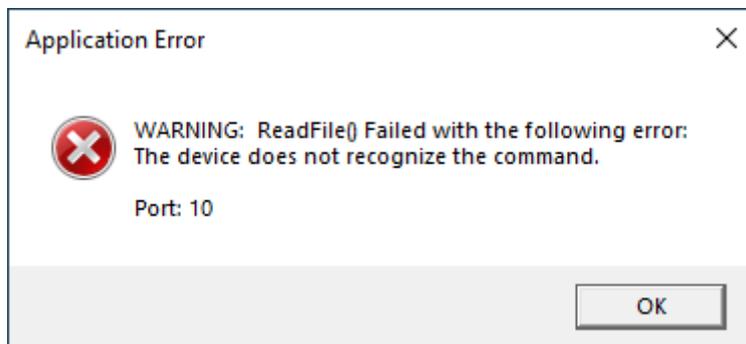
Clicking the OK button has no effect, the application must be closed using the Task Manager. Start the Task Manager by right clicking on the Taskbar at the bottom of the screen and selecting Task Manager from the menu that appears.

In the Task Manager select GPSSyncApp from the list of applications on the Processes tab and click End Task to close it.

Error Message: mfc140.dll missing

This error is generated if the PC does not have the required C++ dll file available.

The file can be loaded from Microsoft's servers using the following link:

https://support.microsoft.com/en-gb/help/2977003/the-latest-supported-visual-c-downloads

You should install the 32 bit version of the files i.e. x86: vc_redistx86.exe

Deliverables

The GPS Sync consists of the following:

1 GPS Sync unit
2 Dual band antenna - 3 metres long
3 USB connector - 1 metre long terminated with USB type A plug
4 Power connector - 1 metre long terminated with 4 mm plugs
5 Trigger connector* - 1 metre long terminated with BNC plug
6 Carry case

* There are three cable options for the trigger: Opto-isolator, Closure or TTL. The opto-isolator type is supplied by default, please indicate at the time of ordering if the TTL or Closure option is required.

Software can be downloaded from Verif-i's website at:

http://www.verif-i.com/upgrades.asp

Front Panel Connectors

Trigger

Input Connector: 8 pin DIN socket

Pin	Signal
1	Trigger - Closure
2	Not Used
3	Ground
4	Trigger - TTL1
5	Trigger - TTL 2
6	Ground
7	Trigger - Opto-isolator negative
8	Trigger - Opto-isolator positive

Auxiliary

Input Connector: 6 pin DIN socket

Pin	Signal
1	12 Volt Power Input
2	Ground
3	1 PPS Output
4	Ground
5	RS232 Transmit
6	RS232 Receive