APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

PAM Portable
Operation Manual

THIS PAGE IS INTENTIONALLY LEFT BLANK

Revision History

Issue	Change No.	Reason for change	Date
A	N/A	Draft Issue	15/02/12
B	N/A	First Release	09/03/12
1	N/A	Final Release	15/11/12
2	1332	Omitted 3510 unit weight and dimensions added. Other minor amendments.	08/05/13
3	1454	Addition of 529 Release Commands Addition of Compatt Commands Addition of LF Compatibility Addition of dunker model 3191 Other minor amendments	29/04/14
4	1480	Addition of Pinger Addition of IXBlue	16/06/14
5	1493	Add extra channels to Sonardyne Beacon setup Updated Option Code information	16/07/14
6	1507	Amendments to 15xx release information	18/08/14
7	1533	V-Nav section expanded	03/10/14
8	1642	Addition of 1439 Switch Release beacon commands	03/06/15
9	1753	Addition of 1439E Switch Release beacon commands	26/05/16
10	1805	Addition of REL-1450 Release beacon commands and internal battery charge time	13/01/17
11	1811	Addition of E2270- PAM heater operation Amendment of 319X weight specification	10/03/17
12	1862	Addition of 1439 RX / TX Information	04/08/17
13	1939	Amendments to 15xx Release for 2nd generation operation	21/02/18

Table of Contents

Thank you for choosing Applied Acoustic Engineering as one of your subsea equipment suppliers. We hope you experience many years of reliable operational use from our products.

If you do encounter any technical issues with any of our products then please don't hesitate to contact our Technical Team via the following methods.

Tel: +44 (0)1493 440355

Fax: +44 (0)1493 440720

Email: techsupport@appliedacoustics.com

The products described herein have been built and tested to the highest standards. They are supplied "as is" and due to the nature of underwater acoustics, no liability whatsoever can be accepted by the manufacturer for a failure to perform or to perform to a published specification or any damages that result from the use of this manual or equipment it describes. Equipment suitability and any operational issues such as safe working practices and risk assessments are the responsibility of the user.
The manual is believed to be correct at the time of printing. However software updates or hardware changes may mean there are differences between the manual and the software/hardware contained in any particular product. If in doubt, please contact us as described above. Note that we cannot accept liability for any errors or omissions described in this manual.

These written instructions must be followed fully for reliable and safe operation of the equipment that this manual refers to. Applied Acoustic Engineering Ltd cannot be held responsible for any issues arising from the improper use or maintenance of equipment referred to in this manual or failure of the operator to adhere to the instructions laid out in this manual. The user must be familiar with the contents of this manual before use or operation.

_____

1. Introduction to the 3510 PAM Portable

This manual provides the user with information on the operation and maintenance of the Model 3510 PAM Portable. Housed in a water-proof rugged enclosure with a clear LCD the unit can be used on-deck as a portable test control unit or on the bench for pre-dive system checks.

Features / Compatibility

- Test and Configuration of AAE 1000 Series Spread Spectrum beacons.
- AAE 900 Series beacon testing.
- AAE 600 Series beacon testing
- AAE 300 Series beacon testing.
- AAE 200 Series beacon testing.
- Sonardyne Wideband™ beacon testing.
- HPR and HiPAP compatible beacon testing.
- AAE 1500 Release Beacon.
- AAE 529, 559 Release Beacon.
- 4 Beacon Ranging and depth telemetry.
- 669 Pinger

Optional Features / Compatibility

- VNAV Multi Transponder Positioning.
- Compatt IV Commands and Configuration
- IXBlue Testing
- AAE Acoustic Telemetry functions.
- AAE 1439 Switch Release Beacon.
- AAE 1450 Release Beacon
- Low Temperature Operation- E2270

Sonardyne Wideband™ is a registered trademark of Sonardyne International Ltd
ADP Number 0880985001

_____

_____

2. System Description

PAM 3510 Console Unit

Supplied as standard with:

- Model 3102 Test Transducer
- Model CHA-1082-4000 Beacon Interface Lead
- 24VDC PSU and AC IEC Mains Cable

The PAM console contains a storage area for the 3102 test transducer and AC mains adaptor, when closed the unit is water proof. During operation the panel is splash proof. The LCD has an optional back light to allow operation in bright sun light. The membrane keys and intuitive GUI allow for ease of operation in all conditions.

Model 3102 Test Transducer

The test transducer is used for testing and configuring beacons in air.

Model 3190/1 Transducer

The 3190 transducer is a medium frequency (MF) transducer complete with integrated cable for typical deployments over the side of a vessel for acoustic release and ranging applications. The transducer can be deployed either free hanging or pole mounted depending on application, see Model 3190 deployment options. The 3191 transducer is the Low Frequency (LF) complete with integral cable for LF ranging and release operations.

The cable is integral to the transducer and provides a safe means of deployment together with electrical connections. To prevent damage to the cable and minimise potential problems, please ensure the following points are observed:

- Ensure personnel cannot step on, or trip over, the deck cable.

- Keep the cable away from sources of electrical noise such as electrical generators, sonar sources (bang boxes etc.).

- Avoid trapping the cable in doorways, hatches and alike.

- Ensure the cable is not bent less than the minimum bend radius of **150mm**.

- Ensure the cable is not laid over sharp edges.

- When deployed over the side of a vessel, ensure that the cable is secured to any mounting pole to prevent chaffing, strumming, and excessive movement.

- Ensure the polyurethane outer jacket of the cable is not breached allowing water ingress.

_____

3. Connections and Installation

Transducer:	For connection of the Model 3190 or 3191 Transducer.
Test Transducer:	For connection of the Model 3102 Test Transducer.
Beacon:	For connection of a 1000 Series Beacon via CHA-1082-4000 cable.
Serial:	External serial connection for program/ control/ data output.
DC In:	24VDC Input from AC Mains Adaptor or Battery.

_____

_____

Model 3190 Deployment Options

_____
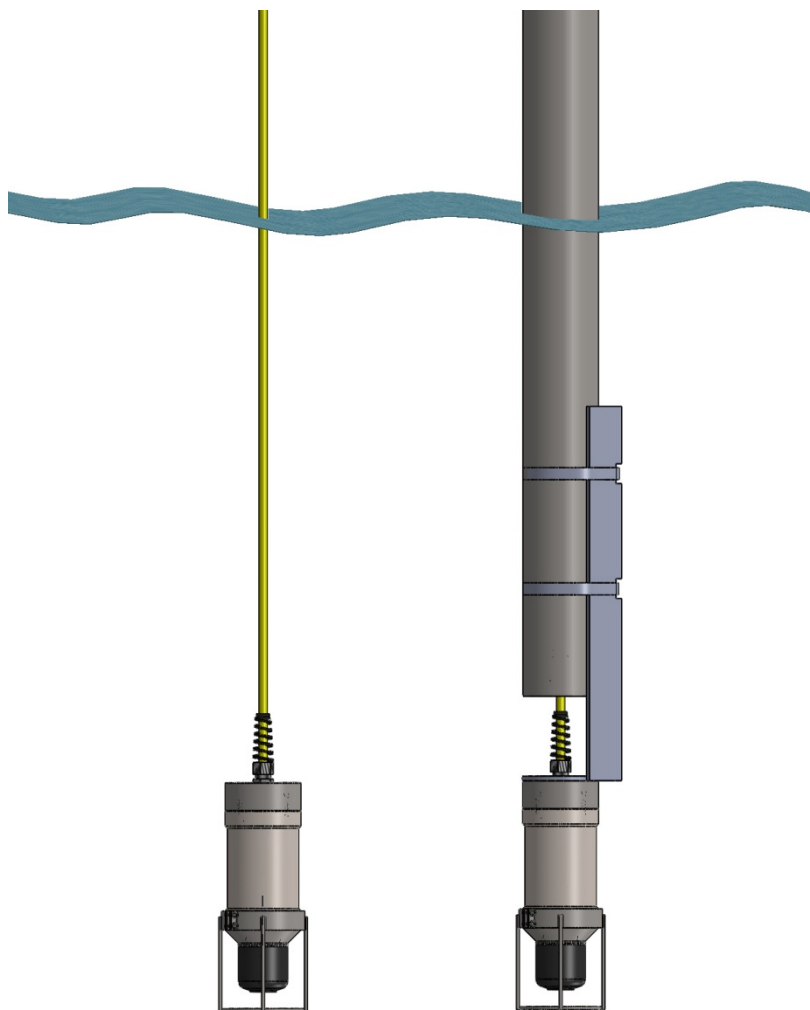
Power Up

- Ensuring the internal battery is charged or there is external power connected (see section 4); the PAM Portable can be powered up.
- Press and hold the Power Button on the front panel. The switch will indicate red.
- The battery status is indicated on the display, note if the battery is discharged the unit will not power up until an external supply is connected.
- The system will automatically launch and load the previous configuration.
- To power down the system press and hold the Power Button.

Front Panel Indicators

- Mains Power LED will indicate Red when ON.
- TX / RX will indicate Yellow upon a beacon interrogation and valid reply received.

Front Panel Key Pad

- Mains Power LED will indicate Red when ON.
- TX / RX will indicate Yellow upon a beacon interrogation and valid reply received.

Low Temperature Operation- Model E2270

Note: For operation at temperatures below 2ºc the external 24V PSU **MUST** be connected at all times.

Power Up Below 2°c

- Connect external PSU to the PAM Portable, if the Mains Indicator is Green the internal heater is operating.
- Wait for Mains indicator to turn Red (approximately 40minutes for -10ºc ambient). This indicates that the internal temperature has reached operating level and is safe to power up.
- To Power off press the Power Button and wait for shut down sequence to complete.

Note: Once unit is powered up the Mains Power LED may change back to Green to show the internal temperature has dropped and heater has turned on, however the PAM will maintain normal operation.

Front Panel Indicator

- Mains Power LED will indicate Green when internal temp is below 2ºc. The unit must not be switched on while in this condition.
- Mains Power LED will indicate Red when internal temp is above 5ºc the unit is ready for operation.

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

4. Operation

Overview

```
PAM Portable    Batt    %           14:22
                Main Menu

F1:  Transponder Testing

F2:  Depth and Ranging

F3:  Release

F4:  Beacon Setup


F6:  System Configuration
```

Upon power up and initialisation the above main menu will be displayed.

The sub menus can be accessed via the function 'F' keys or by using the cursor keys then selecting by pressing the return key.

The function keys are used as shortcut keys throughout the menu structure and their functionality varies.

_____

_____
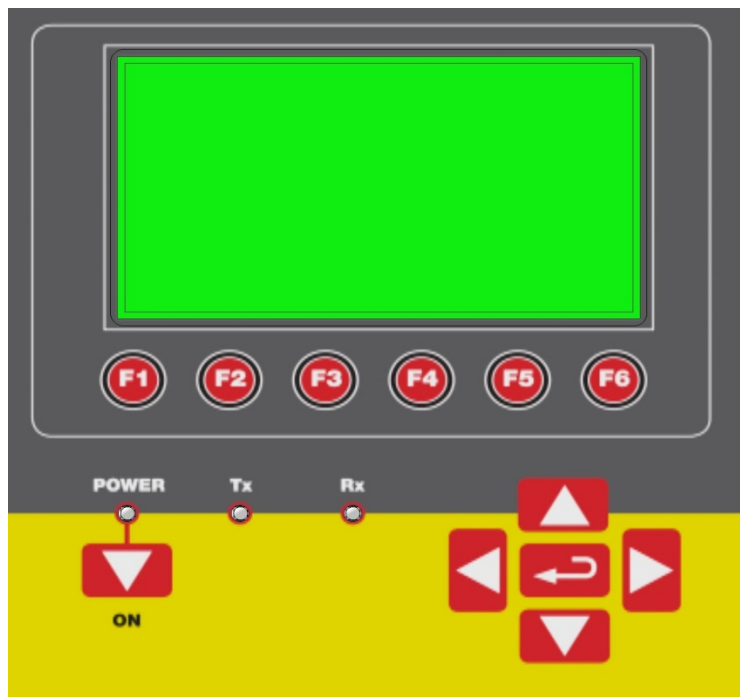
Parameter Editing

To select a parameter use the cursor keys to select

```
PAM Portable   Batt   %          14:22
           AAE Testing Functions
    Channel  : MF a1  Type :Transponder

    TAT = xxx.x ms    Freq = xxxxx.x hz
    PW  = xx.x ms

 F1 : Interrogate: OFF
 F4 : Search  F5: Main Menu  F6: Back
```

Press the return key to edit then use the cursor keys to set the desired value and return to confirm.

```
PAM Portable   Batt   %          14:22
           AAE Testing Functions
    Channel  : MF a1  Type :Transponder

    TAT = xxx.x ms    Freq = xxxxx.x hz
    PW  = xx.x ms

 F1 : Interrogate: OFF
 F4 : Search  F5: Main Menu  F6: Back
```

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

F1 Transponder Testing

The Transponder Testing function allows the operator to verify the operation of all industry standard beacons in air. The system measures Turnaround Time (TAT), Pulse Width (PW) and Reply Frequency (mode dependant) using the 3102 Test Transducer.

```
PAM Portable__Batt____%_____14:22
              Transponder Testing

F1:  AAE, AAE Spread Spectrum

F2:  HiPAP, HPR3, LFHPR4, HPR1507

F3:  IXBlue

F4:  User Defined CW

F5:  Sonardyne WB1

F6:  Main Menu
```
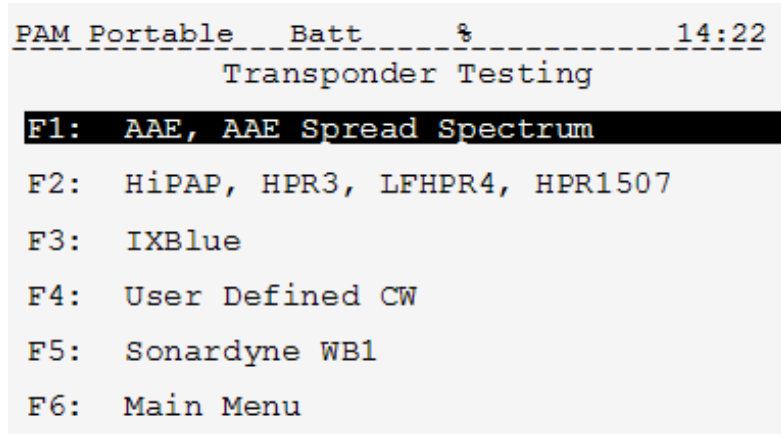
Select the desired configuration to test the beacons operation.

The 3102 test transducer should be connected to the front panel test transducer socket. To test the responder function the CHA-1082-4000 lead should be connected to the beacon serial port on the front panel and the connected to the beacon.

The turnaround time (TAT) is the time it takes for the beacon to respond to an interrogate signal. This time depends on the type of beacon and how far the beacon is away from the test transducer.

The pulse width is the length of the transmitter pulse. This value can vary due to the beacon type. If the PAM indicates a pulse width significantly longer or shorter than expected then the beacon may be faulty.

The final parameter which is tested is the beacon reply frequency. The PAM will calculate the frequency of the receive signal and display the results. If the frequency is out of the expected band then it will display an error message as well as the received frequency.

Responder Test

≤ 1m
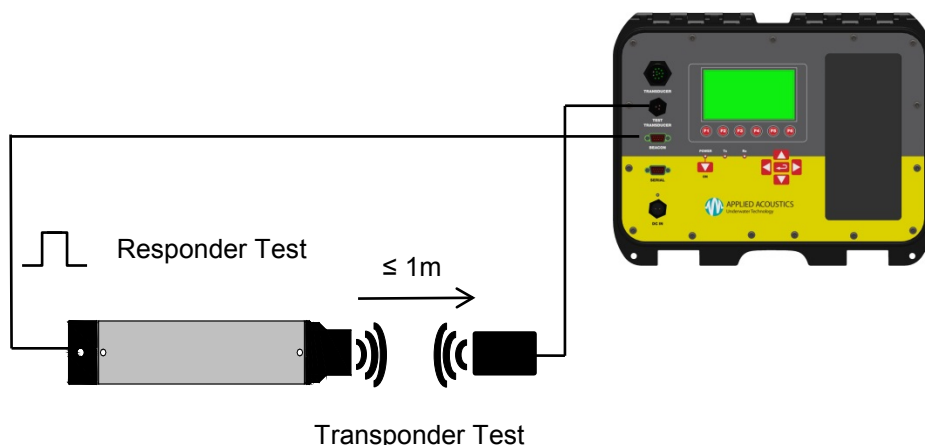
Transponder Test

Upon selection of testing mode the testing function screen will be displayed (example):

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

```
PAM Portable  Batt     %          14:22
---------------------------------------
              AAE Testing Functions
    Channel  : a0      Type :Transponder

    TAT = xxx.x ms    Freq = xxxxx.x hz

    PW  = xx.x ms

F1 : Interrogate: OFF

F4 : Search   F5: Main Menu   F6: Back
```

Set the Channel and Type parameters as desired to test the operation of the beacon in either transponder or responder mode.

Press F1 to begin interrogation of the beacon.

If the channel of the beacon is not known select the Search function to identify the operating channel. Press F4 to launch, select the mode of operation and press F1 to begin search.

```
PAM Portable  Batt     %          14:22
---------------------------------------
               Beacon Search
    Search for : AAE SS
F1: Start Search

    Status    :

    Channel   :

    Frequency :xxxxx.x     TAT:xxx.x

F5: Main Menu
```

Upon a valid reply from the beacon the PAM will emit a 'beep' and the TX and RX indicators will light sequentially. The Turnaround time (TAT), Frequency (Freq) and Pulse Width (PW) fields will be populated with the readings.

From any of the channel selection screens F4 Search function is available.

i The interrogation cycle time can be set in the System Configuration \ RxTx Configuration Menu

i Frequency will not be displayed in AAE Spread Spectrum and Sonardyne WB1 test modes.

F2 Depth and Ranging Functionality

The PAM Portable can calculate the range and received depth telemetry information from a deployed beacon. The mode of depth telemetry is automatically selected upon selection of channel scheme. Please note digital depth telemetry mode is AAE Spread Spectrum only, time delay telemetry compatiblity is across the AAE Tone, HiPAP, HPR and Trackpoint channel schemes.

```
PAM_Portable__Batt_____%_____14:22
              Depth And Ranging

F1:  4 Channel Depth & Ranging

F2:  Tx  parameters

F3:  VNav

F4:  Compatt

F5:  Pinger

F6: Main Menu
```

Ranging Transmit Parameters

The transmit parameters can be set by pressing F2 Tx Parameters. The following parameters can be configured:

```
PAM Portable  Batt      %          14:22
----------------------------------------
         General Rx/Tx Parameters
    Tx Power             : High
    Speed Of Sound       : 1500.0 m/s
    Sound Mode           : Tone
    Speaker Volume       : |--------
    Test Interval        : 1520 ms
F5: Main Menu               F6: Back
```

Transmit (Tx) Power (Dunker):   High // Low

Speed of Sound (in Water):   300 to 1600 m/s

Enter the Velocity of Sound (VOS) for transmission through water to be used in the range calculation. This is the mean velocity

Sound Mode (Speaker):   Tone // Received Signal

Speaker Volume: User specified level

Test Interval (Update Rate in ms):   User specified 0 to 9999 ms

_____

4 Channel Ranging Control

To go to the 4 Channel Ranging Control menus, Press F1.

```
PAM Portable  Batt      %              14:22
--------------------------------------------
             4 Channel Ranging

            MODE    CH    RANGE    DEPTH

F1:OFF      AAE     XX    XXXX.X   XXXX.X

F2:OFF      AAE     XX    XXXX.X   XXXX.X

F3:OFF      AAE     XX    XXXX.X   XXXX.X

F4:OFF      AAE     XX    XXXX.X   XXXX.X

F5:  Main Menu              F6:  Back
```

To access the configuration page of each channel press F1 – 4 or use the cursor keys to select the mode of operation, upon selection the system will take you to the configuration page.

```
PAM Portable  Batt      %              14:22
--------------------------------------------
          Beacon  1  Setup

Mode          :AAE Rel  Channel :

RepRate       :2.0s     Depth   :OFF

--------------------------------------------




F4: Gain Setup  F5:Main Menu   F6:Back
```

Select Mode using arrow keys and press return to confirm.

Select Channel using arrow keys and press return to confirm.

Select RepRate using arrow keys and press return to confirm.

Select Depth using arrow keys and press return to confirm.

Press F6 to return to Ranging Control menu.

i Depth Telemetry is not available with AAE Release and Sonardyne Wideband modes.

i When operating in AAE Tone or TPII mode with Depth enabled, the Depth and Time Span variables are displayed and required configuring.

i Ensure Rep rate > depth span in AAE Tone, Trackpoint, HiPAP and HPR modes.

F4 Gain set up opens the Gain Set Up for the selected channel

_____

```
PAM Portable  Batt    %           14:22
----------------------------------------
              Beacon  1  Gain Setup
    Gain Control        : Auto
    Manual Control      : 4000
    Gain Step           : 0100
    Rx Sensitivity      : High
    Averaging           : Off
F6:   Back
```

Gain Control:	Auto // Manual
Manual Control (Gain Control in manual mode):	0000 to 4000
Gain Steps (Gain sets in Auto mode):	0100 (Default)
RX Sensitivity:	High // Medium // Low
Averaging:	Off // High (16) // Medium (8) // Low (4)

ⓘ   Gain Control only available if 319X Dunker connected.

_____

V NAV Ranging Control

VNAV is a positioning system for statically deployed AAE Beacons. The system provides a navigation screen for deployment, acquisition and processing of range data to obtain seabed positions for the deployed units. Once processed, exports are provided to feed into seismic processing packages or CAD plotting.

The system can be used when deploying OBC seismic arrays or positioning multiple seabed objects, quickly and at low cost.

V-Nav System Configuration

PC LAPTOP

3510 PAM

POLE MOUNTED 3190
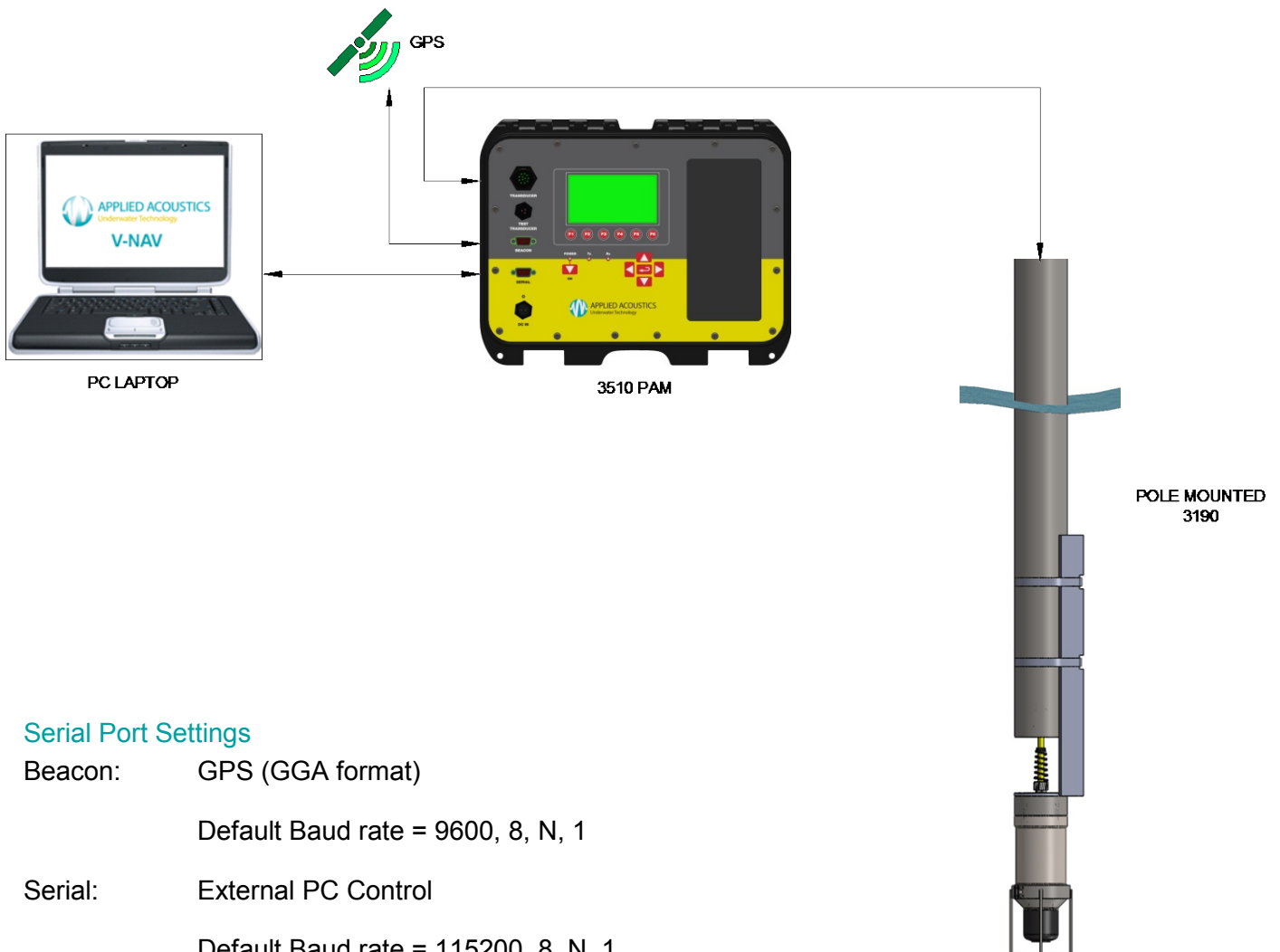
Serial Port Settings

Beacon: GPS (GGA format)

Default Baud rate = 9600, 8, N, 1

Serial: External PC Control

Default Baud rate = 115200, 8, N, 1

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

V-Nav Positioning

```
              VNav Positioning

F1:  Deployment Logging

F2:  Serial Control Ranging

F3:  Command

F4:  Ranging


F5:   Main Menu        F6:  Back
```

F1: Deployment Logging

```
              VNav Logging
 GPS Status :

 Entry     ID    GPS      Scan Status
 XXX     XXXX    XX       XX
 XXX     XXXX    XX       XX
 XXX     XXXX    XX       XX
 XXX     XXXX    XX       XX
 XXX     XXXX    XX       XX

 F1: Scan              F2: Scroll Up
 F3: Scroll Down       F4: Clear
 F5: Clear ALL         F6: Back
```

The PAM 3510 allows the deployed position or trial position to be logged to an entry (slot), this allows the same IDs to be used on large deployments. The entry and Vector ID are logged to the GPS position ready to be uploaded to the VNAV Software for acquisition set-up.

With GPS interfaced the status is reported, the GPS antenna should be referenced or as close as possible to the deployment location. There are 600 entries (slots) available for storage.

Place the test transducer close to the Vector Beacon's transducer face and press F1 to scan as the beacon is being deployed from the vessel. If successful the table will update with the ID, GPS Status OK and Scan Status OK, else any errors are reported.

Once logging is complete, the whole table or part can be uploaded to the VNAV application. This is controlled by the Import TPs button on the VT Data Base Menu.

i   When Deployment Logging is active not GPS data is sent to the VNAV Application

_____

F2: Serial Control Ranging

```
              VNav Ranging
GPS Status :

Ranging to :

 VNav ID     Status  time(ms)  Sig level
   ----        --     ----.-      -


Gain: -    Sens: -      TimeOut:-    ms
F4: Comms   F5: Main Menu    F6: Back
```

This is a status / info page for ranging to the beacons.

F3: Command

1419 Vector Beacons are configured using acoustic commands this menu allows the operator to configure and read the status of the Vector Beacons.

```
             VNav Commands
Command :- Get ID     Data:- xxxx

Reply:-    xxxx       Status:xx xxxx



F1:  Send Command
F5:  Main Menu         F6:  Back
```

Commands:

Get ID: Press F1 to send, the reply field returns the Vectors 4 digit ID

Change ID: Set the desired ID in the Data Field and Press F1 to send.

Get Battery: Press F1 to send, the reply field returns the battery voltage in the format xxx.x Volts

Get Rev: Press F1 to send, the reply field returns the firmware revision xxx.x

TX Test: Press F1 to send, this is a factory test.

Data Test: Press F1 to send, the reply field returns the data set in the data field.

Compatt

See Page 31 for Compatt Functionality.

Pinger

See Page 54 for Pinger Functionality.

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

F3 Release Functionality

From this menu the PAM Portable commands and configures the AAE 529P or AAE 15xx Release transponders by an acoustic protocol. A Compatt IV can also be commanded to release if functionality enabled.

```
                    Release

  F1:  Release 529P

  F2:  Release 15xx

  F3:  Compatt

  F4:  Release 1439


  F5:   Main Menu        F6:  Back
```

529P Release Menu

```
PAM Portable   Batt      %          14:22
                AAE Release 529P

F1: Release Channel Setup

F2: Release Functions

F3: Release Rx Setup




F5: Main Menu               F6: Back
```

Release Channel Setup

From this menu the Mode, Channel and ID of the 529P Release beacon is configured.

```
PAM Portable   Batt      %          14:22
      AAE Release 529P Channel setup

    Mode: HPR3

 Channel: 99

      ID: 01

  Status:

F1: Test

F5: Main Menu         F6: Back
```

Set Mode of operation: HPR3, HPR4, AAE LF, HPR4 LF, HPR 1507

Set Channel

Set Beacon ID

Press F1 to perform an Interrogation Test, if OK Status will be indicated.

Press F5 for Main Menu

_____

Release Functions

With the Mode, Channel and ID configured the following commands can be sent to the 529P Release beacon.

```
PAM Portable  Batt    %           14:22
      AAE Release 529P Commands
 Release Command: Status
 Status:
 Comms:        Armed:        Released:
 Sleep:        Tilt:        Battery Err:
F1: Send Command    F2: Tilt
F5: Main Menu       F6: Back
```

Command Options:

Status Request

Arm

Release

Sleep On / Off

Anti-Jam

Reset

STATUS Command

The PAM displays the status of the release parameters. When the menu is first displayed it will show a '?' next to each value. This means the PAM does not know the status of the release and the '?' represents 'Status Unknown'.

Arm	0 = disarmed 1 = armed.
Tilt	If the release lying in a position greater than 15 degrees from vertical. 0 = less than 15 degrees, 1 = greater than 15 degrees.
Release	0 = Not released 1 = released.
Fault	0 = no fault 1 = fault.
Sleep	0 = awake 1 = sleep

ARM Command

For the 529P Release to operate it must first be armed. Select the ARM command and press F1 to transmit command to the 529P Release.

RELEASE Command

To operate the release mechanism the 529P Release requires arming first. (See above.)

To initiate a release, select RELEASE command and press F1 to send the command.

i   Communications to the 529P Release will not be possible for 60 seconds after initializing a release.

_____

_____

SLEEP Command

If the release is not going to be used as a transponder or where there are other beacons that use the same channel as the release, it is possible to stop it responding to a navigation interrogation. This can be done by commanding the release to go into sleep mode. The normal release operations will subsequently work as normal but it will not be possible to range to it.

To set the 529P into Sleep Mode, select SLEEP and press F1 to send the command.

The Sleep status will be updated to 1, when in sleep mode.

To un-set the 529P into Sleep Mode, select SLEEP and press F1 to send the command.

The Sleep status will be updated to 0, when not in sleep mode.

ANTI JAM Command

The JAM command is used when a release has failed to operate using the normal release command. This uses anti jam techniques built into the release to try and get it operating. To send the jam command, select ANTI JAM and press F1.

For further information on using the jam command consult the release operating instructions.

RESET Command

This will reset the release status flags to their default conditions this will be indicated in the status flags.

15xx Release

```
              AAE Release 15xx
   F1: Release 1519

   F2: Release 1559




   F5: Main Menu          F6: Back
```

Press F1 for Model 1519, F2 for the Model 1559.

The 15xx command protocol is shared across the 1519 and 1559 beacons, the command menus have been separated to allow model specific developments.

15xx Release Menu

```
            1519    Release Menu
    F1:  Commands

    F2:  Release Functions

    F3:  Rx/Tx settings

    F4:  General Rx/Tx settings


   F5: Main Menu          F6: Back
```

_____

F1 Commands

To configure, identify and check the status of a 1500 Release beacon in air select F1 Commands.

```
          1519   Release Commands
Command:- Get ID      Data :- 0128
Reply  :-
Status :-
Transducer:
F1: Send Command
F5: Main Menu          F6:  Back
```

Commands:

Get ID: Press F1 to send, the reply field returns the 4 digit ID in the Data

Change ID: Set the desired ID in the Data Field and Press F1 to send.

Get Battery: Press F1 to send, the reply field returns the battery voltage in the format xx.x Volts

Battery Status: Returns OK if battery > 11.0V

Transducer: Test Transducer only.

_____

F2 Release Functions

To command 1500 Release beacon select F2 Release Functions:

```
        1519    Release Functions

F1:   Send ARM Command        ID:-  0128

F2:   Send FIRE Command    Time:-  ----s

F3:   Range test          Range:-  xxxx.xm

F4:   Battery Status

Action :-

F5: Settings                  F6: Back
```

i   ID: Set the desired ID in the field and Press Return to exit field.

Range Test

Press F3 to measure the slant range to the deployed 1500 Release with the ID set in the data field. The range is displayed in meters, the velocity of sound is set to 1500m/s by default. To change go to System configuration (F6 from Main Menu) then select RX TX Parameters (F2).

```
        1519    Release Functions

F1:   Send ARM Command        ID:-  0128

F2:   Send FIRE Command    Time:-  ----s

F3:   Range test          Range:-  217.5m

F4:   Battery Status

Action :- Reply from Release Received

F5: Settings                  F6: Back
```

i   If no reply received, Error is reported in the Range and Action fields.

i   The FIRE Command is not available until a valid ARM command has been received.

_____

_____

Battery Status

Press F4 to check the status of the 1500 battery.

```
        1519    Release Functions

F1:   Send ARM Command        ID:-  0128

F2:   Send FIRE Command     Time:-  ----s

F3:   Range test            Range:-  217.5m

F4:   Battery Status

Action :-   Rx Battery Ok

F5: Settings                     F6: Back
```

i   Battery status is returned ok if battery level is > 11.0V.

ARM Command

For the 1500 Release to operate it must first be armed. Press F1 to transmit command to the 1500 Release.

```
        1519    Release Functions

F1:   Send ARM Command        ID:-  0128

                            Time:-  ----s

F3:   Range test            Range:-  217.5m

F4:   Battery Status

Action :-

F5: Settings                     F6: Back
```

i   The ARMED state of both the surface command unit and 1500 is limited to 60 seconds allowing the FIRE to be issued within this window. Upon time out the 1500 will requiring re-arming to FIRE, the FIRE command is also de-activated on the PAM requiring re-arming to activate.

_____

Upon receipt of ARM response from 1500 Beacon the FIRE command is available, the status is updated and a countdown is active.

```
        1519    Release Functions

                            ID:-  0128

F2:   Send FIRE Command    Time:-   59 s

F3:   Range test          Range:- 217.5m

F4:   Battery Status

Action :- Release has been ARMED

F5: Settings                    F6: Back
```

ⓘ Any command sent to the 1500 when in the ARMED state other than the expected FIRE command will reset the 1500.

FIRE Command

To operate the switch release the 1500 Release requires arming first.

To initiate a Fire, press F2 to send the command within the ARM window of 60 seconds.

```
        1519    Release Functions

                            ID:-  0128

                          Time:-  120 s

F3:   Range test          Range:- 217.5m

F4:   Battery Status

Action :- Release has been  Activated

F5: Settings                    F6: Back
```

ⓘ Upon Activation the 1500 release will reply to the PAM then engage the release mechanism.

During release the 1500 will not reply to any surface commands.

The activation period is 180 seconds, a countdown timer is initiated upon confirmation of release fire command.

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

F3: RX / TX Settings

```
        1519   Rx/Tx Settings

  Rx Gain   : ------

  Rx Sens   : High

  Tx Power  : ----

  Transducer:


F5:   Main Menu        F6:  Back
```

Using the cursor keys to select and return to confirm the receiver can be configured with the following options:

Release RX Gain: Low // Medium // High
                             High = 65dB // Med =41dB // Low = 17dB

Release Rx Sensitivity: Low // Medium // High

TX Power: High // Low
                             191dB // 188dB

Transducer: Dunker // Test

i   RX Gain and TX Power settings are only available with Dunker (3190) connected.

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

F4 Compatt Menu

This software module enables the PAM to communicate with a Sonardyne Compatt MK4, upon activation by an update code this module is available.

```
PAM Portable   Batt      %            14:22
                    Compatt

F1: Interrogate Test Functions

F2: Set Address

F3: Release

F4: Compatt Status

F5: System Commands

F6: Back
```

ⓘ An electrostatic loop can be used to communicate with the Compatt. Connect the test loop to the transducer connector of the Pam and put the loop around the Compatt's transducer.

Set Compatt Address

To enable communications with the Compatt, the address needs to be entered. From the Compatt main menu press F2. The following menu will be displayed, enter the address of the Compatt. Press F1 to Test, the result of the test interrogation is displayed in the Status line.

```
PAM Portable   Batt      %            14:22
          Set Compatt Address


   Address =   01 03



Status:

F1:  Send test Tx

F5:  Main Menu          F6:  Back
```

ⓘ **Note:** If the Compatt has the address 201 marked on the bottle then the PAM should be set so that it shows 0201

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

System Commands

```
PAM Portable  Batt     %          14:22
          Compatt System Commands
F1: Enable/Disable Functions
F2: Power Settings
F3: Gain/Frequency/TAT settings
F4: Reset Screen
F5: PAM Rx settings
                        F6:  Back
```

Enable / Disable Functions

```
PAM Portable  Batt     %          14:22
          Compatt Enable/Disable
F1: Enable/Disable Compatt    :?
F2: Enable/Disable IIF        :?
F3: Enable/Disable CIF        :?
F4: Enable/Disable USBL       :?
Status:
F5: Get Configuration      F6:Back
```

To update status information press F5, the '?' are updated

F1: Enable / Disable Compatt

F2: Enable / Disable IIF (Individual Interrogate Frequency)

F3: Enable / Disable CIF (Common Interrogate Frequency)

F4: Enable / Disable USBL (Ultra Short Base Line)

i   The Compatt must be enabled to allow communications with the PAM 3510.

_____

Power Settings

```
PAM Portable   Batt      %            14:22
              Compatt Power settings
F1: Set All Power High/Low        :?
F2: Set Tel Pulse power High/Low  :?
F3: Set Tel Data Power High/Low   :?
F4: Set USBL Power High/Low       :?
Status:
F5: Get Power status        F6: Back
```

To update status information press F5, the '?' are updated

F1: Set all Power High / Low

F2: Set Tel Pulse Power High / Low (Telemetry)

F3: Set Tel Data Power High / Low (Telemetry)

F4: Set USBL Power High / Low (Ultra Short Base Line)

Gain / Frequency / TAT Settings

```
PAM Portable   Batt      %            14:22
              Compatt Settings
F1: Change gain setting   Gain: x
F2: Change TAT setting     TAT: xxxxxxx
F3: Change reply frequency  CH: xx
Status:
F4: Get settings
F5: Main Menu             F6: Back
```

To update status information press F4, 'xx' are updated

F1: Change gain setting (Receiver)

F2: Change TAT setting (Turn Around Time)

F3: Change Reply Frequency (Channel)

_____

Reset Screen

```
PAM Portable  Batt      %            14:22
              Compatt Reset


F1: Reset to defaults




Status:

F5:   Main Menu         F6:  Back
```

Press F1 to Reset Compatt to defaults

i   The Compatt must be in default baud rate to allow communications with the PAM 3510.

Compatt Rx Settings

```
PAM Portable  Batt      %            14:22
           Compatt PAM Rx Settings

   PAM Gain          : Medium
   PAM Rx Threshold : Medium




F5:   Main Menu         F6:  Back
```

Set the PAM 3510 Receiver gains and Detect Thresholds for operation with a Compatt Transponder.

_____

Compatt Status

```
PAM Portable   Batt     %           14:22

           Compatt Status/Sensors

F1: Read Power Status

F2: Read Battery/Time Status

F3: Read Status

F4: Read Sensors


F5: Main Menu          F6: Back
```

Read Power Status

```
PAM Portable   Batt     %           14:22

           Compatt Power Status

LBL Power: -         USBL Power: -

Tel Start Pulse Power : -

Tel Data Pulse Power  : -

Jitter Power          : -

Status:

F1:Get Power    F2:Set Power    F6:Back
```

Press F1 to refresh the status of the power levels.

Press F2 to set the various power levels below:

```
PAM Portable   Batt     %           14:22

           Compatt Power settings

F1: Set All Power High/Low         :?

F2: Set Tel Pulse power High/Low   :?

F3: Set Tel Data Power High/Low    :?

F4: Set USBL Power High/Low        :?

Status:

F5: Get Power status        F6: Back
```

_____

Battery / Time Status

```
PAM Portable   Batt     %          14:22
         Compatt Battery Status
Battery Volts : ?

Battery Count : ?

Elapsed Time  : ?

Status:

F1: Battery Status    F2: Elapsed Time

F5: Main Menu         F6: Back
```

Press F1 to refresh Battery Volts and Count.

Press F2 to refresh Elasped Time.

Read Status

```
PAM Portable   Batt     %          14:22
          Compatt Status
   Reply Ch: ?              TAT: ?

     Enabled: ?      USBL Enabled: ?

IRF Enabled: ?      CIF Enabled : ?

Ver: ?                 Options: ?

Status:

F1:Read Status    F5:Main Menu   F6:Back
```

Press F1 to Read Status, '?' fields will update.

_____

_____

Read Sensors

```
PAM Portable   Batt     %            14:22
              Compatt Sensors
Temperature = ?          Depth = ?
      Pitch = ?           Roll = ?
Status:
F1: Get temperature     F2: Get Depth
F3: Get Pitch/Roll      F4: DigiQuartz
F5: Main Menu           F6: Back
```

Press F1 to get Temperature reading

Press F2 to get Depth Reading

Press F3 to get Pitch / Roll Reading

To convert this value into degrees use the following formula:

$\varnothing$ = arc sign (V / SF)   where SF = 16 for ± 14.5
5.895 for ± 5
4 for ± 90

Press F4 to enter DigiQuartz Sub Menu:

```
PAM Portable   Batt     %            14:22
              Compatt DigiQuartz
Temperature count : ?

Depth count       : ?

Status:
F1: Get temperature     F2: Get Depth
F5: Main Menu           F6: Back
```

Press F1 to read Temperature

Press F2 to read Depth

Refer to the Sonardyne Compatt manual for converting count values to depth.

_____

_____

Interrogate Test Functions

```
PAM Portable  Batt     %           14:22
           Interrogate Functions
F1: Interrogate on CIF
F2: Interrogate on IIF
F3: Simultaneous Interrogate
F4: Ranging Settings

F5:   Main Menu       F6:  Back
```

Compatt CIF Interrogate

```
PAM Portable  Batt     %           14:22
         Compatt CIF Interrogate
Rx Channel  : 14
F1: Ranging : OFF   Range =  xxxx.x m

F2: Test.            Freq = xxxxx.x Hz
   PW  = xx.x ms      TAT =   xxx.x ms

F3: Settings   F5: Main Menu  F6: Back
```

Set RX Channel of Compatt under test then

Press F1 to Range

Press F2 to Test (TEST Transducer only)

Press F3 to access Ranging Settings (Page 36)

_____

Compatt IIF Interrogate

```
PAM Portable  Batt      %            14:22
         Compatt IIF Interrogate
Tx Channel  : 01
F1: Ranging : OFF    Range =  xxxx.x m

F2: Test.             Freq = xxxxx.x Hz

   PW  = xx.x ms       TAT =   xxx.x ms


F3: Settings   F5: Main Menu  F6: Back
```

Set TX Channel of Compatt under test then

Press F1 to Range

Press F2 to Test (TEST Transducer only)

Press F3 to access R settings (above)

Compatt Simultaneous Interrogate

```
PAM Portable  Batt      %            14:22
         Simultaneous Interrogate
 CH      Range        CH      Range
 XX      XXXX.XX      XX      XXXX.XX
 XX      XXXX.XX      XX      XXXX.XX
 XX      XXXX.XX      XX      XXXX.XX
 XX      XXXX.XX      XX      XXXX.XX
 XX      XXXX.XX      XX      XXXX.XX

 Depth ?          Status:

F1:Interrogate   F2:Settings  F6:Back
```

The Pam will command the Compatt under control to do interrogate any Compatts it is close to. After a short period of time any Compatt it has found will be shown as well as the range.

Press F1 to initiate

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

Ranging Settings

```
PAM Portable  Batt     %           14:22
              Ranging Settings
Gain Control      : Auto
Manual Gain Level : 100%
Auto Gain Step    : ----
Rx Sensitivity    : High
Test Interval     : 1200ms
TAT               : 062.5ms    F6: Back
```

Gain Control:	Auto // Manual
Manual Control (Gain Control in manual mode):	0000 to 4000
Gain Steps (Gain sets in Auto mode):	0100 (Default)
RX Sensitivity:	High // Medium // Low
Test Interval:	1000 to 9999ms
TAT (Turn Around Time):	Compatt Setting

Compatt Release Function

```
PAM Portable  Batt     %           14:22
              Compatt Release
Address: ?
 Press F1
    + Press F1
       + Press F1 to activate Release
Status:
F1:-> F1:-> F1:-> Release
F5:  Main Menu          F6:  Back
```

Set the Compatt Address '????' to be released.

Press F1 **3** times to send Release Command to Compatt

ⓘ   See page 16 to adjust transmit settings.

_____

F1: 1439 Release

(i) 1439 Switch Release Micro Beacons are factory configured and labelled with their unique ID and battery fitted date.

Using acoustic commands this menu allows the operator to configure and control the 1439 Release Beacons on deck with the Test Transducer and deployed with the 3190 Dunker. The 1439 Menu is accessed from the Main Menu by selecting :-
   F3 Release, F4 14xx Release then F1 Release 1493.

```
            1439 Release Menu

   F1: Commands

   F2: Release Functions

   F3: Rx/Tx settings



   F5: Main Menu        F6: Back
```

F1 Commands

To configure or identify a 1439 Release beacon select F1 Commands:

```
        1439 Release Commands

Command:- Get ID        Data :- 2222

Reply  :-

Status :-

Transducer:

F1: Send Command

F5: Main Menu        F6:  Back
```

Commands:

Get ID: Press F1 to send, the reply field returns the 4 digit ID

Change ID: Set the desired ID in the Data Field and Press F1 to send.

Get Battery: Press F1 to send, the reply field returns the battery voltage in the format xx.x Volts

Info: Transducer: Test Transducer only.

_____

F2 Release Functions

To command 1439 Release beacon select F2 Release Functions:

```
            1439 Release Functions

    F1:  Send ARM Command        ID:- 0128


    F3:  Range test         Range:- xxxx.xm

    Action :-

    Reply  :-              Status :- xx xxxx
    F4: Settings   F5: Main Menu   F6: Back
```

ⓘ ID: Set the desired ID in the Data Field and Press Return to exit field.

Range Test

Press F3 to measure the slant range to the deployed 1439 Release with the ID set in the data field. The range is displayed in meters, the velocity of sound is set to 1500m/s by default. To change go to System configuration (F6 from Main Menu) then select RX TX Parameters (F2).

```
            1439 Release Functions

    F1:  Send ARM Command        ID:- 0128


    F3:  Range test         Range:- 217.5m

    Action :-  Reply from Release Received

    Reply  :- 0128        Status :- 0    0
    F4: Settings   F5: Main Menu   F6: Back
```

ⓘ If no reply received, Error is reported in the Range and Action fields.

ⓘ The FIRE Command is not available until a valid ARM command has been received from the 1439.

_____

_____

ARM Command

For the 1439 Release to operate it must first be armed. Press F1 to transmit command to the 1439 Release.

```
              1439 Release Functions

F1:   Send ARM Command        ID:- 0128

F2:   Send FIRE Command     Time:- 56s

F3:   Range test           Range:- 217.5m

Action :- Release has been ARMED

Reply  :- 0001           Status :- 00 0000
F4: Settings    F5: Main Menu    F6: Back
```

The ARMED state of both the surface command unit and 1439 is limited to 60 seconds allowing the FIRE to be issued within this window. Upon time out the 1439 will requiring re-arming to FIRE, the FIRE command is also de-activated on the PAM requiring re-arming to activate.

FIRE Command

To operate the switch release the 1439 Release requires arming first.

To initiate a Fire, press F2 to send the command within the ARM window of 60 seconds.

```
              1439 Release Functions

F1:   Send ARM Command        ID:- 0128

F2:   Send FIRE Command     Time:- 48s

F3:   Range test           Range:- 217.5m

Action :-  Release has been ACTIVATED

Reply  :- 0002           Status :- 00 0000
F4: Settings    F5: Main Menu    F6: Back
```

_____

_____

F3: RX / TX Settings

```
          14xx Rx/Tx Settings

  Rx Gain   : ------

  Rx Sens   : High

  Tx Power  : ----

  Transducer:


F5:   Main Menu          F6:  Back
```

Using the cursor keys to select and return to confirm the receiver can be configured with the following options:

Release RX Gain: Low // Medium // High
                              High = 65dB // Med =41dB // Low = 17dB

Release Rx Sensitivity: Low // Medium // High

TX Power: High // Low
                              191dB // 188dB

Transducer: Dunker // Test

i   RX Gain and TX Power settings are only available with Dunker (3190) connected.

_____

_____

F2: 1439E Release

ℹ 1439E Switch Release Micro Beacons are factory configured and labelled with their unique ID and battery expiry date.

Using acoustic commands this menu allows the operator to configure and control the 1439E Release Beacons on deck with the Test Transducer and deployed with the 3190 Dunker. The 1439E Menu is accessed from the Main Menu by selecting:

F3 Release, F4 14xx Release then F2 Release 1493E.

```
              1439E Release Menu

  F1: Commands

  F2: Release Functions

  F3: Rx/Tx settings



  F5: Main Menu          F6: Back
```

F1 Commands

To configure or identify a 1439E Release beacon select F1 Commands:

```
            1439 Release Commands

Command:- Get ID        Data :- 2222

Reply  :-

Status :-

Transducer:

F1: Send Command

F5: Main Menu          F6:  Back
```

Commands:

Get ID: Press F1 to send, the reply field returns the 4 digit ID

Get Battery: Press F1 to send, the reply field returns the battery voltage in the format xx.x Volts

Info: Transducer: Test Transducer only.

F2 Release Functions

To command 1439E Release beacon select F2 Release Functions:

_____

```
              1439 Release Functions

F1:   Send ARM Command           ID:- 0128


F3:   Range test              Range:- xxxx.xm

Action :-

Reply  :-                 Status :- xx xxxx

F4: Settings    F5: Main Menu    F6: Back
```

i ID: Set the desired ID in the Data Field and Press Return to exit field.

Range Test

Press F3 to measure the slant range to the deployed 1439E Release with the ID set in the data field. The range is displayed in meters, the velocity of sound is set to 1500m/s by default. To change go to System configuration (F6 from Main Menu) then select RX TX Parameters (F2).

```
              1439 Release Functions

F1:   Send ARM Command           ID:- 0128


F3:   Range test              Range:- 217.5m

Action :-  Reply from Release Received

Reply  :- 0128             Status :- 0    0

F4: Settings    F5: Main Menu    F6: Back
```

i If no reply received, Error is reported in the Range and Action fields.

i The FIRE Command is not available until a valid ARM command has been received from the 1439E.

ARM Command

For the 1439E Release to operate it must first be armed. Press F1 to transmit command to the 1439E Release.

```
              1439 Release Functions

F1:  Send ARM Command        ID:- 0128

F2:  Send FIRE Command     Time:- 56s

F3:  Range test            Range:- 217.5m

Action :- Release has been ARMED

Reply  :- 0001            Status :- 00 0000

F4: Settings   F5: Main Menu   F6: Back
```

The ARMED state of both the surface command unit and 1439E is limited to 60 seconds allowing the FIRE to be issued within this window. Upon time out the 1439E will requiring re-arming to FIRE, the FIRE command is also de-activated on the PAM requiring re-arming to activate.

FIRE Command

To operate the switch release the 1439E Release requires a Fire command to be sent.

To initiate a Fire, press F2 to send the command within the ARM window of 60 seconds.

```
              1439E Release Functions

F1:  Send ARM Command        ID:- 0128

                           Time:-    9s

F3:  Reset/Range           Range:- 217.5m

Action :-Activated, Please wait 10s

Reply  :- 0002            Status :- 00 0000

F4: Settings   F5: Main Menu   F6: Back
```

The 1439E switched output will be ON for 10s, no commands will be accepted by the 1439E Release until the 10s countdown has expired.

Response confirmation

After the 10s countdown the PAM will interrogate the 1439E Release every 4 seconds for 2Hrs.

```
            1439E Release Functions
F1:   Send ARM Command        ID:- 0128
                            Time:- 7199s
F3:   Reset/Range       Range:- 217.5m
Action :-Waiting for Confirmation
Reply  :- x000        Status :- 01 0001
F4: Settings   F5: Main Menu   F6: Back
```

The 1439E Release will only respond when the feedback signal (nominal 24v) has been applied to the 1439E Release during the 2hr window.

```
            1439E Release Functions
F1:   Send ARM Command        ID:- 0128
                            Time:- 7192s
F3:   Reset/Range       Range:- 217.5m
Action :-Activation Confirmed
Reply  :- x002        Status :- 00 0000
F4: Settings   F5: Main Menu   F6: Back
```

Sending the ARM or Range command during the 2hr window will reset the 1439E. In this case an ARM command will need to be re-sent followed by a Fire command (at which point the 1439E output will be ON for 10s) to get back to waiting for the 24v signal.

The ARM and Range commands can be sent at any time to reset the 1439E Release and the PAM 3510 back to a common state. Sending multiple ARM or Range commands is acceptable and will not cause any problems.

_____

F3: REL-1450 Release

i   The REL-1450 Release Beacons are factory configured and labelled with their unique ID and battery fitted date.

Using acoustic commands this menu allows the operator to check the configuration and control the 1450 Release Beacons on deck with the Test Transducer and deployed with the 3190 Dunker. The 1439 Menu is accessed from the Main Menu by selecting –

F3 Release, F4 14xx Release then F3 Release 1450.

```
              1450 Release Menu

  F1: Operation

  F2: Diagnostics

  F3: Rx/Tx settings




  F5: Main Menu          F6: Back
```
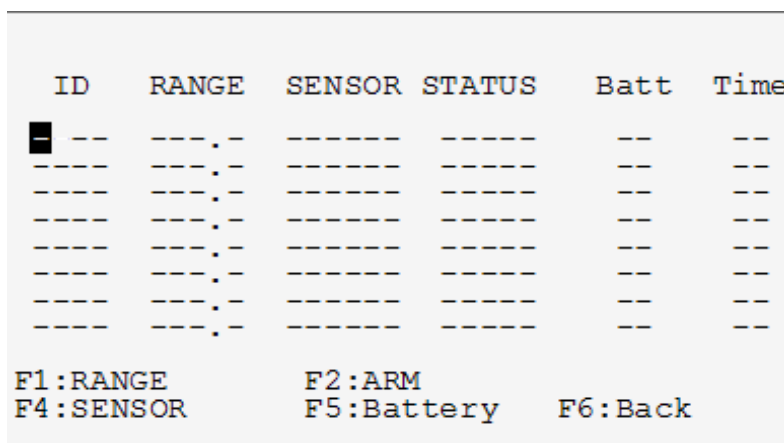
F1 Operation

To operate the 1450 Release beacons select F1 Operation:

i   Operation commands are performed with the REL-1450 Deployed and the 3190 Dunker.

```
   ID    RANGE   SENSOR STATUS    Batt   Time
  ▄ --   ---.-   ------  -----     --     --
  ----   ---.-   ------  -----     --     --
  ----   ---.-   ------  -----     --     --
  ----   ---.-   ------  -----     --     --
  ----   ---.-   ------  -----     --     --
  ----   ---.-   ------  -----     --     --
  ----   ---.-   ------  -----     --     --
  ----   ---.-   ------  -----     --     --

  F1:RANGE        F2:ARM
  F4:SENSOR       F5:Battery   F6:Back
```

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

Configuration:

Manually enter the ID of the REL-1450 in the ID column of the table, the PAM-3510 supports an array of 8 REL-1450s.

```
    ID    RANGE   SENSOR STATUS   Batt   Time

  2010   ---.-   ------ -----     --     --
  2020   ---.-   ------ -----     --     --
  2030   ---.-   ------ -----     --     --
  2040   ---.-   ------ -----     --     --
  2050   ---.-   ------ -----     --     --
  2060   ---.-   ------ -----     --     --
  2070   ---.-   ------ -----     --     --
  2080   ---.-   ------ -----     --     --

  F1:RANGE        F2:ARM
  F4:SENSOR       F5:Battery   F6:Back
```

Use cursor keys to select row.

Press ENTER to activate ID selection.

Use cursor keys to enter ID of 1450.

Press ENTER to deactivate ID selection.

```
   ID    RANGE

  2010   ---.-
         ---.-
  - - - -
```

Commands:

i The commands are sent to highlighted REL-1450 ID in the table, in the above screen REL-1450 ID 2010 will be commanded.

F1 RANGE Command

Press F1 to send, the range field is updated with the range to the REL-1450. The range is displayed in meters, the velocity of sound is set to 1500m/s by default. To change go to System configuration (F6 from Main Menu) then select RX TX Parameters (F2).

```
    ID    RANGE   SENSOR STATUS   Batt   Time

  2010   ---.-   ------ -----     --     --
  2020   ---.-   ------ -----     --     --
  2030   ---.-   ------ -----     --     --
  2040   115.5   ------ RESET     --     --
  2050   ---.-   ------ -----     --     --
  2060   ---.-   ------ -----     --     --
  2070   ---.-   ------ -----     --     --
  2080   ---.-   ------ -----     --     --

  F1:RANGE        F2:ARM
  F4:SENSOR       F5:Battery   F6:Back
```

F2 ARM Command

For the 1450 to operate it must first be armed. Press F2 to transmit command to the 1450 Release.

```
     ID    RANGE   SENSOR STATUS    Batt   Time

    2010   ---.-   ------  -----     --     --
    2020   ---.-   ------  -----     --     --
    2030   ---.-   ------  -----     --     --
    2040   115.5   ------  ARMED     --     56
    2050   ---.-   ------  -----     --     --
    2060   ---.-   ------  -----     --     --
    2070   ---.-   ------  -----     --     --
    2080   ---.-   ------  -----     --     --

    F1:RANGE       F2:ARM        F3:FIRE
    F4:SENSOR      F5:Battery    F6:Back
```

i The ARMED state of both the surface command unit and 1450 is limited to 60 seconds allowing the FIRE to be issued within this window. Upon time out the 1450 will requiring re-arming to FIRE, the FIRE command is also de-activated on the PAM requiring re-arming to activate.

F3 FIRE Command

To operate the switch release the 1450 Release requires arming first.

To initiate a Fire, press F3 to send the command within the ARM window of 60 seconds.

i The FIRE Command is not available until a valid ARM reply has been received from the 1439.

```
     ID    RANGE   SENSOR STATUS    Batt   Time

    2010   ---.-   ------  -----     --     --
    2020   ---.-   ------  -----     --     --
    2030   ---.-   ------  -----     --     --
    2040   115.5   ------  FIRED     --     56
    2050   ---.-   ------  -----     --     --
    2060   ---.-   ------  -----     --     --
    2070   ---.-   ------  -----     --     --
    2080   ---.-   ------  -----     --     --

    F1:RANGE       F2:ARM        F3:FIRE
    F4:SENSOR      F5:Battery    F6:Back
```

i If no reply received, Error is reported in the status field.

F4 Sensor Status

To check the status of the external sensor connected to the 1450 beacon press F4 to transmit the command.

```
  ID     RANGE   SENSOR STATUS     Batt   Time

 2010    ---.-   ------  -----      --     --
 2020    ---.-   ------  -----      --     --
 2030    ---.-   ------  -----      --     --
 2040    ---.-   CLOSED  RESET      --     --
 2050    ---.-   ------  -----      --     --
 2060    ---.-   ------  -----      --     --
 2070    ---.-   ------  -----      --     --
 2080    ---.-   ------  -----      --     --

F1:RANGE          F2:ARM        F3:FIRE
F4:SENSOR         F5:Battery    F6:Back
```

The sensor command will return the OPEN if there is no connection on the sensor switch and CLOSED if the sensor switch is connected.

F5 Battery Status

To check the status of the main electronics battery (Pack A) of the 1450 beacon press F5 to transmit the command.

```
  ID     RANGE   SENSOR STATUS     Batt   Time

 2010    ---.-   ------  -----      --     --
 2020    ---.-   ------  -----      --     --
 2030    ---.-   ------  -----      --     --
 2040    ---.-   ------  RESET      OK     --
 2050    ---.-   ------  -----      --     --
 2060    ---.-   ------  -----      --     --
 2070    ---.-   ------  -----      --     --
 2080    ---.-   ------  -----      --     --

F1:RANGE          F2:ARM        F3:FIRE
F4:SENSOR         F5:Battery    F6:Back
```

The battery command returns OK when the battery is >11.5V and LOW when the level is below 11.5V.

The nominal Pack A battery voltage is 12.6V (#REL-1450-3000)

i If no reply received, Error is reported in the Range and Action fields.

_____

F1 Diagnostics

The status of the REL 1450 can interrogated on deck in air with the test transducer.

```
           1450 Diagnostics
Command:- Get Release ID

Reply  :-

Status :-

Transducer:

F1: Send Command

F5: Main Menu          F6:  Back
```

Commands

Get Release ID: The REL 1450 its 4 digit ID

Test Transducer A: Checks the operation of Transducer A

Test Transducer B: Checks the operation of Transducer B

Get Com's Battery: Returns the battery voltage of com's battery

Get Firmware Revision: Returns the firmware revision

The status of the REL 1450 can interrogated on deck in air with the test transducer only.

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

F6 Pinger

The PAM Portable can report the acoustic results from a 669 series Pinger.

```
PAM Portable    Batt    %            14:22
-------------------------------------------
                  Pinger
       Gain: Low
  Threshold: Low
     Status :
       Found : x Ping   Per x Seconds
 F1: Searching:
 F5: Main Menu                F6:  Back
```

Set the Gain and Threshold and then press F1 to start searching.

'Status' will display 'Searching Please wait' while the PAM searches for the Pinger.

If a Pinger is found, the pings per second will be displayed.

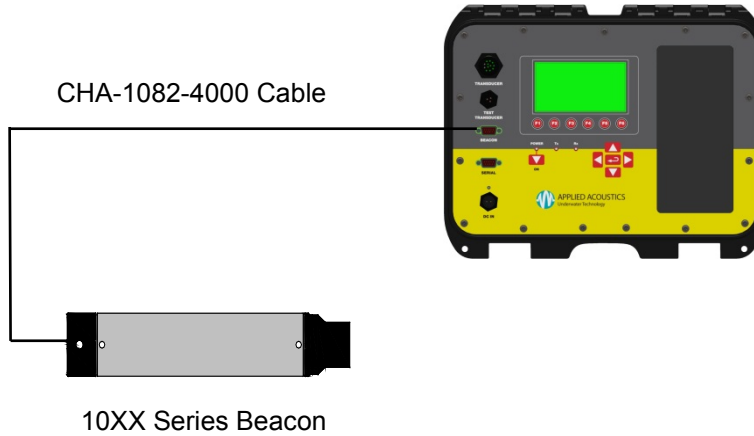If no Pinger is found, 'Status' will display 'No Pinger Found'

i   Searching can take up to 16s

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

F4 Beacon Configuration

The PAM Portable controls and configures the 1000 series Beacons using the Beacon serial port connection.

CHA-1082-4000 Cable

10XX Series Beacon

 Ensure the beacon is switch is the ON position and the battery pack is charged.

Press F1 to read the beacon's configuration. The fields are then updated:


```
PAM Portable  Batt      %              14:22
--------------------------------------------
              Beacon Configuration

  Mode     : AAE SS     Channel  :E1

  Model No: 1019        Serial No:2114258

  MCU Rev : 1.09        DSP Rev   :1.05

  Battery : 18.8v       Depth     :N/A

F1:Get Beacon           F2:Set Beacon

F3:Sonardyne WB         F5:Main Menu
```

Using the cursor keys the Mode and Channel of the beacon can be selected and confirmed by pressing return.

To set the beacon press F2 to send the configuration to the beacon.

 Depth functionality selection is only available where a pressure sensor is fitted to the beacon.

_____

_____

To configure a Sonardyne Wideband channel press F3.

```
PAM Portable   Batt   %          14:22
            Sonardyne Wideband
  ACA        : 47 01  [ xxxx ]

  Turnaround: 250.0ms     Int: MF9

  Quick Set : A1


F1:Get Beacon          F2:Set Beacon

F5:Main Menu           F6:Back
```

Using the cursors the Acoustic Command Address (ACA), Turnaround Time can be selected and confirmed by pressing the return key. Alternatively a Quick Set channel can be selected.

To set the beacon press F2 to send the configuration to the beacon.

i Remember, you must press F1 to get beacon settings before the on screen settings can be changed.

F5 Telemetry Functionality

Will not appear in menu unless function added

_____

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

F6 System Configuration

```
PAM Portable   Batt   %        14:22
            System Configuration

F1:  System Configuration

F2:  RxTx  parameters

F3:  Serial Comm's parameters

F4:  System Information/Upgrade

F5:  Diagnostics

F6:  Main Menu
```

F1 System Configuration

The system date and time can be set from this menu.

```
PAM Portable   Batt   %        14:22
         Date And Time Setup

    Day/Month/Year : xx / xx / xxxx

    Hour/Min       : xx : xx

    Back Light     : ON

F2: Set Time   F5: Main Menu  F6:  Back
```

The back light of the display can also be controlled from this menu.

i   In bright sun shine the back light can be switched off to aid viewing.

_____

_____

F2 Rx Tx Parameters

System parameters can be configured from this menu using the cursor keys to select and return key to confirm.

```
PAM Portable  Batt     %          14:22
----------------------------------------
         General Rx/Tx Parameters
     Tx Power           : Low
     Speed Of Sound     : 1500.0 m/s
     Sound Mode         : Tone
     Speaker Volume     : |--------
     Test Interval      : 1520 ms
F5: Main Menu               F6: Back
```

Transmit (Tx) Power (Dunker: High // Low

Speed of Sound (in Water):   300 to 1600 m/s

Enter the Velocity Of Sound (VOS) for transmission through water to be used in the range calculation. This is the mean velocity

Sound Mode (Speaker):   Tone // Received Signal

Speaker Volume: User specified level

Test Interval (Update Rate in ms): User specified 0 to 9999 ms

_____

F3 Serial Comm's Parameters

The system has 2 serial communication ports, these can be configured from this menu.

```
PAM Portable  Batt     %          14:22
----------------------------------------
     Serial Comunication configuration

   F1:  Beacon Comm's Setup

   F2:  Serial Comm's setup




   F5:  Main Menu        F6:  Back
```

```
PAM Portable  Batt     %          14:22
----------------------------------------
       Beacon Comunication Setup
   Baud Rate     :9600
   Data Bits     :8
   Stop Bits     :1
   Parity        :Off
   Function      :Beacon
 F5:  Main Menu       F6:  Back
```

Baud Rate: 200,2400,3600,4800,9600
14400,19200,28800,
38400,115200

Data Bits: 8 // 9

Stop Bits: 1 // 2

Parity: On // Off

Function: Beacon // GPS

ℹ️ Communications with 1000 series beacons are predefined at 9600, 8, n, 1 upon selection of Beacon.

```
PAM Portable  Batt     %          14:22
----------------------------------------
       Serial Comunication Setup
   Baud Rate     :115200
   Data Bits     :8
   Stop Bits     :1
   Parity        :Off
   Function      :External PC control
 F5:  Main Menu       F6:  Back
```

Baud Rate: 1200,2400,3600,4800,9600
14400,19200,28800,
38400,115200

Data Bits: 8 // 9

Stop Bits: 1 // 2

Parity: On // Off

Function: Test // Ranging // Ext PC
// Telemetry

F4 System Information / Upgrade

The system serial number and current firmware revisions are displayed.

```
PAM Portable  Batt    %         14:22
           System Information
F1: GUI Software Version :x.x.x

F2: DSP Software Version :x.xx

F3: ARM Software Version :x.xx

    PAM Serial Number    :xxxxxxxx

F1-F3: Upgrade        F4: Factory reset

F5: Option Code       F6: Back
```

To configure the system to receive a firmware update, connect serial cable to a PC running the PAM Programmer Application. (See Page 44)

Once PAM Programmer Application connected, re-navigate to above screen then press F1, F2 or F3 to select the update type. The following screen is then displayed, the serial port is opened and the firmware can be updated using the PAM Programmer application.

```
PAM Portable  Batt    %         14:22
-------------------------------------
           SYSTEM UPGRADE

 Serial Comms port is now open for
 upgrade data.

 After successful upgrade the unit
 will reset and turn back on.

 WARNING.
 Leaving this screen during upgrade
 will cause unpredictable results

F5:  Main Menu         F6:  Back
```

Do not power down the unit or leave the upgrade screen whilst programming.

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

To add an option to the system press F5. The following screen is then displayed:

```
PAM Portable   Batt   %        14:22
            Software Options

  Option: 01                [        ]

        Option              Enabled
  ┌─────────────────────────────────┐
  │ 01. Vnav                 Yes     │
  │ 02. Diagnostics          Yes     │
  │ 03. Compatt              No      │
  └─────────────────────────────────┘
 F1:Scroll UP  F2:Scroll Down

 F4:Upgrade    F5:Main Menu    F6:Back
```

Press F1/F2 to scroll through the software options available and to see which are enabled.
The above is an example only of the options available.

Press F4 to add an option; the following screen is displayed:

```
PAM Portable   Batt    %         14:22
          Upgrade Option Code

     Enter Option Code and press F1
              X xxxxxx

Status:


F1:   Validate Code

F5:   Main Menu        F6:  Back
```

Contact Applied Acoustics for the option code quoting the PAM Serial Number, current firmware revision and option required.
Enter the code supplied by Applied Acoustics and press F1.
The code will be validated with on screen messages informing of the progress.
 If the code is correct the software option will be added.
 Please note some options may require firmware / hardware updates and additional cost.

F5 Diagnostics

AAE Engineer option.
This is for troubleshooting problems and includes waveform and FFT captures of the local acoustics.

_____

PAM Programmer Application

Software Operation

The Pam Portable Programmer software can be used to update the PAM unit software, this includes the following:

- GUI Software
- ARM Software
- DSP Software

The software communicates with the PAM Portable via a serial interface and uses a one-to-one 9 way serial cable. Please connect this cable to the serial port labelled 'Serial' on the PAM Portable from an available port on your PC.

When the application is launched it will attempt to establish communication with the connected PAM unit.

Note: If the PAM is not detected please ensure the correct serial port is selected. To change the serial port select 'Com Port' from the main menu and select the correct COM port. Note that the selected port will be automatically saved and used when the software is next launched.

_____

The following window will be displayed
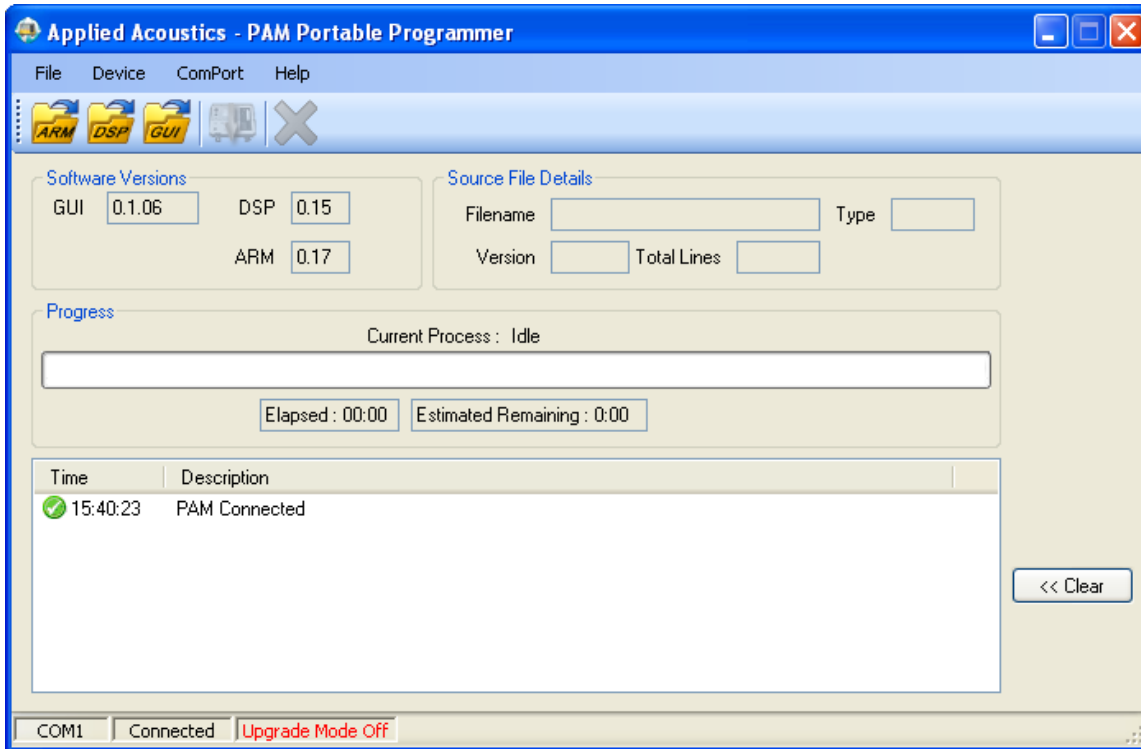
The window contains four areas.

Software Versions – this area will display the versions of software currently installed in the unit

Source File Details – this area will display information about the file that has been selected to update the PAM unit

Progress – this area will display information about the current progress of any operation selected

Events – this area displays system messages including information, warnings, errors and progress messages. The window may be cleared at any time by pressing the 'Clear' button.

_____

_____

Programming Procedure

Please ensure the PAM Portable is in upgrade mode before attempting to update the software in the unit. Enter upgrade mode detailed on page 43.

The current upgrade mode status is displayed in the status bar at the bottom of the window.

- Open the source file of the software you wish to update (either ARM, DSP of GUI) by pressing the relevant button on the toolbar. The open file window will show only the files relevant to the source file type selected. Once selected the information about the file selected will be displayed in the 'Source File Details' area as below
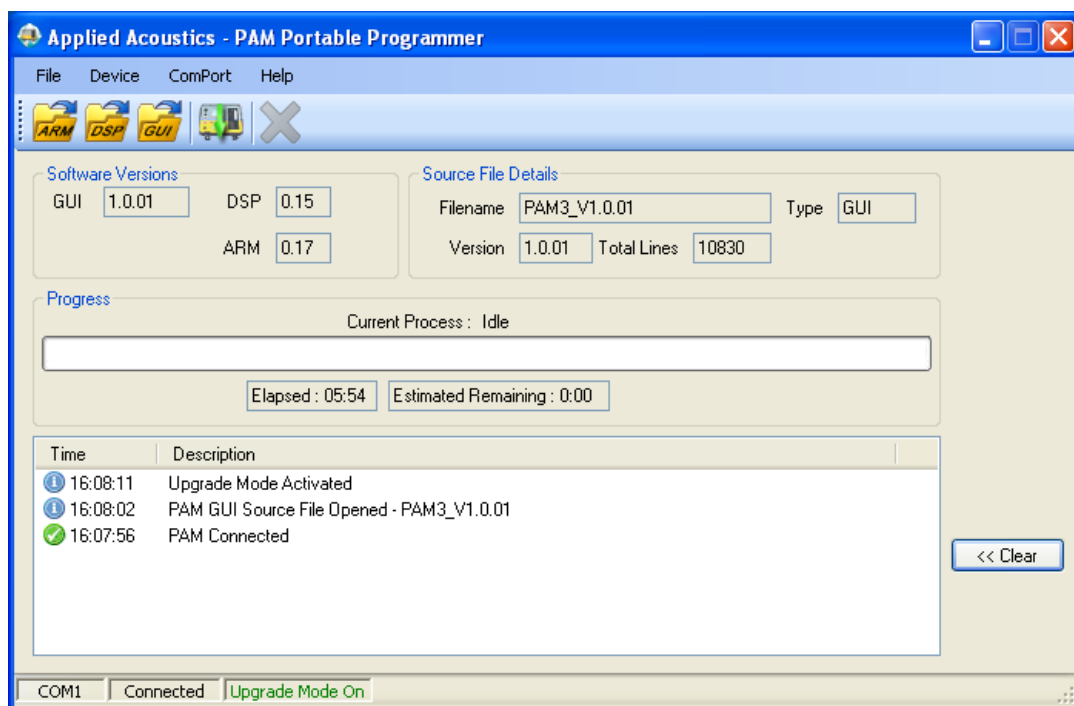
- To proceed with the programming press the 'Program PAM' button on the toolbar. Confirm you wish to program at the next confirmation prompt. If you are programming a version of software that is either older or the same as the currently installed version you will be presented with an extra confirmation as below
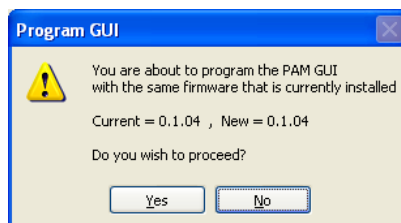
- If confirmed, programming will proceed with the following screen displayed

_____

_____
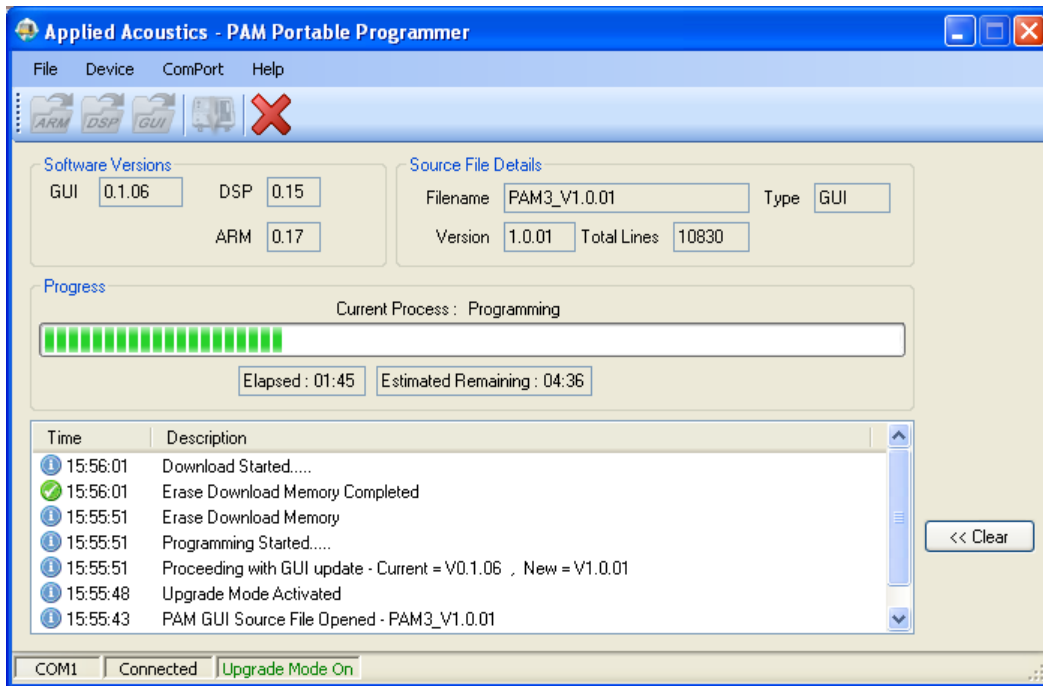
The progress and an estimated time to complete will be displayed along with various messages in the event window to show current progress.

Note: During this phase, the programming may be aborted if required.

- When the programming phase is complete the PAM unit will carry out an internal re-flash process and the automatically reset. During this phase the following screen will be displayed

_____
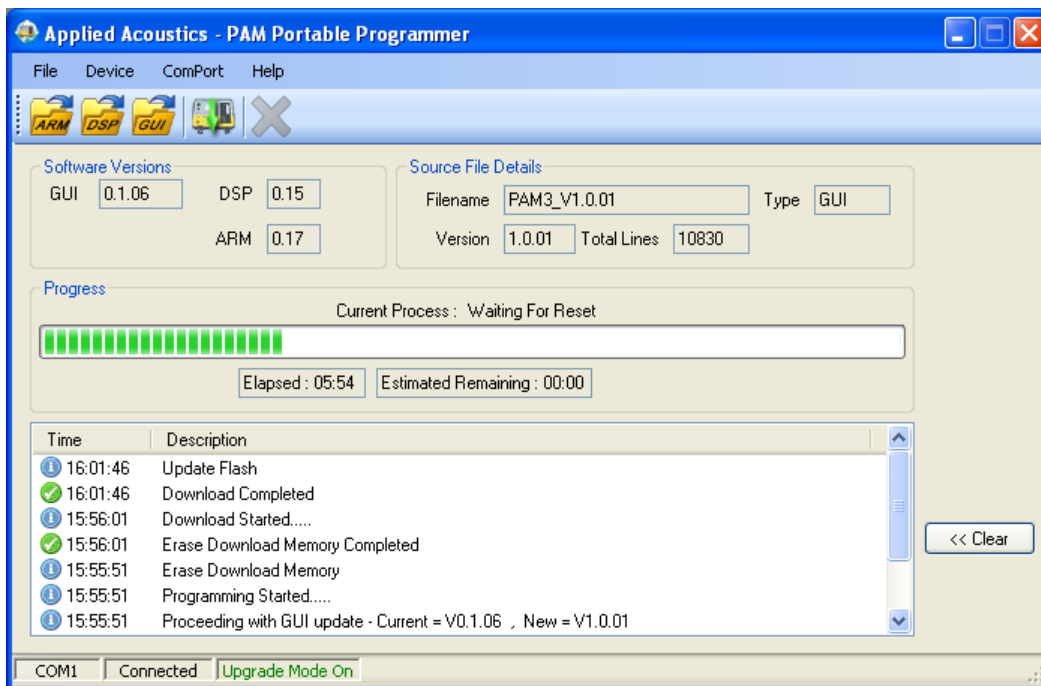
**This phase can take up to 90 seconds to complete**

It is critical that during this phase the unit must not be powered down or tampered with in any way. Failure to comply may result in the unit becoming unserviceable and would have to be returned to the factory for repair.

- After the unit is reset the unit will automatically power down to complete the programming, as shown in the screen below

_____
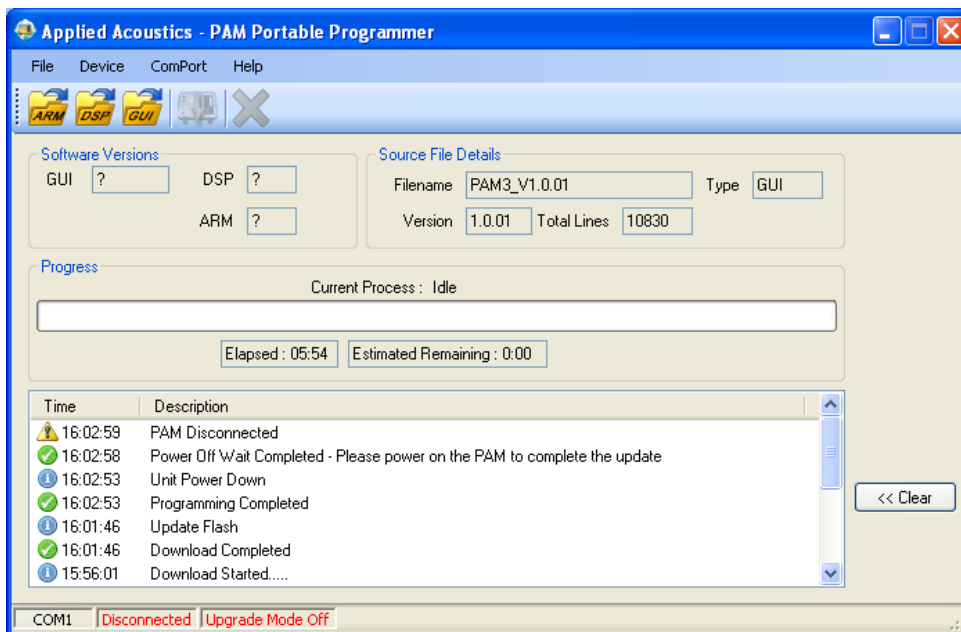
- Power the PAM back on and confirm all software revisions are correct, as below
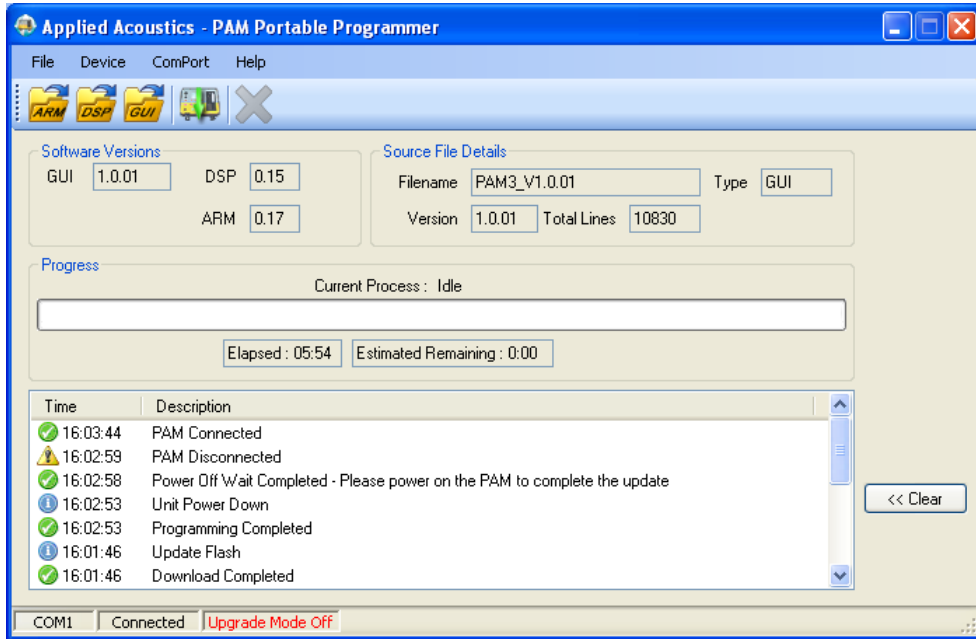
- This completes the programming process

ⓘ　Remember to disconnect the serial cable after confirming software revision.

_____

_____

5. Handling

There are no special handling conditions with this product.

For beacons, please see their specific manuals.

6. End of Life Recycling / Disposal

Within the EU all electronic components and batteries must be taken for separate collection at the end of their working life under EU WEEE directives. Applied Acoustics as a manufacturer within the EU will responsibly dispose of any returned end of life Applied Acoustics components / batteries through a registered WEEE scheme. In order to prevent uncontrolled waste disposal and promote re-cycling please return any end of life Applied Acoustic components postage paid by sender to our UK head office. Please contact Tech Support for a RMA number prior to shipping.

7. Spares

The following spare peripherals are available from stock. Spare parts for system repairs are available; please contact our technical support team.

Description	Part Number
1000 Series Beacon Serial Interface Cable	CHA-1082-4000
PAM Portable Test Transducer	PAM-3102-7000
PAM Portable 24VDC Adaptor	PAM-3510-4007
PAM Portable NiMH battery pack	PAM-3510-4005
3190 Dunker Transducer	DKR-3190-7004

_____

8. Troubleshooting

FAULT / SYMPTOM	No Power light on the front panel.
POSSIBLE CAUSES	**The Power supply.** Is there power to the socket? The Power supply is not plugged in, or the Wall socket, or not switched on. **Internal Battery.** Battery flat connect the DC power supply and allow to charge for 1 hour.

FAULT / SYMPTOM	No Signal return at any range
POSSIBLE CAUSES	**Incorrect Channel.** Check Beacon editor **Beacon TX power.** This may be due to a discharged battery, fouled transducer, or beacon fault. Try with a known working beacon. **Obstruction.** The beacon's signal may be blocked by submerged parts of the vessel, seabed objects – manmade or natural. **Deck Cable.** Check that the deck cable or connectors have not been damaged. Look for cuts, splits or abrasions. Check there is no corrosion on the connector pins. **Damaged responder cable**. Check the pulse from Nexus is present at the Responder end of the cable (approx 12VDC pulse on load). **Confirmation**. Temporarily locate the transducer and a suitable beacon on-deck. Try interrogating the beacon. Is the transducer transmitting (clicking)? Is the beacon transmitting (clicking)? No, try another transducer / beacon. Is Easytrak Nexus receiving the beacon's transmission? If there is still no response the transducer is suspect.

FAULT / SYMPTOM	Incorrect Range
POSSIBLE CAUSES	**Incorrect Velocity of Sound.** Enter correct value. **Turn around delay.** Is the turnaround delay set correctly in the beacon? Correct turn around delay. Another beacon in the water set to the same channel. Another sonar system transmitting at the beacon's reply frequency.

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

_____

FAULT / SYMPTOM	Short range
POSSIBLE CAUSE	**Excessive range for conditions.** Range is dependent on local conditions such as in-band noise from man-made or marine sources. If possible reduce noise or work at a shorter range. **Beacon reply insensitivity.** This may be due to a fouled transducer, or beacon fault. Clean beacon transducer with fresh water. Try using another beacon. **Transducer reply insensitivity.** Check that the transducer is not damaged or fouled. Clean transducer with fresh water. **Obstruction.** The beacon's signal may be blocked by submerged parts of the vessel, seabed objects – man-made and natural. Bubbles of air and gas produced by the vessel's propeller. **Thermoclines.** This is due to abrupt changes of velocity of sound in water due to variances of water temperature and / or salinity. The effect of this can be to 'tunnel' or bend the acoustic signal away from either the target or the transducer. If possible try adjusting the height of the transducer in the water.

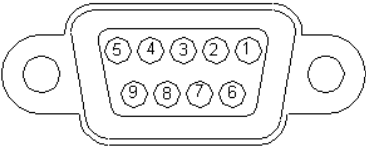| FAULT / SYMPTOM	Unstable communications
POSSIBLE CAUSES	**Transducer depth.** Transducer may not be deep enough in the water. It is recommended the transducer be below the draft of the vessel by at least 1 metre. **Interrogation rate too fast.** If the interrogation rate is too quick, it is possible that reflections from previous signals may not have reduced sufficiently, and are picked up first rather than the new signal. **Multipath interference.** This may be due to multipath interference away from the transducer e.g. pipelines, underwater structures, and thermoclines. If the sea is flat calm, it is common for the water / air interface to give strong reflections. If possible try adjusting the height of the transducer in the water. **Acoustic noise.** The noise can be vessel borne such as from the propeller (try running at different revs), sonar systems (try synchronising so that the sonar's transmission does not overlap Easytrak's receive time. It is known in certain parts of the world for marine animals to generate quite loud acoustic noise. **Electrical noise.** This can be conducted or radiated from generators, welding kits, radio communications, sonar systems etc. If possible, switch off equipment one system at a time until the offending piece of equipment can be identified.

_____
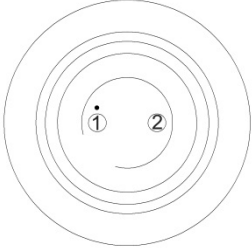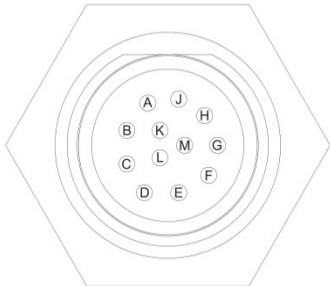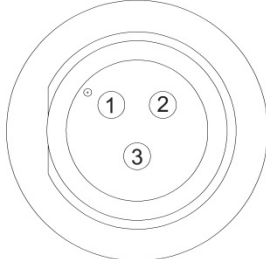
Battery Replacement

We recommend a maximum 3 year life for re-chargeable packs.
3510 Series Mini NiMH Battery Pack   14 cells at 1.2V / cell = 16.8V.

NOTE: - Ensure that replacement battery packs are the same as the original type and complete the battery pack information label. Refer to the label on the old pack.

9. External I/O Connector Pin Outs

• **SERIAL CONNECTORS** 2 Receive Data (Rx) 3 Transmit Data (Tx) 5 Ground	
• **DC POWER CONNECTOR** 1 +24v 2 Ground	
• **DUNKER CONNECTOR** A TX + B TX - C TX Screen D Gain Screen E Gain + F Gain - G RX - H RX + J RX Screen K 0V L -12VDC M +12VDC	
• **TEST TRANSDUCER** 1 +Transmit 2 No Connection 3 - Transmit	

---

10. Data Output format

APPLIED ACOUSTIC ENGINEERING RANGE DATA STRING

Beacon # Range = rrrr.r M Depth = dddd.d M CL

Beacon identification (1 to 4)	#
Range in meters	r
Depth in meters	d
Carriage return (CR)	C
Line Feed (LF)	L

APPLIED ACOUSTIC ENGINEERING TEST DATA STRING

Beacon # TAT = ttt.t ms Frequency = fffff.f Hz PW = pp.p ms CL

Beacon identification (1 to 4)	#
TAT (Turnaround Time) in ms	t
Frequency (Reply Frequency) in Hz	f
PW (Reply Pulse Width) in ms	f
Carriage return (CR)	C
Line Feed (LF)	L

Note fields are 'space' separated.

Example strings

"Range" string

    Beacon 1 1011.1 M Depth = 525.5 M

"Test" string

    Beacon 1 TAT = 30.1 ms Frequency = 28409.0 Hz PW = 10.0 ms

_____

11. System Specification

Pam Portable Model 3510

Dimensions	Width 390mm x Height 310mm x Depth 170mm Weight 6 kg (Inc peripherals)
Power requirements	24VDC at 1A AC Adaptor 90 – 250 VAC at 250 VA maximum.
Internal Battery	16.8V 3.3A/h NiMH (Charge time 12 Hours)
Front panel Indicators	LED indicators for power and TX // RX status.
Serial Communications	2 x RS-232 Ports All RS232C inputs must comply with EIA (Electronics Industry Association) RS232C standard.
GPS / DGPS Input	NMEA; GLL, GGA, RMC
Responder Output Positive	12v pulse 5mS long

Accuracy / Performance

Accuracy is based on the correct speed of sound being entered, no ray bending and an acceptable S/N ratio

Slant Range accuracy	10 cm. (Accuracy dependent on correct speed of sound)
Frequency Band (MF)	Reception 22 - 30 kHz Transmission 17 – 26 kHz Transmitter Nominally 190 dB SPL
Frequency Band (LF)	10 - 18 kHz Transmitter Nominally 192 dB SPL
Tracking Beam Pattern	> Hemispherical
Beacon Types	Transponders and Responders Digital Depth Transponders AAE Release and Telemetry beacons
Interrogation Rate	Internally set or by external control

Environment

Operating Temperature	0 to 30°C
Storage Temperature	-5 to 45°C

E2270 Variant

Operating Temperature	-10 to 40°C
Storage Temperature	-15 to 45°C

_____

_____

Compatibility

Test and Configuration of AAE 1000 Series Spread Spectrum beacons

AAE 1200, 1300, 900, 300, 200 Series beacon testing

AAE 529, 559, 1439, 1500 Release Beacon

AAE VNAV 1400 Beacon

IXBlue (Option)

Sonardyne Wideband™ 1 beacon testing

HPR and HiPAP compatible beacon testing

COMPATT IV Functionality (Option)

669-138 Pinger

Transducer Model 3190

Material	Stainless Steel
Size	276.5 mm long x 100 mm diameter
Weight	7.2Kg (not inc cable)
Depth Rating	30 meters
Power requirements	Powered from Console.
Transducer	Multi-element transducer head molded in polyurethane

Transducer Model 3191

Material	Anodized Aluminum
Size	376.0 mm long x 181 mm diameter
Weight	8.7Kg (not inc cable)
Depth Rating	30 meters
Power requirements	Powered from Console.

_____

Transducer Model 3190/1 Integrated Cable

Diameter	12.8 mm nominal
Length	20 – 60 meter standard lengths
Colour	Yellow - Connector Supplied
SWL	20 kg (Allows Transducer to be deployed from cable)

System externally assessed for immunity and emissions; conforms to 89/336/EEC.

RoHS compliant

Note: Specification is subject to change without notice

Appendix A – Transducer Mounting Bracket A

172.40

10.00

Ø152.40

4 x Ø17.50
ON A 114.30 PCD
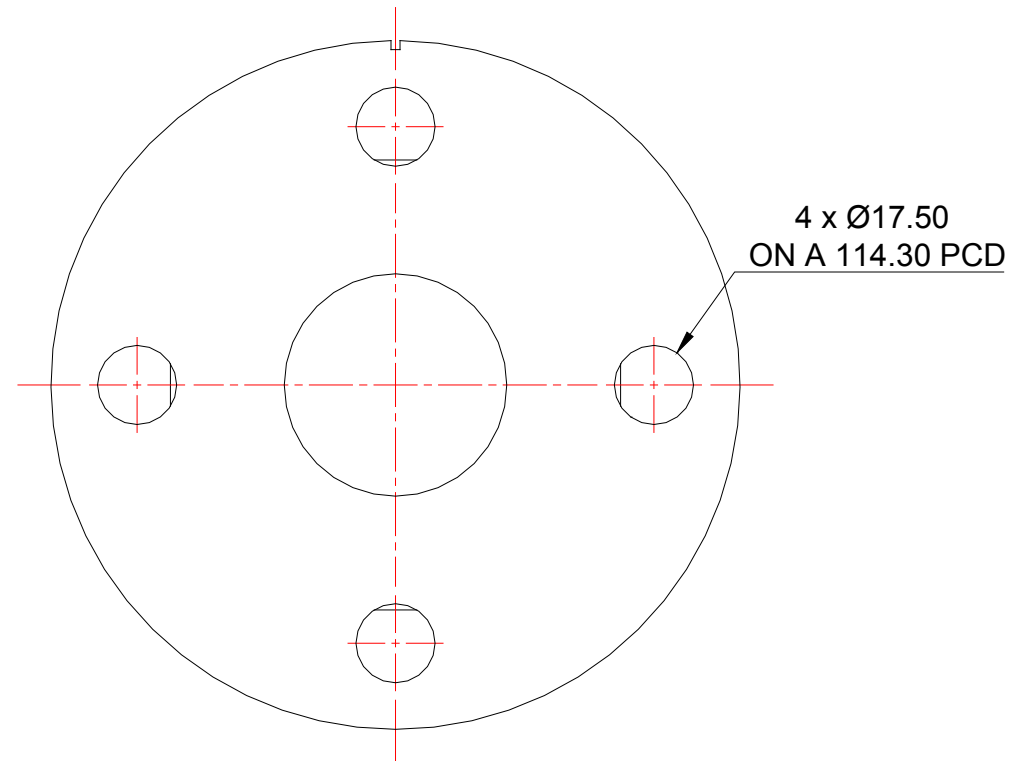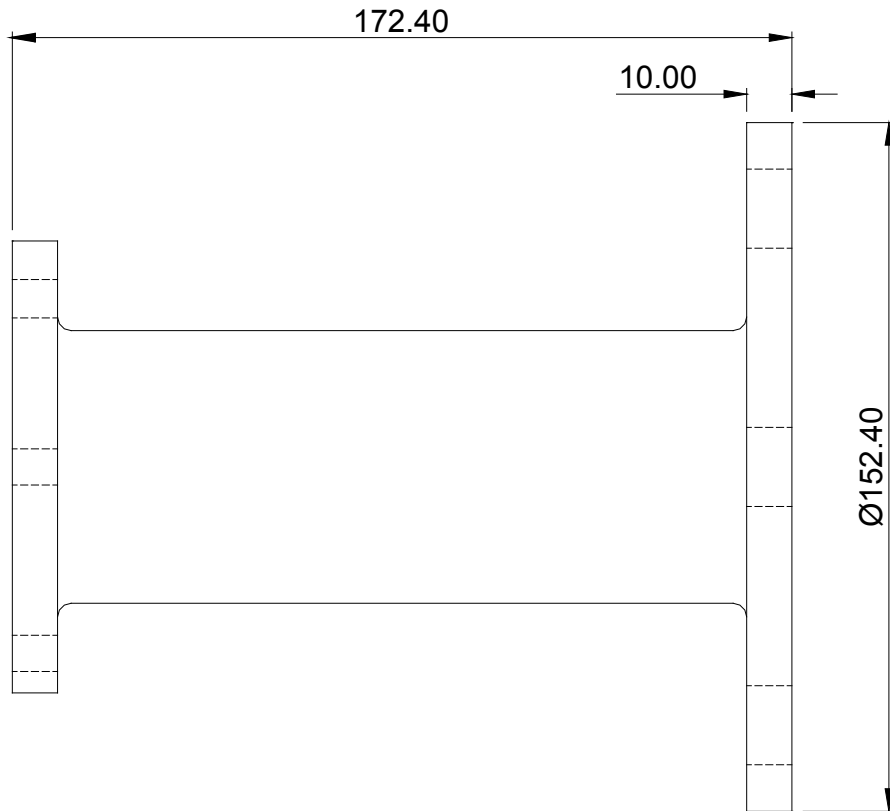
Appendix B – Transducer Mounting Bracket B

M12 CLEARANCE

152.00

89.00

131.00

Ø102.00

495.00 ±5.00mm
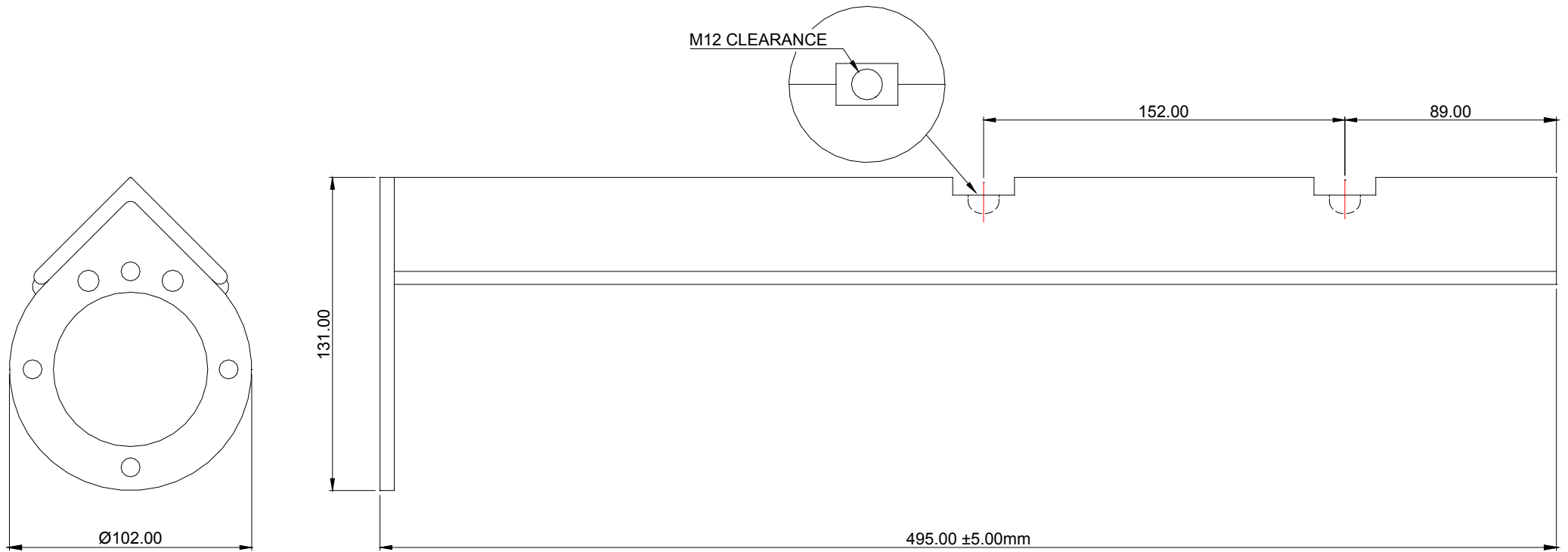
Appendix C – Model 3190 Transducer Mounting Dimensions
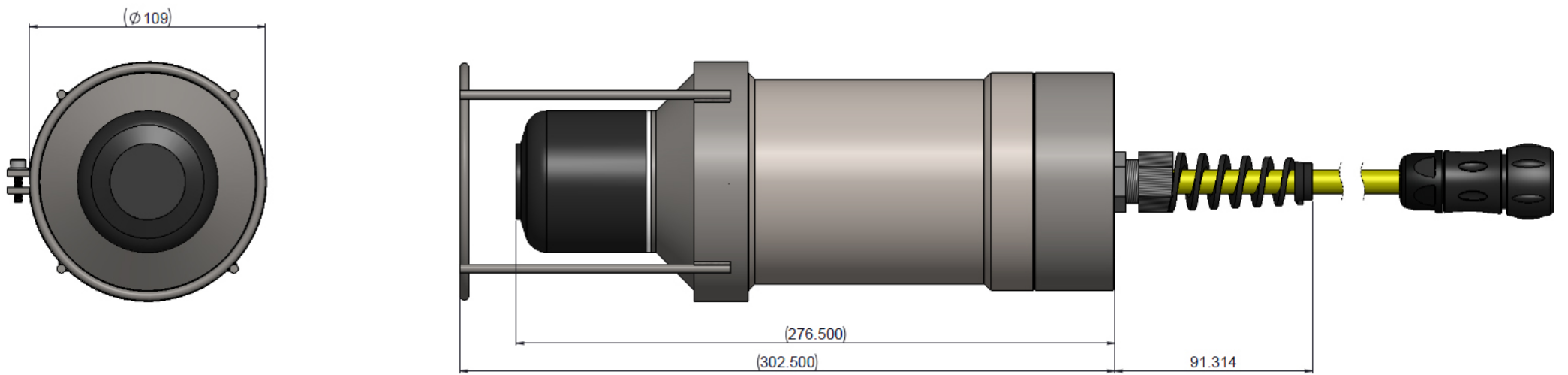
Appendix D – Model 3191 LF Transducer Mounting Dimensions

(Ø181)

(333)

(376)

91

Appendix E - Compatible Channels

AAE Spread Spectrum Channels

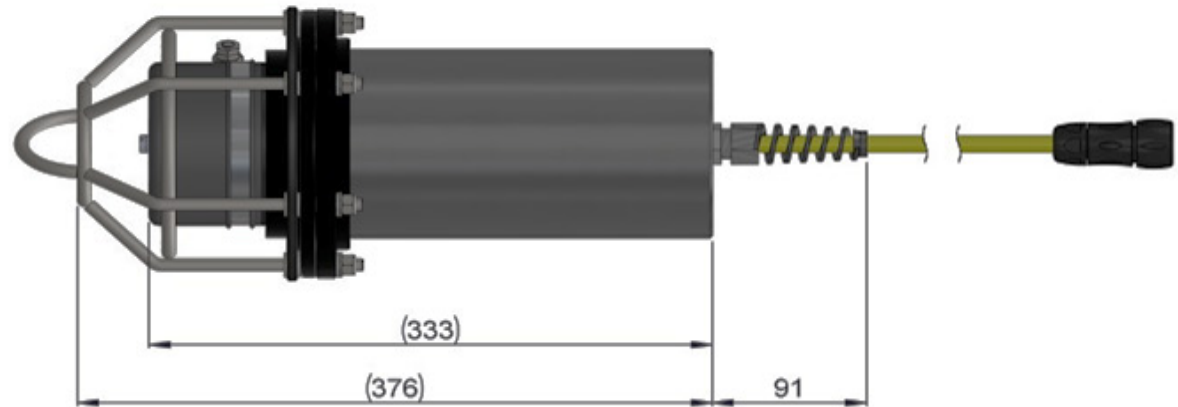| ID	Channel	Transponder TAT (ms)	Responder TAT (ms)	Description
E0	SS CH 0	100	100	AAE Spread Spectrum
E1	SS CH 1	100	100	AAE Spread Spectrum
E2	SS CH 2	100	100	AAE Spread Spectrum
E3	SS CH 3	100	100	AAE Spread Spectrum
E4	SS CH 4	100	100	AAE Spread Spectrum
E5	SS CH 5	100	100	AAE Spread Spectrum
E6	SS CH 6	100	100	AAE Spread Spectrum
E7	SS CH 7	100	100	AAE Spread Spectrum
E8	SS CH 8	100	100	AAE Spread Spectrum
E9	SS CH 9	100	100	AAE Spread Spectrum
EA	SS CH 10	100	100	AAE Spread Spectrum
EB	SS CH 11	100	100	AAE Spread Spectrum
EC	SS CH 12	100	100	AAE Spread Spectrum
ED	SS CH 13	100	100	AAE Spread Spectrum
EE	SS CH 14	100	100	AAE Spread Spectrum
EF	SS CH 15	100	100	AAE Spread Spectrum
F0	SS CH 16	100	100	AAE Spread Spectrum
F1	SS CH 17	100	100	AAE Spread Spectrum
F2	SS CH 18	100	100	AAE Spread Spectrum
F3	SS CH 19	100	100	AAE Spread Spectrum
F4	SS CH 20	100	100	AAE Spread Spectrum
F5	SS CH 21	100	100	AAE Spread Spectrum
F6	SS CH 22	100	100	AAE Spread Spectrum
F7	SS CH 23	100	100	AAE Spread Spectrum
F8	SS CH 24	100	100	AAE Spread Spectrum
F9	SS CH 25	100	100	AAE Spread Spectrum
FA	SS CH 26	100	100	AAE Spread Spectrum
FB	SS CH 27	100	100	AAE Spread Spectrum
FC	SS CH 28	100	100	AAE Spread Spectrum
FD	SS CH 29	100	100	AAE Spread Spectrum
FE	SS CH 30	100	100	AAE Spread Spectrum
FF	SS CH 31	100	100	AAE Spread Spectrum

Digital Depth telemetry available if depth sensor fitted to beacon

AAE Easytrak Channels

Channel	RXF1 (Hz)	RXF2 (Hz)	TXF1 (Hz)	TXF2 (Hz)*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
A0	17500	-	30000	29000	30	30	2
A1	18500	-	28000	27000	30	30	2
A2	19500	-	26000	25000	30	30	2
A3	20500	-	29000	28000	30	30	2
A4	21500	-	27000	26000	30	30	2
A5	22500	-	30000	29000	30	30	2
A6	18000	20000	27000	26000	60	30	2
A7	18000	21000	28000	27000	60	30	2
A8	18000	22000	30000	29000	60	30	2
A9	18000	23000	29000	28000	60	30	2
B0	20000	18000	30000	29000	60	30	2
B1	20000	21000	29000	28000	60	30	2
B2	20000	22000	28000	27000	60	30	2
B3	21000	18000	27000	26000	60	30	2
B4	21000	20000	26000	25000	60	30	2
B5	21000	22000	28000	27000	60	30	2
B6	21000	23000	30000	29000	60	30	2
B7	22000	18000	26000	25000	60	30	2

*Depth telemetry transponders only.

Simrad HPR Channels

Channel	Simrad Channel	RXF1 (Hz)	TXF1 (Hz)	TXF2 (Hz)*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
01	1	20492	29762	32468	30	30	10
02	2	21552	30488	29762	30	30	10
03	3	22124	31250	30488	30	30	10
04	4	22727	31847	31250	30	30	10
05	5	23364	32468	31847	30	30	10
06	6	24038	27173	29070	30	30	10
07	7	24510	27777	27173	30	30	10
08	8	25000	28409	27777	30	30	10
09	9	26042	29070	28409	30	30	10
11	11 Square	21552	27173	32468	30	30	10
22	22 Circle	22727	28409	27173	30	30	10
33	33 Delta	23923	29762	28409	30	30	10
44	44 X	25126	31250	29762	30	30	10
55	55 Y	26455	32468	31250	30	30	10

*Depth telemetry transponders only.

Simrad HiPAP Channels

Channel	RXF1 (Hz)	RXF2 (Hz)	TXF1 (Hz)	TXF2 (Hz)*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
12	21000	21500	29250	29750	60	30	10
13	21000	22000	29750	30250	60	30	10
14	21000	22500	30250	28750	60	30	10
15	21000	23000	30750	27250	60	30	10
16	21000	23500	27250	27750	60	30	10
17	21000	24000	27750	28250	60	30	10
18	21000	24500	28250	30750	60	30	10
21	21500	21000	28500	29000	60	30	10
23	21500	22000	29500	30000	60	30	10
24	21500	22500	30000	28500	60	30	10
25	21500	23000	30500	27000	60	30	10
26	21500	23500	27000	27500	60	30	10
27	21500	24000	27500	28000	60	30	10
28	21500	24500	28000	30500	60	30	10
31	22000	21000	28750	29250	60	30	10
32	22000	21500	29250	29750	60	30	10
34	22000	22500	30250	28750	60	30	10
35	22000	23000	30750	27250	60	30	10
36	22000	23500	27250	27750	60	30	10
37	22000	24000	27750	28250	60	30	10
38	22000	24500	28250	30750	60	30	10
41	22500	21000	28500	29000	60	30	10
42	22500	21500	29000	29500	60	30	10
43	22500	22000	29500	30000	60	30	10
45	22500	23000	30500	27000	60	30	10
46	22500	23500	27000	27500	60	30	10
47	22500	24000	27500	28000	60	30	10
48	22500	24500	28000	30500	60	30	10
51	23000	21000	28750	29250	60	30	10
52	23000	21500	29250	29750	60	30	10
53	23000	22000	29750	30250	60	30	10
54	23000	22500	30250	28750	60	30	10
56	23000	23500	27250	27750	60	30	10
57	23000	24000	27750	28250	60	30	10
58	23000	24500	28250	30750	60	30	10
61	23500	21000	28500	29000	60	30	10
62	23500	21500	29000	29500	60	30	10
63	23500	22000	29500	30000	60	30	10
64	23500	22500	30000	28500	60	30	10
65	23500	23000	30500	27000	60	30	10
67	23500	24000	27500	28000	60	30	10
68	23500	24500	28000	30500	60	30	10

Simrad HiPAP Channels Continued

Channel	RXF1 (Hz)	RXF2 (Hz)	TXF1 (Hz)	TXF2 (Hz)*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
71	24000	21000	28750	29250	60	30	10
72	24000	21500	29250	29750	60	30	10
73	24000	22000	29750	30250	60	30	10
74	24000	22500	30250	28750	60	30	10
75	24000	23000	30750	27250	60	30	10
76	24000	23500	27250	27750	60	30	10
78	24000	24500	28250	30750	60	30	10
81	24500	21000	28500	29000	60	30	10
82	24500	21500	29000	29500	60	30	10
83	24500	22000	29500	30000	60	30	10
84	24500	22500	30000	28500	60	30	10
85	24500	23000	30500	27000	60	30	10
86	24500	23500	27000	27500	60	30	10
87	24500	24000	27500	28000	60	30	10

IXBlue

Firmware and option permitting.

The Interrogate Frequency is selectable from 19.5kHz to 21.0kHz in 0.5kHz steps.

The Reply Code is selectable from 00 to 09, 22 & 23 for a total of 12 codes.

Turn-Around-Time is selectable from 20 milliseconds to 200 milliseconds in 1 millisecond steps.

ORE Trackpoint Channels

Channel	LXT Channel	RXF1 (Hz)	TXF1 (Hz)	TXF2 (Hz)*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
0A		18000	24000	23000	15	15	1.5
0B		17000	24000	23000	15	15	1.5
00	LXT Code 1	17000	23000	22000	15	15	1.5
09		18000	25000	24000	15	15	1.5
1A		16000	25000	24000	15	15	1.5
1B		21500	26000	25000	15	15	1.5
20	LXT Code 2	19000	25000	24000	15	15	1.5
29		18000	26000	25000	15	15	1.5
2A		17500	28500	27500	15	15	1.5
2B		18500	26500	25500	15	15	1.5
30	LXT Code 3	17000	27000	26000	15	15	1.5
40	LXT Code 4	19000	29000	28000	15	15	1.5
50	LXT Code 5	17000	30000	29000	15	15	1.5
60		18000	28000	27000	15	15	1.5
69		16000	23000	22000	15	15	1.5
6A		18000	23000	22000	15	15	1.5
6B		20500	23000	22000	15	15	1.5
70		18000	30000	29000	15	15	1.5
79		17000	24000	23000	15	15	1.5
7A		19000	24000	23000	15	15	1.5
7B		17000	25000	24000	15	15	1.5
80		21000	29000	28000	15	15	1.5
89		17000	26000	25000	15	15	1.5
8A		21000	33000	32000	15	15	1.5
8B		18000	31000	30000	15	15	1.5

Sonardyne Wideband™

10XX Beacon Firmware permitting, the PAM Portable can configure the 1000 series beacons for operation with Sonardyne Wideband™.

The Interrogate Channel is selectable from CIF and MF0 to MF14 for a total of 16 channels.

The Acoustic Command Address, comprised of 4 decimal digits, is selectable from 0101 to 1514 and 3301 to 4714 for a total of 420 command addresses.

Turn-Around-Time is selectable from 62.5 milliseconds to 875.0 milliseconds in 62.5 millisecond steps.

Quickset schemes A1 to C3 are selectable for a total of 9 schemes using 1082 Smart Switch.

Sonardyne Wideband™ is a registered trademark of Sonardyne International Ltd
ADP Number 0880985001

AAE LF Channels

Channel	RXF1 (Hz)	TXF1 (Hz)	TXF2 (Hz)*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
17	10000	12000	11000	30	30	10
18	10000	13000	12000	30	30	10
19	10000	14000	13000	30	30	10
1A	10000	15000	14000	30	30	10
1B	10000	16000	14000	30	30	10
37	11000	13000	12000	30	30	10
38	11000	14000	12500	30	30	10
39	11000	15000	13500	30	30	10
3A	11000	16000	15000	30	30	10
57	12000	14000	13000	30	30	10
58	12000	15000	14000	30	30	10
59	12000	16000	15000	30	30	10
6A	14000	13000	12000	30	30	10
6B	14000	12000	11000	30	30	10
71	15000	14000	13000	30	30	10
72	15000	13000	12000	30	30	10
73	15000	12000	11000	30	30	10
75	16000	14000	13000	30	30	10
76	16000	13000	12000	30	30	10
77	16000	12000	11000	30	30	10

*Model 6xxD depth telemetry transponders only.

HPR1507 LF Channels

Channel	RXF1	TXF1	TXF2*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
0 1	9.901 kHz	13.158 kHz	15.158kHz	30	30	10
0 2	10.309 kHz	13.587 kHz	15.587kHz	30	30	10
0 3	10.707 kHz	14.045 kHz	16.045kHz	30	30	10
0 4	11.111 kHz	14.451 kHz	16.451kHz	30	30	10
0 5	11.547 kHz	14.881 kHz	16.881kHz	30	30	10

*Model 6xxD depth telemetry transponders only.

HPR4 LF Channels

Channel	RXF1	RXF2	TXF1	TXF2*	Transponder TAT (ms)	Responder TAT (ms)	Pulse Width (ms)
1 2	10.00 kHz	10.50 kHz	13.75 kHz	15.75 kHz	60	30	10
1 3	10.00 kHz	11.00 kHz	14.25 kHz	16.25 kHz	60	30	10
1 4	10.00 kHz	11.50 kHz	14.75 kHz	16.75 kHz	60	30	10
1 5	10.00 kHz	12.00 kHz	15.25 kHz	17.25 kHz	60	30	10
1 6	10.00 kHz	12.50 kHz	15.75 kHz	17.75 kHz	60	30	10
2 1	10.50 kHz	10.00 kHz	13.00 kHz	15.00 kHz	60	30	10
2 3	10.50 kHz	11.00 kHz	14.00 kHz	16.00 kHz	60	30	10
2 4	10.50 kHz	11.50 kHz	14.50 kHz	16.50 kHz	60	30	10
2 5	10.50 kHz	12.00 kHz	15.00 kHz	17.00 kHz	60	30	10
2 6	10.50 kHz	12.50 kHz	15.50 kHz	17.50 kHz	60	30	10
3 1	11.00 kHz	10.00 kHz	13.25 kHz	15.25 kHz	60	30	10
3 2	11.00 kHz	10.50 kHz	13.75 kHz	15.75 kHz	60	30	10
3 4	11.00 kHz	11.50 kHz	14.75 kHz	16.75 kHz	60	30	10
3 5	11.00 kHz	12.00 kHz	15.25 kHz	17.25 kHz	60	30	10
3 6	11.00 kHz	12.50 kHz	15.75 kHz	17.75 kHz	60	30	10
4 1	11.50 kHz	10.00 kHz	13.00 kHz	15.00 kHz	60	30	10
4 2	11.50 kHz	10.50 kHz	13.50 kHz	15.50 kHz	60	30	10
4 3	11.50 kHz	11.00 kHz	14.00 kHz	16.00 kHz	60	30	10
4 5	11.50 kHz	12.00 kHz	15.00 kHz	17.00 kHz	60	30	10
4 6	11.50 kHz	12.50 kHz	15.50 kHz	17.50 kHz	60	30	10
5 1	12.00 kHz	10.00 kHz	13.25 kHz	15.25 kHz	60	30	10
5 2	12.00 kHz	10.50 kHz	13.75 kHz	15.75 kHz	60	30	10
5 3	12.00 kHz	11.00 kHz	14.25 kHz	16.25 kHz	60	30	10
5 4	12.00 kHz	11.50 kHz	14.75 kHz	16.75 kHz	60	30	10
5 6	12.00 kHz	12.50 kHz	15.75 kHz	17.75 kHz	60	30	10
6 1	12.50 kHz	10.00 kHz	13.00 kHz	15.00 kHz	60	30	10
6 2	12.50 kHz	10.50 kHz	13.50 kHz	15.50 kHz	60	30	10
6 3	12.50 kHz	11.00 kHz	14.00 kHz	16.00 kHz	60	30	10
6 4	12.50 kHz	11.50 kHz	14.50 kHz	16.50 kHz	60	30	10
6 5	12.50 kHz	12.00 kHz	15.00 kHz	17.00 kHz	60	30	10

*Model 6xxD depth telemetry transponders only.

Index

EQA
European Quality Assurance

UKAS
MANAGEMENT
SYSTEMS
047

Registration No. U6447
BS: EN: ISO9001

APPLIED ACOUSTICS
Underwater Technology
An AAE Technologies Group Company

Due to continual product improvement, specification information may be subject to change without notice.