



**APPLIED ACOUSTICS**  
Underwater Technology

## **PAM 2520 – OPERATING MANUAL**

**PAM-2540-8000/1**





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# 1 Introduction

The 'PAM' AAE Model 2520 tester charger has been designed to carry out a number of sub-sea acoustic tasks. The basic version allows the testing and charging of a wide variety of beacons.

The applications which have been included in the basic PAM software are as follows:

- Charging AAE beacons and some other manufactures beacons.
- Basic testing of beacons.
- Four channel ranging functions.
- AAE 669-138 Pinger receiver.
- AAE Release Functions.
- 4 target Depth Telemetry (Analogue).

The PAM can be used for other applications as optional extras. These include the following:

- Command of Simrad MPT/SPT Transponders.
- AAE Acoustic Telemetry functions.
- Altimeter functions.
- Sonardyne Compatt Commands
- Other customised functions.

Update software can now be emailed for remote upgrade. Please contact the factory.

## 2. Unpacking and Setting Up

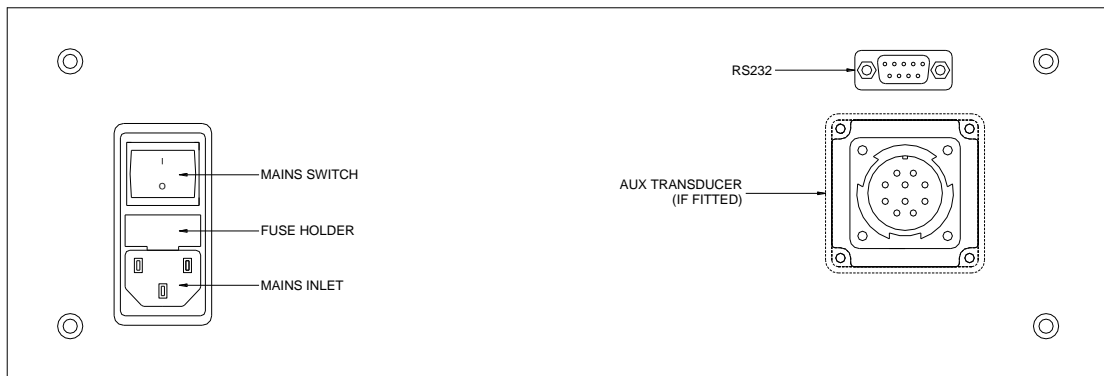
### 2.1 System Contents

The PAM unit consists of the following items:

- PAM Model 2520
- Mains Lead
- Responder / Charger lead (optional)
- This Manual

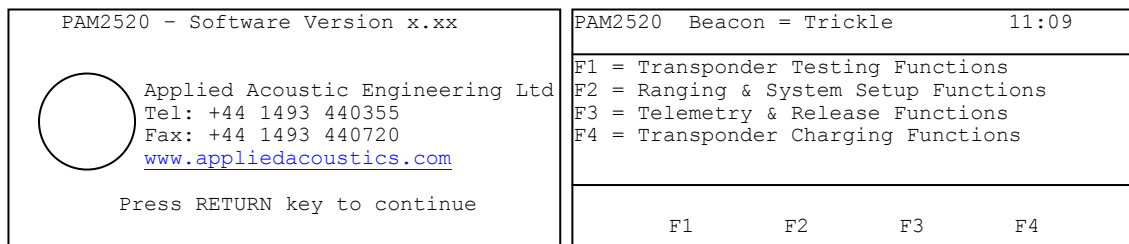
## 2.2 Switching the PAM On

The PAM will arrive with the internal battery uncharged. To charge the battery, connect the mains lead to the PAM and switch on the mains at the wall socket. Switch on the PAM at the back of the unit, this switch is located just above the mains inlet connector. The mains LED on the front panel should be on. The internal battery will be charging when either the PAM is in standby mode or the PAM is on. It should take 6 Hours to fully charge the battery.



Rear View of PAM 2520

To switch the PAM on from standby press the ON STANDBY button. After a short time the display will show the main menu options.



PAM 2520 Start-Up Display

PAM 2520 Main Menu

## 2.3 Using the Internal Battery

The internal battery is designed to power the unit where mains is not available. It cannot be used for charging beacons. The PAM will automatically switch to the internal battery when the mains is switched off. The mains LED will go off and the LCD back light will also go off.

## 2.4 Setting the Clock

The PAM 2520 has a real time clock built in to it. The clock is powered by a small battery which will last for up to 10 years. To set up the clock, first make sure the PAM is displaying the main menu. If not press the RETURN key until the main menu is displayed.

Press F2 to go into the Ranging and System Menu.

Press F4 to go into the System Set Up Functions.

Press F4 to go into Clock.

To adjust the time press the F1 key.

PAM2520	Beacon = Trickle	11:09
11:09		
Select the Function & Arrow Keys		
Hour	Minute	

*Menu for setting up the time*

To adjust the hour hold down the F1 key and press the arrow keys. The hour in the centre of the LCD display will slowly increment or decrement depending on which arrow key is being pressed.

To adjust the minute hold down the F2 key and press the arrow keys. The minute in the centre of the LCD display will slowly increment or decrement depending on which arrow key is being pressed.

To exit the time menu, press the RETURN key.

**Note:** the time at the top right of the display will not change until the minute after the clock menu has been exited.

To set the date Press the F2 key when in the clock menu. The menu will display the date menu.

PAM2520	Beacon = Trickle	11:09
24-06-20XX		
Select the Function & Arrow Keys		
Year	Month	Day

*Menu for setting up the date*

To adjust the year hold down the F1 key and press the arrow keys. The year in the centre of the LCD display will slowly increment or decrement depending on which arrow key is being pressed.

To adjust the month hold down the F2 key and press the arrow keys. The month in the centre of the LCD display will slowly increment or decrement depending on which arrow key is being pressed.

To adjust the day hold down the F3 key and press the arrow keys. The day in the centre of the LCD display will slowly increment or decrement depending on which arrow key is being pressed.

Press the RETURN key four times to go back to the main menu.



### 3.0 Charging the Beacons

The PAM 2520 can be used to charge a beacon (transponder; responder; pinger) instead of using a separate charger. To charge the beacon, first connect the charger lead to the front panel socket marked 'Beacon'. Connect the other end of the lead to the beacon to be charged. If the lead is not the correct type for the beacon then contact AAE for information on the correct connector.

Switch the beacon off and select the transponder charging functions (F4) on the PAM main menu.

PAM2520	Beacon = Trickle	11:09
F1 = AAE 900 Series Beacons		
F2 = AAE 800 Series Beacons		
F3 = Other Beacons		
F1	F2	F3

*Beacon Charging Options*

Select which family of beacon you wish to charge e.g. for an AAE919 beacon press F1. The PAM will then display a more detailed screen to allow you to select the exact beacon. A flashing cursor shows the beacon, which is currently selected. Use F3 and F4 to move the cursor up and down and press F1 once the correct beacon has been selected. The table below shows the beacons which can be charged, contact AAE for information on other beacons.

**WARNING - DO NOT ATTEMPT TO CHARGE ANY BEACON WHICH IS NOT ON THE LIST WITHOUT CONSULTING AAE FIRST.**

Beacon Select	Beacon Family	Beacons which can be charged
AAE 91x	900 Series	919,916,915,915H,419
AAE 93x	900 Series	939,935,933(not TFT),930
AAE 94x	900 Series	949,945,940
AAE 95x	900 Series	959,956,955,955H
AAE 96x	900 Series	965,962
AAE 97x	900 Series	972,970
AAE 81x	800 Series	819,816
AAE 83x	800 Series	839,835,830,829,826
AAE 84x	800 Series	Long 83x tubes
AAE 85x	800 Series	8590,8560,8545
SimMHT	Other Beacons	Simrad MHT316, MHT319
SimRPT	Other Beacons	Simrad RPT316,RTP319,RPT324
Son 7656	Other Beacons	Sonardyne 7656, Directional & Omni-directional
ORE 4330A	Other Beacons	4320A, 4330A
ORE 4350A	Other Beacons	ORE's high power Beacons

Once the beacon has been selected the PAM will display the main charging menu.

PAM2520 Beacon = Trickle	11:09
Beacon Selected = AAE 91x	
Discharging	
Charging	
<input type="checkbox"/> Trickle Charging	
Start	Stop

*Main Charging Menu*

Press F1 to begin the charging process. The cursor will move to the discharging display and the top line will display “Beacon = Dumping”.

Once the beacon has finished dumping it will automatically begin to charge the beacon. The cursor will move to the charging line and display the time remaining before the beacon has been charged. This information is repeated on the top line of the display. Once the beacon has been fully charged the cursor will move to the trickle charge line and the top line will indicate that the beacon is being trickle charged.

If an error had occurred during the charge process the display would show Error Open Circuit and this will be shown on the top line.

A beacon can be charged whilst performing other tasks using the PAM. The top line will show the status of the charging process. The only task that cannot be carried out during charging is any application that requires the use of the ‘beacon’ connector e.g. responder testing.

## **Warning**

If a beacon is fitted with primary cells such as alkaline or lithium then **DO NOT ATTEMPT** to charge these cells, as this could cause an explosion or serious injury.

If any beacon becomes warm to the touch, the charge cycle should be terminated. Additionally, it is suggested that the securing screws of AAE beacon bottom end-caps be removed before charging. This will stop excessive internal pressure from building up in case of operator error or any other abnormal charging conditions.

## CONNECTION DETAILS

The front panel charging / responder connector is wired as follows:-

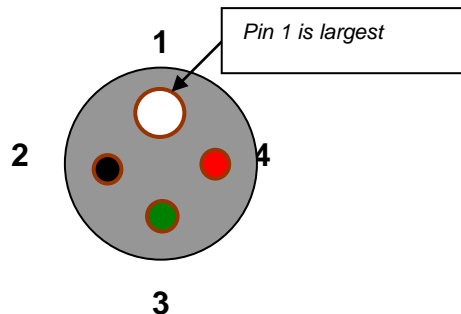
BEACON:

Pin	:	Function
A	:	Charge
B	:	Responder key
C	:	Common

THE VMG-4-FS PIGTAIL is wired as below:-

When mating the connector, ensure that the contacts are clean, and observe the alignment 'dot' for pin 1 on the pigtail connector. Clean with alcohol or a solvent cleaner and use a suitable O ring lubricant, (such as Parker O lube) around the circumference of the bulkhead connector where the rubber pigtail grips. Do not O lube the contacts. If these contacts (sockets) are not properly maintained, they will be damaged, and although replacement might be carried out in the field by experienced and careful personnel, we would advise return to the factory for repair and pressure test. We have seen these connectors last for 6 – 8 years when looked after, or just a few weeks of not. The choice is yours!

**Face view of bulkhead connector on beacon**



Connections are as follows:-

Pin No	Wire colour	Use
1	White	External trigger
2	Black	0 volts
3	Green	Charge (ONLY from AAE charger).
4	Red	+ 24 volts

Note that a dummy connector (Blanking plug) must be used when a pigtail is not connected. Mating connector type is VMG-4-FS. Dummy connector, blanking plug, is type VMG-4-AAE.

## 4.0 Beacon Testing Functions

The PAM is capable of testing many different types of beacons. The PAM is capable of measuring the turnaround time, pulse widths and transmit frequency from the beacon.

The testing functions have been designed to be used in air with the PT02 test transducer. This should be placed approximately half a meter from the beacon's transducer. The testing functions will not work in water and should not be used for ranging functions. During the testing functions the receiver of PAM is effectively 'wide open' and will tend to pick up extraneous noise and signals.

The PT02 test transducer should be connected to the front panel transducer socket. To test the responder function the charge lead should be connected to the beacon and the other end connected to the beacon connector.

The turn around time (TAT) is the time it takes for the beacon to respond to an interrogate signal. This time depends 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. The transducers are designed to work in water and this and the transducer resonance will affect the pulse width measured. 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 work out 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.

Press F1 to go into the main testing functions. Press F4 to go into the second main menu and F1 to go back to the first main menu.

PAM 2520 Beacon = Trickle	12:01		
PAM Testing Function			
Select button under text. RETURN Exits			
AAE	HIPAP	SON USBL	
Channels	HPR 4	HPR 3	Next

Test Menu 1

PAM 2520 Beacon = Trickle	12:01		
PAM Testing Function			
Select button under text. RETURN Exits			
Previous	Trackpoint	Pinger	Next

Test Menu 2

PAM 2520 Beacon = Trickle	12:01	
PAM Testing Function		
Select button under text. RETURN Exits		
	LF	HPR
Previous	HPR 4	1507

Test Menu 3

## 4.1 AAE Channel Testing

This is used for testing Applied Acoustic Channels for use with the Easytrak System.

PAM2520	Beacon = Trickle	11:09
AAE Channel Testing Functions		
Channel a1 TAT = xx.xxms Freq.=xx.xxKHz		
PW = xx.xxms		
Trans.	CH Up	CH Down Search

*AAE Channel Test Display*

The frequencies used for AAE Channels are detailed below.

Switch [ 1 ]	Switch [ 2 ]	Rxf1 (Hz)	Txf1 (Hz)	Mode	TAT (ms)
10 [a]	0	30000	17500	AAE	30
10 [a]	1	28000	18500	AAE	30
10 [a]	2	26000	19500	AAE	30
10 [a]	3	29000	20500	AAE	30
10 [a]	4	27000	21500	AAE	30
10 [a]	5	30000	22500	AAE	30
10 [a]	6	27000	18000	AAE	30
10 [a]	7	28000	18000	AAE	30
10 [a]	8	30000	18000	AAE	30
10 [a]	9	29000	18000	AAE	30
11 [b]	0	30000	20000	AAE	30
11 [b]	1	29000	20000	AAE	30
11 [b]	2	28000	20000	AAE	30
11 [b]	3	27000	21000	AAE	30
11 [b]	4	26000	21000	AAE	30
11 [b]	5	28000	21000	AAE	30
11 [b]	6	30000	21000	AAE	30
11 [b]	7	26000	22000	AAE	30
11 [b]	8	25000	17000	AAE	30
11 [b]	9	25000	19000	AAE	30

**Note:** Beacon Switch Position 10 = a and 11 = b.

To test the beacon in transponder mode connect the PT02 test transducer to the front panel. Position the test transducer approximately half a meter away from the beacon's transducer. Use the F2 and F3 keys on the PAM to select the channel, which the beacon is set to. Make sure the beacon is switched on and the PAM should display the turnaround time, pulse widths and frequency. The turnaround time for AAE should be approximately 30mS in transponder mode. The pulse width should be approximately 2mS and the frequency is dependent on the channel the transponder is set to.

To test the beacon in responder mode, connect the charge/responder lead to the front panel and the other end to the beacon. Ensure the test transducer is approximately half a meter away from the beacon's transducer. Press F1 to set the PAM to responder mode. The turnaround time should be approximately 30mS. The pulse width will be approximately 2mS and the frequency dependant on the transponder channel.

**Note:** In responder mode the beacon will always reply to an interrogate pulse, no matter what channel the beacon is set to. The PAM will pick this up and may indicate an incorrect frequency if is set to the wrong channel.

## 4.2 HPR4 / HiPAP Testing

This is used for testing HiPAP / HPR4 compatible beacons.

This testing function is a similar process to the AAE testing. The differences are (a) the frequencies used; (b) the turnaround time in transponder mode, this will be 60mS instead of 30mS and (c) the pulse width, this will be 10mS instead of 2mS. The frequencies and channel numbers are detailed in the table below. To go into the HPR4 test mode from the main test menu press F2.

PAM2520	Beacon = Trickle	11:09
Hipap 56 Channel Testing Function		
Channel 24	TAT = xx.xxms	Freq.=xx.xxKHz
	PW = xx.xxms	
Trans.	CH Up	CH Down
		Search

*HiPAP / HPR4 Test Display*

## HPR 4 / HiPAP Channel Listing

Switch 1	Switch 2	Interrogate1	Interrogate 2	Reply
1	2	21KHz	21.5KHz	29.25KHz
1	3	21KHz	22KHz	29.75KHz
1	4	21KHz	22.5KHz	30.25KHz
1	5	21KHz	23KHz	30.75KHz
1	6	21KHz	23.5KHz	27.25KHz
1	7	21KHz	24KHz	27.75KHz
1	8	21KHz	24.5KHz	28.25KHz
2	1	21.5KHz	21KHz	28.5KHz
2	3	21.5KHz	22KHz	29.5KHz
2	4	21.5KHz	22.5KHz	30KHz
2	5	21.5KHz	23KHz	30.54KHz
2	6	21.5KHz	23.5KHz	27KHz
2	7	21.5KHz	24KHz	27.5KHz
2	8	21.5KHz	24.5KHz	28KHz
3	1	22KHz	21KHz	28.75KHz
3	2	22KHz	21.5KHz	29.25KHz
3	4	22KHz	22.5KHz	30.25KHz
3	5	22KHz	23KHz	30.75KHz
3	6	22KHz	23.5KHz	27.25KHz
3	7	22KHz	24KHz	27.75KHz
3	8	22KHz	24.5KHz	28.25KHz
4	1	22.5KHz	21KHz	30KHz
4	2	22.5KHz	21.5KHz	29KHz
4	3	22.5KHz	22KHz	29.5KHz
4	5	22.5KHz	23KHz	30.5KHz
4	6	22.5KHz	23.5KHz	27KHz
4	7	22.5KHz	24KHz	27.5KHz
4	8	22.5KHz	24.5KHz	28KHz
5	1	23KHz	21KHz	28.75KHz
5	2	23KHz	21.5KHz	29.25KHz
5	3	23KHz	22KHz	29.75KHz
5	4	23KHz	22.5KHz	32.25KHz
5	6	23KHz	23.5KHz	27.25KHz
5	7	23KHz	24KHz	27.75KHz
5	8	23KHz	24.5KHz	28.25KHz
6	1	23.5KHz	21KHz	28.25KHz
6	2	23.5KHz	21.5KHz	29KHz
6	3	23.5KHz	22KHz	39.5KHz
6	4	23.5KHz	22.5KHz	30KHz
6	5	23.5KHz	23KHz	30.5KHz
6	7	23.5KHz	24KHz	27.5KHz
6	8	23.5KHz	23.5KHz	24.5KHz
7	1	24KHz	21KHz	28.75KHz
7	2	24KHz	21.5KHz	29.25KHz
7	3	24KHz	22KHz	29.75KHz
7	4	24KHz	22.5KHz	30.25KHz
7	5	24KHz	23KHz	30.75KHz
7	6	24KHz	23.5KHz	27.25KHz
7	8	24KHz	24.5KHz	28.25KHz
8	1	24.5KHz	21KHz	28.5KHz
8	2	24.5KHz	21.5KHz	29KHz
8	3	24.5KHz	22KHz	29.5KHz
8	4	24.5KHz	22.5KHz	30KHz
8	5	24.5KHz	23KHz	30.5KHz
8	6	24.5KHz	23.5KHz	27KHz
8	7	24.5KHz	24KHz	27.5KHz

### 4.3 Sonardyne USBL / HPR3 Testing

This testing function is similar to the HPR4 testing the only difference is the frequencies used and the turnaround time in transponder mode. This will be 30mS instead of 60mS. The frequencies and channel numbers are detailed in the table below. To go into the HPR3 test mode from the main test menu press F2.

Channel	Symbol	Interrogate	Reply
11	O	21.552KHz	27.173KHz
22	Square	22.727KHz	28.409KHz
33	Delta	23.923KHz	29.762KHz
44	X	25.126KHz	31.250KHz
55	Y	26.455KHz	32.467KHz
1	1	20.492KHz	29.762KHz
2	2	21.552KHz	30.488KHz
3	3	22.124KHz	31.250KHz
4	4	22.727KHz	31.847KHz
5	5	23.364KHz	32.468KHz
6	6	24.038KHz	27.173KHz
7	7	24.510KHz	27.777KHz
8	8	25KHz	28.409KHz
9	9	26.042KHz	29.070KHz

□

### 4.4 Trackpoint Testing Functions

This testing function is designed to test Trackpoint beacons. From the main testing menu press F3 to go into the testing mode.

PAM2520	Beacon = Trickle	11:09
TRACKPOINT TESTING FUNCTION		
Tx Freq.17000 TAT=xx.xxms F=xx.xxKHz		
Rx Freq.27000 PW = x.xxms		
Trans.	Tx Freq	Rx Freq Search

*Trackpoint Testing Menu*

Position the test transducer the same as the other test modes. To change the interrogate frequency, hold down F2 and press either the up arrow to increase the frequency or the down arrow to decrease the frequency. To change the reply frequency, hold down F3 and either press the up arrow to increase the frequency or the down arrow to decrease the frequency.

Available PAM Rx frequencies are in the range 10kHz to 30 kHz in 500 Hz steps. Available PAM Tx (Interrogate) frequencies are in the range 10 – 90 kHz in 500 Hz steps. (Note the wide frequency range which has been added for other applications other than Trackpoint II)!



## 4.5 Pinger Testing Function

The pinger test function is on the second test menu. To reach it from the first menu press F4. To select the pinger test function press F2.

PAM2520	Beacon = Trickle	11:09	
Rx Freq. = 26000Hz	Rx Gain = 0		
Rx Inhibit = 400mS	Time Out = 1S		
Ping Rate = xxxxmS			
Rx Freq	Inhibit	Rx Gain	TimeOut

*Pinger Test Menu*

Position the test transducer or suitable dunking transducer the same as the other test modes. To adjust the receive frequency, hold down F1 and press either the up arrow to increase the frequency or hold the down arrow to decrease the frequency. To change the receiver gain hold F3 and either press the up arrow to increase the gain or the down arrow to decrease the gain.

Available frequencies are in the range 10 – 30 kHz plus 37.5 kHz.

The Rx Gain adjustment allows the amplification to be adjusted to suit the acoustic conditions experienced. The inhibit time can be adjusted up to 400ms; this assists in reducing the detection of multipath (reflections) which might otherwise give an inaccurate ping rate.

## 4.6 Low Frequency HPR4 Testing Function

This testing function is similar to the HPR4 testing function, the only difference being the frequencies used. The frequencies and channel numbers are detailed in the table below. To go into the LF HPR4 test mode from the second test menu, press F3.

Switch 1	Switch 2	Interrogate 1	Interrogate 2	Reply
1	2	10KHz	10.5KHz	13.75KHz
1	3	10KHz	11KHz	14.25KHz
1	4	10KHz	11.5KHz	14.75KHz
1	5	10KHz	12KHz	15.25KHz
1	6	10KHz	12.5KHz	15.75KHz
2	1	10.5KHz	10KHz	13KHz
2	3	10.5KHz	11KHz	14KHz
2	4	10.5KHz	11.5KHz	14.5KHz
2	5	10.5KHz	12KHz	15KHz
2	6	10.5KHz	12.5KHz	15.5KHz
3	1	11KHz	10KHz	13.25KHz
3	2	11KHz	10.5KHz	13.75KHz
3	4	11KHz	11.5KHz	14.75KHz
3	5	11KHz	12KHz	15.25KHz
3	6	11KHz	12.5KHz	15.75KHz
4	1	11.5KHz	10KHz	13KHz
4	2	11.5KHz	10.5KHz	13.5KHz
4	3	11.5KHz	11KHz	14KHz
4	5	11.5KHz	12KHz	15KHz
4	6	11.5KHz	12.5KHz	15.5KHz
5	1	12KHz	10KHz	13.25KHz
5	2	12KHz	10.5KHz	13.75KHz
5	3	12KHz	11KHz	14.25KHz
5	4	12KHz	11.5KHz	14.75KHz
5	6	12KHz	12.5KHz	15.75KHz
6	1	12.5KHz	10KHz	13KHz
6	2	12.5KHz	10.5KHz	13.5KHz
6	3	12.5KHz	11KHz	14KHz
6	4	12.5KHz	11.5KHz	14.5KHz
6	5	12.5KHz	12KHz	15KHz

## 4.7 HPR1507 Low Frequency Transponders

This testing function is similar to the HPR4 testing the only difference is the frequencies used and the turnaround time in transponder mode. This will be 30mS instead of 60mS. The frequencies and channel numbers are detailed in the table below. To go into the HPR1507 test mode from the second test menu, press F4.

Switch 1	Switch 2	Interrogate	Reply
0	1	9.901KHz	13.158KHz
0	2	10.309KHz	13.587KHz
0	3	10.707KHz	14.045KHz
0	4	11.111KHz	14.451KHz
0	5	11.547KHz	14.881KHz

## 4.8 Search Functions

On each of the beacon's test menu there is an option to go into the beacon search functions. Pressing F4 in each of the individual test function menus enters the search menu.

The search function will scan through the entire range of beacon frequencies to try and identify which channel the beacon is on.

PAM2520	Beacon = Trickle	11:09	
F1 = Search for HPR4 MF LF Beacons F2 = Search for HPR3 / HPR1507 Beacons F3 = Search for Trackpoint Beacons			
F1	F2	F3	F4

*Beacon Search Functions*

To search for an HPR4 beacon press F1 followed by F2 for an MF beacon. The PAM will then start to find the channel number the beacon is set to. If it has found the correct beacon then it will display the channel number, otherwise it will display 'Beacon Not Found'. To stop the search, press the F4 button.

## 5.0 Ranging

### 5.1 Setting the Speed of Sound in Water

Before any ranging can be done, the speed of sound in water must be set. To do this from the main menu, Press F2. Then Press F4 followed by F1.

PAM2520	Beacon = Trickle	11:09	
Speed of Sound in Water			
<u>1</u> 5 0 0			
Left	Right	Up	Down

*Speed of Sound in Water Menu*

To alter the speed of sound press either the F1 key to move the left by 1 digit or press F2 to move the cursor right one digit. Press F3 to increment the digit by one or press F4 to decrement the digit by one. Press the return key to exit this menu.

### 5.2 Setting the Rx Parameters, Tx Gain and Averaging

To get the best results from the ranging functions, it may be necessary to change some of the parameters. This can be done by going into the 'Rx Gain, Tx Power, Averaging' menu option. To reach this menu from the main menu Press F2 followed by F3.

PAM2520	Beacon = Trickle	11:09
F1 = Tx Power - Low F2 = Receiver Parameters F3 = Averaging - Low		
F1	F2	F3

*Rx Gain, Tx Power, Averaging Menu*

To change the Tx power press F1. The Tx power will switch between low, medium and high. Steps are at approximately 6dB increments.

To change the Receiver parameters press F2 to go into the receiver menu.

To change the averaging press F3. The averaging will switch between off, low, medium and high. The averaging is not used for the depth portion of a depth telemetry transponder but is used for the navigation reply.

### 5.3 Receiver Parameters

The receiver parameters can be changed to improve stability of the receiver in a noisy environment or to increase sensitivity for longer ranges.

PAM2520 Beacon = Trickle	11:09
F1 = Rx Gain - Low F2 = Rx Sensitivity - Medium F3 = Bandwidth - Wide	
F1	F2 F3

*Receiver Parameters*

To increase the gain of the Pam press F1, this will toggle between low, medium, high and max. The gain should be set so that it is on the lowest value which gives stable results.

The detect sensitivity can be set by pressing F2. The sensitivity can be set to low, medium and high.

The receiver bandwidth can be toggled between narrow and wide by pressing the F3 button.

The sensitivity and bandwidth setting should be adjusted to compensate for the environment. In low noise conditions with the dunking transducer deployed in deep water, the sensitivity can be set to high with a wide bandwidth to get very stable results. If the conditions are noisy and the receiver triggers on false settings then the bandwidth and sensitivity should be reduced, so that the receiver is capable of picking the correct signal from the noise.

### 5.4 Starting the Ranging

PAM is capable of receiving depth telemetry information from compatible transponders, which are fitted with a pressure transducer. The depth transponder transmits two signals. The first is the usual navigation reply; the second is delayed from the first in proportion to the depth. This simple two-transmission telemetry system is often referred to as analogue telemetry and uses a minimal amount of transmitter power.

Should a serial output be required for data logging, the Ranging Serial Output may be enabled from section 9 of this manual.

To enter the ranging function from the main menu press F2 followed by F1. There is a further menu (from Rev 4.3 onwards) which allows you to chose 4-channel ranging or Depth Telemetry. Press F1 for 4-channel ranging. The following screen will be displayed:-

PAM2520		Beacon = Trickle		25:69	
1	off	HPR4	CH=12	R=xxxx.x	D=xxxx.x
2	off	HPR3	CH=1	R=xxxx.x	D=xxxx.x
3	off	HPR4	CH=1	R=xxxx.x	D=xxxx.x
4	off	HPR4	CH=1	R=xxxx.x	D=xxxx.x
UP		DOWN		On/Off Setup	

*Ranging Menu*

The 4 channel ranging function allows ranging to 4 transponder. If the depth sensors are not fitted to the transponders or of depth is not required, then range only will be received. PAM can be used with a mixture of depth transponders which are compatible with Simrad HPR; Simrad HiPAP and ORE Trackpoint II systems. Because of the flexibility of the Trackpoint II compatible beacons an additional menu is utilised to allow setting up of all the required functions. With the Simrad modes, these parameters are set up automatically. It's a less flexible solution, but there is less chance of getting it wrong!

To change the beacon type, use the UP and DOWN arrows to select row 1 – 4 and press the setup button F4. The following screen will be displayed. It is this screen which allows selection of the type of depth transponder being used as well as adjusting all the set-up parameters for the Trackpoint II compatible beacons:-

PAM 2520 Beacon = Trickle		01:30	
Beacon 1 Setup			
Mode = Track	I = 17.0	R = 23.0	
Reprate = 3S	Depth = On	TAT= 15mS	
Max Depth= 1000	Offset= 100	Span=900	
LEFT	RIGHT	UP	DOWN

With the cursor flashing on the Mode, press the red UP/DOWN buttons to select HPR3, HPR4 or Trackpoint II (Track) compatibility.

For HPR modes, simply select the channel number, the repetition rate and whether you require depth telemetry or not (Depth = On). Use the Function buttons to move around the screen and the red UP/DOWN buttons to change parameters to suit the transponder used.

For Track mode, the operation is more complex as you will need to set up

- 1) The interrogate frequency ( I )
- 2) The reply frequency ( R )
- 3) The repetition rate ( 2 – 8 seconds)
- 4) The TAT of the transponder (usually 15 mS)
- 5) The Maximum depth of the pressure transducer in metres
- 6) The zero depth offset (delay) in milliseconds
- 7) The depth span in milliseconds

This can be carried out by using the function keys to move around the screen and the red UP / DOWN buttons to change the parameter.

Once the target has been set up, then press the Return button to return to the previous screen.

Note: Should no target be detected, the repetition rate will increase above that displayed on the front panel. This is a limitation in the software because of the way the processor looks at the real time clock and the charge timings.

To switch on the ranging, move the cursor to the first column (off) and press F3 the On/Off button. The PAM will start to range to the selected beacon. Select any other beacons as required. Note that the PAM will cycle through each target in order. If all 4 targets are set with an interrogation rate of 5 seconds, then the process will repeat every (4 x 5) 20 seconds.

If the averaging is set high then it will take a few interrogations before the range settles down. If you are tracking a fast moving object then the averaging should be set to low.

## **5.5 Additional Depth telemetry function**

This function may be used where simple one transponder depth telemetry is required.

From the first menu, press F2 to go into the ranging and system set-up functions and press F1 to enter the ranging and depth telemetry functions. Press F2 for the depth telemetry menu.

Select F1 "Mode" to chose either HPR3, HPR4 or Trackpoint modes of operation.

For HPR3/4 modes, simply work up or down with the red arrow keys until the desired channel is reached. Pressing F4 will allow the repetition rate to be changed.

For Trackpoint II operation, more information is required. This information will be listed on the transponder body or in it's equipment manual. The following information is required:-

- Interrogate frequency ( 16 – 26 kHz)
- Reply Frequency (22 – 30 kHz). (It is assumed that the telemetry frequency is 1 kHz lower than the navigation reply).
- Depth sensor rating ( say 1000 metres).
- Zero delay in mS.
- Depth Span in mS.

Enter the interrogate and reply frequencies by pressing F2 or F3 and the UP/DOWN arrows to cycle through the available frequencies. (500Hz increments).

Press F4 SETUP and select

F1 to enter the depth span in metres.

F2 to change the zero delay.

F3 to change the span in mS. (The time between zero depth and maximum depth).

F4 to change the interrogation (repetition) rate.

These displays are navigated and changed by using the left / right and up / down buttons.

The system is now ready to operate. The receiver gain and transmit power functions operate. However the averaging function which can be used for the 4 channel ranging does not operate with the depth telemetry capability.

## 6.0 4 Rate 669-138 Pinger

This function has been designed to be used with the AAE 669-138 pingers and the older Simrad 138 pingers. To enter the four rate pinger menu from the main menu press F2 twice.

PAM2520	Beacon = Trickle	11:09
Receiver Gain = Minimum		
Ping Rate = xxxxmS x Pings Per x Second		
Gain Up	Gain Down	

*Four Rate Pinger Menu*

Pressing F1 will increase the gain of the PAM, while pressing F2 will decrease the gain. The gain should be set so that the PAM can reliably receive the signals without corruption. In a highly reverberant location such as a dock the gain should be set to the minimum, while if the pingers are located a long distance from the dunker the gain should be set high.

The Dunker should be positioned below the vessel, free from any obstructions such as the vessel's hull.

Once the PAM is correctly receiving the pings from the pinger, it will display the time between the pings and which electrical contact is closed on the pinger.



## 7.0 AAE Release Functions

This function is to be used with the AAE range of releases. For detailed operation of a particular release refer to its manual.

To locate the release functions from the main menu press F3 followed by F2. The PAM will then display the main release menu.

PAM2520	Beacon = Trickle		11:09
Channel	HPR4 12	Arm U	Tilt U
ID	0	Release U	Fault U
		Sleep U	
Setup	Status	Arm	Release

*Main Release Menu*

The PAM displays the status of the release parameters. When the menu is first displayed it will show a 'U' next to each value. This means the PAM does not know the status of the release and the 'U' stands for 'Unknown'. The parameters stand for the following:

- Arm – has the release been armed, 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 – has the beacon been released. 0 = primed 1 = released.
- Fault – is there a fault on the release, 0 = no fault 1 = fault.
- Sleep – is the release in sleep mode, 0 = wake 1 = sleep.

When using the release command, the Tx power and Rx gain will need to be set up. Refer to section 5.2 for details on setting these parameters.

### 7.1 Setting the release ID and Channel number

In order to be able to communicate with the release, the PAM needs to know which mode the release is in and the ID the release is set to. For information in setting the release mode and ID refer to the release manual.

To go into the set-up menu press F1.

PAM2520	Beacon = Trickle	11:09	
	Mode = HPR4		
	Channel = 12		
	ID = 0		
Mode	Channel	ID	Next

*Release Set Up menu*

To set the mode press F1 key. This will switch between HPR4, HPR3, HPR4 LF and HPR1507.

To set the channel number hold down the F2 key and press the up arrow to increment the channel number or the down arrow to decrement the channel.

To set the ID number hold down the F3 key and press the up arrow key to increment the ID number or press the down arrow to decrement the ID number.

## 7.2 Obtaining the Status of the Release

To obtain the status of the release go into the main release menu and then press F2. The PAM will show a list of status options.

To read the general status flag press F1. If the release has correctly received the status message it will reply with the status. The PAM will automatically go back into the main release menu, but instead of showing 'U' next to the parameters it will show the correct values. If the release has not received the message the PAM will display an error message.

To read the tilt status of the release press F2. The release will then reply with the position of the two tilt sensors. These values will then be displayed on the PAM.

To read the detailed fault status of the release press F3. The release will then reply with the fault status of the release. This will be displayed on the PAM display.

## 7.3 Arming and Disarming the Release

For the release to operate it must first be armed. To do this, press F3 when in the main release menu. The PAM will then display two options, the first option is to clear the arm status of the release and the second option is to arm the release.

Press F1 and the PAM will command the release to disarm. If the release has received the message correctly it will automatically go into the main release menu with the arm flag set to zero, otherwise the PAM will display an error message.

Press F2 and the PAM will command the release to arm. If the release has received the message correctly it will automatically go into the main release menu with the arm flag set to one, otherwise the PAM will display an error message.

## **7.4 Operating the Release**

To operate the release mechanism the release needs to be armed first. See Section 7.3 for details on arming the release. To operate the release the PAM must first be in the main release menu. Press F4 and the PAM will send the release command. If the release has correctly received the message it will reply with a status message. The status flags on the main release menu will be updated with the release flag showing '1'.

If the release has not been armed first then the release flag will remain showing '0' and the release will not operate.

Once this message has been sent, it is important to wait for up to 5 minutes to allow the release to operate. If the release has failed to operate then try sending the JAM command instead, see section 7.6.

## **7.5 Priming the Release**

On some release models it is possible for the release to automatically set the jaws back into the closed position. To send the prime command, from the release main menu press F1 followed by F4 and finally to prime the release, press the F2 key.

For further information on priming the release, consult the release operating instructions.

## **7.6 Using the 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, from the release main menu press F1 followed by F4 and finally to prime the release, press the F3 key.

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

## 7.7 Sending the 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 the standard 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 go into the sleep menu from the main release menu, press F1 followed by F4 and finally F4 again. This menu gives the option command for the release to go into sleep mode and also to command the release to go back into normal mode.

To turn on the sleep mode press F1 and the PAM will send the sleep on command. If the release has correctly received the command the PAM will display the main release display with the sleep flag set to 1.

To turn off the sleep mode press F2 and the PAM will send the sleep off command. If the release has correctly received the command the PAM will display the main release display with the sleep flag set to 0.

## 7.8 Release Troubleshooting

Problem	Solution
Cannot range to the release.	Check the mode and channel number is set properly.  Check the Rx Gain and Tx Power have been set correctly.  Ensure the release is not in sleep mode.
Cannot communicate with the release	Ensure the correct mode, channel and ID are set properly.  Check the Tx Gain and Tx Power have been set correctly.

## 8.0 Simrad Command Functions (option)

This software module enables the PAM to communicate with an SPT or MPT transponder. To go into the main Simrad command menu from the main menu, press F3 followed by F3 again.

PAM2520	Beacon = Trickle	11:09
Serial No. 2272	Channel No. 12	
Nav. Power High	Tel. Power High	
Rx Gain High	Pulse Width 10mS	
Serial	Power	Change
Number	Set-Up	Channel Transmit

*Simrad Command Main Menu*

### 8.1 Setting up the Serial Number

For the PAM to successfully communicate with the SPT or MPT, it needs to know the serial number. To change the serial number, from the Simrad main menu press F1.

PAM2520	Beacon = Trickle	11:09
Use Left/Right to select Number Up/Down to change Number		
<u>0</u> 2 2 7 5		
Left	Right	

*Change Serial Number Menu*

To change the serial number, move the cursor to the digit you want to change by using the F1 and F2 keys. Press the up arrow key to increment the selected digit or press the down arrow key to decrement the digit.

Press the RETURN key to go back to the main Simrad menu.

## 8.2 Changing the Transponder Power and Receive Settings

To enter this menu press F2 from the Simrad main menu.

PAM2520	Beacon = Trickle	11:09	
Nav. Power	High	Tel. Power	High
Rx Gain	High	Pulse Width	10mS
Nav Power	Tel Power	Pulse Width	Rx Gain

To alter the Navigation power setting, hold down the F1 key and press the up arrow key.

To alter the Telemetry power setting, hold down the F2 key and press the up arrow key.

To alter the Pulse Width setting, hold down the F3 key and press the up arrow key.

To alter the Receiver Gain setting, hold down the F4 key and press the up arrow key.

**Note:** These changes will not effect the transponder until the data has been sent using the transmit menu.

## 8.3 Changing the Channel Number

For the PAM to successfully communicate with the SPT or MPT it needs to know the channel number. To change the channel number in PAM or to change the transponder channel number to a different one, from the Simrad main menu press F3.

PAM2520	Beacon = Trickle	11:09
Current Channel = 12		
New Channel = 12		
Current	New	

*Simrad Channel Change Menu*

To change the current channel hold down the F1 key and either press the up arrow to increase the channel number or press the down arrow key to decrease the channel number.

To change the new channel number, hold down the F2 key and either press the up arrow to increase the channel number or press the down arrow key to decrease the channel number.

## **8.4 Transmitting the Data to the Transponder**

To transmit the changes to the transponder, from the Simrad main menu and press F4.

To transmit the new power and gain settings press F1. The PAM will display “Sending Message”. If the message has been received correctly the transponder will reply. If the transponder failed to receive the message correctly the PAM will display “Transponder – Message Not Received”.

To transmit the new channel number press F2. The PAM will display “Sending Message”. If the message has been received correctly the transponder will reply. If the transponder failed to receive the message correctly the PAM will display “Transponder – Message Not Received”.

To transmit the release command press F3. The PAM will display “Sending Message”. If the message has been received correctly the transponder will reply. If the transponder failed to receive the message correctly the PAM will display “Transponder – Message Not Received”.

## 9.0 Sonardyne Compatt Testing

This software module enables the PAM to talk to Sonardyne's Compatt MK4.

### 9.1 Setting up the Pam

To get good quality communication with the Compatt's an electrostatic loop is required. Connect the test loop to the transducer connector of the Pam and put the loop around the Compatt's transducer. Make sure the loop is not too close to the neck of the Compatt as this will cause communications problems with the Compatt.

### 9.2 Compatt Main Menu

To go into the compatt main menu from the main menu press F3 followed by F4. The Pam will display the following:

PAM2520	Beacon = Trickle	11:09	
F1 - Interrogate Test Functions F2 - Advanced Testing Functions F3 - Enter Beacon Details			
F1	F2	F3	F4

*Compatt Main Menu*

### 9.3 Entering the Compatt Address

To be able to communicate with the Compatt, the address needs to be entered. From the Compatt main menu press F3. The Pam will display the following menu.

PAM2520	Beacon = Trickle	11:09	
Enter Compatt Address			
0 2 0 1			
Left	Right	Up	Down

*Compatt Address Menu*

To change the Compatt address press the keys marked left or right to move the cursor to the digit, which needs changing. The press the key marked up to increase the value and the key marked down to decrease the value.



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

## 9.4 Resetting the Defaults.

For the PAM to be able to receive information from the Compatt's, the baud rate of the Compatt needs to be set to normal. To do this from the main compatt menu press F2 followed by F1. The Pam will show the system commands menu.

PAM2520	Beacon = Trickle	11:09
F1 -	Reset Defaults	(RDxxx)
F2 -	Enable	
F3 -	Disable	
F4 -	Gain & Power Settings	
F1	F2	F3
	F4	

*Compatt System Commands Menu*

## 9.5 Enable Commands Menu

The enable commands are used to enable the compatt receiver and to select between the different receiver modes. To go into the enable menu, from the system command menu press F2.

PAM2520	Beacon = Trickle	11:09
F1 -	Enable Compatt	(Enxxx)
F2 -	Enable USBL	(EU)
F3 -	Enable CIF	(EC)
F4 -	Enable IIF	(EI)
F1	F2	F3
	F4	

*Compatt Enable Commands*

To enable the compatt receivers press F1. The PAM will then send the command to the Compatt. After a short period of time the Compatt will reply and the Pam will display 'Compatt Enabled'. If the Pam has failed to communicate with the Compatt or there was an error while receiving the information, the Pam will display an error message.

To switch the PAM into USBL mode press F2. After a short period of time the PAM will display 'Telemetry Pending'. The Pam will send a second message to the compatt. After a short period of time the Pam will display the status message. Press the return key to go back to the system menu.

To switch the PAM into Common Interrogate mode press F3. After a short period of time the PAM will display 'Telemetry Pending'. The Pam will send a

second message to the Compatt. After a short period of time the Pam will display the status message. Press the return key to go back to the system menu.

To switch the PAM into Individual Interrogate mode press F4. After a short period of time the PAM will display 'Telemetry Pending'. The Pam will send a second message to the Compatt. After a short period of time the Pam will display the status message. Press the return key to go back to the system menu.

## 9.6 Disable Menu Commands

The disable commands are used to out the receiver in standby mode to save power or to deselect one of the receive modes. To go into the disable menu press F3 while in the system command menu.

PAM2520 Beacon = Trickle		11:09	
F1 - Disable Compatt		(DS)	
F2 - Disable USBL		(DU)	
F3 - Disable CIF		(DC)	
F4 - Disable IIF		(DI)	
F1	F2	F3	F4

*Disable Menu Commands*

To put the Compatt receiver in standby mode press F1. After a short period of time the PAM will display 'Compatt Disabled'.

To disable USBL mode press F2. After a short time the PAM will display 'Telemetry Pending'. Then after another short period the PAM will display a status message. To go into the main system command menu press the return key.

To disable the Common Interrogate mode press F3. After a short time the PAM will display 'Telemetry Pending'. Then after another short period the PAM will display a status message. To go into the main system command menu press the return key.

To disable the Individual Interrogate mode press F4. After a short time the PAM will display 'Telemetry Pending'. Then after another short period the PAM will display a status message. To go into the main system command menu press the return key.

## 9.7 Power, Gain Frequency menu

To go into the gain and power menu press F4 when in the system command menu. The Pam will display the gain, power, reply frequency and TAT menu options.

PAM2520 Beacon = Trickle	11:09		
F1 - Change Gain Settings (CG)			
F2 - Change Power Settings			
F3 - Change Frequency (CF)			
F4 - Change TAT (TT)			
F1	F2	F3	F4

*Gain, Power, Frequency and TAT menu*

To change the receiver gain setting press F1. To increase the gain press the F1 key and to reduce the receiver gain press the F2 key. To send the new gain setting to the Compatt press F4 key. After a short period of time the PAM will display 'Telemetry Pending'. After a further period of time the PAM will display the Compatt gain and power settings. Press return to go back to the gain setting menu.

### 9.7.1 Changing the Transmit Power

To change the transmit power settings press F2 the PAM will display the transmit power menu.

PAM2520 Beacon = Trickle	11:09		
F1 - Change Power (CPA)			
F2 - Change Tel. Start Power (CPS)			
F3 - Change Tel. Data Power (CPT)			
F4 - Next			
F1	F2	F3	F4

*Transmit Power setting menu 1*

To change all of the transmit power settings press F1. To set the power to high press F2. To set the power to low press F1. After a short period the PAM will display the 'Telemetry Pending' message followed after another short period the power status. Press return to go back to the power menu.

To change the telemetry start pulse power press F2 from the power setting menu followed by F1 to set the power to low or F2 to set the power to high. After a short period the PAM will display the 'Telemetry Pending' message followed after another short period the power status. Press return to go back to the power menu.

To change the telemetry data power press F3 from the power setting menu followed by F1 to set the power to low or F2 to set the power to high. After a

short period the PAM will display the 'Telemetry Pending' message followed after another short period the power status. Press return to go back to the power menu.

To change the USBL power setting or the LBL power setting press F4 to go into the second power menu.

PAM2520 Beacon = Trickle		11:09
F1 - Previous		
F2 - Change USBL Power		(CPU)
F3 - Change LBL Power		(CPL)
F1	F2	F3

*Transmit Power Setting Menu 2*

To change the USBL power press F2 from the power setting menu followed by F1 to set the power to low or F2 to set the power to high. After a short period the PAM will display the 'Telemetry Pending' message followed after another short period the power status. Press return to go back to the power menu.

To change the LBL power press F3 from the power setting menu followed by F1 to set the power to low or F2 to set the power to high. After a short period the PAM will display the 'Telemetry Pending' message followed after another short period the power status. Press return to go back to the power menu.

To go back to the first power menu press F1.

## 9.8 Change Individual Reply Frequency

To change the individual reply frequency press F3 from the gain, Power menu. Press F1 to increase the channel and press F2 to decrease the channel. Press F4 to transmit the changes to the Compatt. After a short period of time the PAM will display 'Telemetry Pending' and after a further short period the PAM will display the status screen.

## 9.9 Change the Turn Around Time

To change the Turn around time press F4 from the gain, power menu. To increase the turn around time press F1 (increments the TAT by 62.5mS, minimum TAT = 62.5ms). To decrease the turn around time press F2. To send the change to the Compatt press F4. After a short period of time the Pam will display 'Telemetry Pending' followed after a short period of time the status message.

## 9.10 Read Sensors

To read the sensors from the main compatt menu press F2 to go into the advanced menu followed by F2.

PAM2520 Beacon = Trickle		11:09	
F1 - Read Temperature	(CT)		
F2 - Read Depth	(CD)		
F3 - Read Inclinator	(AN5)		
F4 - Read DigiQuartz Sensor			
F1	F2	F3	F4

*Read Sensors Menu*

To read the temperature press F1. After a short period the PAM will display the temperature.

To read the depth (not digiquartz) press F2. After a short period the PAM the PAM will display the depth.

To read the inclinometer press F3. After a short period of time the PAM will display the pitch and roll values with a voltage reading. To convert this value into degrees use the following formula:

$$\theta = \text{arc sign} (V / SF) \quad \text{where SF} = \begin{matrix} 16 \text{ for } \pm 14.5 \\ 45.895 \text{ for } \pm 5 \\ 4 \text{ for } \pm 90 \end{matrix}$$

If the Compatt has an inclinometer fitted press F4 followed by F1 to read the temperature count and F4 followed by F2 to read the pressure count. Refer to the Sonardyne Compatt manual for converting these values to depth.

## 9.11 Read Status

To read status Press F2 followed by F3 from the main compatt menu.

PAM2520 Beacon = Trickle		11:09	
F1 - Read Power Status	(PS)		
F2 - Read Battery Status	(BC)		
F3 - Read Elapsed Time	(EL)		
F4 - Read Transponder Status	(TS)		
F1	F2	F3	F4

*Status Menu*

To read the power status press F1. After a short period of time the Pam will display the power status settings.

To read the battery status press F2 after a short period the Pam will display the battery voltage and the battery count.

To read the Elapsed time press F3 after a short period of time the Pam will display the elapsed time.

To read the transponder status press F4. After a short period of time the Pam will show the first transponder status screen. Press F1 to go to the second transponder status screen.

## 9.12 Compatt Release

To operate the compatt release from the compatt main menu press F2 to go into the advanced menu.

PAM2520	Beacon = Trickle	11:09	
F1 - System Commands			
F2 - Read Sensors			
F3 - Compatt Status			
F4 - Release Commands	(RL)		
F1	F2	F3	F4

*Advanced Menu*

Press F4 followed by F1 and the Pam will send the first release command and after a short period of time will display 'Release No. = 1'.

Press F1 again to send the second release command and after a short period the Pam will display 'Release No. = 2'.

Press F1 for the final time and after a short period of time the Pam will display 'Release No. = 3'. The compatt should then begin to start the release process.

**Note:** The release commands must be sent within a minute of each other or the Compatt will reset the release process to the beginning.

## 9.13 Interrogate on Common Interrogate Frequency (CIF)

To interrogate using the Common Interrogate Frequency first make sure the CIF has been enabled. From the main menu press F1 followed by F1 again to go into the CIF test screen. Use F1 to increment the Individual Reply Frequency and F2 to decrement the Individual Reply Frequency. The Pam will display the Turn around time, Receive frequency and pulse width.

## **9.14 Interrogate on Individual Interrogate Frequency (IIF)**

To interrogate using the individual interrogate frequency first make sure the IIF has been enabled. From the main compatt menu press F1 followed by F2. Use F1 to increment the interrogate channel and F2 to decrement the interrogate channel. The PAM will display the turn around time, frequency and pulse width.

## **9.15 Base Line interrogate**

From the main compatt menu press F1 followed by F3. Use F1 to increase the interrogate channel and F2 to decrease the interrogate channel. Press F4 to command the compatt to interrogate the transponder on the set interrogate transponder. After a short period of time the compatt will replay with the turn around time in mS.

## **9.16 Simultaneous Interrogate**

From the main Compatt menu press F1 followed by F2. The Pam will command the Compatt to do an interrogate of any Compatts it is close to. After a short period of time any Compatt it has found will be shown as well as it's turn around time.

## 10.0 Serial Communications

The PAM has a serial port which sends the results from the ranging, testing functions and the four rate pinger to a remote terminal. The serial port is set to the following protocol:

- 9600 Baud
- 1 Start Bit
- 1 Stop Bit
- No Parity

To connect the PAM to a PC use a straight 9 way female to 9 way female lead. The connections should be as follows:

<u>Pam 9 way D type</u>	<u>PC 9 way D type</u>
Pin 5 -----	Pin 5
Pin 2 -----	Pin 2
Pin 3 -----	Pin 3

To have the PAM to communicate with the PC, it needs to be enabled from the options menu. To go into the options menu, from the main menu press F2, followed by F4 and then finally F3.

PAM2520	Beacon = Trickle	11:09
F1 = Testing Serial Output - Off F2 = Pinger Serial Output - Off F3 = Ranging Serial Output - Off		
F1	F2	F3

By pressing F1 the testing serial output will toggle between on and off.

By pressing F2 the four rate pinger serial output will toggle between on and off.

By pressing F3 the ranging serial output will toggle between on and off.

PAM has the ability of being upgraded by transmitting data into the serial port. This facility is available from revision 4.2 and upwards. This feature gives the possibility of upgrading PAM to the latest specification simply by receiving a file by e mail. Please contact the factory for more information.



## 11. Specifications

Size	350mm x 250mm x 120mm
Weight	5Kg
Temperature	Storage -10°C to 80°C Operating -5°C to 40°C
Mains Input	100 to 240V ac 50 to 60 Hz 1.3A
Connections	IEC for mains input RS-232 9 pin connector Auxiliary Transducer 3 pin Beacon Connector on front panel 6 pin transducer connector on front panel
Beacon Compatibility	AAE 600, 800, 900 Series Simrad HPR3, HPR4, HPR1507, HPR4LF Sonardyne USBL ORE Trackpoint II
Internal Battery	4 hours minimum 2.1 AH gel electrolyte ( no airfreight restrictions )
Charge time	6 Hours
Charger Compatibility	All AAE beacons Simrad RPT and MHT Sonardyne 7656 ORE Multi beacons
Processors	Hitachi 16 bit running at 10MHz Texas Dual Core DSP running at 100MHz
RAM	12KB
ROM	512KB Flash 128KB EPROM
Tx Power	Three power settings up to 200W
Tx Frequency	10KHz to 120KHz in 25Hz steps
Rx Channels	Dependant on DSP Software
LCD	40 characters x 8 line LCD with back light
RS232	9600 Baud as standard on 9 pin D connector
Sound	Small piezo buzzer for signal detection

### Front panel Transducer connection details

Pin	:	Function
A	:	Ground
B	:	Transmit
C	:	N/C
D	:	0 volts
E	:	+12V
F	:	Receive Signal

## 12.0 Shipping Details - Airfreight Information

The battery inside PAM with a GEL Electrolyte is **NOT DANGEROUS** to airfreight. However, the following statement must be added to your shipping documentation to comply with the current regulations:-

**“The above item is fitted with a non-dangerous battery”.**

## 13 Spares

We hold a complete range of spares for all our products which can be dispatched by return.

If you have any problems or questions concerning any of our products, please contact us at any time and we will do what we can to help. Always quote the model number and serial number when making enquires or placing orders for any of our products.

The following parts may be required:

Mains Lead	Order as IEC Mains Lead and specify plug required.
Test Transducer	Model 7905 Transducer
Standard Charger/Responder lead	PAM Charge Lead with VMG-4-FS
Large Burton Charger/Responder lead	PAM Charge Burton 2008
Small Burton Charger/Responder lead	PAM Charge Burton 1508
Responder Test Lead for ORE 4320A	PAM Responder Lead 4320A
Responder Test Lead for ORE 4330A	PAM Responder Lead 4330A
RS232 Interconnect lead	PAMII RS-232 Lead
Battery Pack	Battery Pack 2520
Case Handle	Handle Assembly for 2520
Fuse	20mm 2A Quick Blow
Power Supply	PAM II 24v Power Supply
Fan	PAM II Cooling Fan

## 14 Trouble Shooting

Problem	Solution
Mains LED off	Check Mains is switched on at wall socket. Check the Mains switch at the back of the PAM unit is On. Check the Fuse on the back of PAM has not blown.
LCD Backlight not on	The LCD backlight will only work when mains is switched on
LCD Screen corrupt or line appears on the display	The internal battery is empty, connect the PAM to the wall socket, and switch on at the rear of the PAM.





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