Verify DPx

Operations Manual

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Verify DPx Operations Manual

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CONTENTS

1. INTRODUCTION

This document describes the operation of the Verify DPx system. It covers the following:

- Initial Startup
- On-screen Configuration
- Display Screens
- Error Log
- Troubleshooting

For Installation guidance please see the Verify DPx Installation Manual.

Throughout this manual reference will be made to the VERIPOS Helpdesk. The Helpdesk is provided by VERIPOS and the first point of contact for technical enquiries and assistance. It is manned 24 hours per day, 365 days per year.
Details are in the Appendix.

1.1 DISCLAIMER

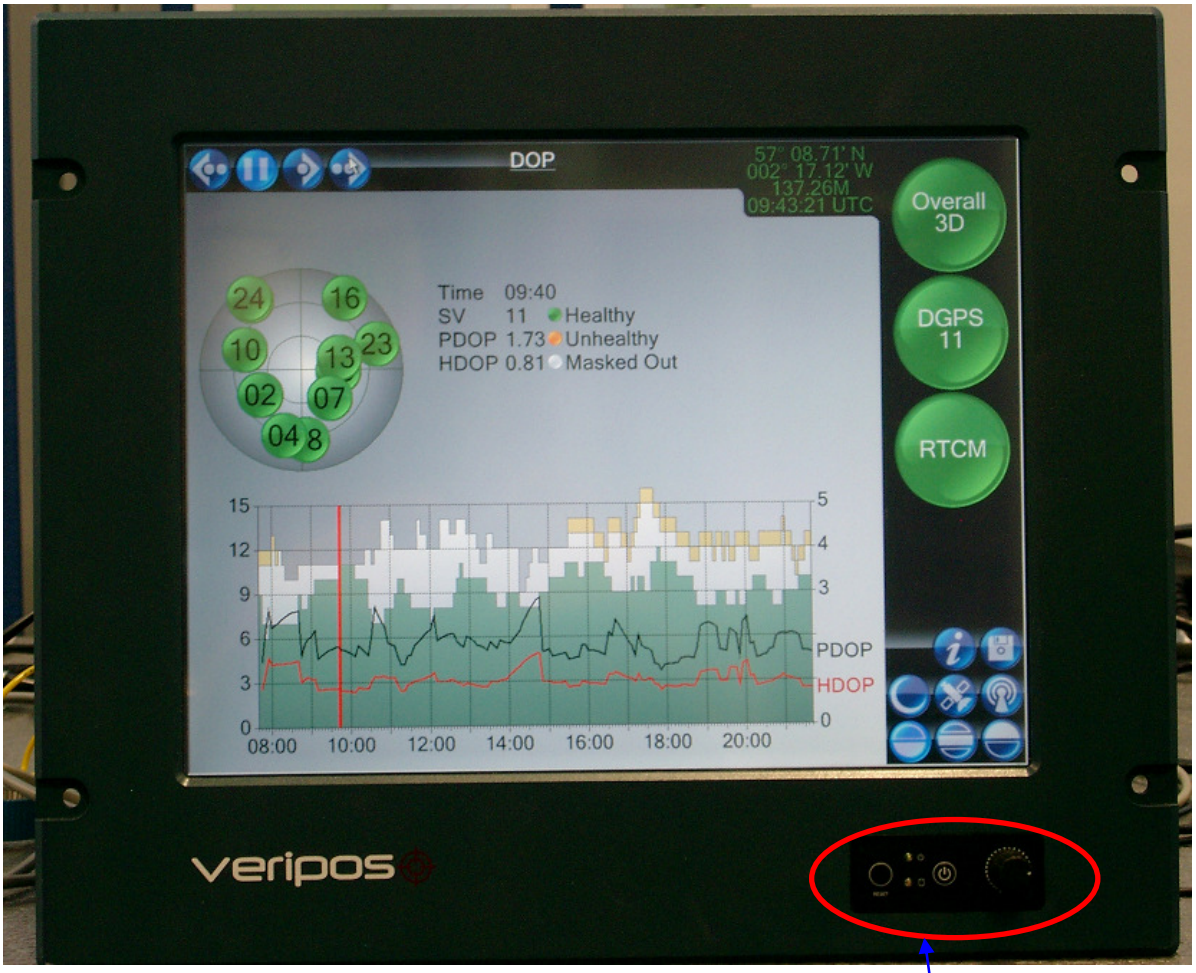
VERIPOS accepts no responsibility for any damage or injury to the system, ship or personnel caused by drawings, instructions or procedures not prepared by VERIPOS.

Contents of this manual are subject to change without notice.

Every effort has been made to ensure accuracy of the information contained within this manual. Please advise VERIPOS of errors you may encounter. Thank you.

VERIPOS assume no responsibility for errors or omissions contained within this manual.

1.2 VERIFY DPX DESCRIPTION



The Verify DPx Display Panel

L to R:
Reset button
On/Off button
Screen brightness

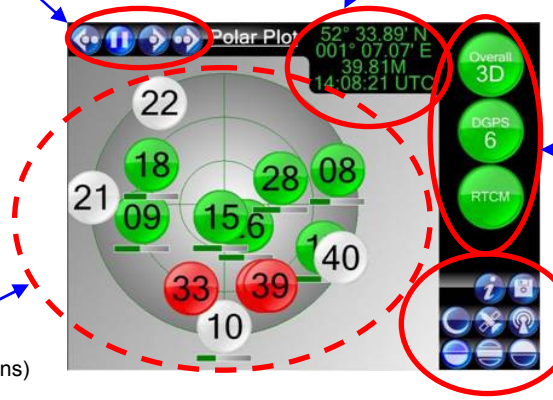
Fixed display:
Position
Height
Time (UTC)

Touch screen:
Navigation between screens

Fixed display: Traffic lights
Top:
Overall system status

Middle:
Differential position output status shows shared number of satellites with Reference station(s)

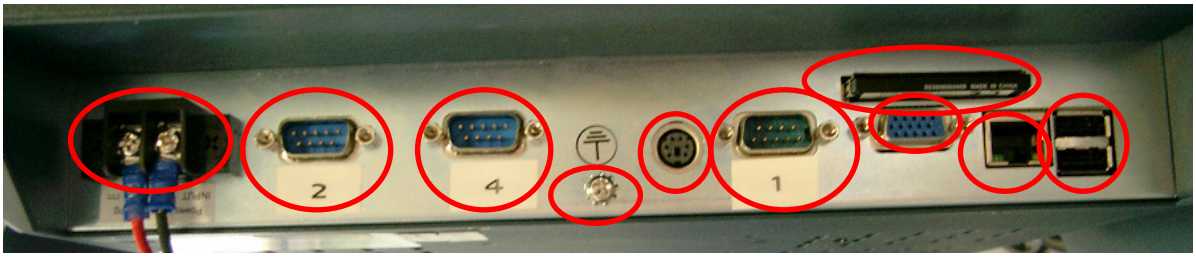
Lower:
Correction data received status



Display screens (6):
Map (navigation buttons)
Polar Plot
Heading Plot
DOP
SNR Plot
Track Plot

Touch screen
System Information:
Archive of Log
Dim screen
GPS status & settings
Demodulator corrections & change beam
Log (no display / part / full screen)

The Verify DPx Screen regions



Connector sockets on bottom of the Panel PC

Key L- R:

Power COM 2 ***RTCM***	COM 4 LD3 ***OEM***	Earth Com 1 ***GPS***
PS2 Keyboard/mouse port	VGA out (not used)	Memory card CF
LAN RJ45	USB ***x2***	

Verify DPx is a system developed by VERIPOS specifically to meet the needs of DP operators. It provides a positioning system that enables a DP Operator to quickly and effectively assess the quality of their positioning system. It provides warnings of any fault conditions which occur and maintains a 48 hour rolling log of significant events.

It provides simple controls for performing basic configuration of the positioning system. This is required when moving to a new operating region or enabling/disabling services.

Verify DPx uses a Touch-Screen Panel PC running the Windows XP Embedded operating system with solid state storage. It has an LCD display and is panel mounted for use as a DP console or using brackets may be mounted on a desktop or 19" rack. During normal operation the touch screen is used for all operator interaction – no keyboard or mouse is required.

The system continuously maintains a log of up to 48 hours of raw GPS and correction data. Subsets of this data may be archived to removable storage for off-line playback. This is a valuable tool for diagnosing any problems which might occur with the installation.

The Verify DPx is a system which adds display and configuration features to VERIPOS services. The position output to the user's equipment is taken from the matched LD3 (or LD3S) receiver, an integral part of the Verify DPx system.

A separate Operations manual is provided for the LD3 (or LD3S) receiver.

The Verify DPx software is supplied under licence and activated with a license code that is entered during commissioning and which is specific to the Verify DPx system.
Entering a code is required after software upgrades.
A new license code will be required should the LD3 (or LD3S) need to be changed.

License codes are obtained from the VERIPOS Helpdesk (see contacts list in appendix). The user must provide the ID of the LD3 (or LD3S) unit which is interfaced to the Verify DPx. This is a 5 -digit number engraved on front panel of LD3 (or LD3S. It may also be determined from the demodulator Status screen.

The positioning services available are defined by the attached LD3 (or LD3S) Integrated Positioning Mobile. The following is a brief summary. For detailed information see the LD3 (LD3S) manual.

The LD3 (or LD3S) positioning mobiles incorporate a single frequency GPS (GNSS) satellite receiver and normally use the VERIPOS “Standard” service which provides Multi-Ref DGPS solutions with an accuracy of 1 - 3 metres.

VERIPOS DGPS corrections signals are transmitted from geostationary communication satellites using an L-Band carrier. The signals are received using a small omni-directional (SPOT) antenna or a feed from a vessel’s Inmarsat system. (See the LD3 or LD3S manuals for details.) The received signals are demodulated within the LD3 (or LD3S) to provide RTCM correction signals. These are fed to the internal GPS receiver and may be output from the LD3 (or LD3S) in RS232 format for use by external equipment.

A position solution is computed within the GPS receiver using up to eight reference stations. Stations used may be selected by the operator using Verify DPx. Where more than eight stations are selected by the operator the receiver will use the eight closest stations. In normal operation all available reference stations are enabled to allow the receiver to make the appropriate selection.

LID3-G1 and LID3S-G1 units incorporate a dual-channel IALA beacon receiver. Where these receivers are used, corrections from the nearest two beacons will be used to compute a position solution when L-band corrections are unavailable.

INITIAL START UP

Sequence:

1. Turn on the Verify DPx Panel display. Wait until unit has booted in to Verify DPx.

2. Turn on the LD3 (or LD3S) receiver.

Where this is not possible the “Control” connector on the LD3 (or LD3S) front panel should be temporarily disconnected during boot up of the Panel display.

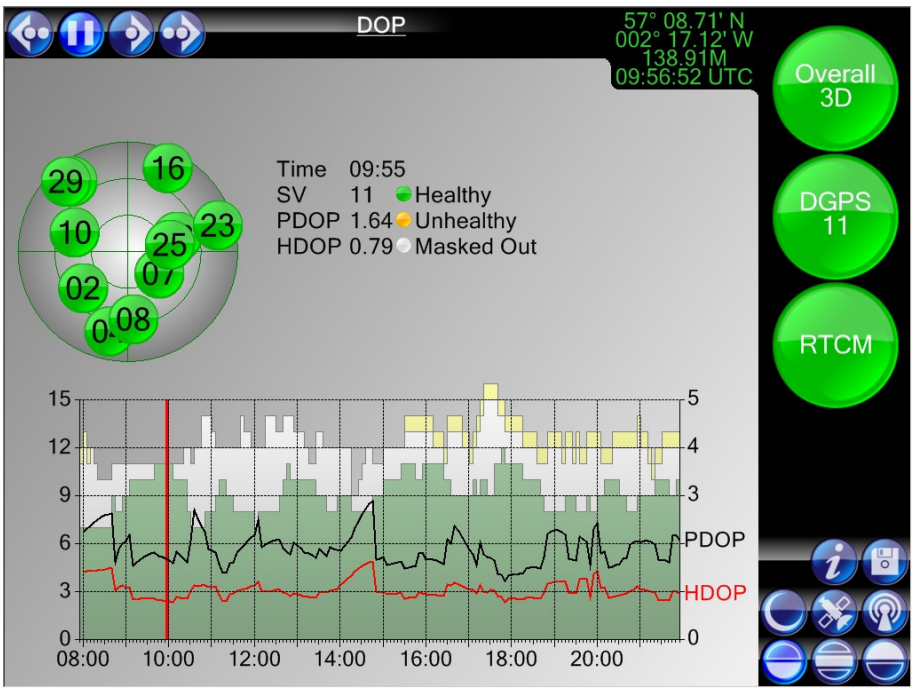
The Panel display uses the Windows operating system which checks serial ports during the boot process. A port which is active at boot time may be (incorrectly) assigned as a mouse input.

Turn on the Verify DPx system by pressing the Power button at the lower right corner of the panel. The Power indicator will illuminate. (Front panel, 1. above). Adjust backlight illumination knob to suit the ambient conditions.

The computer will progress through a normal PC boot sequence until the main Verify DPx screen is displayed. This will take several minutes.

At start up screens will be displayed. Verify DPx has five or six different status display screens. Adjust using the on-screen controls (top Left) to automatically cycle through these screens or select screens manually.

The “Traffic Light” display on the right of the screen is common to all displays:



A screen similar to that shown (with the “Traffic Lights” on the right) appears when the boot sequence has completed.

Verify DPx will indicate fault conditions until the LD3 (or LD3S) has acquired GPS and correction signals.

The LD3 (or LD3S) should now be turned on.

Allow several minutes for the LD3 (or LD3S) to acquire L-band and GPS signals before proceeding with configuration.

1.3 LD3 (OR LD3S) STATUS

Wait for a few minutes for data to be acquired then check indicators on the LD3 (or LD3S) front panel. These confirm input of GPS and corrections (DGPS) data.

SIG LEDs — The signal status LED bar graph consists of 8 LED's.
From left to right, the LED colours are: 1 × Red, 3 × Orange and 4 × Green.
Where a green indicator is lit the signal strength is satisfactory

BATT LED — Lit if input voltage drops below 11VDC.

SYNC LED: — Illuminated when LD3 (or LD3S) is locked onto the downlink beam.

ID LED: — Illuminated when LD3 (or LD3S) is enabled for service.
Flashes when LD3 (or LD3S) is disabled.

Note: <u>For LD3S/LID3S units only</u>, the indicator is extinguished when the unit is first switched on. It is not illuminated until the unit locks to an L-band signal. ("SYNC" indicator illuminated.).

GPS LED: — Illuminated when the GNSS receiver is outputting a GGA position telegram.
Flashing indicates the number of satellites used in the position computation.

DGPS LED: — Illuminated when the GNSS receiver is outputting a differentially corrected GGA position telegram.

1.3.1 Normal Indications

During normal operation the indicators on the LD3 (or LD3S) will be:

- BATT light OFF
- SYNC light ON
- ID light ON (not flashing)
- GPS light ON, Flashing periodically
- DGPS light ON
- SIG light – at least one of the green LEDs should be ON

1.3.2 Corrective Action

If indicators are not as described perform the following checks:

- All lights are off or the **BATT** indicator is on - there is a power problem.
  See "POWER FAULTS, LD3 (or LD3S) section in Troubleshooting guide (Section 7).

- The **SYNC** indicator is extinguished - the LD3 (or LD3S) is not locked to a communications satellite. See "L-BAND SIGNAL FAULT section in Troubleshooting guide (Section 7).

- The **ID** indicator is flashing - the LD3 (or LD3S) is disabled. It must be enabled before it will output positions. The procedure is described in section 4.

- The **GPS** indicator is extinguished - the LD3 (or LD3S) is not receiving GPS satellites information - may indicate poor antenna siting limiting number of satellites available to achieve a fix
  Note: Allow several minutes after switch on for the receiver to search for satellites.
  Check that the coax connector(s) on the LD3 (or LD3S) rear panel are secure. Check antenna and cabling for problems. Contact VERIPOS Helpdesk for further guidance if problems persist.

- The **DGPS** indicator is extinguished AND the **SYNC** indicator is ON AND the **GPS** indicator is ON (flashing periodically) – may indicate no reference stations are enabled. Enable reference stations as described in section 4.

1.4 SHUTTING DOWN THE SYSTEM

With any Windows system the program should be terminated using a shut down before turning off power. To shut down Verify DPx:

Touch the **Information** icon in the lower right of the screen:

Touch the **Shutdown** button on the Information Screen.

When completed power may be disconnected where required.

2. DISPLAYS AND CONTROLS

The Verify DPx touch screen is used for all inputs. A keyboard and mouse are not required for normal operation, only during commissioning or for updates.

Common features to all display screens are described in this section.

Verify DPx has five or six status display screens depending whether the heading option is being used. Status screens are described in detail in Section 5.

2.1 SCREEN CONTROL BUTTONS

These touch sensitive buttons allow the user to control how status screens are displayed:


Previous screen


Pauses automatic cycling of screens


Enables automatic cycling of screens

Display changes every 5 seconds to show the next screen in sequence.


Selects next screen

2.2 SCREEN TITLE

To the right of the Screen Control Buttons is the Screen Title.

The six screens are:

- **DOP**
- **Map**
- **Polar Plot**
- **SNR Plot**
- **Track plot**
- **Heading Plot** (Optional)

2.3 POSITION AND TIME

The Position/Time display shows Latitude and Longitude of the GPS antenna in the WGS84 datum.
It also shows the current time in UTC.
(At start up, the time displayed is taken from the PC clock. As soon as position data is received from the LD3 (or LD3S), the time displayed will be UTC derived from the GPS receiver.)

2.4 TRAFFIC LIGHTS

Traffic lights provide users with visual indication of system status.

GREEN = Normal system operation

FLASHING AMBER = Alert outside normal limits - requires investigation

FLASHING RED = Warning - position is unreliable.

Traffic lights are present on all screens so the user is always updated on system status.

Use

During an alarm condition, traffic light buttons CHANGE AMBER / RED and flash. Touching the relevant traffic light acknowledges the alarm, the light ceases to flash and acknowledgement is recorded in the event log.

Any subsequent alarm will cause the traffic light to resume flashing.

2.4.1 Top Traffic light - Overall System Status

Green during normal operation.

Flashes red when a significant error is detected.
Onscreen legend may show:

3D – Normal use – the system is computing a DGPS position solution
GPS – Lost corrections and the position output is raw (uncorrected) GPS
None – Lost GPS and no position solution can be computed

2.4.2 Middle Traffic light – GPS Status

In normal operation this is green and shows **DGPS** and the number of satellites in use.

It will flash amber or red when either the number of satellites or the signal to noise ratio (SNR) value drops to the alarm threshold set. (Alarm thresholds - see section 5.9 and Appendix.)

Where RTCM corrections are lost the middle traffic light will flash amber and the legend will change to **GPS**

If all GPS signals are lost the middle traffic light will flash red and show **"0"** as the satellite count.

2.4.3 Bottom Traffic light – RCTM (corrections) Status

Green in normal operation.

The bottom traffic light will flash amber or red when the age of the corrections reaches the corresponding alarm threshold. (Alarm thresholds - see section 5.9 and Appendix.)

Notes:

1. *Consult the Error Log (Section 6) for additional information on conditions shown in the Traffic Lights.*
2. *All three indicators flash red if the unit is disabled or the license entry is incorrect. (See configuration summary, Section 4.)*
3. *With LD3 (or LD3S) units the unit may report a license problem where the unit is disabled or no RTCM corrections.*

2.5 CONTROL BUTTONS

The bottom right corner of the screen has a group of 8 touch sensitive buttons.

Four control the main display and the others used to open supplementary screens for system configuration.

When viewing a supplementary screen a thumbnail (**Home** button) of the main screen is displayed in the top left corner. Touching the **Home** button returns the user to the main screen.

2.5.1 Program Information

Use to check the Verify DPx software version and to enter the license code

2.5.2 Archive

Used to archive logged data.

2.5.3 Night time dimming button

Toggle between day and night time colour schemes.

2.5.4 GPS

Displays GPS status information and enables the user to configure alarm levels.

2.5.5 Demodulator

Displays the current demodulator configuration and allows the user change the satellite and stations selected. Also used to enable/disable the system and modify services.

2.5.6 Error Log Display Buttons

Changes how and whether the error log is displayed.

- Left button – Hides error Log, shows only main display
- Middle button – Splits screen horizontally to show both main screen and Error Log
- Right button – Hides main screen and shows Error Log

3. CONFIGURATION

Commissioning will normally be performed by an engineer. It is only required after initial installation or after the replacement of an LD3 (or LD3S) or Verify DPx unit. Procedures are detailed in the Verify DPx Installation manual.

Operational configuration is performed by the DP Operator using the Verify DPx system and procedures described in this manual for any changes during normal operations.

Changes are easily made and include:

1) Enabling/Disabling the LD3 (or LD3S) and making changes to the services in use

2) Selecting the communications satellite appropriate to the operating region

3) Selecting reference stations appropriate to operating the region

4) Change alarm thresholds related to the GPS system. (Optimised during commissioning. Only change these after consulting VERIPOS.)

5) Archiving logged data (e.g. Troubleshooting).

6) Entering a new license code (e.g. replacing hardware.).

The first three procedures are used on a regular basis and are described in detail below.

Items 4 - 6 are used infrequently and are included for reference in the “Additional Configuration” section of the Appendix.

3.1 ENABLING/DISABLING LD3 (OR LD3S) AND CHANGING SERVICES

Note: The VERIPOS Helpdesk can only issue enable codes if a Service Access License (SAL) exists and the license number can be determined. Licenses must be pre-arranged between the user’s company and the VERIPOS Operations Department.

VERIPOS correction signals are provided as a chargeable service. Users may wish to disable the EQUIPMENT during periods of prolonged inactivity.

If the unit has been disabled the user must re-enable it for the required services before resuming operations.

An LD3S unit can only be enabled or disabled when receiving L-Band signals from a geo-stationary satellite. The “ID” indicator on the LD3S will be extinguished when it is first switched on. It will not be illuminated until the unit has locked to the L-band signal. (“Sync” indicator illuminated.)

Ensure the “Sync” indicator is illuminated before attempting to enter enable or disable codes. (See Troubleshooting section if require help.)

LD3 units can be enabled or disabled without an L-band signal.

3.1.1 Checking Current Status

The current unit status can be determined from the "**ID**" LED on the LD3 (or LD3S) front panel.

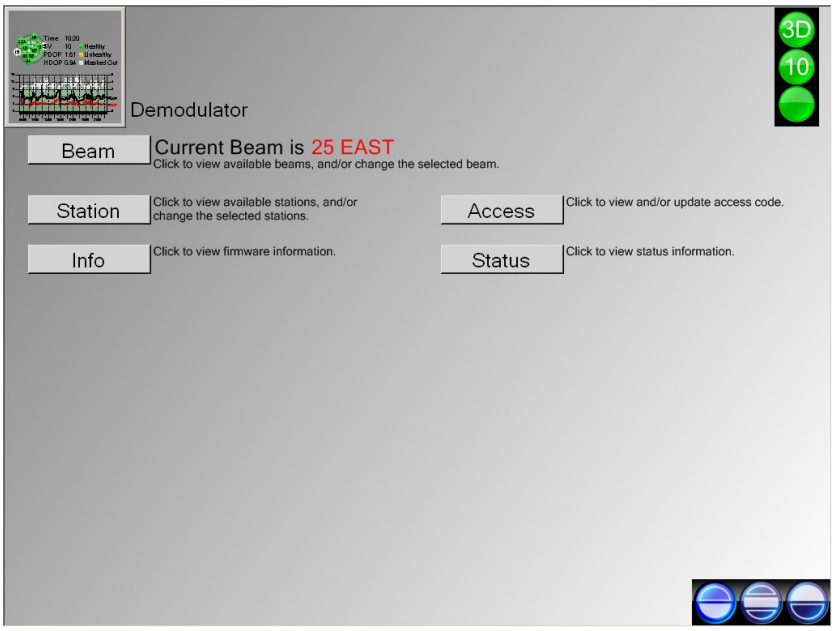
"ID" LED is **on and solid** LD3 (or LD3S) is **ENABLED**
"ID" LED is **flashing** LD3 (or LD3S) is **DISABLED**

As noted above, the indicator may be blank if the unit is an LD3S and no L-Band signal is received.

3.1.2 Determine Current Code

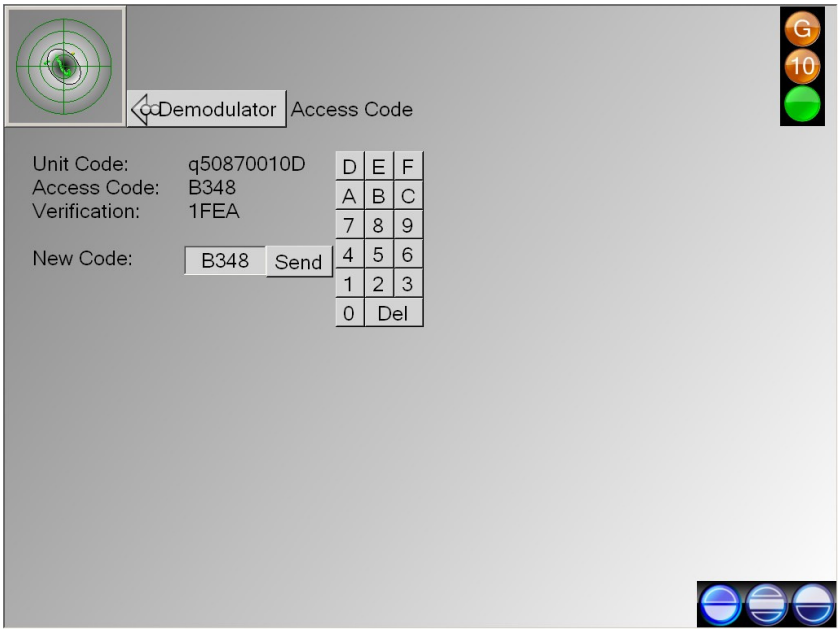
To enable (or disable) the unit, the user must manually enter a four-digit code which is supplied by the VERIPOS Helpdesk.
In order to generate this code, the Helpdesk require the current Access Code of the unit. This can be obtained as follows:

From any main screen, touch the Demodulator key in the bottom right area:



Touch the "Access" button:

On "Access Code" screen:



Note the "Unit Code" from the Access Code screen and enter this on the VERIPOS Signal Notification Form SNF) in the "Current Code" box. (See Appendix).

In this example the code is **q50870010D**.

- The first character in this example above, "**q "** indicates the VERIPOS service(s) used
- The last **character " D "** indicates the LD3 (or LD3S) is disabled. (**E** would indicate enabled)

Note: ***Case Sensitive***

Ensure when completing the SNF to report the case (upper or lower) of the first letter when reporting the access code to the Helpdesk

.

Example: **Qxxxxxxxxx** = upper case Q **qxxxxxxxxx** = lower case q

3.1.3 Request an Enable or Disable Code

Requests for enable/disable codes should be made using the **Signal Notification Form** (SNF). This should be submitted, by email, to the VERIPOS Helpdesk at: veripos.helpdesk@subsea7.com

A blank SNF form is included in the Appendix.
Up to date versions are also available from the VERIPOS Online Support Web site: http://help.veripos.com

Note: For Verify DPx -

On the Signal Notification Form check two fields "VERIFY DP DISPLAY" and "STANDARD" service options.

Enable requests may be submitted by telephone to the VERIPOS Helpdesk. See Appendix for contact details. Before calling please refer to a Signal Notification form and ensure that all the required information is available.

VERIPOS provide a range of services which are available in various combinations. When requesting an enable code the user must specify which services are required. The full listing of services is provided on the Signal Notification form.

See the Appendix for details. The choice of services affects both pricing and system accuracy.

Some services are only available on units with specific hardware options installed.

3.1.4 Enable Verify DPx

Once VERIPOS receive the SNF form containing the current code and service requirements the Helpdesk issue a new 4 digit enable code.

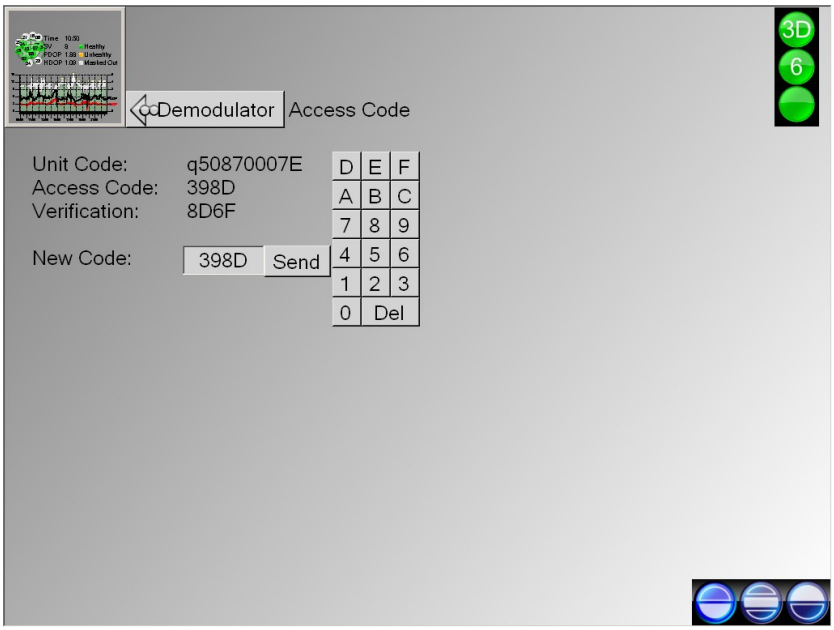
This will be in the “VERIPOS Supplied Code” box on the SNF.

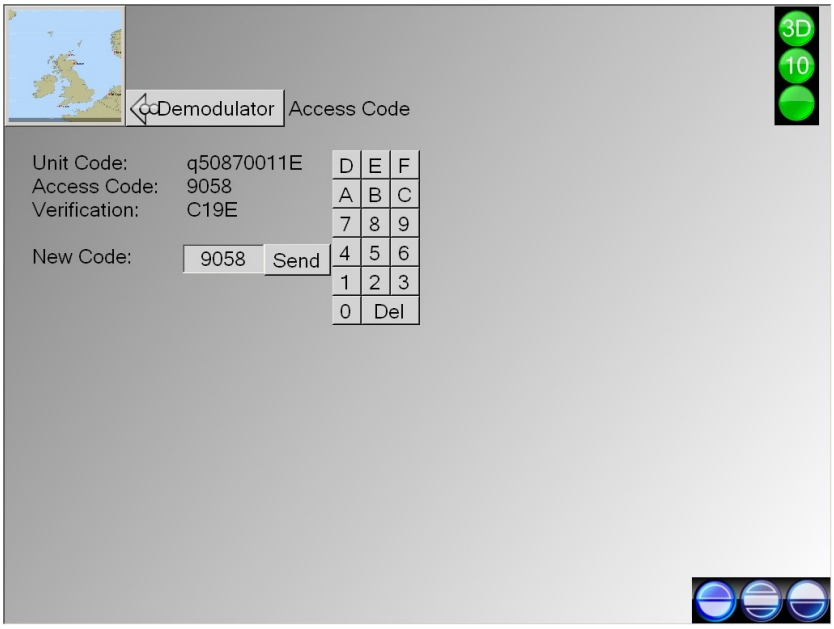
In Verify DPx the user enters this code into the “New Code” box on the Access Code screen using the on-screen keypad.

When entry is complete, touch the “Send” button to confirm.

Notes:

1. *On the Verify DPx Access Code screen the “New Code” box may show data from the previous entry. Use the “Del” button to clear the box before entering the new code.*
2. *After touching “Send”, the screen may not immediately update. In this case touch the home button to the main display, then return to the “Access Code” screen. The screen will now update.*





If the code was entered correctly the “Unit Code” and “Verification” code will update.

As confirmation that the system is enabled for use, the “ID” light on the LD3 (or LD3S) front panel will change from flashing to continuously lit.

Provide VERIPOS with the confirmation code. This ensures the unit has been successfully activated.

On the VERIPOS SNF, copy the “Verification” code displayed by Verify DPx to the “User Confirmation Code” field in the form. Return by email a copy of the form with this information to the VERIPOS Helpdesk.

3.1.5 Disable Verify DPx

The LD3 (or LD3S) is disabled in the exactly the same way by obtaining a 4 digit access code from the VERIPOS Help Desk and entering it into the unit

ALWAYS report the “Verification” code to ensure the correct charges are applied.

As confirmation that the system is disabled, the “ID” light on the LD3 (or LD3S) front panel will change from continuously illuminated to flashing.

3.2 SELECTING COMMUNICATIONS SATELLITE

VERIPOS corrections are broadcast from Geo-stationary satellites.
The Verify DPx uses corrections broadcast from one of these satellites. Choice of satellite is determined by the location of the work area and is referred to as “Beam Selection”.

The user must choose a beam whose footprint covers the work area. A chart showing VERIPOS beam coverage is provided in the Appendix.

Vessels may have more than one Verify DPx system installed.
More than one beam with acceptable coverage may be available in the work area.
For system redundancy the systems may be configured on different beams.

VERIPOS correction data are broadcast on the following beams:

Satellite	Longitude	Frequency (MHz)	Data Rate (bps)	Power
98W	98W	1535.1750	1200	High Power
AORW	54W	1535.1150	1200	High Power
25E	25E	1535.1650	1200	High Power
AORE	15.5W	1535.1050	1200	High Power
IOR	64E	1535.0700	1200	High Power
109E	109E	1535.1750	1200	High Power
POR	178E	1535.1050	1200	Low Power

The above information is updated periodically. Visit http://help.veripos.com for the up to date listing. Global and region coverage charts are available from the same location.

The type of antenna attached to system will determine the beams which can be used.

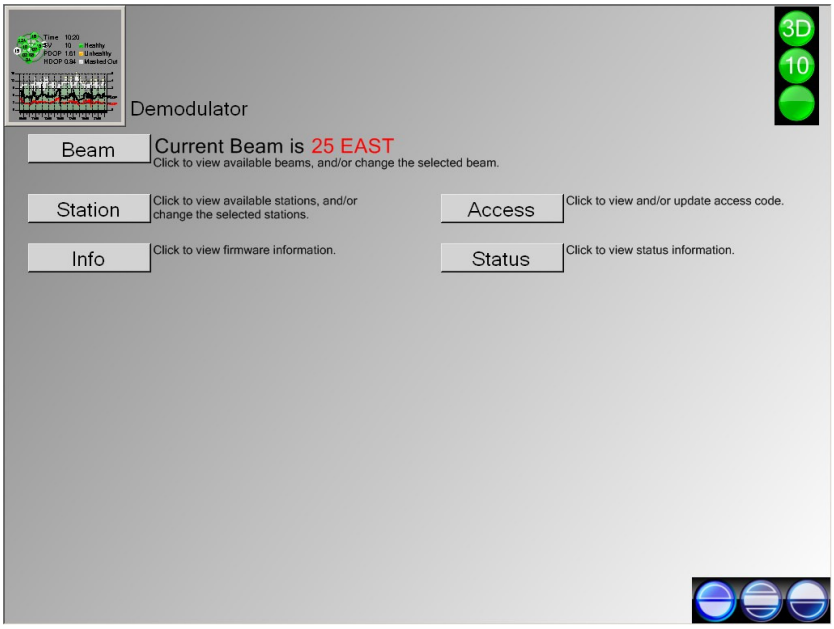
a) Using a SPOT omni-directional antenna any of the High power beams can be used.

b) When interfacing to the vessel's Inmarsat Communications System, the choice is limited to those satellites which are supported by this system. Currently these are: AORE, AORW, IOR and POR.

Satellite beam selection:

From main screen touch the Demodulator icon in the bottom right corner:

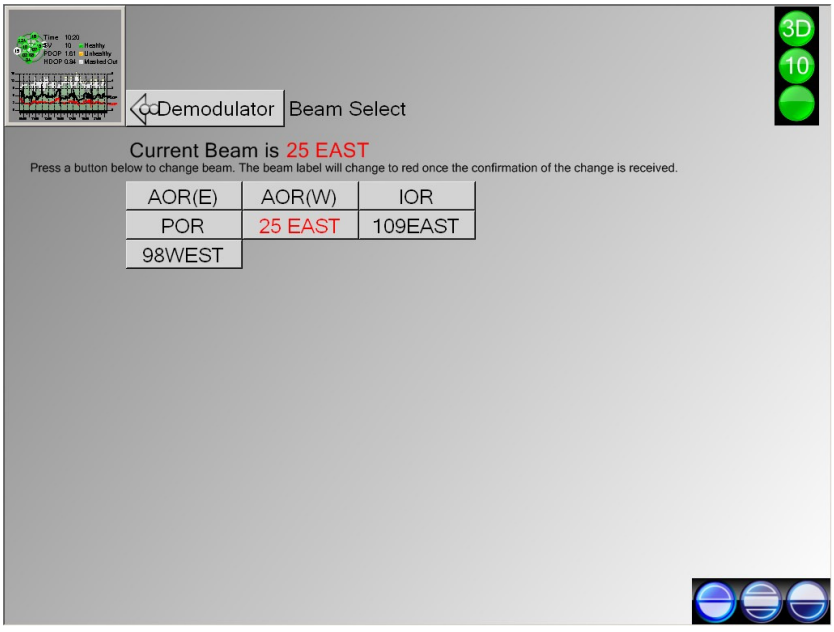
From the Demodulator Options screen:



The Current Beam is displayed and highlighted in red.

To change to a different Beam, touch the “Beam” button:

This opens the Beam Select screen:



Touching any beam button selects that beam and its selection confirmed by the button changing to red.

Touch the 

button to return to the Demodulator Status screen:

Press the “Home” thumbnail (top left corner) to return to the main display.

3.3 SELECTING REFERENCE STATIONS

The LD3 (or LD3S) demodulator provides RTCM data used by the internal GPS receiver.

The VERIPOS reference station numbers shown in the demodulator station list change with the satellite beam selected.

A list of VERIPOS Reference stations together with their associated satellite beams is in the appendix. Updated listings and Global and regional coverage charts are available on the VERIPOS Online Support Site (VOSS): http://help.veripos.com

All stations available in the demodulator station list are potentially available for use by the GPS receiver. However Verify DPx software makes provision for each reference station to be individually enabled or disabled.

The position solution computed by the GPS receiver uses up to eight reference stations.

Where more than eight stations are selected by the operator the receiver will use the eight closest stations and ignore the remainder.

VERIPOS recommend the operator enables all available reference stations and permit the receiver to make the appropriate selection.

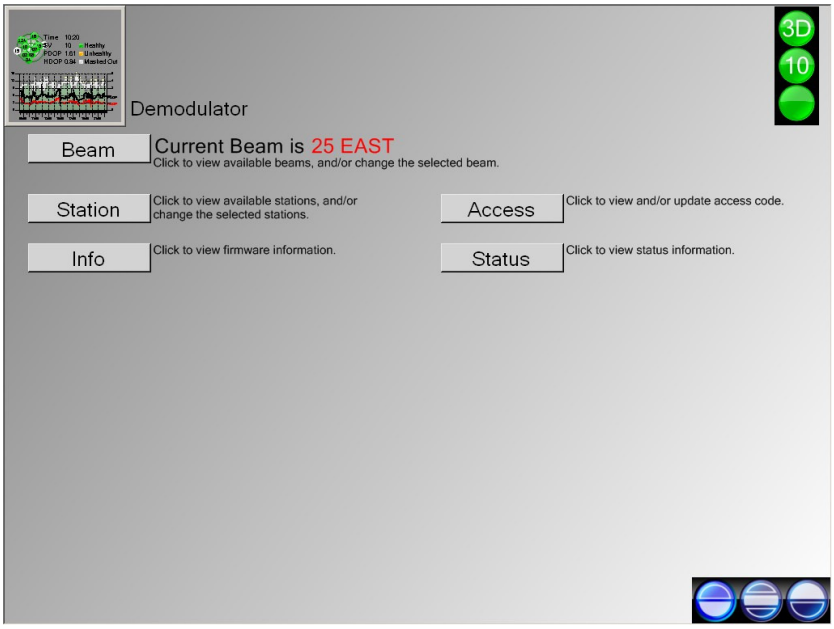
If the user wishes to manually select specific stations he should be aware that the closest stations normally provide the best accuracy.

VERIPOS provide “Verichart” software which enables the user to generate a chart showing the available beams and reference stations for the worksite. This software is provided on CD with the Verify DPx system. It may also be downloaded and can be updated with the latest VERIPOS reference station listings, from VOSS.

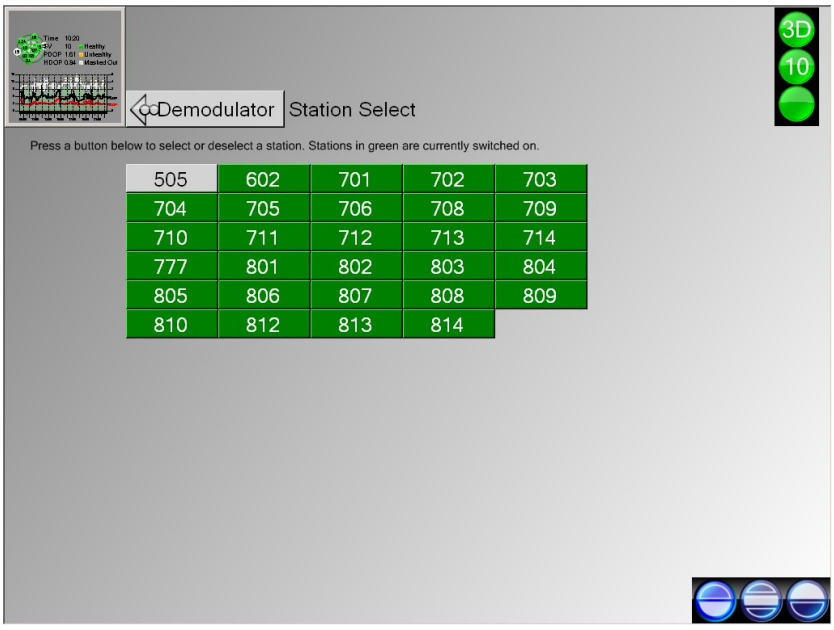
Stations are selected as follows:

From a main screen, touch the Demodulator icon:

This opens the Demodulator Options screen:



Touch the “Station” button. This opens the Station Select screen:



This screen lists all the available reference stations. Those with green backgrounds are enabled for use by the GPS receiver; a grey background indicates they are disabled. Touching any station number will toggle its status.

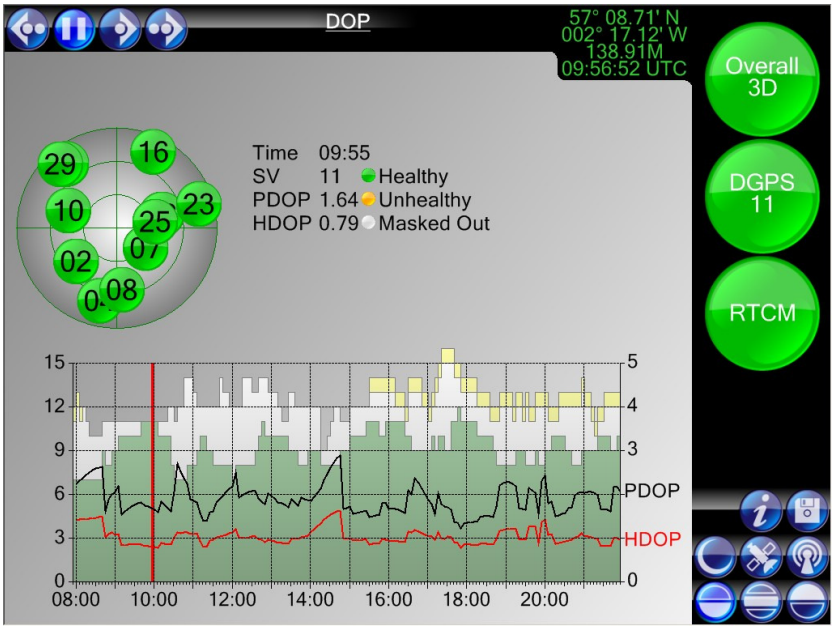
When the required stations have been selected touch the ←Demodulator button to return to the Demodulator Status screen:

Press the “Home” button (top left corner) to return to the main display.

4. DISPLAY DESCRIPTIONS

Verify DPx display cycles through five or six screens.
The sixth is shown where the heading option is installed.

4.1 DOP



The DOP and satellite count are important indicators of positioning quality. Values outside preset limits will trigger alarms. This screen provides the user with the opportunity to anticipate any potential problem periods which might occur during the next twelve hours and to plan accordingly.

This is a composite display that shows numeric values for the number of satellites used in the position calculation, together with the current PDOP and HDOP values.
The polar plot indicates the azimuth and elevation of all satellites in view and their status. (See on-screen colour key)

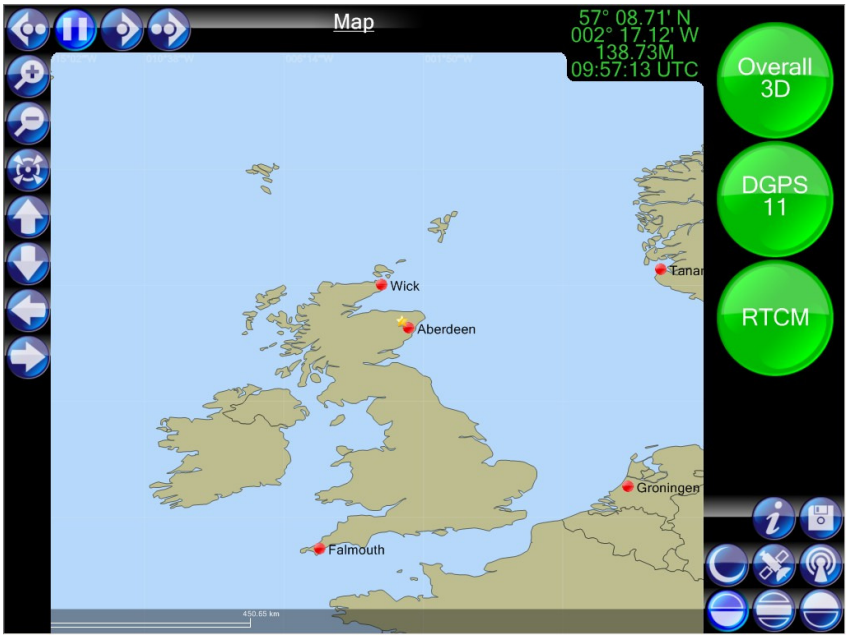
The graph shows HDOP, PDOP and satellite count, plotted against time.
The vertical red line indicates the current time. The two hours which precede it (to the left) show historic observed values. The twelve following hours show predicted values computed from the broadcast almanac.

The shaded areas indicate the satellite count. The grey area includes only those satellites which will be used in the calculations. The white area includes satellites which are visible and healthy but are below the minimum elevation mask. Any amber area shows all visible satellites including those which are unhealthy.

The polar plot and numeric data normally indicate the status at the current time.
The user may temporarily display data for any time within the limits of the graph by touching the screen within the graph area. A blue vertical line is draw at the point of contact and the data for that time is displayed for as long as contact is maintained.

The user should take care when moving to a new operating region or after receiving a broadcast email message (NANU) warning that satellites are being taken out of service for maintenance.

4.2 MAP

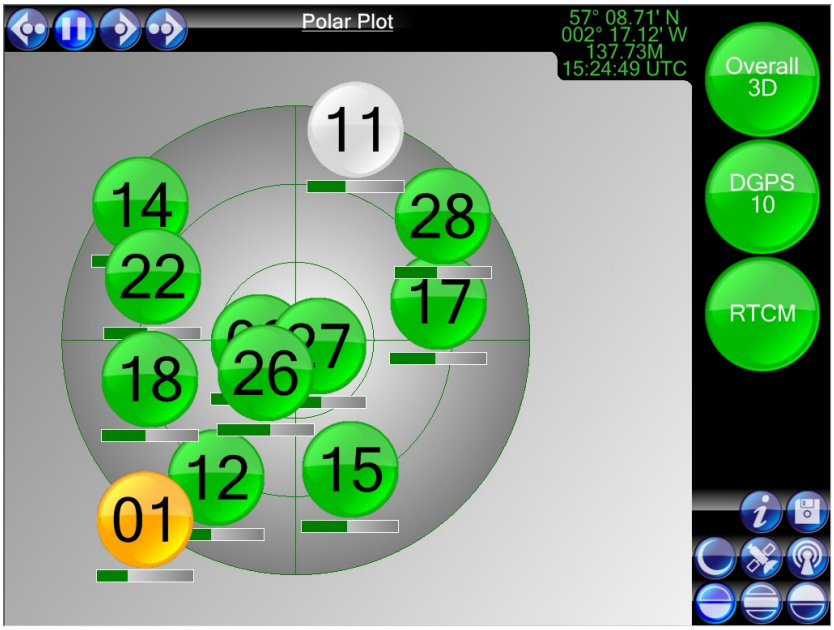


The map displays the current position of the user (with a star) and the locations of all the enabled reference stations.

Buttons down the left of the screen enable the user to modify the display to:

Zoom in	Zoom out
Re-centre	Move up
Move down	Move left
Move right	

4.3 POLAR PLOT



This screen shows the status and position of all the satellites which are above the horizon at the user's location. The user position is at the centre of the display.

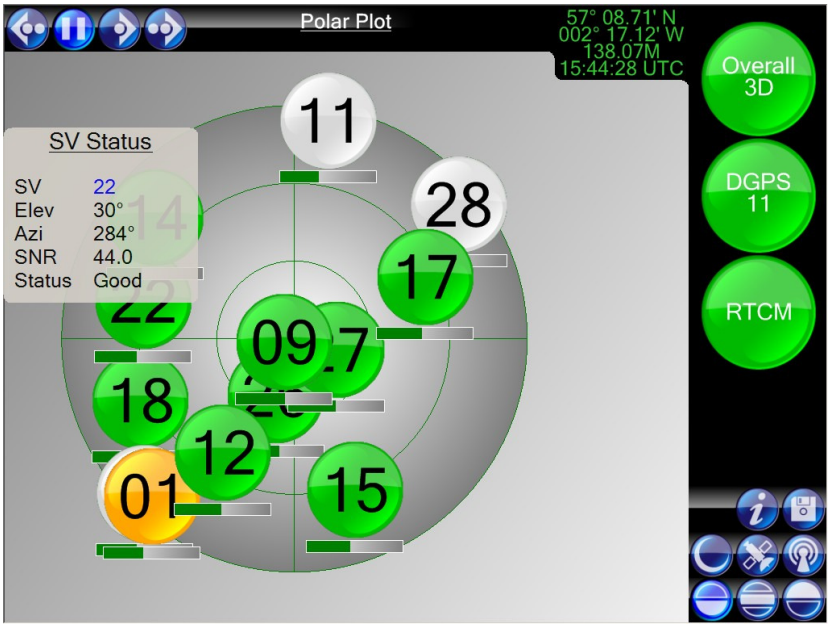
Each satellite is shown as a circle containing its PRN number.

The concentric rings represent angles of elevation. The outside ring is the horizon; the centre of the plot is directly above the user. Satellites below the minimum elevation mask are displayed in white.

Colours represent health of the satellites; green for healthy, amber for unhealthy or white when outside the mask limits.
The bars represent the signal to noise ratio for each satellite (0 to 100).

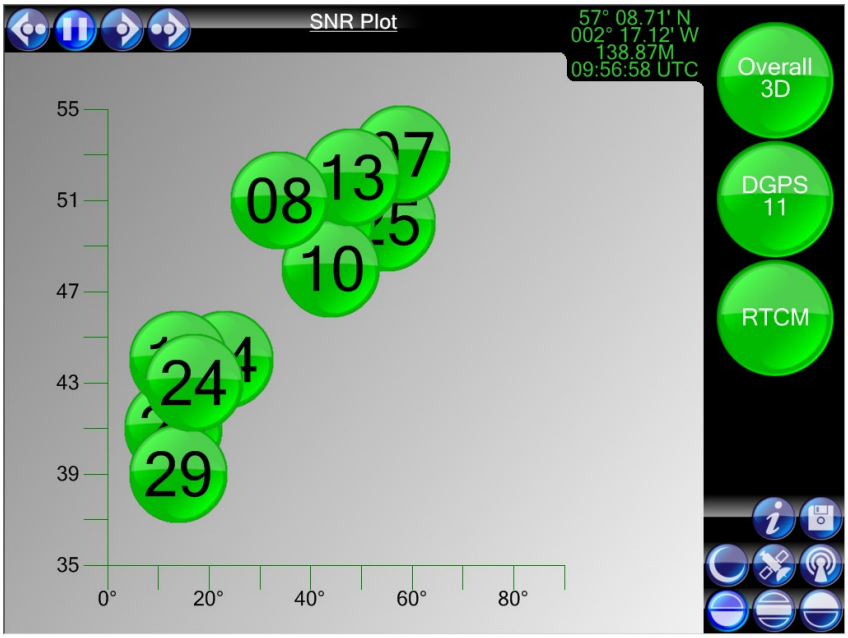
When the icons for two or more satellites overlap, the display alternates between them to allow a clear view.

The user may display addition numeric data for any satellite by touching its icon on the screen:



Clear the display by touching any blank area.

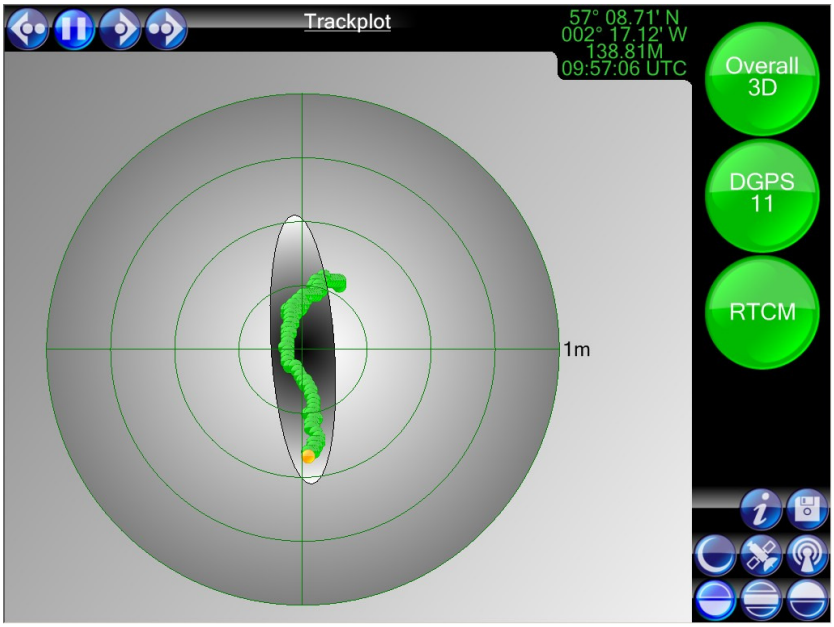
4.4 SNR PLOT



This is a graphical representation of satellite elevation and signal to noise ratio. Each satellite is shown as a circle containing its PRN number.

X axis indicates satellite elevation and the Y axis shows SNR.

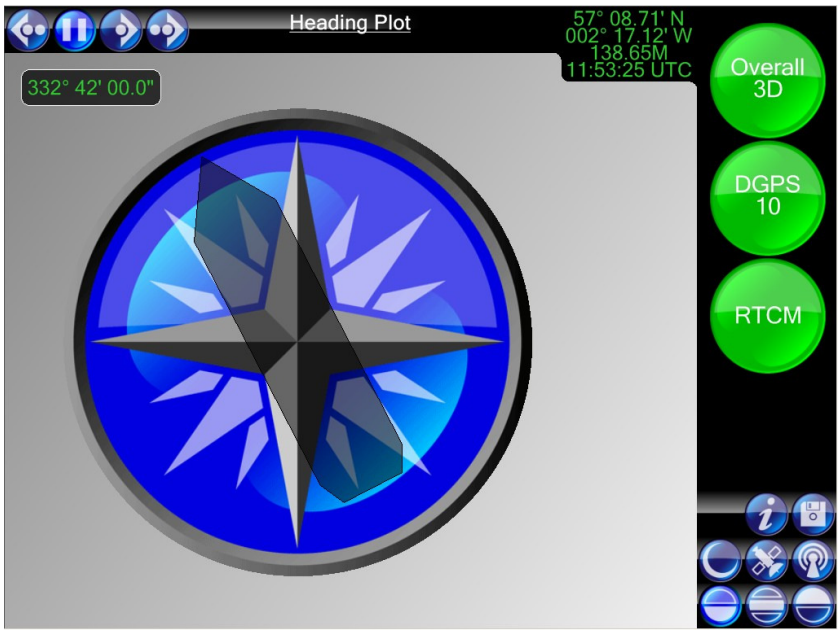
4.5 TRACK PLOT



The display is centred on the vessel's current position.
It shows the error ellipse for the current position computation.
The dot trail shows the history for the last one hundred position fixes at one second intervals.

The scale is shown to the right of the graph. Scale will change to accommodate the error ellipse or keep historical data on-screen where the vessel is moving.

4.6 HEADING PLOT



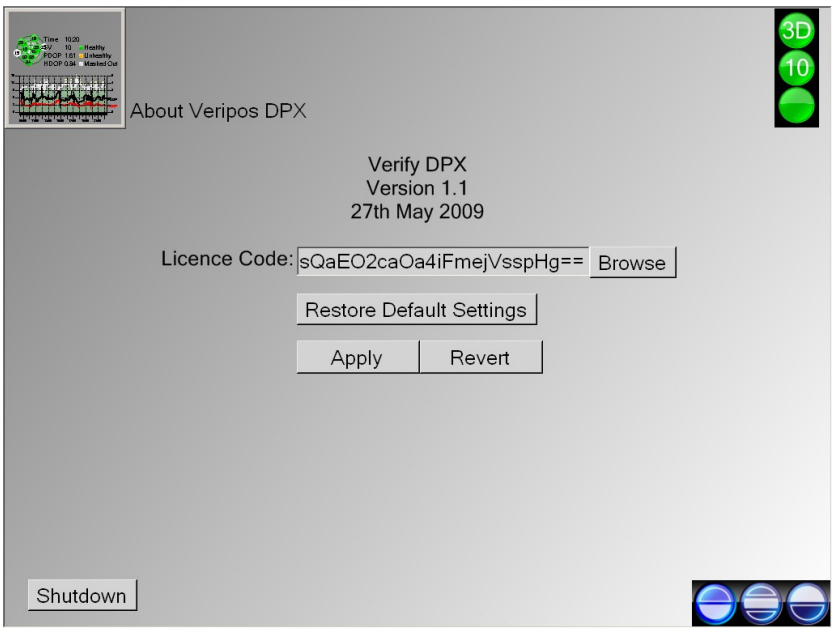
This is an optional feature in Verify DPx.

Where enabled a vessel outline, centred on the display may be configured during commissioning. A default vessel display is show in the example.
During commissioning a vessel outline can be added.
A text file (the default name has to be vessel.txt) needs to be provided with the vessel outline to be used.

A heading window will display the compass input (top left).

4.7 PROGRAM INFORMATION SCREEN

This may be accessed by touching the “Information” icon:



This shows the Verify DPx version number and release date.

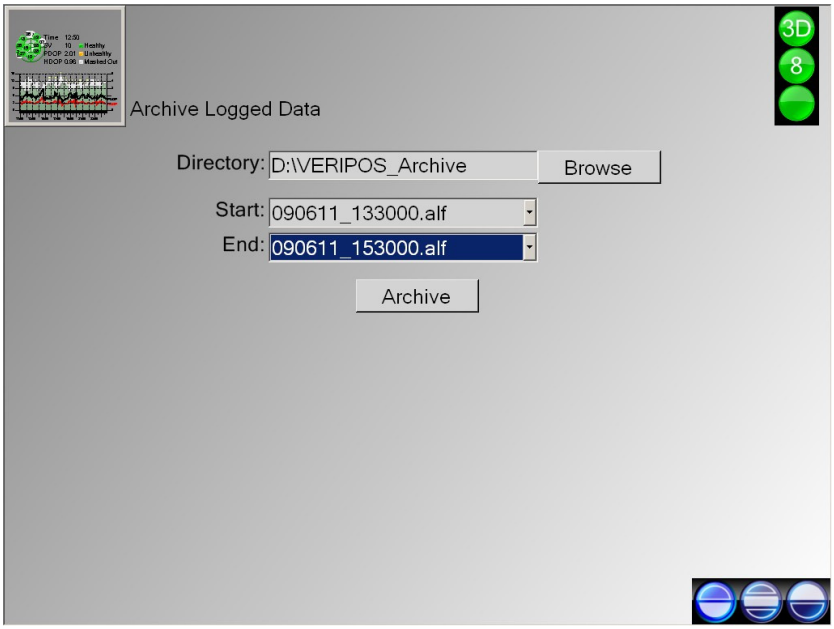
A Verify DPx License Code is entered on this screen and should only be used during commissioning or after replacing elements of the Verify DPx system.
Details are in the “Additional Procedures” section of the Appendix.

Restore Default Settings - only use this under guidance from the VERIPOS Helpdesk to reset Verify DPx to the default configuration settings.

Shutdown - used to shut down Verify DPx.

4.8 ARCHIVE SCREEN

This screen may be accessed from any main screen by touching the Archive icon:

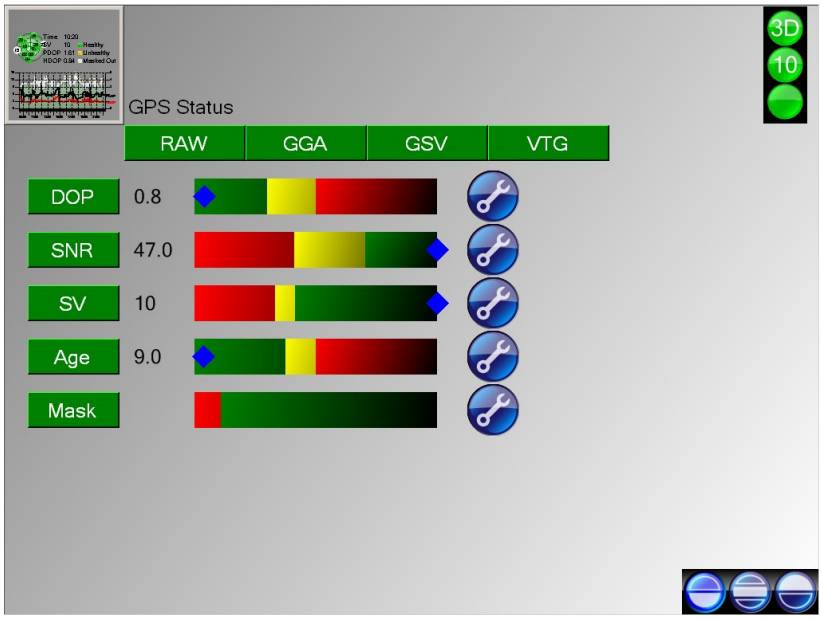


This screen is only used when archiving logged data. The procedure is detailed in the "Additional Procedures" section of the Appendix.

Used only when investigating problems with the positioning system. Logged data is archived to removable storage and transmitted to Technical Support for analysis.

4.9 GPS SCREEN

Access by touching the "GPS" icon:



Settings are optimised during commissioning and should not normally require changes. Get advice from the VERIPOS Helpdesk before changing these settings.

The GPS screen has a row of status indicators. They show the status of the various GPS messages. Colour coded - green when normal messages received red for missing messages.

RAW = Raw GPS data
GGA = NMEA GGA position data
GSV = NMEA GSV satellites in view data
VTG = NMEA VTG velocity and track data

The bars below indicate the current values for various parameters:

DOP = Dilution of precision (a measure of constellation geometry)
SNR = Signal to noise ratio for each satellite
SV = Number of satellites used in position computation
Age = Age of correction data
Mask = Setting of Elevation Mask

The bars have colour coded backgrounds.

Green for good values, amber for marginal values and red for unacceptable values.
Current values are indicated by blue diamonds.
(SNR has multiple diamonds, one for each satellite in use.)

To the right of each bar is a wrench (spanner) icon: 

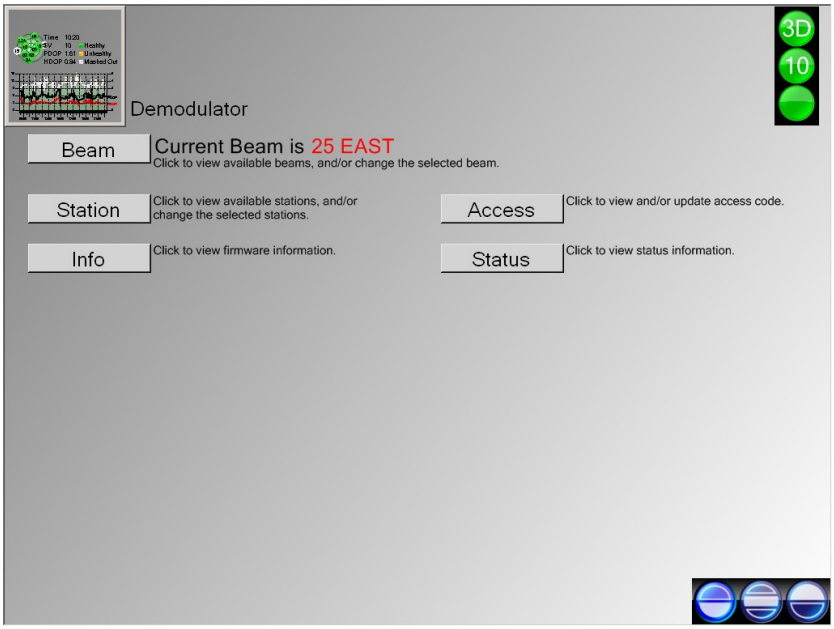
Touching this opens a screen to change an associated threshold value.
Thresholds are used both to control the background colours of the bars and also to trigger system alarms.

"Mask" is a special case since it sets the minimum elevation mask below which satellites are rejected.
During periods when low satellite count or high DOP values are predicted it may be beneficial to adjust this level – VERIPOS recommend between 10 and 5 degrees.
Users should only change the level if where they have a thorough understanding of the principles involved or under direction from an experienced operator.

Changing these settings is not a routine operation. Procedures are described in the "Additional Configuration" section of the Appendix.

4.10 DEMODULATOR SCREEN

Access by touching the "Demodulator" icon:



This displays the "Current Beam" (satellite) selection (in this example AORE) and five buttons to provide access to additional configuration and status screens.

Each of the five screens has a 

button:

Touching this button returns to the above display.

4.10.1 Beam

Used to select the Communications Satellite described in Section 4, above.

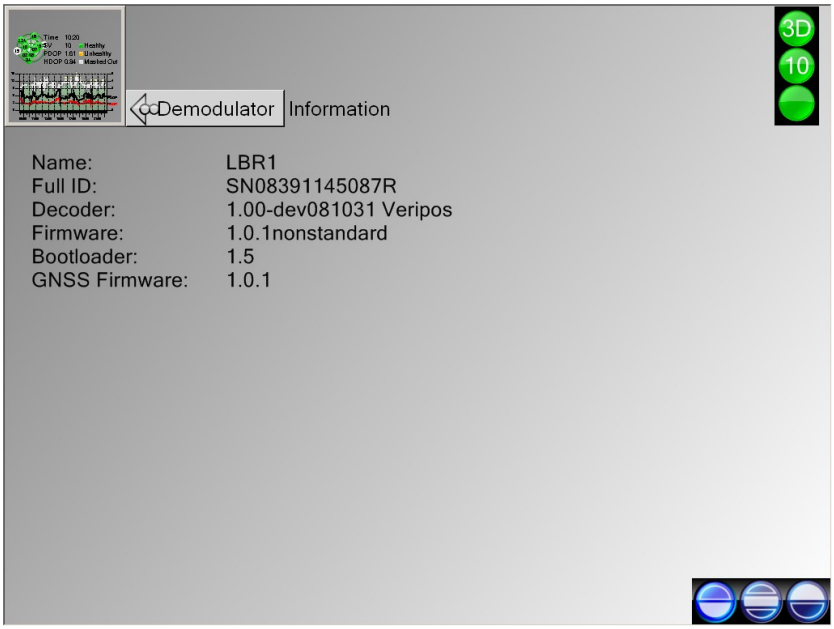
4.10.2 Station

Used to select the Reference Stations described in Section 4, above.

4.10.3 Access

Used for Enabling/Disabling the system and selecting the required services described in Section 4 above.

4.10.4 Info

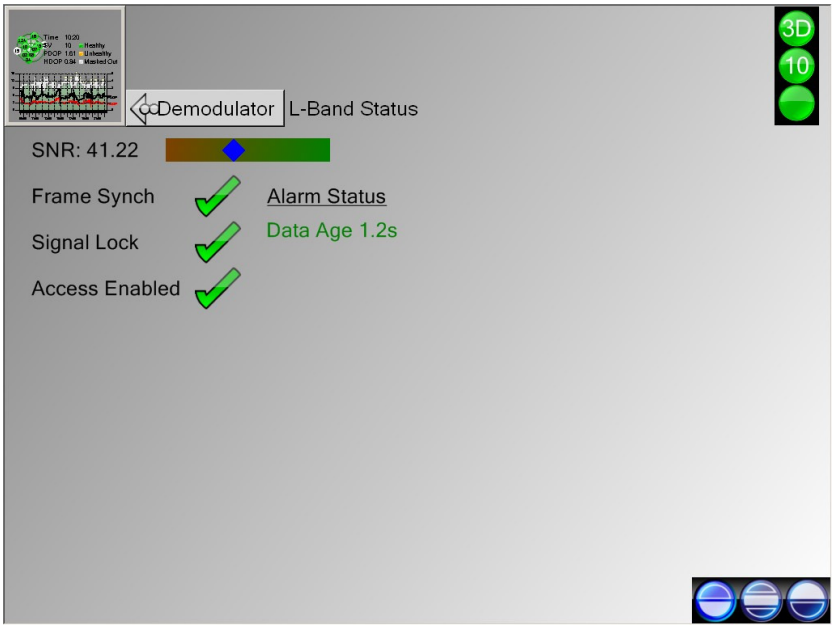


Displays the LD3 (or LD3S) ID and firmware versions. No settings are required.

When applying for a software license, the user must provide the last 5 numbers from the ID. In this example, these are 45087.

The ID number is also shown on the LD3 (or LD3S) front panel.

4.10.5 Status



Shows the strength, status and age of the L-Band correction signal.
Note - Verify DPx does not display the signal strength of IALA signals.

ERROR LOG

The Verify DPx system maintains a 48 hour rolling log of all significant events.

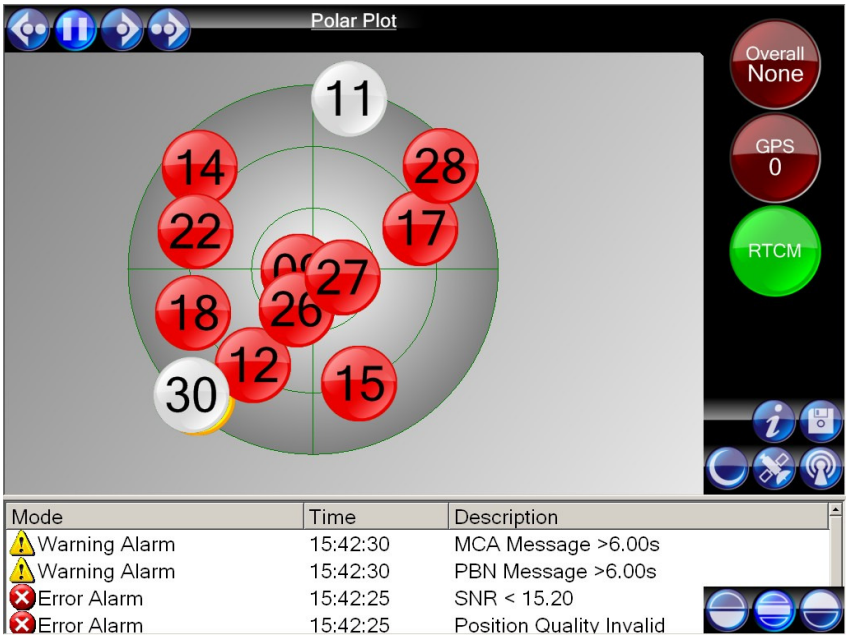
Buttons control how the error log is displayed.

- Left button – Hides error Log, shows only main display
- Middle button – Splits screen horizontally to show both main screen and Error Log
- Right button – Hides main screen, shows only Error Log

The error events are displayed in plain text and include a timestamp. When reporting incidents to the VERIPOS Helpdesk the user should include a note of any error messages which were generated around the time when the incident occurred.

The log contains details of configuration changes as well as alarms. The main message types are as follows:

Error Alarm	An alarm caused by a serious condition. The error Log opens in split-screen mode if it was previously closed
Warning Alarm	Indicates an alarm condition which requires investigation by the operator
Configuration Changed	Records a change of system configuration
System Updated	Records a change of status updates
Alarm Cleared	The problem which caused the previous (named) alarm has now cleared
Information	System information such as time source



Alarm example

The example shows a screen shown when there is total loss of GPS signals.

The Error Log window was opened automatically by the “Position Quality Invalid” Error Alarm.

This event was followed by another critical alarm - “SNR < 15.20” (SNR below set threshold)

The Satellites have turned red on the Polar Plot and their SNR bar graphs have disappeared.

Overall or top Traffic Light shows “None” (no position) and the middle, GPS traffic light shows “0” (zero) satellites. (The top two traffic lights were flashing red.)

Bottom RTCM traffic light is green, as RTCM corrections were still being received by Verify DPx.

TROUBLESHOOTING

During commissioning, the LD3 (or LD3S) receiver is configured to work with the Verify DPx system. (LD3 or LD3S configuration is performed using a separate software application.)
I
Should it be necessary replace the LD3 (or LD3S) unit in the field, some level of re-configuration will always be required.

- Where a pre-configured LD3 (or LD3S) receiver is available it will still be necessary to obtain a new license code and enter this in to Verify DPx.

- Where an LD3 (or LD3S) has not been pre-configured - it will be necessary to configure it using Commissioning Software before connecting a replacement to the Verify DPx system. (See Commisssioning Guide for Verify DPx)

- Please contact the VERIPOS Helpdesk whenever considering any changes to the Verify DPx system. Different LD3 models use different types of demodulator card. Current models are identified by an "S" in the model number (LD3S/LID3S instead of LD3/LID3).
  Different versions of Verify DPx software are used with different receiver models.

4.11 OVERVIEW OF TROUBLESHOOTING

Verify DPx system comprises a Touch-screen Panel PC running Verify DPx software on an embedded Windows XP operating system. The PC contains no user-serviceable parts. The cover should not be removed except under the guidance of a VERIPOS engineer.

Most faults indicated by the Verify DPx relate to signal reception issues and system or configuration errors relating to the LD3 (or LD3S) Positioning Unit.

Hardware fault finding should be limited to checking the security of connectors, checking the DC supply voltage and checking the security of the CompactFlash memory card. It is recommended to check coaxial cable integrity and location of antennas.

This manual provides some guidance for the LD3 (or LD3S). Consult the LD3 (or LD3S) Operations Manual for details.

For problems relating to antennas or cables - see the LD3 (or LD3S) Installation Manual before installing replacements and guidance on safe practice.

4.12 VERIPOS HELPDESK

VERIPOS encourage all users to report problems or operating queries to the Helpdesk so that they may receive assistance.

The VERIPOS Helpdesk is the first point of contact for technical enquiries and fault reports. It is manned 24 hours per day, 365 days per year.

Contact details are in the Appendix.

For assistance with basic Troubleshooting see section in this manual.

We recommend initial contact is made by email to the Helpdesk.
You can also create a fault ticket on the Web site. This will ensure contact details and the description of the fault are correctly recorded.

The Helpdesk is trained to provide assistance with the most queries. They can request technical staff to provide support for more complex issues.

To ensure a rapid response, the initial communication should include the following information:

- User's name
- Telephone number
  If possible, choose a phone near the equipment
- Email address
- Full vessel name
  Correct identification is important; VERIPOS may have installation drawings
- Name of parent company
- User Code (on front panel) and Current Access Code of Verify DPx system
- Current status of the front panel indicators on the LD3 (or LD3S)
- Brief Description of other VERIPOS hardware and software installed
- Vessel's current operating region and Lat/Long
- Vessel's status.
  Is it alongside, in transit, in operation, or shut down due to fault?
- History of fault including time when a problem occurred
  Is this a new installation which has not yet been fully commissioned?
  Did a problem suddenly arise with a system which was previously working?
  Did the system cease working after moving to a new region?
- Description of fault

Once basic information has been received the Helpdesk raise a fault ticket. Users can access the ticket from the VERIPOS Online Support Site.

4.13 TROUBLESHOOTING TOOLS

Verify DPx system has three tools to assist diagnosing problems:

- The Error Log
- The Archive Facility
- The Bridge I/O Tool

4.13.1 The Error Log

Described in section 6. The error log provides a record of system errors detected for a rolling 48 hr period. Each error is time stamped.
When working with the VERIPOS Helpdesk include a note of any error messages which show near the time at which the incident occurred.

4.13.2 The Archive Facility

Where a problem may be intermittent or symptoms are unclear, it is helpful if real time data can be replayed by a Technical Support Specialist on an offline system for analysis.

Verify DPx retains a history of all raw data received during the preceding 48 hour period. The archive feature enables the user to copy a subset of this data to an archive directory (typically on removable storage) so that it may be transmitted to a Technical Support Specialist for analysis.

The procedure is described in the “Additional Configuration” section of the Appendix.

4.13.3 The Bridge I/O Tool

This is described in detail in the Appendix. This is a separate program which is always running in the background. It can only be accessed using a keyboard.

It may be used for checking incoming data on the Verify DPx serial ports.

4.14 POWER PROBLEMS

Verify DPx Computer

Fault	Reason	Remedy
Screen blank Power indicator blank.	External supply disconnected or switched off	Locate the external supply and check connections
	External supply faulty.	The Panel PC uses a DC supply of 9 - 36v which is connected to screw terminals on the rear of the panel in the bottom left corner. Use a multi-meter to check the voltage between these terminals If voltage incorrect, replace PSU and/or cable
	Computer fault	If voltage between the terminals is correct, contact the Helpdesk.
Screen blank but Power indicator illuminated.	Backlight intensity set too low	Turn the front panel knob fully clockwise
	Computer fault	Turn off power using front panel button – ensure that Power indicator is extinguished. Wait one minute then turn power back on. If screen remains blank, contact the Helpdesk.

LD3 (or LD3S)

Fault	Reason	Remedy
All indicators extinguished	External supply disconnected or switched off	At the LD3 (or LD3S), check the connection between the interface cable harness and the external PSU. Check the AC power to the external PSU.
	External supply faulty.	Disconnect the 7 pin connector from the rear panel of the LD3 (or LD3S). Check the voltage between pins "A" and "B" of the cable connector, taking care not to short any pins. This should be between 11v and 36v (A + ve, B –ve). If voltage incorrect, replace PSU and/or cable
	LD3 (or LD3S) fault	If voltage between pins "A" and "B" is correct, contact Helpdesk.
"Batt" indicator illuminated.	Input voltage is less than 11v	PSU is faulty or has inadequate current rating. Replace PSU.

4.15 ENABLE/DISABLE PROBLEMS

Fault	Reason	Remedy
After entering "New Code" and touching "Send", all entries remain unchanged. ("Access Code" shows previous value)	Access code with the version of software in use does not update as expected.	After entering the code, exit the Access Code screen and return to main screen display. Navigate back to the Demodulator / Access code entry screen
	Code incorrect or wrongly entered	Repeat entry – where a problem persists report problem to Helpdesk – include a note of the Current Code.
	LD3 (or LD3S) Unit requires a reset	Disconnect the power from the LD3 (or LD3S) for one minute. Reconnect power and repeat code entry
After entering "New Code" and touching "Send", "Access Code" shows value entered but other entries remain unchanged	**For LD3S only** Not receiving L-Band	LD3S units cannot be enabled or disabled unless the "Sync" indicator is illuminated. See later in this section for troubleshooting L-Band.
"ID" lamp on LD3S front panel is extinguished (It should normally be illuminated, either solid or flashing)	**For LD3S units only** No L-band signal has been received since the unit was switched on.	For LD3S units, the "ID" indicator is not activated until L-band signals have been received. See later in this section for troubleshooting L-Band.

4.16 L-BAND SIGNAL PROBLEMS

Fault	Reason	Remedy
SYNC indicator extinguished on LD3 (or LD3S) front panel	Unit requires a reset	Switch power OFF for 1 minute then switch back ON. Allow a few minutes for the unit to acquire synchronisation.
	The vessel has moved to a new region but the demodulator has not been re-configured	Check which satellite beam is selected. (See section 4.2) Use the Global coverage chart in the appendix to confirm whether this is correct for the current location.
	L-band signal is derived from vessel's Inmarsat. Inmarsat has lost lock or has switched to a different satellite.	Check which satellite beam is selected. (See section 4.2) Verify that the Inmarsat is tracking the same satellite
	Antenna masking.	Visually check whether the path between the antenna and satellite is subject to masking. This can occur when the vessel is in port or alongside a large structure. Masking can also be caused by the vessel's own superstructure. This can usually be eliminated by changing the heading.
	Interference	Investigate any source of L-band transmissions. Also high power transmissions of other frequencies. If possible, shut down possible sources to eliminate them.
	Antenna disconnected or inoperative	Visually check antenna and cable for possible damage. Check coaxial connections.

APPENDIX I.

CONTACT LIST

VERIPOS CONTACT INFORMATION

All initial contacts regarding technical or support issues should be initially addressed to the VERIPOS Helpdesk. Where appropriate, the Helpdesk will refer issues to the regional operations and engineering teams.

VERIPOS Helpdesk Telephone: +44 (0) 1224 527104

VERIPOS Helpdesk Facsimile: + 44 (0) 1224 748204

VERIPOS UK Operations Project Management

+ 44 (0) 1224 526000

VERIPOS Helpdesk E-mail: veripos.helpdesk@subsea7.com

VERIPOS Online Support Site (VOSS): http://help.veripos.com

If shipping equipment back to VERIPOS, please contact the Helpdesk who will provide the current shipping address, according to your area of operations.

Additional VERIPOS office addresses are listed below: -

	Prospect Road Arnhall Business Park Westhill Aberdeenshire, AB32 6FE United Kingdom --- Greenwell Road East Tullos Aberdeen, AB12 3AX United Kingdom
	15990 North Barker's Landing Suite 200 Houston, Texas 77079 USA
	2E Capital Building No 39 Tampines Street 92, #02-01 Singapore 528883
	Subsea 7 (do Brasil) Avenida prefeito Aristeu Ferreira da Silva, 1256 27930-070 Novo Cavaleiro - RJ Brazil
	Calle 64 No. 26, Fracc. Justo Sierra Entre Av. Justo Sierra Y 31-B Cuidad Del Carmen, Campeche Mexico

APPENDIX II.

SIGNAL ACCESS LICENSE AND SIGNAL NOTIFICATION FORM

SIGNAL ACCESS LICENCE

VERIPOS correction signals are provided as a chargeable service.

In order to receive this service, the user must first arrange a Service Access License (SAL). This takes the form of a contract which is agreed between the user's company and the VERIPOS Operations Department.

The equipment cannot be used until an enable code is obtained from the VERIPOS Helpdesk. The Helpdesk is not authorised to issue a code unless an active SAL exists and its number can be determined. To avoid delays, the user should keep a record of the SAL number associated with his unit.

Depending upon the contract between VERIPOS and the user's company, charges may be waived during periods when the equipment is not in use. If this is the case the user may wish to disable the equipment during periods of prolonged inactivity.

SIGNAL NOTIFICATION FORM

In order to enable or disable the equipment, codes must be obtained from the VERIPOS Helpdesk. (There is a detailed description of the procedure in the Appendix.)

Requests for enable/disable codes should be made using the **Signal Notification Form** (SNF). This should be submitted, by email, to the VERIPOS Helpdesk at: veripos.helpdesk@subsea7.com

Note: A blank SNF form is included below. The current version of the form may also be downloaded from the VERIPOS Online Support Web site: http://help.veripos.com

Note: If necessary, enable requests can also be submitted by telephone to the VERIPOS Helpdesk. See the "Contacts" section of the Appendix for current 'phone numbers. Before calling, please refer to a Signal Notification form and ensure that all the required information is available.

VERIPOS provide a range of services which are available in various combinations. When requesting an enable code, the user must specify which services are required. The full listing of services is provided on the Signal Notification form. The choice of services affects both pricing and system accuracy.
For more information visit the VERIPOS Web site: http://help.veripos.com

Note: Some services are only available on units with specific hardware options installed.

Service Access Instructions

1. CUSTOMER is to obtain sufficient SERVICE ACCESS LICENCES (SAL's) to cover the maximum number of vessels, mobile drilling units or other offshore installations simultaneously accessing SERVICES.
2. SAL's are available for the following VERIPOS SIGNALS, SOFTWARE and SOLUTIONS, either singly or in combination:
    - VERIPOS - HF (requires the issue of a C3 encryption code)
    - VERIPOS - Standard (single or dual-beam satellite delivery)
    - VERIPOS - Standard Plus (single or dual-beam satellite delivery)
    - VERIPOS - Glonass (single or dual-beam satellite delivery)
    - VERIPOS - Ultra (single or dual-beam satellite delivery)
    - VERIPOS - Ultra Position Output (LD2 and LD4 only)
    - THIRD PARTY - IALA HF/MF – Only operates if a VERIPOS service is enabled
    - THIRD PARTY – External RTCM input - Only operates if a VERIPOS service is enabled
    - VERIPOS - Verify-DP Display (Software feature, LD2 And Verify DPx)

    VERIPOS SERVICES are encrypted and the receiving equipment must be programmed with the appropriate access codes in order to receive the SERVICES. Note that where a SAL for combined SERVICES has been procured, it is not possible to split the SERVICES across different vessels.
3. Clients will be allocated a unique SAL number upon completion of commercial agreement. To activate the SERVICE, the SAL ID number must be entered onto this Service Notification Form (SNF), together with all other required details.
4. To activate / deactivate SERVICES, the user must submit a completed Service Notification Form (SNF) to the VERIPOS Helpdesk. A SNF which does not quote a valid SAL number should be marked with the ship's stamp for security purposes.
5. Where required by the VERIPOS Helpdesk, the customer will provide, on the SNF, details of the current access codes contained within the equipment. The VERIPOS Helpdesk will provide assistance on how to view or change access codes as required. However, a summary for commonly used equipment is included below:

    A) Satellite service demodulators (e.g. LD2, LD3S, LD4, SD100R LD1 MkII):

Read the full[1] current access code from the demodulator. This can be displayed using the instructions below (further details can be found in the appropriate equipment Manual):

- LD2 (All models) – Code can be accessed by toggling through main display and selecting enter at access code. The new code is entered by using a combination of the "Toggle" and "Enter" keys.
- LD3S and LD4 – VERIPOS OEM Software must be used to read the current access code from these units. If you are unfamiliar on how to do this, please contact the VERIPOS Helpdesk for assistance.
- SD100R – Using the "Up" and "Down" arrows, select *Access Code* and press the "Circle" button. Note that the full code is on 3 lines and the down arrow should be used to get all the required information.
- LD1 MkII – Code is displayed on power up if the demodulator is disabled or can be accessed from the demodulator by pressing "Setup", highlighting *Access Code* and pressing "Accept".

On receipt of the SNF, the VERIPOS Helpdesk will respond with a 4-digit code, which should then be entered into the demodulator. The demodulator will produce a code that confirms the demodulator status change. This code is the last 4 digits of the new full access code.

To complete the process, the client must add the confirmation code to the appropriate section of the SNF and return this to VERIPOS Helpdesk by fax or e-mail.

B) Encrypted HF Service Receivers (e.g. LD2, NR203 DGPS Receivers):

- LD2 (HF/MF models) to access the C2 code, from the main menu, go to the status menu, HF/MF Receiver, C2 code. To enter the C3 code, from main menu, go to the configuration menu, HF/MF Receiver, Station details (any station), C3 code. Use the "toggle" and "enter" keys to enter the code

- NR203 Read the C2 code from the receiver (displayed by pressing AUX then 4 (ABOUT). Details of C2 and C3 codes are contained in the NR203 manual.

6. Upon receipt of a completed SNF, the VERIPOS Helpdesk will initiate the relevant enable or disable procedures and where appropriate provide updated access codes.

7. It remains the responsibility of the CUSTOMER to ensure that the SERVICE has been enabled or disabled. Delay in notification of SERVICE disablement may have commercial implications.

[1] Format of code is AXXXXXYYYYZ A1B2 C3D4

Service Notification Form

Email to: veripos.helpdesk@subsea7.com
24Hr Helpline +44 (0) 1224 527104
Web Site: http://www.veripos.com
Fax Number +44 (0) 1224 748204

Service Access Licence Number [see note 1, 3 & 4]	
Company / Project Name	
Vessel Name	

Vessel / Rig / Offshore Installation Details			
Geographic Location:		Telephone:	
Contact Name:		Fax:	
Authorised Person		Email:	

Service	**Single or Dual Beam**	**Enable (dd/mm/yy)**	**Disable (dd/mm/yy)**
STANDARD (Inmarsat Correction Signals)			
STANDARD + (Dual Frequency Inmarsat Correction Signals)			
GLONASS (Glonass Inmarsat Correction Signals)			
ULTRA (Precise Point Position Inmarsat Correction Signals)			
ULTRA Position Output (PPP Corrections and Decimetric Position Output)			
VERIFY DP DISPLAY (Software feature) [Specify correction signals separately]			
HF (requires the issue of a C3 code)			

Unit Firmware Versions				
	Serial No.	Equip Type (e.g. LD2 G2)	**LD2 Firmware Version**	**LBand Firmware Version**
1				
2				
3				
4				

Equipment Access Codes [see note 5]						
	Serial No.	Equip Type (e.g. LD2 G2)	Equipment owner	Current Code	VERIPOS Supplied Code	User Confirmation Code
1						
2						
3						
4						

HF Decryption Codes				
	Serial No.	Equip Type	**C2 Code (User Entry)**	**C3 Code (VERIPOS Entry)**
1				
2				
3				
4				

NCC Use Only			
Date Received:		Processed By:	
Date Confirmation Issued:		Issued By:	

APPENDIX III.

ADDITIONAL CONFIGURATION

A. ARCHIVING LOGGED DATA

This is a powerful tool for diagnosing the positioning system especially if they are of an intermittent nature.

The system continuously logs the raw GPS and RTCM data input from the LD3 (or LD3S).

The data is stored in VERIPOS proprietary format. A new file is started every 30 minutes.

The filenames indicate the file date and start time, using the format:

yymmdd_hhmmss.alf

Files are retained for a 48 hour period and are then deleted.

The system retains a history of all the raw data received during the preceding 48 hour period. The archive feature enables the user to copy a subset of this data to an archive directory (typically on removable storage) so that it may be transmitted to VERIPOS (or the user's technical personnel) for analysis.

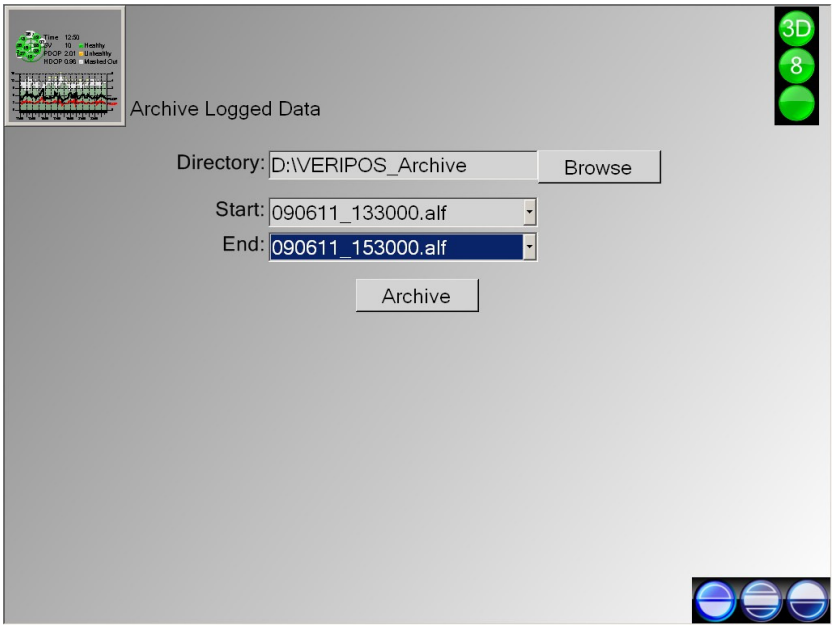
Approximately 1MB of data is logged each hour. Dividing data into 30 minute segments enables the user to select the period during which a problem occurred and avoids the need to send large volumes of data.

In addition to selected logging files the system adds other information (event log, almanac data and configuration data) to the archive directory to assist in the data analysis.

<u>To access the Archive files</u>

From a main screen, touch the "Archive" icon in the bottom right corner:

This will open the Archive screen:



Data may be archived to removable storage - typically a USB flash memory stick (USB Key). It is connected to one of the USB sockets on the bottom rear panel of the Verify DPx computer.

Procedure

When using a USB Key –

Verify DPx has no keyboard.

.

Before attaching to the Verify DPx system on a separate PC create a new directory (for example VERIPOS_Archive) to contain the archive files.

On the Archive screen touch the “Browse” button to the right of the “Directory” entry box.

Use Windows browse feature (touch screen control) to locate the required directory on the removable storage. Touch “Ok” to confirm the selection and display the results in the entry box.

Touch the down-arrow at the right of the “Start” entry box to display a list of all the available logged files. Up to 48 files may be listed.

The filename of each file indicates its start date and start time (see above). Scroll the list and locate a file timed at least 15 minutes prior to the start of the problem. Touch on the filename to select it and display it in the entry box.

Use a similar process to choose the “End” file. This should have a file time not more than 15 minutes prior to the end of the problem.

Verify that the three entry boxes all contain the required values then touch the “Archive” button to create the archive.

Touch the home button to return to the main display.

Disconnect the removable drive from the USB port and transmit the complete contents of the archive directory to the appropriate technical support specialist. (In addition to the selected .alf files, the directory will contain additional files with extensions such as .evt, .alm and .config. These are also needed for processing.)

B. ENTERING A NEW LICENSE CODE

The Verify DPx software is supplied under a limited licence and is activated by the entry of a license code. The code is entered during commissioning and no action is normally required by the operator.

The license code is specific to the ID of the LD3 (or LD3S) interfaced to the Verify DPx system. A new license code will be required if:

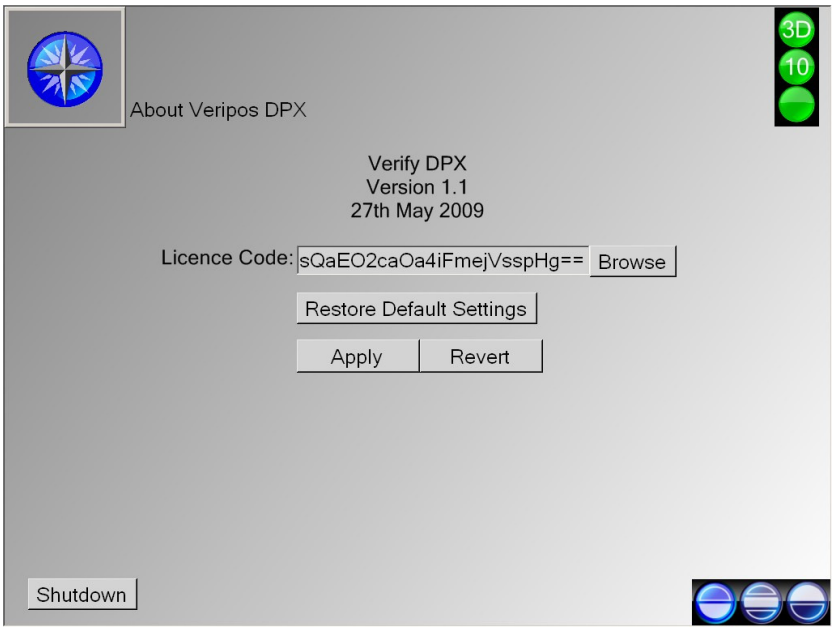
- The LD3 (or LD3S) is exchanged for a different unit
- The Verify DPx computer is replaced
- The CF solid state storage card is replaced (when upgrading software).

A new code may be obtained from the VERIPOS Helpdesk (see contacts list in appendix). The user must provide the ID of the LD3 (or LD3S) unit which is interfaced to the Verify DPx.

This is a 5-digit number engraved on front panel of LD3S. It may also be determined from the demodulator Status screen. (See explanation in Section 5.)

From a main screen touch the Information icon in the bottom right corner:

This opens the Information screen as shown below:



The program version and the release date are displayed.
This screen also allows the user to enter the License Code.

The license code is typically 24 characters in length and contains a mixture of upper and lower case letters as well as numbers. It will normally be provided by the Helpdesk as a text file, named “License.txt”. You may rename the file before use if required.

To enter the License code, import the text file from a USB memory device or attach an external keyboard for manual entry.

File entry is strongly recommended as the License Code may contain both the number zero and upper case letter “o”.

To import as a text file, first copy the licence code file to a USB Key.

Insert the USB Key in to a USB port on the VERIFY DPx Panel PC.

Touch the “Browse” button to the right of the “Licence Code” entry box and locate the file “License.txt” using the browse function.

Touch “Open” to import the content into the License Code box.

Touch the “Apply” button to accept the new code.

Incorrect entries may be removed by touching the “Revert” button before it is applied.

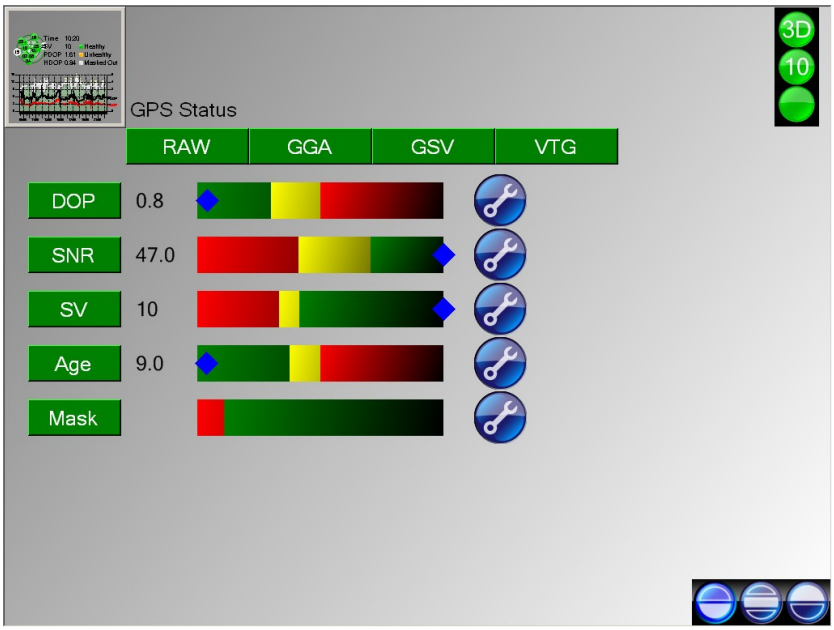
Touching “Restore Default Settings” will remove any alterations even after they have been applied.

Finally return to the main display by touching the home button.

C. CHANGING GPS ALARM THRESHOLDS AND MASK

GPS SCREEN

This screen may be accessed from any main screen by touching the “GPS” icon:



The bars graphs indicate the current values for various parameters:

DOP =	Dilution of precision (a measure of constellation geometry)
SNR =	Signal to noise ratio for each satellite
SV =	Number of satellites used in position computation
Age =	Age of correction data
Mask =	Setting of Elevation Mask

The bars have colour coded backgrounds with green indicating good values, amber for marginal values and red for unacceptable values.
Current value is indicated by a blue diamond. (SNR has multiple diamonds with one for each satellite in use.)

To the right of each bar is a wrench (spanner) icon: 

Touching will open a screen which allows the user to change the associated threshold value. Thresholds are used both to control the background colours of the bars and trigger system alarms.

Values are optimised during commissioning and should not normally require changes. Seek advice from the VERIPOS before changing these settings.

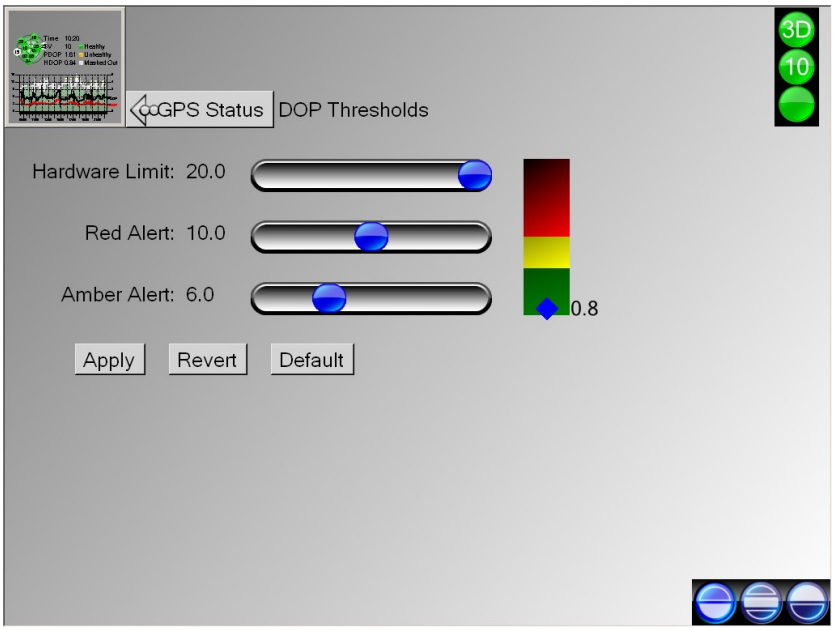
The screens are similar and use the same procedure to change values:

- Touch and drag a slider to the required position. The associated numeric value on the left of the slider will change
- Changes may be cancelled by touching “Revert” (before touching “Apply”).
- When changes have been made touch the “Apply” button to store the values
- Use the “Default” button, if appropriate, to reset values to the factory default

When changes are complete, touch the: 

button to return to the GPS Status screen.

DOP Thresholds

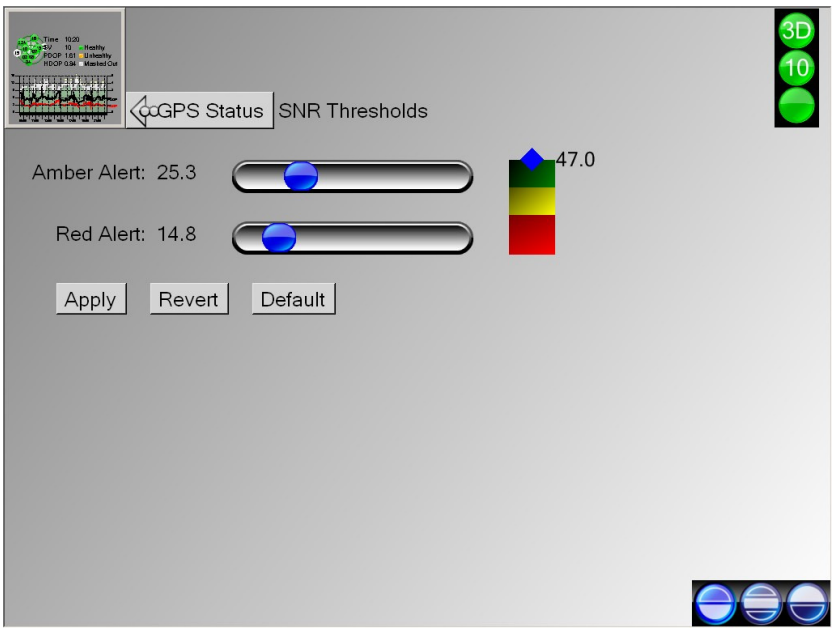


This is the DOP value set on the demodulator.

The default values are recommended and cover most circumstances.

Hardware Limit: 20.0
Red Alert: 10.0
Amber Alert: 6.0

SNR Thresholds



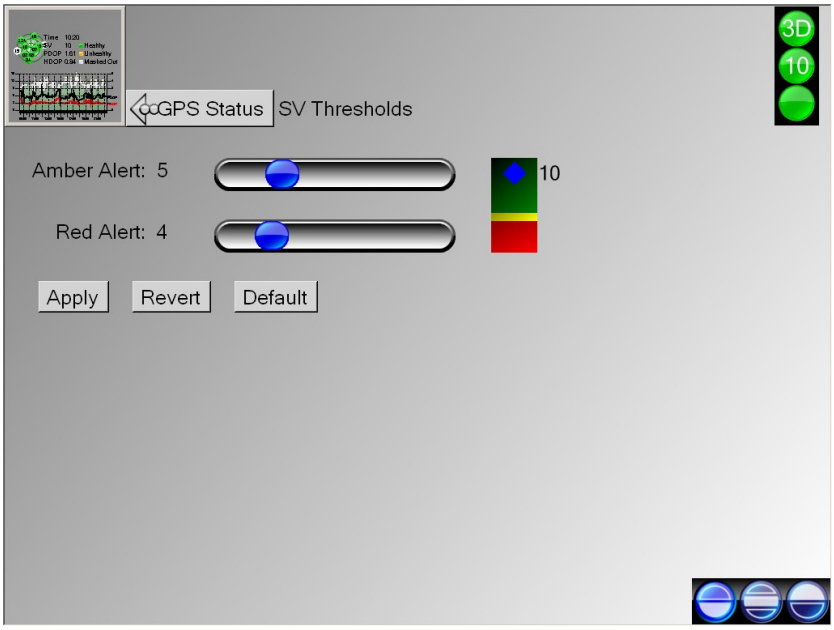
These values must be set to match the GPS Receiver in use.

Settings are optimised during commissioning and should not normally require changes.

The current default values are: Amber Alert: 25.0, Red alert: 10.0

NOTE: Some early software versions had defaults set to: Amber Alert: 2.5, Red Alert: 1.0 These defaults should never be used.

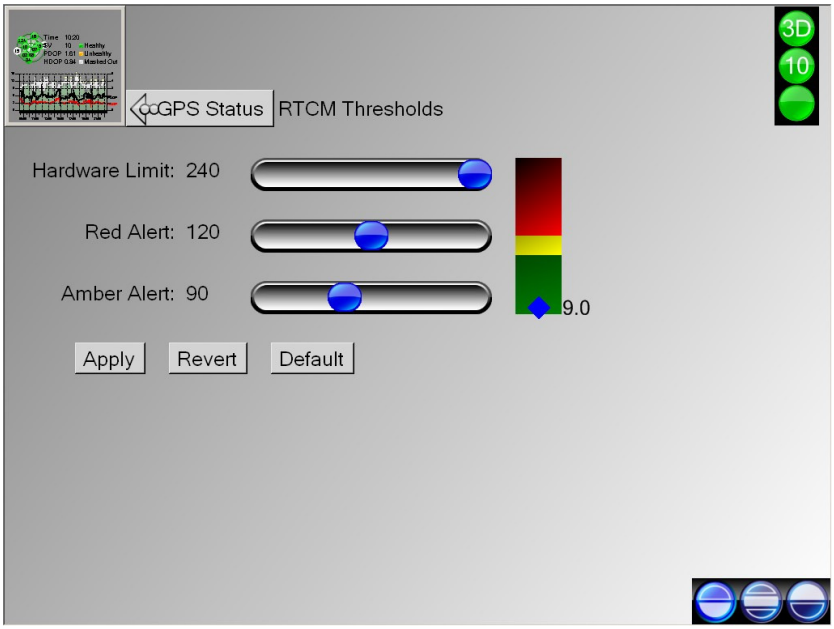
SV Thresholds



Default SV values (Amber Alert: 5, Red Alert: 4) suit the most operational requirements.

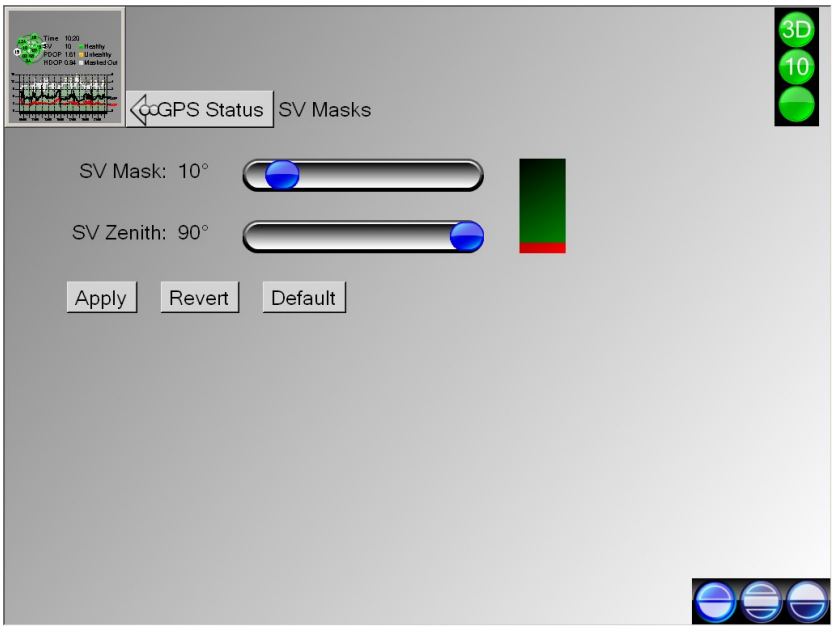
Depending on DOP values there may be situations where 4 satellites give an adequate fix, provided the DOP values are good.

RTCM (Age) Thresholds



Default values (Hardware Limit: 240 seconds, Red Alert: 120 seconds, Amber Alert: 90 seconds) suit most circumstances.

SV (Elevation) Mask



The mask setting permits the user to apply both high and low elevation limits.

The default for SV Mask is 10°. The elevation mask may be adjusted where required.

Users may consider temporary periods where reducing the SV Mask to 7° for periods of low satellite count and/or high DOPs.
Conventionally the SV Zenith should be left at 90°.

APPENDIX IV.

VERIPOS STATION LISTING

VERIPOS reference stations:

veripos

Station ID	Name	Type	Beam			Service Type				
			1	2	3	Standard	Standard+	Glonass	Extra	Comments
HF Stations										
1	Den Helder	HF				x				
2	Wick	HF				x				
5	Utsira	HF				x				
14	Carmen	HF				x				
15	Cabo Frio	HF				x				
North & Central American Stations										
501	Houston	GPS	98W	AORW		x	x			
502	Baton Rouge	GPS	98W	AORW		x	x			
503	Carmen	GPS	98W	AORW		x	x			
504	Trinidad	GPS	98W	AORW		x	x			
505	St Johns	GPS	98W	AORW		x				
506	Halifax	GPS	98W	AORW		x				
509	Tampa	GPS	98W	AORW		x	x			
510	Tampico	GPS	98W	AORW		x	x			
511	Costa Rica	GPS	98W	AORW		x	x			
512	Curacao	GPS	98W	AORW		x	x			
513	Fairbanks	GPS	98W	POR		x	x			
South American Stations										
601	Rio de Janeiro	GPS	AORW	98W		x	x			
602	Macae	GPS, GLO	AORW	98W		x	x	x		
603	Catu	GPS	AORW	98W		x	x			
604	Belem	GPS	AORW	98W		x	x			
605	Natal	GPS	AORW	98W		x	x			
606	Porto Allegre	GPS	AORW	98W		x	x			
607	Buenos Aires	GPS	AORW	98W		x	x			
608	Lima	GPS	AORW	98W		x	x			
609	Chiclayo	GPS	AORW	98W		x	x			
NWECS Stations										
701	Wick	GPS	25E	AORE		x				
702	Netherlands	GPS	25E	AORE		x				
703	Bodo	GPS	25E	AORE		x				
704	Kristiansund	GPS, GLO	25E	AORE		x		x		
705	Tananger	GPS	25E	AORE		x				
706	Falmouth	GPS	25E	AORE		x				
708	Bologne	GPS	25E	AORE		x	x			
709	Cyprus	GPS	25E	AORE		x	x			
710	Marbella	GPS	25E	AORE		x	x			
711	Tromso	GPS	25E	AORE		x				
712	Vardo	GPS	25E	AORE		x				
713	Ny Alesund	GPS	25E	AORE		x				
714	Malta	GPS	25E	AORE		x	x			
715	Cairo									Planned
777	Aberdeen	GPS	25E	AORE		x				
African Stations										
801	Luanda	GPS	25E	AORE		x	x			
802	Malongo	GPS	25E	AORE		x	x			
803	Port Harcourt	GPS	25E	AORE		x	x			
804	Lagos	GPS	25E	AORE		x	x			
805	Accra	GPS	25E	AORE		x	x			
806	Las Palmas	GPS	25E	AORE		x	x			
807	Cape Verde	GPS	25E	AORE		x	x			
808	Cape Town	GPS	25E	AORE		x	x			
809	Gabon	GPS	25E	AORE		x	x			
810	Walvis Bay	GPS	25E	AORE		x	x			
811	Durban									Planned
812	Mozambique	GPS	25E	IOR		x	x			
813	Dar es Salaam	GPS	25E	IOR		x	x			
814	Sao Tome	GPS	25E	AORE		x	x			
Caspian & Middle East Stations										
901	Baku	GPS	109E	POR	IOR	x	x			
902	Aktau	GPS	109E	POR	IOR	x	x			
904	Doha	GPS	109E	POR	IOR	x	x			
905	Dubai	GPS, GLO	109E	POR	IOR	x	x	x		
906	Mumbai	GPS, GLO	109E	POR	IOR	x	x	x		
907	Kolkata	GPS	109E	POR	IOR	x	x			
908	Chennai	GPS, GLO	109E	POR	IOR	x	x	x		

Far East Stations										
301	Singapore	GPS, GLO	109E	POR	IOR	x	x	x		
302	Labuan	GPS	109E	POR	IOR	x	x			
303	Jakarta	GPS	109E	POR	IOR	x	x			
304	Balikpapan	GPS	109E	POR	IOR	x	x			
305	Bangkok	GPS	109E	POR	IOR	x	x			
306	Shenzhen	GPS	109E	POR	IOR	x	x			
307	Shanghai	GPS	109E	POR	IOR	x	x			
309	Kushiro	GPS	109E	POR	IOR	x	x			
310	Sakhalin	GPS, GLO	109E	POR	IOR	x	x	x		
311	Kemamam	GPS	109E	POR	IOR	x	x			
313	Manila	GPS, GLO	109E	POR	IOR	x	x	x		
315	Seoul	GPS	109E	POR	IOR	x	x			
Australian & NZ Stations										
401	Darwin	GPS	109E	POR	IOR	x	x			
402	Broome	GPS	109E	POR	IOR	x	x			
403	Dampier	GPS	109E	POR	IOR	x	x			
404	Perth	GPS	109E	POR	IOR	x	x			
406	Melbourne	GPS	109E	POR		x	x			
408	Hobart	GPS	109E	POR		x	x			
409	New Plymouth	GPS	109E	POR		x	x			
411	Dunedin	GPS	109E	POR		x	x			

Updated 11 March 09

The updated VERIPOS Station listing can be found on the VERIPOS Online Support System at: http://help.veripos.com

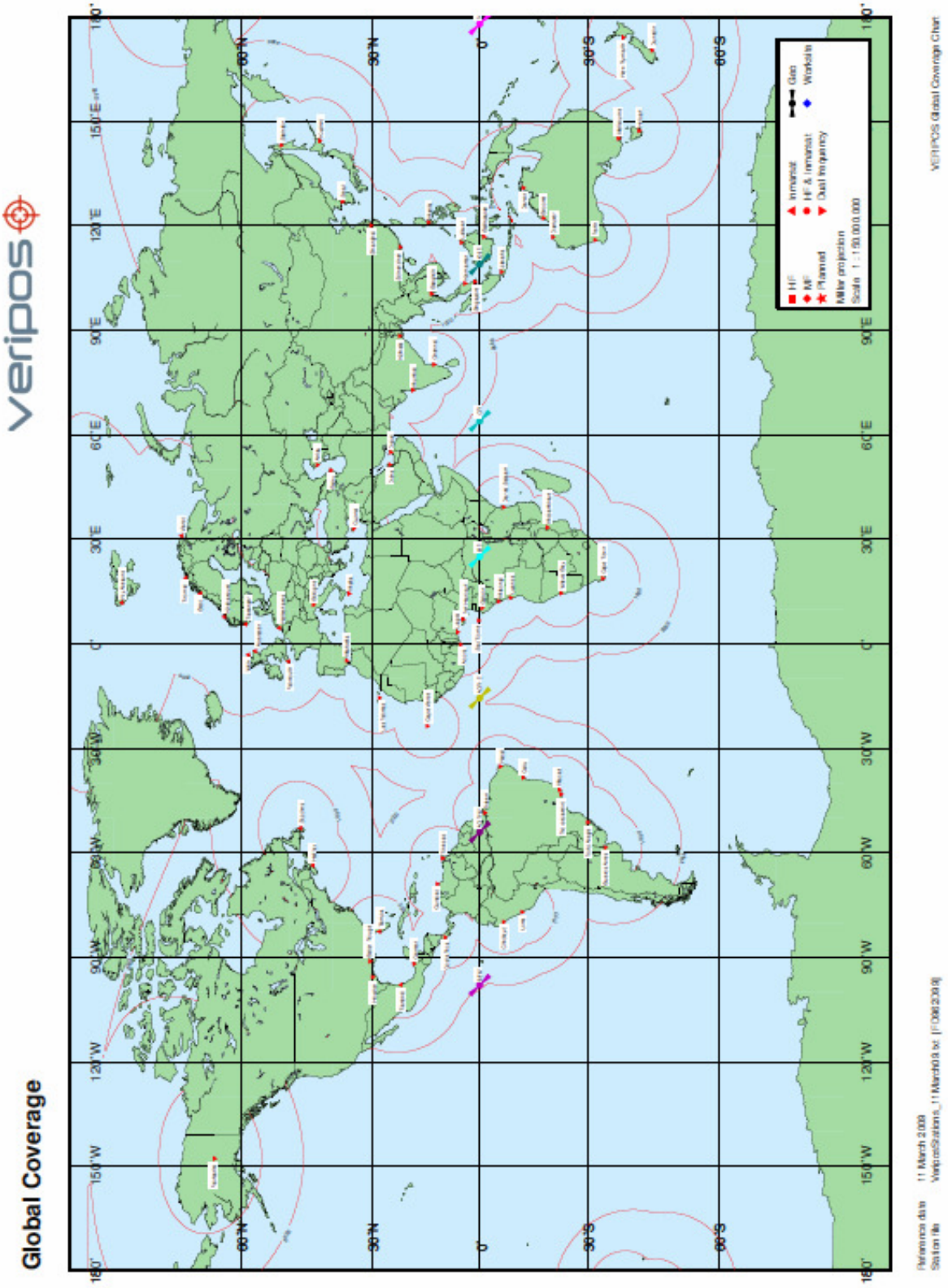
IALA BEACONS:

A listing of IALA MF stations is available from: http://site.ialathree.org/
(Select “IALA Lists of Radionavigation Services”)

VERIPOS accept no responsibility for use of correction signals provided by third parties with VERIPOS equipment.

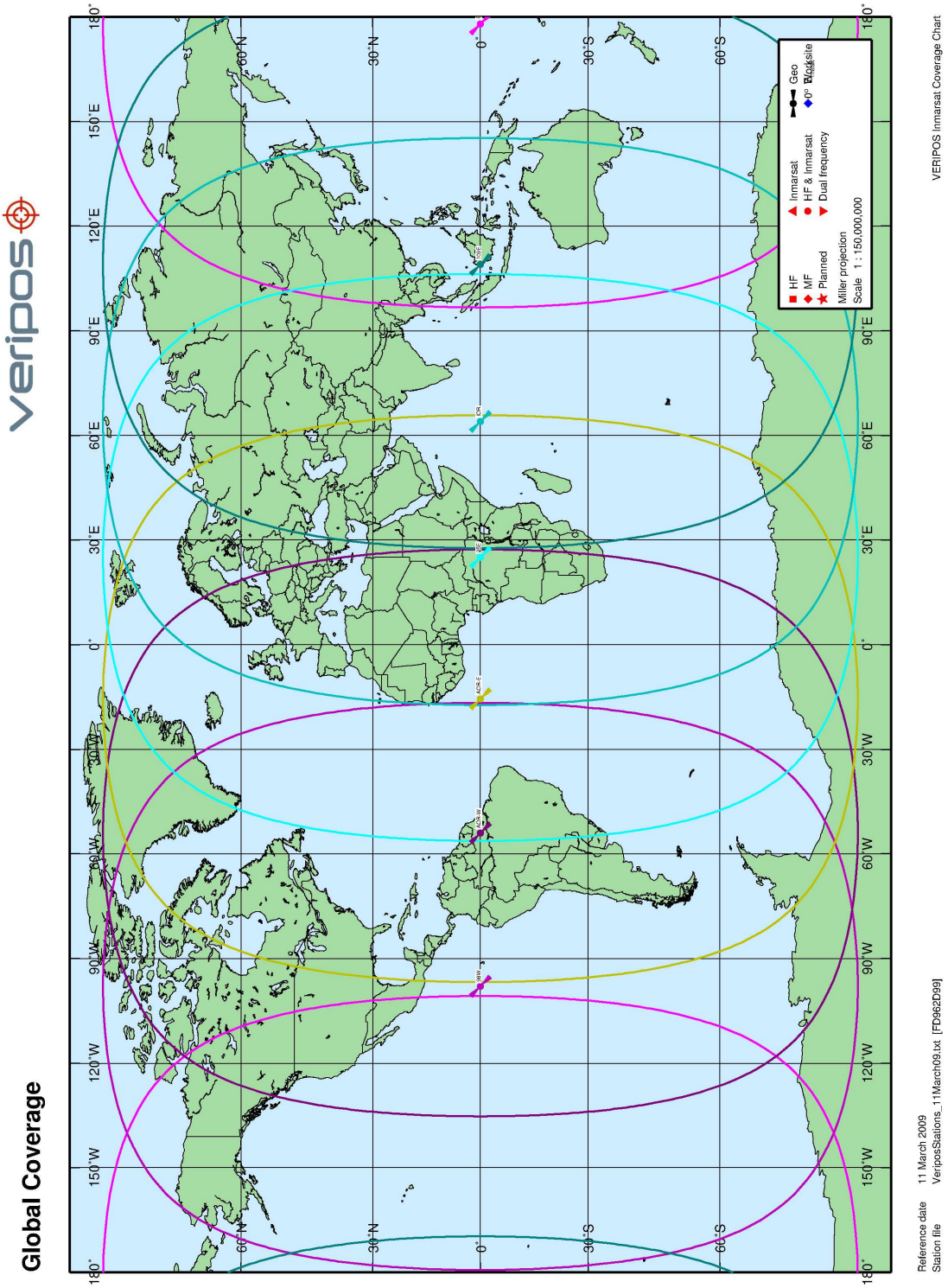
APPENDIX V.

GLOBAL COVERAGE CHART



The updated VERIPOS Global coverage chart can be found on the VERIPOS Online Support System at: http://help.veripos.com

VERIPOS Corrections -Geostationary satellite beam cover



APPENDIX VI.

I/O BRIDGE TOOL

I/O BRIDGE TOOL

The I/O Bridge Tool is part of the standard Verify DPx software installation. The program runs in the background and not normally available to the operator. Access requires use of a keyboard and mouse.

The I/O Bridge Tool is used to view and adjust serial data on three PC ports interfaced to the LD3 (or LD3S) Positioning system.

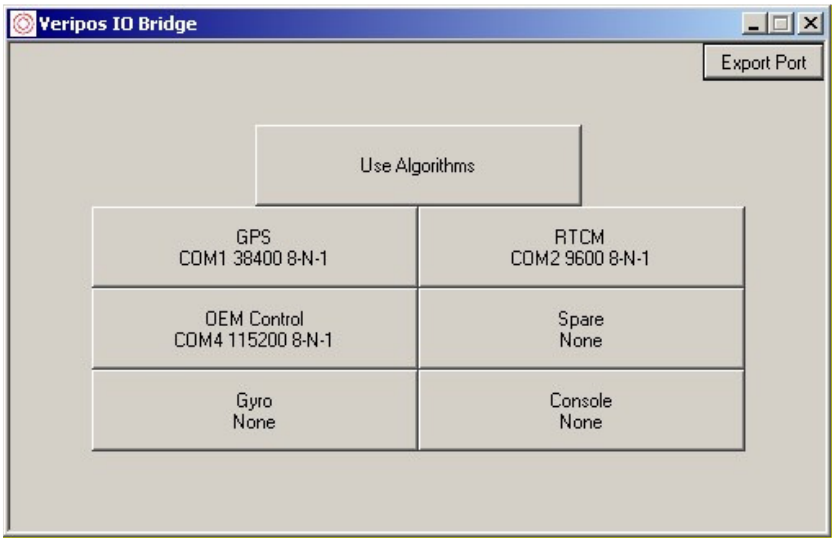
Only use the I/O Bridge tool under the direction of a VERIPOS engineer to provide detailed guidance concerning observations and/or changes required.

Systems may incorporate an input from the vessel's gyro. This is input through the computer's USB port using a USB to serial converter. Where a gyro input is present the data on this interface may also be checked.

This tool can also be used to modify the configuration of serial ports (not normally required).

Before using the I/O Bridge Tool - Shut down the computer before connecting a keyboard (and mouse) to the PS2 connector, connected to the Verify DPx Panel.
(A PS2 "Y" cable is used),

After rebooting Verify DPx, the I/O Bridge Tool will be running. The view can be brought to the foreground by pressing **ALT + Tab** on the keyboard.



Once the external keyboard is connected user input can be made using either the keyboard or the touch screen whichever is convenient.

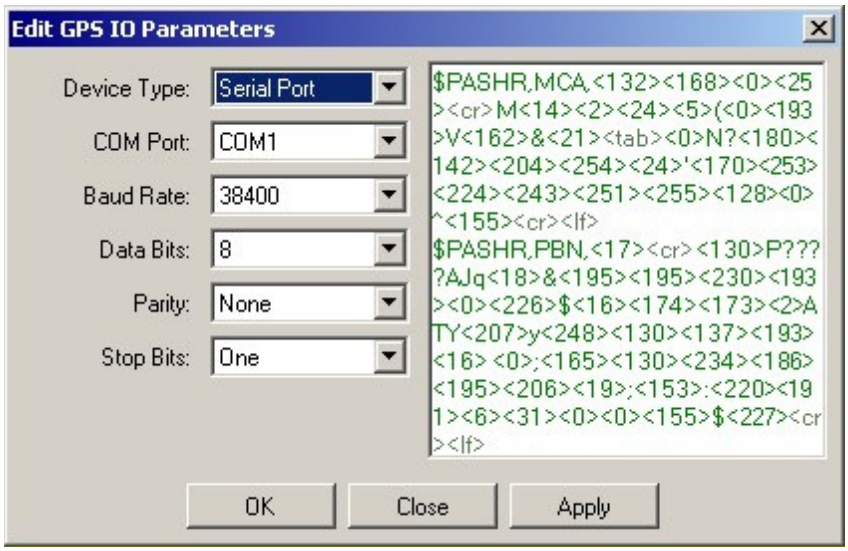
Settings for each of the ports may be examined by clicking /touching the related button on the opening screen. Typical displays for GPS and RTCM ports are shown (below).

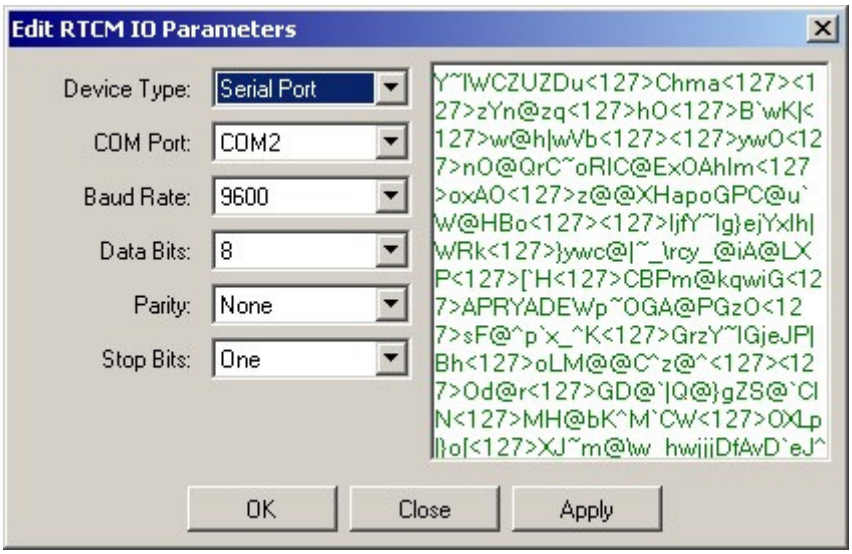
For any port display click /touch the "Close" button to return to the opening screen.

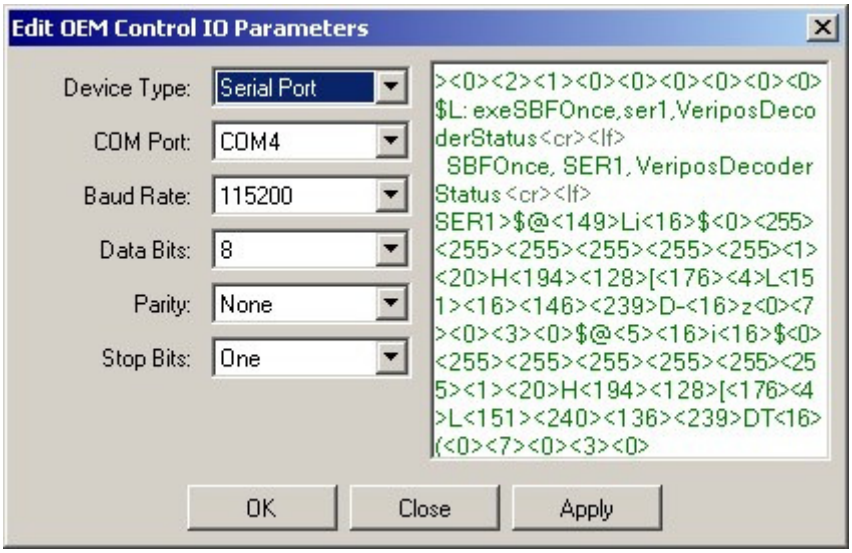
Note:
When you have finished working with the I/O Bridge Tool ensure it is left running.

Do not close the I/O Bridge Tool – it runs in the background to control the ports.

(If it is closed in error, when you reboot Verify DPx it will run in the background)







When you have finished press ALT+TAB and return to the main Verify DPx display.

Disconnect the keyboard and resume use of Verify DPx.

Optional – Heading Plot Gyro Input

Verify DPx can optionally be commissioned with a serial connection to a Gyro compass.

This is displayed on the Heading Plot screen in Verify DPx.

VERIPOS recommend and supply the Amplicon RS232 Serial – USB converter for use when connecting a Gyro input to the USB port of Verify DPx Panel PC.

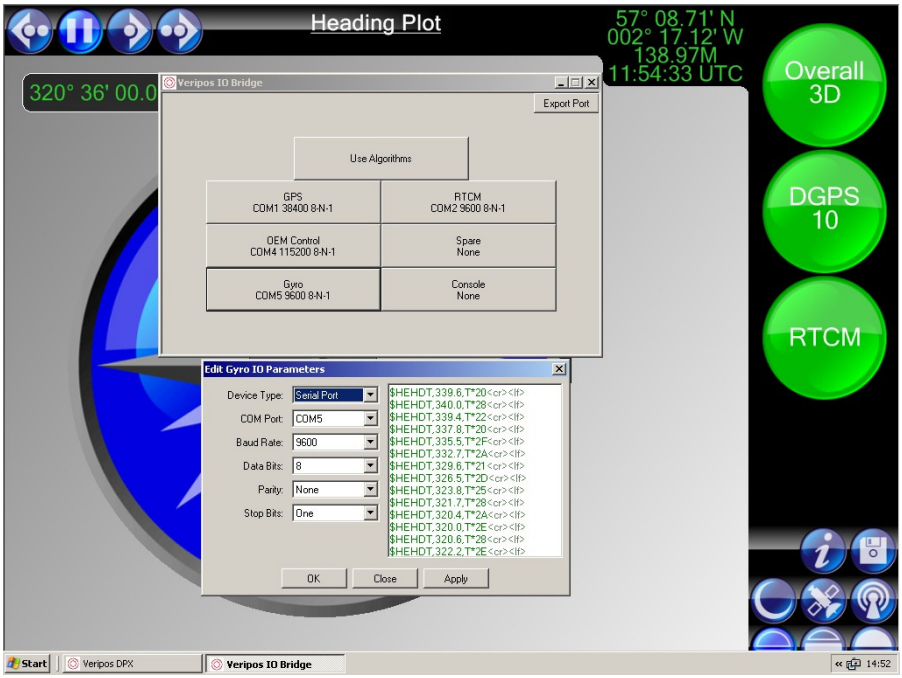
Procedure

Connect the Gyro output to the Verify DPx Panel PC using the Amplicon converter.

Open the I/O Bridge tool as described above.

Click on the Gyro section of the I/O Bridge tool and select to edit a serial port from the drop-down menus.

The screen shown below opens where you can enter the serial parameters appropriate to the gyro input being attached. The inputs default to COM 5: another may be used depending on configuration.



An acceptable input format for Gyro messages is $GPHDT. The first two characters after the $ may vary with manufacturer.

Example: -

Heading, True.

Actual vessel heading in degrees True produced by any device or system producing true heading.

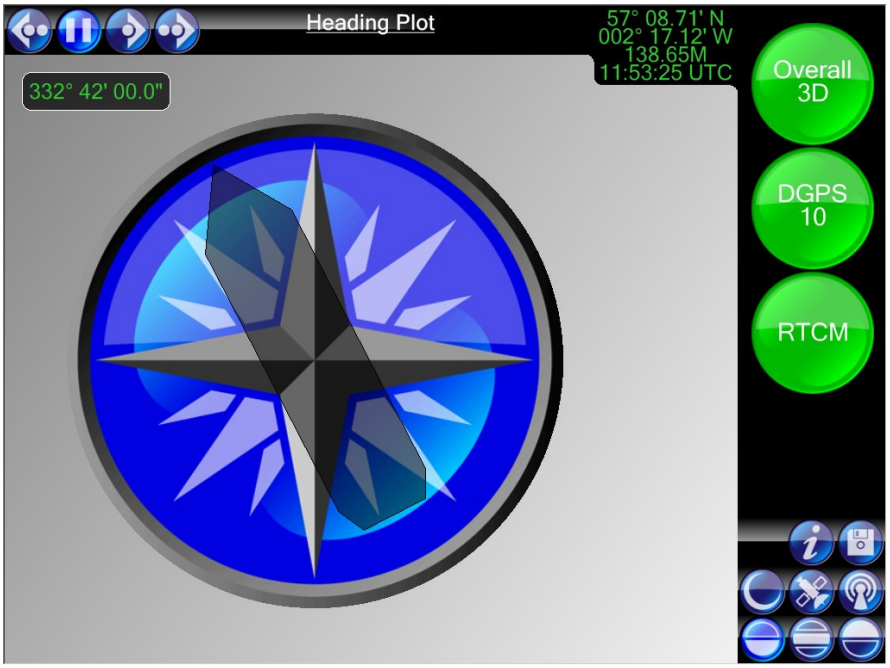
$--HDT,x.x,T
x.x = Heading, degrees True

When the Gyro output is being received and correctly interpreted the text in the viewing window (above) is green.

Apply the changes when this occurs and ALT+TAB using the keyboard to the main Verify DPx displays.

Ensure you leave the I/O Bridge tool running and disconnect the keyboard.

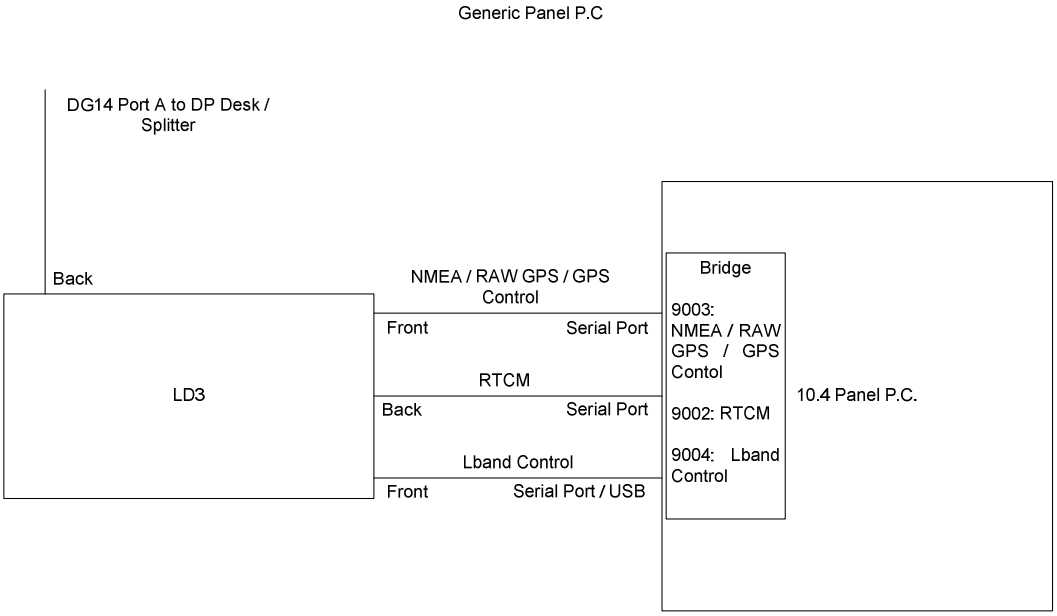
Resume normal use of the Verify DPx system which now has a Heading Plot display showing the Gyro input information onscreen (below).


Heading Plot
57° 08.71' N
002° 17.12' W
138.65M
11:53:25 UTC
332° 42' 00.0"
Overall
3D
DGPS
10
RTCM

APPENDIX VII.

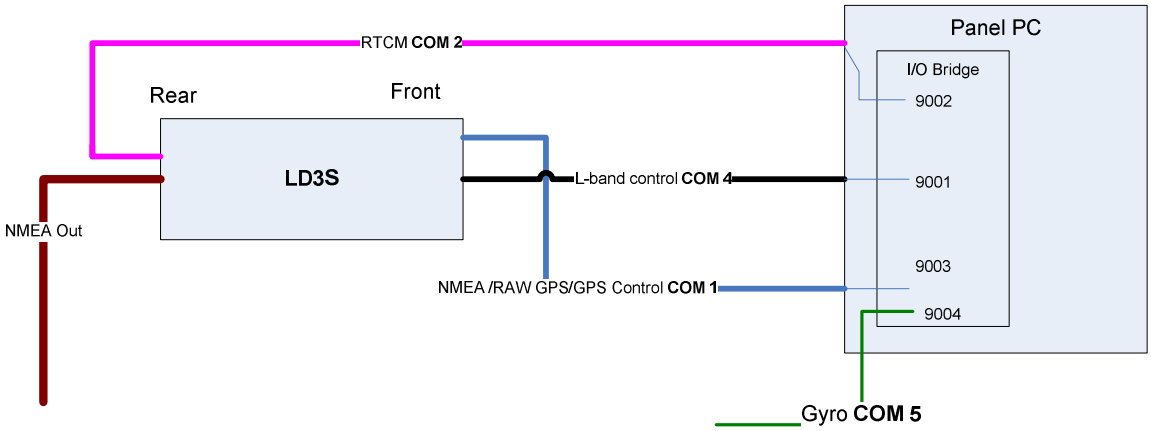
PC SETUP DIAGRAM

PC SETUP DIAGRAM



Set up with LD3S and Verify DPx v1.1

Verify DPx v1.1
Set up Diagram



APPENDIX VIII

ABBREVIATIONS

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BER	Bit Error Rate
CoG	Course over Ground
CR	Carriage Return
DGPS	Differential GPS
DOP	Dilution Of Precision
DP	Dynamic Positioning
GDOP	Geometry Dilution of Precision
GLONASS	GLObal NAvigation Satellite SystemRussian equivalent to GPS
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
HDOP	Horizontal Dilution of Precision
HF	High Frequency Radio used to Transmit Correction Data
KPH	Kilometres Per Hour
LAN	Local Area Network
LF	Line Feed
LNA	Low Noise Amplifier
L-Band	Methods of transmitting Correction data to mobile users
LCD	Liquid Crystal Display
LD2	Unit containing GPS card, demodulator and PC processor
MF	Medium Frequency Radio used to Transmit Correction Data
MPH	Miles Per Hour
NMEA	National Marine Electronics Association
m/s	Metres per Second
PDOP	Positional Dilution of Precision
PPP	Precise Point Positioning
PPS	Pulse Per Second
PRN	Pseudo Random Noise
RMS	Root Mean Square
RTCM	Radio Technical Commission for Maritime
SD	Standard Deviation
SNF	Signal Notification Form
SNR	Signal to Noise
Spotbeam	High Power L-Band Signal
Standard	Veripos Single frequency DGPS system
Standard+	Veripos Dual frequency DGPS system
SV	Space Vehicle
Ultra	Veripos High accuracy positioning systems
USB	Universal Serial Bus
UTC	Coordinated Universal Time
VDOP	Vertical Dilution of Precision
VGA	Video Graphic Array
VOSS	Veripos Online Support System
WAAS	Wide Area Augmentation System
WEEE	Waste Electrical and Electronic Equipment