

Altimeter MKII

Product Manual

0715-SOM-00002 Revision 2

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Warning Symbols

Throughout this manual the following symbols may be used where applicable to denote any particular hazards or areas which should be given special attention:



Note

This symbol highlights anything which would be of particular interest to the reader or provides extra information outside of the current topic.



Important

When this is shown there is potential to cause harm to the device due to static discharge. The components should not be handled without appropriate protection to prevent such a discharge occurring.



Caution

This highlights areas where extra care is needed to ensure that certain delicate components are not damaged.



Warning

DANGER OF INJURY TO SELF OR OTHERS

Where this symbol is present there is a serious risk of injury or loss of life. Care should be taken to follow the instructions correctly and also conduct a separate Risk Assessment prior to commencing work.

Help & Support

First please read this manual thoroughly (particularly the Troubleshooting section, if present). If a warranty is applicable, further details can be found in the Warranty Statement, 0080-STF-00139, available upon request.

Tritech International Ltd can be contacted as follows:



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Prior to contacting Tritech International Ltd please ensure that the following is available:

1. The Serial Numbers of the product and any Tritech International Ltd equipment connected directly or indirectly to it.
2. Software or firmware revision numbers.
3. A clear fault description.
4. Details of any remedial action implemented.



Contamination

If the product has been used in a contaminated or hazardous environment you must de-contaminate the product and report any hazards prior to returning the unit for repair. Under no circumstances should a product be returned that is contaminated with radioactive material.

The name of the organisation which purchased the system is held on record at Tritech International Ltd and details of new software or hardware packages will be announced at regular intervals. This manual may not detail every aspect of operation and for the latest revision of the manual please refer to www.tritech.co.uk.

Tritech International Ltd can only undertake to provide software support of systems loaded with the software in accordance with the instructions given in this manual. It is the customer's responsibility to ensure the compatibility of any other package they choose to use.

Introduction

Tritech's latest Digital Precision Altimeter MKII offers a host of additional features along with the existing range of available connector and output options. Utilising Tritechs proprietary signal processing engine to provide millimetre accuracy, the devices now features an inclinometer that can compensate for attitude change on altimeter measurements in realtime. Software configurable digital and analogue outputs allow the device to be integrated to a wide range of interfaces (including seamless operation within Tritech Genesis, Seanet or AltTest software). Compatibility with PC, data-loggers, multiplexers and industrial 4-20 mA interfaces are included as standard. The new Altimeter MKII is fully backwards compatible with the previous PA sensor range.

The Altimeter MKII makes use of Tritech's proprietary signal processing engine. The altimeter actively filters acoustic noise generated by other subsea equipment to offer accurate and reliable target detection in the harshest of environments.

Technical Specifications



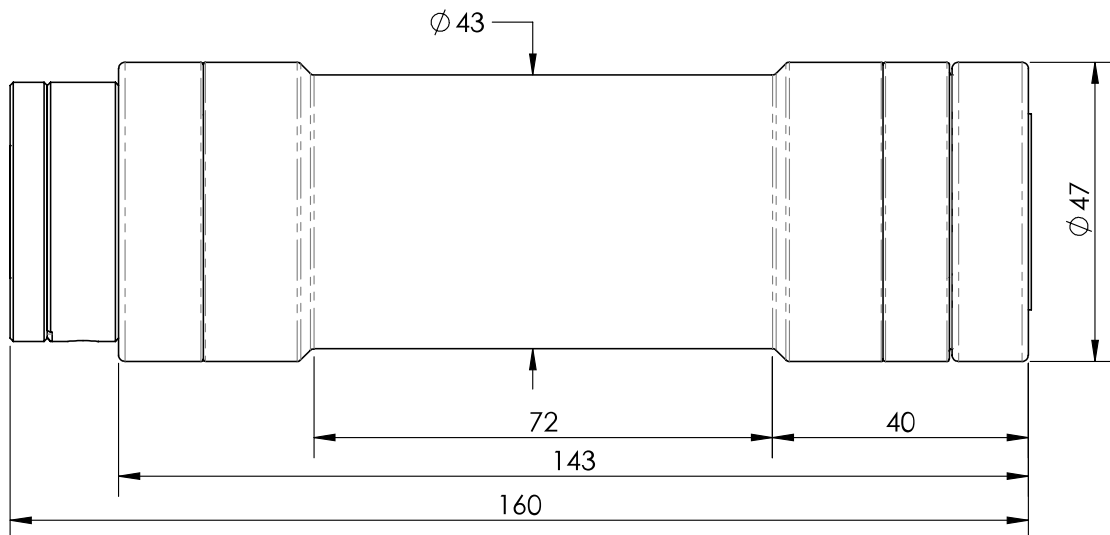
Tritech International Ltd reserves the right to change, modify and update designs and specifications as part of their ongoing product development program.



The standard ***Tritech International Ltd*** 6-pin connector is rated to a maximum depth of 4000m, any deep rated altimeters (up to 6800m) will be fitted with different connectors.

Dimensions

Straight Stainless Steel - 4000m

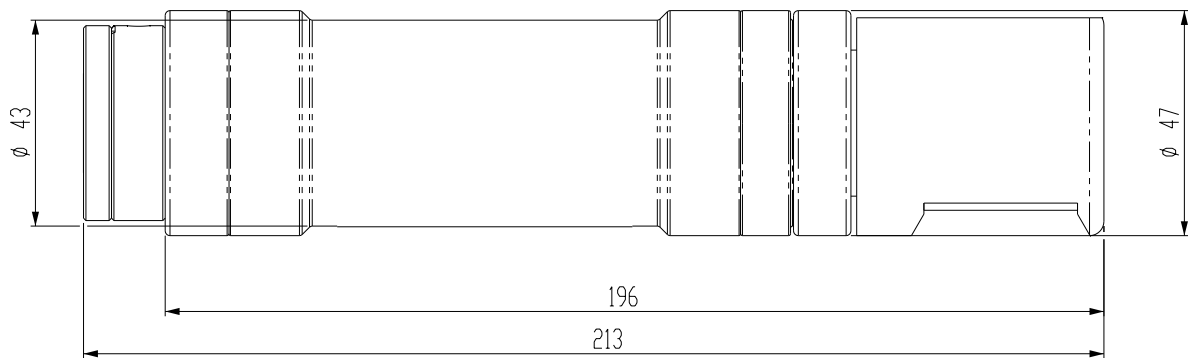


Drawings are not to scale. Dimensions in millimetres (mm) unless otherwise stated.

Right Angle Delrin, Aluminium 700m - 4000m



Right Angle Stainless Steel - 4000m



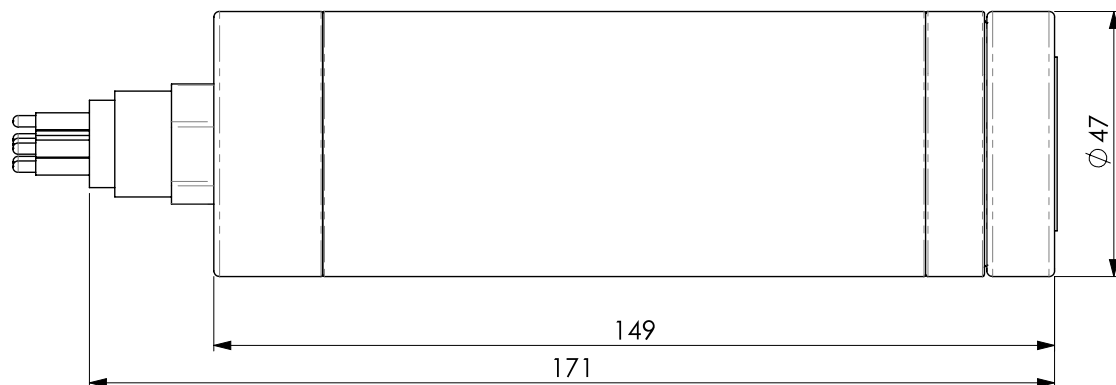
Straight BHXM 4000m - 6800m



Straight XSG-X-BCL 700m - 4000m - 6800m



Straight MCBHXM 700m - 4000m - 6800m



Specifications

Acoustic				
	PA200		PA500	
Operating Frequency	200 kHz		500 kHz	
Beamwidth	20° conical		6 ° conical	
Peak Source	187 dB re 1 µPa @ 1 m		197 dB re 1 µPa @ 1 m	
Pulse Length	300 µs		100 µs	
Range	0.7 m to 50 m	1 m to 100 m	0.3 m to 50 m	0.1m to 10 m
Inclination accuracy	± 0.5°			
Digital resolution	1 mm			
Analogue resolution	0.001% of range (0 to 10 Vdc) or 0.003% of range (0 to 5 Vdc)			

Electrical and communications	
Power supply	9-50 Vdc (< 2 W @ 12VDC) *
Analogue output	0 to 10 Vdc (with ≥24 V power supply) 0 to 5 Vdc 4 to 20 mA
Serial data communications	RS232 or RS485 (4822 to 115200 baud)
Output modes	Free running, interrogated or part of multidrop network

Physical specification					
Materials	Delrin™	Aluminium	Aluminium R/A	Stainless Steel	Titanium <i>Grade 6Al-4V</i>
Weights	0.42 kg in air, 0.15 kg in water	0.57 kg in air, 0.3 kg in water	0.67 kg in air, 0.29 kg in water	1.15 kg in air, 0.8 kg in water	See Tritech for information
Depth Rating	700 m with Delrin™ housing (aluminium alloy endcap)	4000 m All right-angle transducers are ABS (part 1 in Appendix A – Parts List)		4000 m standard (6800m On request	6800m
Operating temperature	-10 to 50°C				
Storage temperature	-20 to 60°C				

* See Appendix F – Altimeter Power Consumption for more details.

Connector specifications

Standard altimeters up to 4000m depth rating are fitted with Trittech International Ltd 6-pin connectors and are the most common variant of altimeter supplied by Trittech International Ltd. There are a large variety of options available in terms of connectors and it is outwith the scope of this manual to cover every configuration possible. Other connectors that have been supplied include:

- Burton 1508
- Seacon 1508
- Branter SeaCon XSG-4/XSG-5
- Subconn:
 - BH4-F
 - BH6-M
 - BH8-M
 - IL6-FS
 - MCBH4-M SS
 - MCBH5-M
 - MCBH6-F

For each of the above a variety of wiring schemes has been used and so it will be necessary to contact Trittech International Ltd for a detailed description of the product supplied (provided serial numbers are available). The list is not exhaustive and there may be special items or other connectors that are not included.

Installation

Communications Protocols

This section details communication information that should be taken into consideration prior to installation.

Serial Communications

In serial mode the Altimeter MKII sends text data either in the RS232 or RS485 protocol.

Unlike the Altimeter MKI which had a fixed serial speed of 9600 baud, the serial speed of the Altimeter MKII can be adjusted. It is important to note that the UART (Universal Asynchronous Receiver/Transmitter) within your serial converter will determine the maximum speed that you can theoretically send and receive data. Older systems had a baud rate ceiling of 115200 bps, whereas the Altimeter MKII is capable of baud rates of 460800 bps.



The minimum baud rate for the effective use of the Scanline display in Genesis is 115200 in both RS232 and RS485

RS232

The RS232 signal on the Altimeter MKI has the signal ground on two pins, the 0VDC line and the Analogue voltage line (when it is not in use). This allows the altimeter to be set in RS232 only mode and connect directly to the aux port of a Trittech Seaking device with a standard Trittech double ended connector. This Allows for easier connectivity to other Trittech products.

For the RS232 signal for on the Altimeter MKII the baud rate range is 2400 – 115200. The cable length limit for a 115200 baud altimeter is 15m.

RS485

This is the preferred serial option for the Altimeter MKII as it allows for the fastest data speeds at longer cable lengths than RS232. This is the option for the best overall performance.

For the RS485 signal for on the Altimeter MKII the baud rate range is 2400 – 460800.

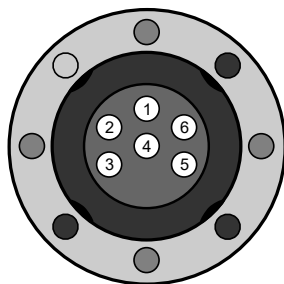
Standard Pin-Out Diagrams



The power supply to the altimeter should be turned off before making a physical connection.

The Altimeter MKII can operate in RS232, RS485 serial mode, analogue mode and as a current loop device. Analogue and serial modes can run on the same device with the analogue output signal on Pin 5. The pin out configurations are shown below for each type.

RS232 without Analogue (Default)



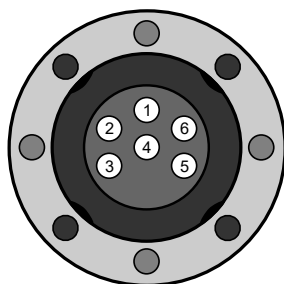
Tritech Waterblock

Pin	Function	Wire Colour
1	RS232 Tx	Yellow
2	RS232 Rx	Blue
3	+ V DC	Red
4	0V	Black
5	RS232 Ground	Green
6	Chassis Ground	Cable screen



Pins 4 and 5 are linked so an older MKI analogue cable will also work. It also allows for the direct connection to a Seaking sonar AUX port in RS232.

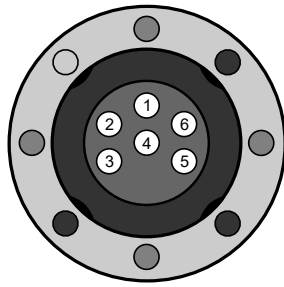
RS232 with Analogue



Tritech Waterblock

Pin	Function	Wire Colour
1	RS232 Tx	Yellow
2	RS232 Rx	Blue
3	+ V DC	Red
4	0V, RS232 Ground, Analogue Ground	Black
5	Analogue Output	Green
6	Chassis Ground	Cable screen

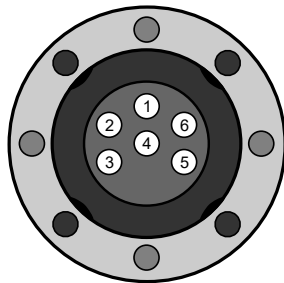
RS485



Tritech Waterblock

Pin	Function	Wire Colour
1	RS485 A	Yellow
2	RS485 B	Blue
3	+ V DC	Red
4	0V Analogue Ground	Black
5	Analogue Output (optional)	Green
6	Chassis Ground	Cable screen

Current Loop (4-20mA)



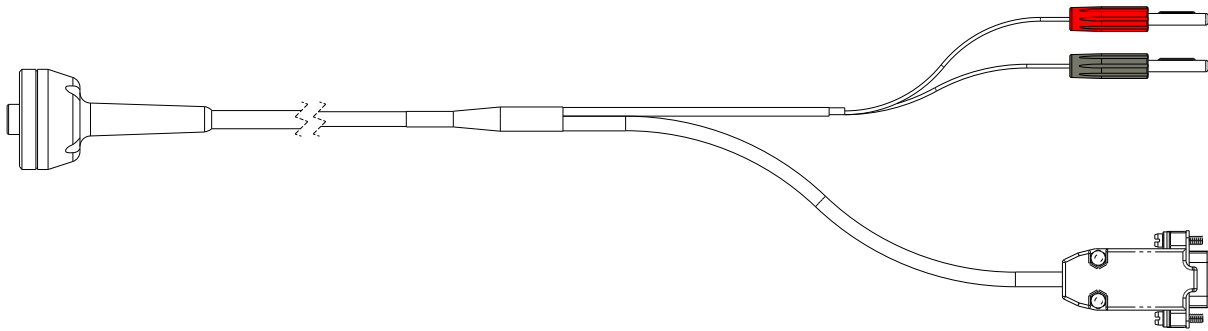
Tritech Waterblock

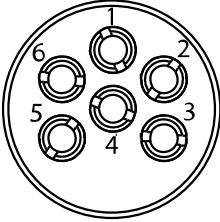
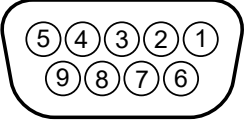
Pin	Function	Wire Colour
1	+ Current Loop	Yellow
2	- Current Loop	Blue
3	+ V DC	Red
4	0V Analogue Ground	Black
5	Analogue Output (optional)	Green
6	Chassis Ground	Cable screen

Example Test Cables

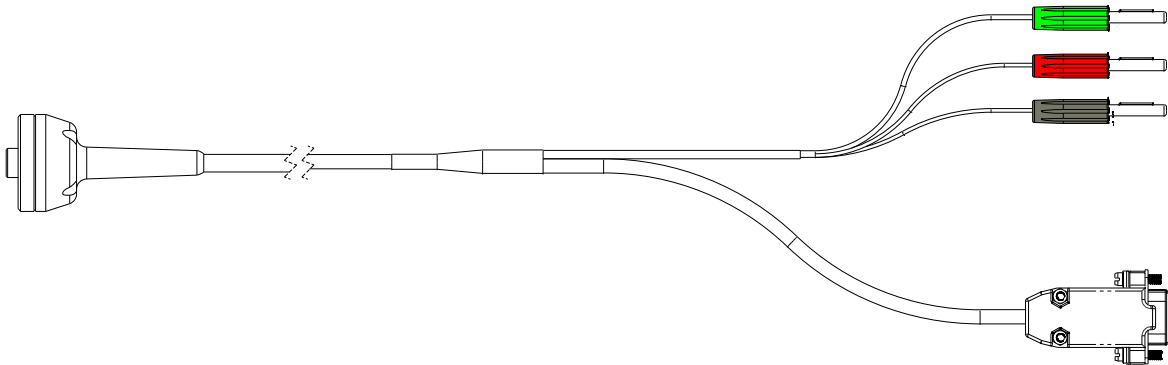
Some examples of test cabling wiring are show in this section to highlight the change in pinouts when an analogue voltage output is enabled. With the analogue disabled the Altimeter MKII has a more traditional RS232 ground arrangement.

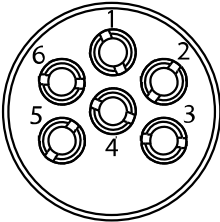
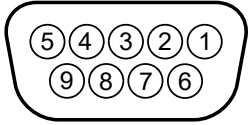
RS232 & RS485 (No Analogue)



Trittech Connector				Banana Plugs	DB9 Connector (face view)	
	Pin No	Cable Colour	Signal		Pin No	
 Face view	1	Yellow	RS232 Tx / RS485 A		2	 Face view
	2	Blue	RS232 Rx / RS485 B		3	
	3	Red	+V DC	Red		
	4	Black	0V DC	Black		
	5	Green	RS232 GND		5	
	6	Shield	Shield			

RS232 & RS485 with Analogue



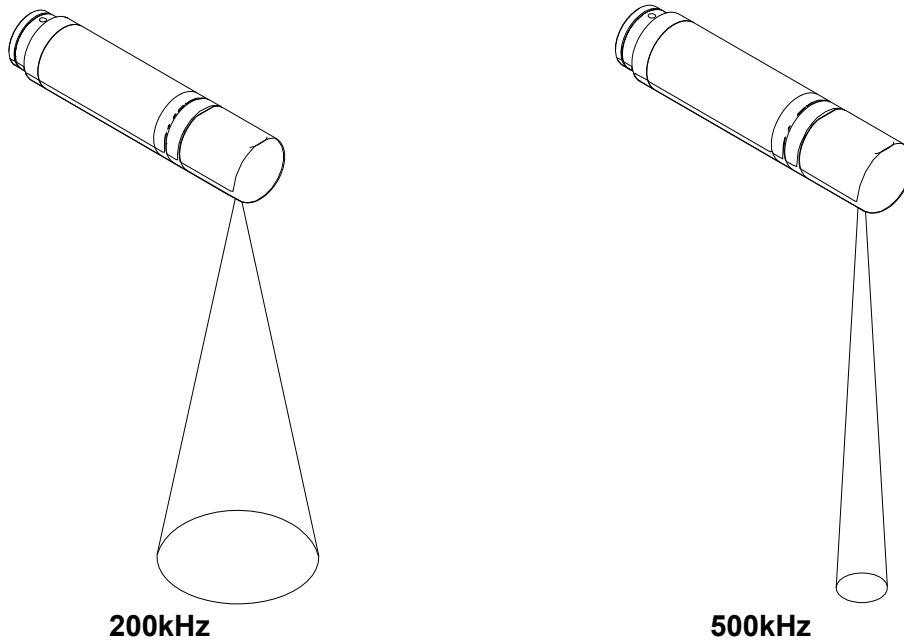
Trittech Connector				Banana Plugs	DB9 Connector (face view)	
	Pin No	Cable Colour	Signal		Pin No	
 Face view	1	Yellow	RS232 Tx / RS485 A		2	 Face view
	2	Blue	RS232 Rx / RS485 B		3	
	3	Red	+V DC	Red		
	4	Black	0V DC RS232 GND	Black	5	
	5	Green	Analogue Output	Green		
	6	Shield	Shield			

Mechanical Installation

Orientation

For ROV installations where the altimeter is used for altitude, always mount the altimeter so that it is as close to the true vertical as possible (or horizontal for a right angled altimeter), in relation to the trim position of the vehicle. The transducer head should be clear of obstructions and possible sources of interference, such as the wake from thrusters or from electrical devices that may have high electromagnetic emissions. Errors in the head alignment can give rise to unreliable results.

The images below show the right angle altimeter but the beam is the same for the straight altimeter. The beam transmits from the middle of the transducer in a conical pattern.



Mounting Material and Suitable Brackets



Avoid any metal alloys containing copper such as brass or bronze

Non-metallic clamps should always be used where possible to prolong the life of the unit and prevent any galvanic corrosion effects. If metallic clamps are used they should be electrically insulated from the Altimeter MKII by means of rubber or plastic strips or mount brackets of at least 3mm thickness and extending at least 3mm beyond the clamp boundary. They should also be painted or lacquered with at least three coatings.

Long Term Use



The stainless steel Altimeter MKII is not designed for long-term submersion and may suffer from corrosion if left underwater or in a splash zone for extended periods. Refer to the maintenance section for appropriate care.

Operation

Main body Label

All altimeters will be fitted with a label on the body details the original settings that the unit was built with. The details of the label are as follows:

Tritech
Altimeter MKII

1

Model:
Depth:
Housing:
Connector:

2

Centre Frequency:
Operating Range:

3

Supply Voltage: 9-50 Vdc
Comms Mode: Serial ☐ 4-20 mA ☐ TTL ☐

Analogue Output: None ☐ 0-5 V ☐ 0-10 V ☐

No Return Output: MNE ☐

4

S/N:

UK CA CE

1 Physical Characteristics

Details pertaining to the mechanical specifications of the Altimeter MKII.

2 Frequency Information

The Acoustic specification of the Altimeter MKII.

3 Electrical Connection Information

The output settings for the altimeter to allow for the electrical connection of the Altimeter MKII to users systems.

4 Serial Number

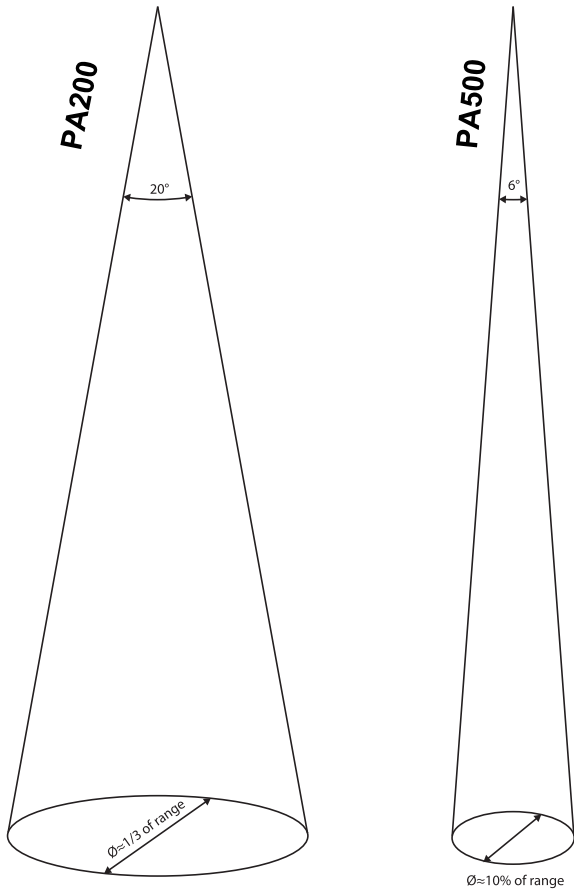
This is the part number and the serial number of the Altimeter MKII. This is in the format XXXXX.YYYYYY.

Where X is the part number of the altimeter and Y is the unique serial number.

If you are unsure of your specifications please contact Tritech Support on the details in the Help & Support section.

Beam Coverage and Range

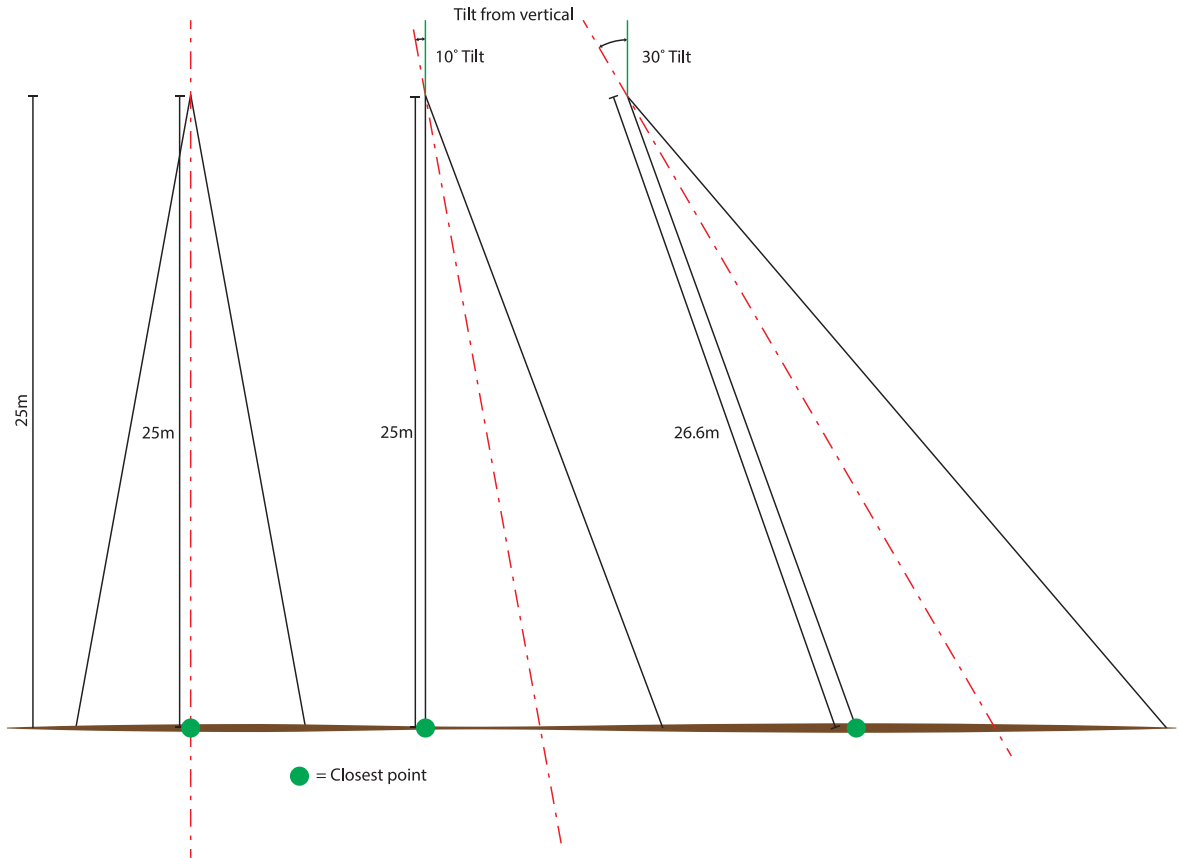
The Altimeter MKII will post an altitude for the first valid return that it receives. The wider the beam angle then the more coverage the altimeter has. This means that if the bottom is undulating then it will pick up the first return which could lead to some variation in readings. It also has the advantage that if the unit is pitched/tilted it will always read the vertical value as this is the closest to the altimeter. The wider the angle the less sensitive the altimeter is to changes in pitch and roll. For example the PA500 is only accurate in to 3 degrees of pitch and roll whereas the PA200 is accurate to 10 degrees.



Beam Pattern vs Range

Range (m)	Footprint Diameter (m)	
	PA500	PA200
1	0.1	0.4
5	0.5	1.8
10	1.1	3.5
20	2.1	7.0
30	3.1	10.6
40	4.2	14.1
50	5.2	17.6
70		24.7
100		35.3

An example of a pitch affecting a PA200 altitude readings



Output formats

The serial output is either interrogated (i.e the software asks for a response) or is freerunning and will continuously send out acoustic pulses and supply the output from the Altimeter MKII to the connected computer even if the software is not running. The output is an ASCII data string terminated with a carriage return and line feed (<CR><LF>) and can be in one of the following formats depending on the hardware settings.

2P2	<pre>xx.xxm<CR><LF></pre> xx.xxx = range in metres to 3 decimal places m = units label for metres <CR><LF> = carriage return and line feed terminators.
2P3	<pre>xx.xxxm<CR><LF></pre> xx.xxx = range in metres to 3 decimal places m = units label for metres <CR><LF> = carriage return and line feed terminators.
3P2	<pre>xxx.xxm<CR><LF></pre> xxx.xx = range in metres to 2 decimal places m = units label for metres <CR><LF> = carriage return and line feed terminators.
3P3	<pre>xxx.xxxm<CR><LF></pre> xxx.xxx = range in metres to 3 decimal places m = units label for metres <CR><LF> = carriage return and line feed terminators.
NMEA \$PADBT	<pre>\$PADBT,xxx.xx,f,yyy.yy,M,zzz.zz,F*hh<CR><LF></pre> xxx.xx is the range in feet yyy.yy is the range in metres zzz.zz is the range in fathoms hh is an 8-bit checksum <CR><LF> = carriage return and line feed terminators
NMEA \$SDDBT	<pre>\$SDDBT,xxx.xx,f,yyy.yy,M,zzz.zz,F*hh<CR><LF></pre> xxx.xx is the range in feet yyy.yy is the range in metres zzz.zz is the range in fathoms hh is an 8-bit checksum <CR><LF> = carriage return and line feed terminators
TSS	<pre>Rxx.xx<CR><LF></pre> (truncates to 99.99)

LAN Interrogate Yxxx.xxxm<CR><LF>
Y = ASCII interrogation character, A-H
xxx.xxx = range in metres to 3 decimal places
m = units label for metres
<CR><LF> = carriage return and line feed terminators

BATHY Bathy output format

POM \$POM,xxx.xxxm,

In free running mode the unit will start to output data immediately upon power up (the data rate is about 10Hz for a PA500 or 7Hz for a PA200). If the Altimeter MKII has been set to interrogate mode it will not output data until the interrogate command (Z) is received, at which point a single data string is transmitted to the surface computer.

To confirm which mode the Altimeter MKII is in a simple test is to power on the unit and listen for any audible clicks or pings. In free running mode the Altimeter MKII will start pinging as soon as it receives power but in interrogated mode it should remain silent.



NEVER place the transducer close to the ear to listen for the clicks. Doing so could result in permanent damage to the eardrum. Always remain at least 15cm away from the transducer.

Accelerometer

The accelerometer within the Altimeter MKII is a complete 3-axis acceleration measurement system. It measures both dynamic accelerations resulting from motion and static acceleration.

Deflection of the structure is measured using differential capacitors that consist of independent fixed plates and plates attached to the moving mass. Acceleration deflects the proof mass and unbalances the differential capacitor, resulting in a sensor output whose amplitude is proportional to acceleration. Phase-sensitive demodulation is used to determine the magnitude and polarity of the acceleration.

Unlike a Motion Reference unit, the accelerometer measures the tilt with respect to gravity so there is no direction (tilt, yaw). This has the advantage that the Altimeter MKII can be mounted with any rotational offset.

Fish Filter

The fish filter averages the last 3 readings and if the next reading is out with 2% of the range of the average the value is rejected and the last value used.

Slant Range Correction

The slant range correction will slant range correct the output with the limits being $\pm 45^\circ$



Slant range correction is only applicable on straight altimeters.

Modes Of Operation

The instrument has three main modes of operation. These modes are:

- Serial (RS-232/RS-485)
- TTL Trigger
- 4-20mA Current Loop

Serial and TTL trigger are software selectable. '4-20mA Current Loop' is hardware selectable by means of DIP switch inside the unit.

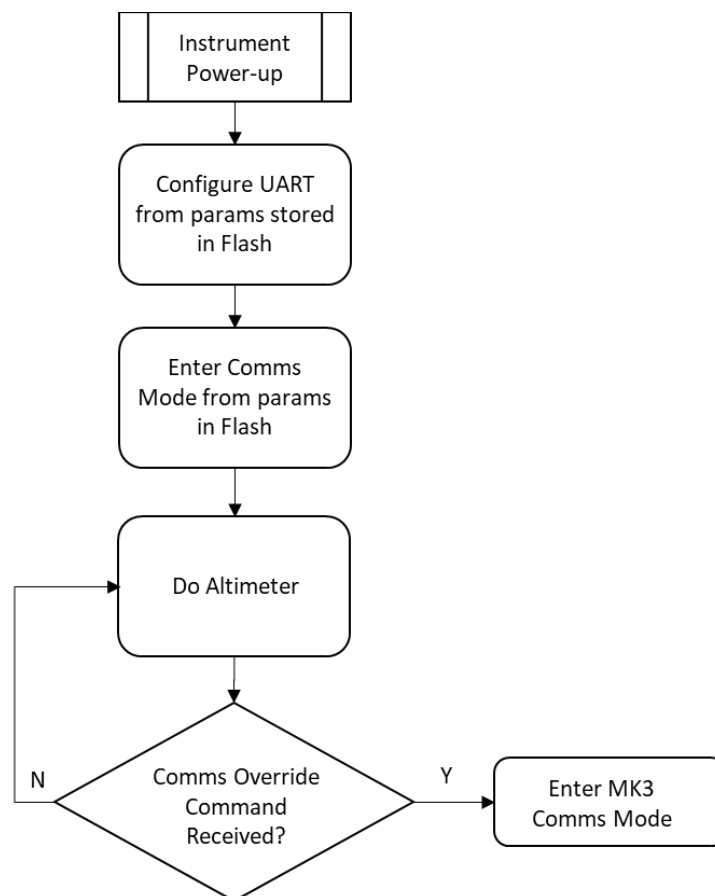


When the instrument is operating in '4-20mA Current Loop', the instrument can only be reconfigured if its switched back into Serial Mode.

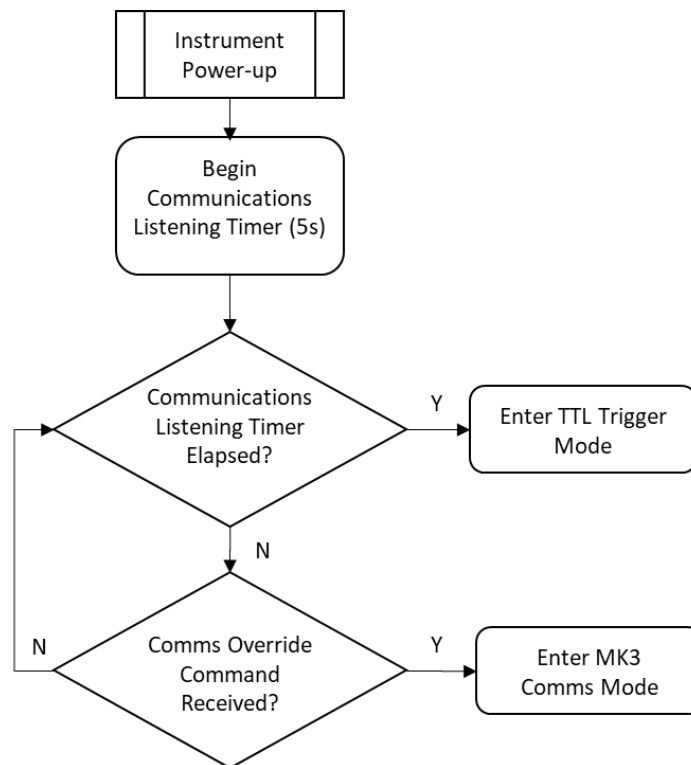


The internals of the Altimeter MKII are electrostatically sensitive. Antistatic precautions should be in place whilst the unit is open and the boards are handled.

Serial Mode Startup Operation

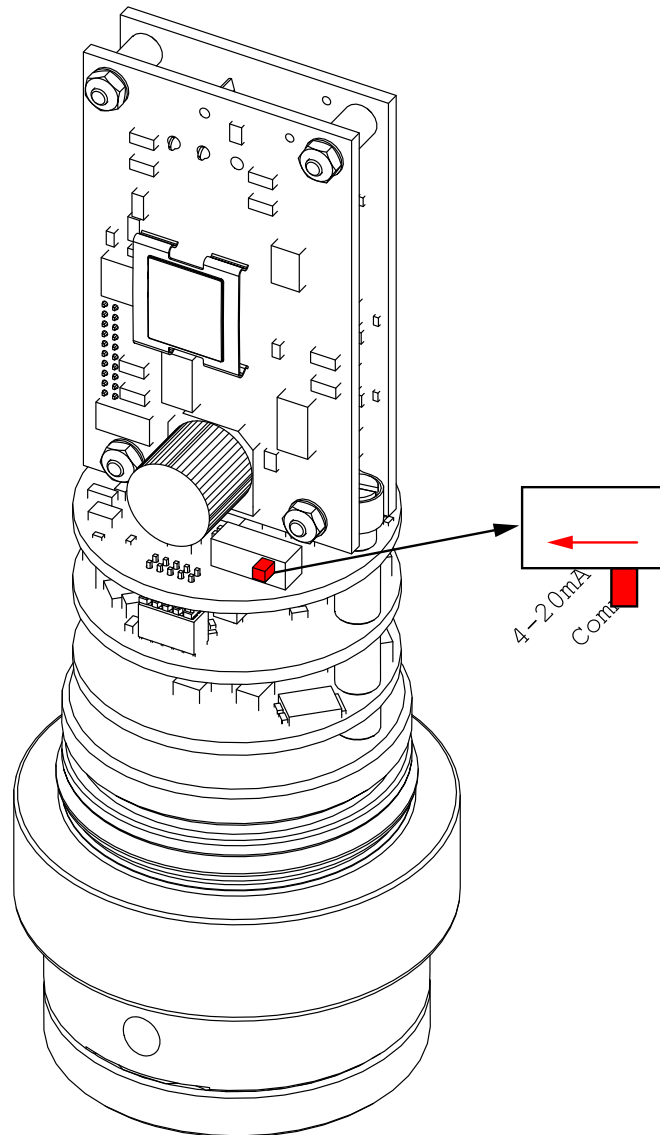


TTL Mode Startup Operation



4-20mA Mode Operation

To enable the 4-20mA output the Altimeter MKII will need to be opened and the hardware switch on the INT PCB moved to the 4-20mA position. This moves the unit to 4-20mA only operation.



The 4-20mA on the Altimeter MKII is driven from the power supply within the altimeter rather than loop powered from the 4-20mA circuit

Default Communication Settings

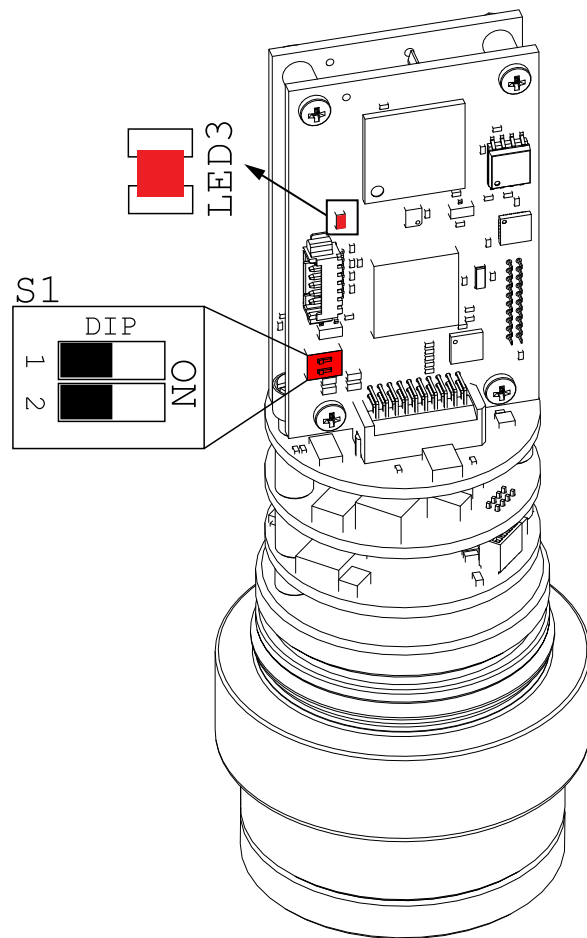
The default communications mode for the instrument is as follows:

- Serial Protocol: RS-232
- Baud Rate: 115200 baud
- 3P3 'Z' Interrogate

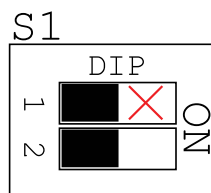
This is the mode the instrument will return to should Switch 2 on S1 (Comms def) on the DSP PCB be operated to reset the communications.

The process for resetting the comms is

1. Power down the Altimeter MKII.
2. Move SW2 on S1 to the ON position.
3. Power up the Altimeter MKII and wait till LED 1 begins to flash.
4. Power down the Altimeter MKII
5. Move SW2 on S1 to the OFF position.



Do not move SW1 [Force def] to the ON position. This will force reset the internal programming and delete operational settings. The unit will not operate without reprogramming by Tritech International.



Force def.

Comms def.

The wiring for the default settings can be found in RS232 Default (No Analogue)

Fault Finding

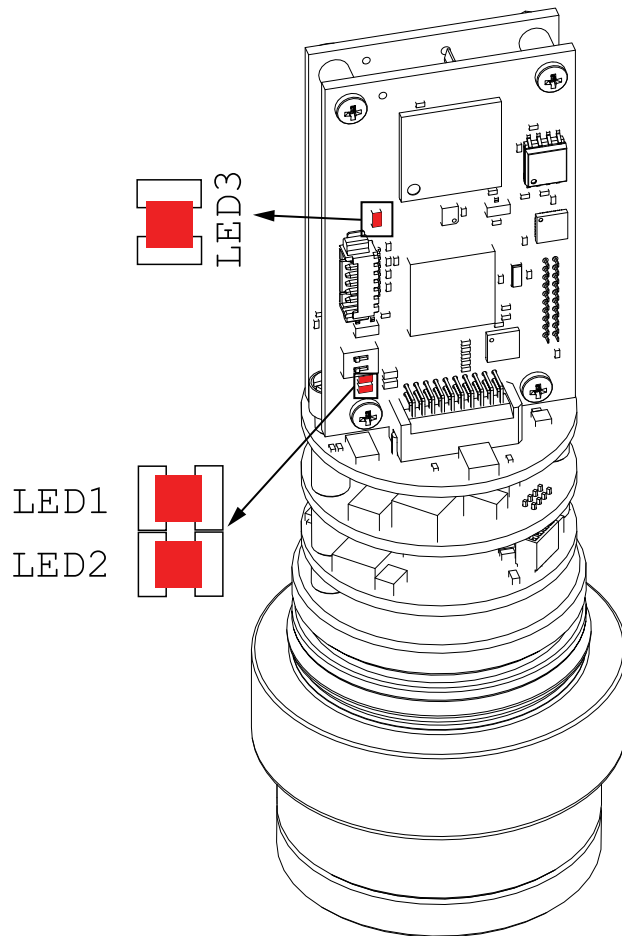
These are basic checks to ensure that the unit is powered up and in a ready mode.



The PCB stack within the Altimeter MKII is electrostatically sensitive. Antistatic precautions should be in place whilst the unit is open and the boards are handled.

Follow the Maintenance guide (Maintenance Procedure) on how to open the unit the altimeter to access the internals.

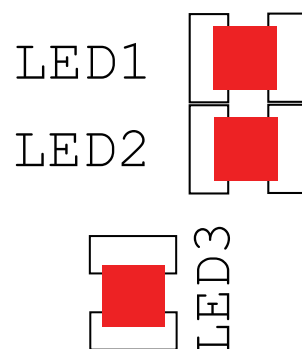
From there you can see the internal function LEDs



LED1 – This toggles at 1Hz once the instrument has booted up.

LED2 – Toggles state on reception of a message and/or ping

LED3 - This is constantly illuminated during normal operation.



Ground Fault Monitoring Systems

The Altimeter MKII is not fitted with line ground surge protection fitted at point of sale. This can be added in on request. The line-to-line surge protection is fitted and set at 56VDC.

If the line-to-ground surge protection fitted then users need to be aware that the supply ground can only be raised such that the positive supply voltage does not exceed 56 VDC else the protection resistors will conduct to chassis.

There is also a 470nF capacitor fitted between ground and chassis.

Maintenance Procedure

The aim of this section is to outline recommendations and general procedures for the periodic and preventative maintenance covering Tritech PA series Altimeters, MKI and MKII. Although these maintenance procedures are specific to the PA 200 and 500 series of Altimeters, the guidelines and general recommendations are valid for other models of Tritech PA Altimeter.

It is assumed that the persons carrying out these procedures have the required level of mechanical and electrical/electronic skills to complete all of the tasks safely and without damage to the mechanical or electronic parts of the equipment.



The internals of the Altimeter MKII are electrostatically sensitive. Antistatic precautions should be in place whilst the unit is open and the boards are handled.



Every time the altimeter is retrieved from the water it should be washed with a mild soap solution to clear any marine growth and inspected for signs of damage.



Alternative configurations may have additional serviceable items, if in doubt please contact Tritech International Ltd to establish the correct service routine



It is essential to have a regular maintenance schedule so that any defects arising from corrosion or erosion can be spotted early and corrected before they cause severe damage to the unit.



Care should be taken when inspecting the altimeter with a Delrin housing material due to the internal copper earth shield. This shield can be easily damaged by the PCB during disassembly and subsequent re-assembly.

Equipment Overview

The PA Series Altimeters are made up of 5 main parts:

- Tritech Bulkhead Connector
- Altimeter End Cap
- Altimeter electronics assembly which is mounted to the underside of the End Cap
- Altimeter Body Tube
- Altimeter Transducer assembly

There is an O-ring located behind the threads on the End Cap and Transducer Assembly that seals against the inside of the Body Tube when assembled. A smaller O-ring seals between the top face of the End Cap and the bottom of the Tritech Bulkhead Connector.

These three O-rings provide the pressure seal for the instrument and protect the electronics assembly from water ingress.

Pre Deployment Checks

Ensure there is no visible damage to the Transducer face, Bulkhead Connector or the external parts of the altimeter.

Check that the set screws attaching the Bulkhead Connector to the End Cap are tight and made up to the appropriate torque (1.5 N.m) using a 3mm hex driver or similar. The M4 socket head set screws are located under the tapped holes in the top of the Bulkhead Connector indicated in the right hand photograph.

Check that the threads between the End Cap, Body Tube and Transducer Assembly are fully made-up with no gaps visible between the parts.



Location of the set screws attaching the Bulkhead Connector

Post Deployment Check

The altimeter should be washed down with fresh water and may be cleaned by hand using a cloth or soft bristle brush and mild non bleach detergent if required.

The unit should be fully dried and the pre deployment checks repeated before returning to storage or refitting.

Periodic Maintenance and Inspection

The following are recommendations and should be used as a guide. The frequency and extent of any inspection and maintenance activities will be related to the operational demands, storage and working environment of the unit. All procedures should be read and fully understood prior to the start of any inspection or maintenance activities. Trittech recommend the following as best practice:

The unit be cleaned, inspected for any damage or water ingress and the O-ring seals replaced on the main Body Tube threads and Bulkhead Connector every 12 months.

If used for frequent short duration jobs then the unit should be washed down with fresh water and visually inspected after each operation. The condition of the O-ring seals and internal components checked every 4-6 months.

If the unit is used for an extended period of time or at depths close to the maximum rating (above 70-80%) inspect the unit for damage to the seals or evidence of water ingress after each job or as often as practicable.

Inspection and Replacement of the Body Tube O-Rings



PA Altimeter with the End Cap and Transducer unscrewed the Body Tube O-Rings are marked with arrows

1. Hold the unit on the Altimeter Housing and carefully unscrew the Transducer Assembly from the end of the altimeter. The housing should be held with non marking grips or a non metallic strap wrench with care taken not to crush the part. The Transducer Assembly should be unscrewed by hand or using a non metallic strap wrench as required.
2. Check to ensure there is nothing to obstruct the electronics assembly rotating within the Housing.
3. Using the same method as for the Transducer Assembly, unscrew and remove the End Cap and electronics assembly from the Housing.
4. Carefully remove the O-rings from the grooves on the Transducer Assembly and End Cap ensuring not to damage the O-ring or scratch the sealing surface of the O-Ring groove. If the O-rings are in good condition and not scheduled for replacement they can be reused.
5. Examine the parts for damage or evidence of water ingress. Particular attention should be made to the inner seal surfaces on the O-ring grooves and the O-ring sealing surfaces on the inside of the Body Tube.
6. Before assembly ensure that all parts are free of any debris, clean and completely dry. To ensure the minimum amount of moisture is trapped inside the unit after assembly Trittech recommend the assembly be carried out in a warm and dry environment if possible.
7. Ensure the O-rings, seal faces, threads and thread shoulder faces are coated with a light covering of silicon grease (MOLYKOTE 111 or equivalent).
8. Ensure the O-rings are fully seated in the grooves and not twisted.
9. Carefully insert the electronics assembly into the Body Tube and screw the End Cap to the Body Tube by hand only. The thread will make up fully by hand until the shoulder faces make contact. This will force a small amount of the silicone grease out between the parts.

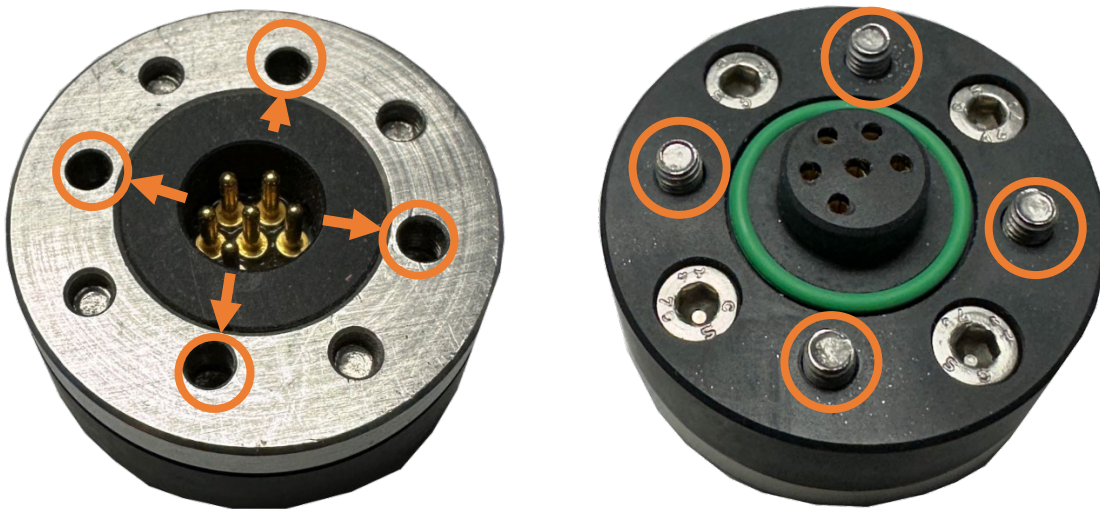
Repeat the previous method (steps 7 to 9) to screw the Transducer Assembly onto the bottom of the Housing.

For Aluminium and Stainless Steel units additional tightening torque can be applied to the threads if required. Hold the Body Tube in place using a non metallic strap wrench and apply a tightening torque of 3.5 N.m using an additional non metallic strap wrench to the End Cap and Transducer Housing.

It is recommended that a mark be made across the thread connection using a permanent marker or by using a waterproof anti-tamper seal. This provides a simple and quick visual indication of either thread loosening during operations.

Inspection and Replacement of the Trittech Bulkhead Connector O-Rings

The O-ring between the Bulkhead Connector and End Cap should be inspected and replaced with the same frequency as the Body Tube O-rings. The set screws that secure the connector to the End Cap are located under and accessed through the 4 free tapped holes in the metal ring on the top of the Bulkhead Connector.



Photographs of the top and bottom of the Bulkhead Connector, the securing screws are highlighted by the arrows. Note the location of the green O-ring on the bottom of the Bulkhead Connector

The above photos show the full assembly of the Trittech Bulkhead Connector. The M4 socket head set screws that attach the connector to the Altimeter End Cap are shown by arrows. It is not necessary to remove the metal ring from the Bulkhead Connector during routine inspection or field service.

1. Locate the securing screws using a 3mm hex driver or key inserted carefully through the free tapped holes in the top of the connector (see above photos).
2. To remove the connector loosen each set screw by half a turn (180 deg) per screw. Repeat this until the connector has been fully released from the top of the End Cap. This will allow inspection of the seal faces and replacement of the O-ring if necessary. The O-ring forms a pressure tight seal against the top face of the End Cap and so the cleanliness and surface finish of this item in the area underneath the connector is critical.
3. Before refitting the connector the sealing surfaces and O-ring should be coated with a light covering of silicon grease (MOLYKOTE 111 or equivalent).

4. Place the Tritech Water-Block in the correct orientation to line up the electrical contacts and secure by tightening the four set screws under the threaded holes in the metal connector ring.
5. The set screws should be tightened half a turn (180 deg) at a time around the four screws until fully secured. The set screws should be tightened by hand to 1.5 N.m torque.

Shipping Information

This section contains information that may be required when shipping the Trittech MKII Altimeter

Commodity Code

HS Number 901580

ECCN Number

6A001

Country of Origin

UNITED KINGDOM

Licence

The Trittech PA Altimeter range are not licensable.

Declaration of Conformity

All up to date Declarations of Conformity can be found on the Trittech website under the Resources section of Support

<https://www.tritech.co.uk/support/resources>

Appendix A – Serviceable Parts List



The internals of the Altimeter MKII are electrostatically sensitive. Antistatic precautions should be in place whilst the unit is open and the boards are handled.

This is a basic parts list to aid with the maintenance and upkeep of the Altimeter MKII.

Item Number	Quantity	Part Number	Description
1	3	S00973	BS4518 0315-30 NBR O Ring
2	1	S00009	BS4518 0161-16 HNBR O Ring GREEN

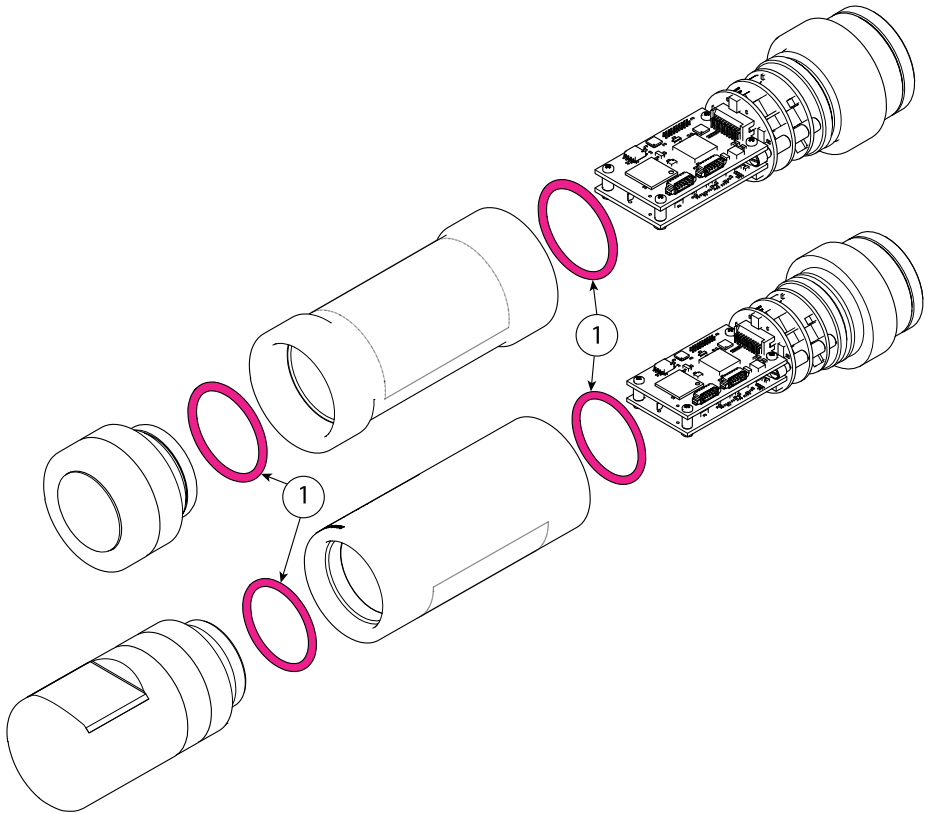
There are four o-rings within the Altimeter MKII which are serviceable items. These are shown here.

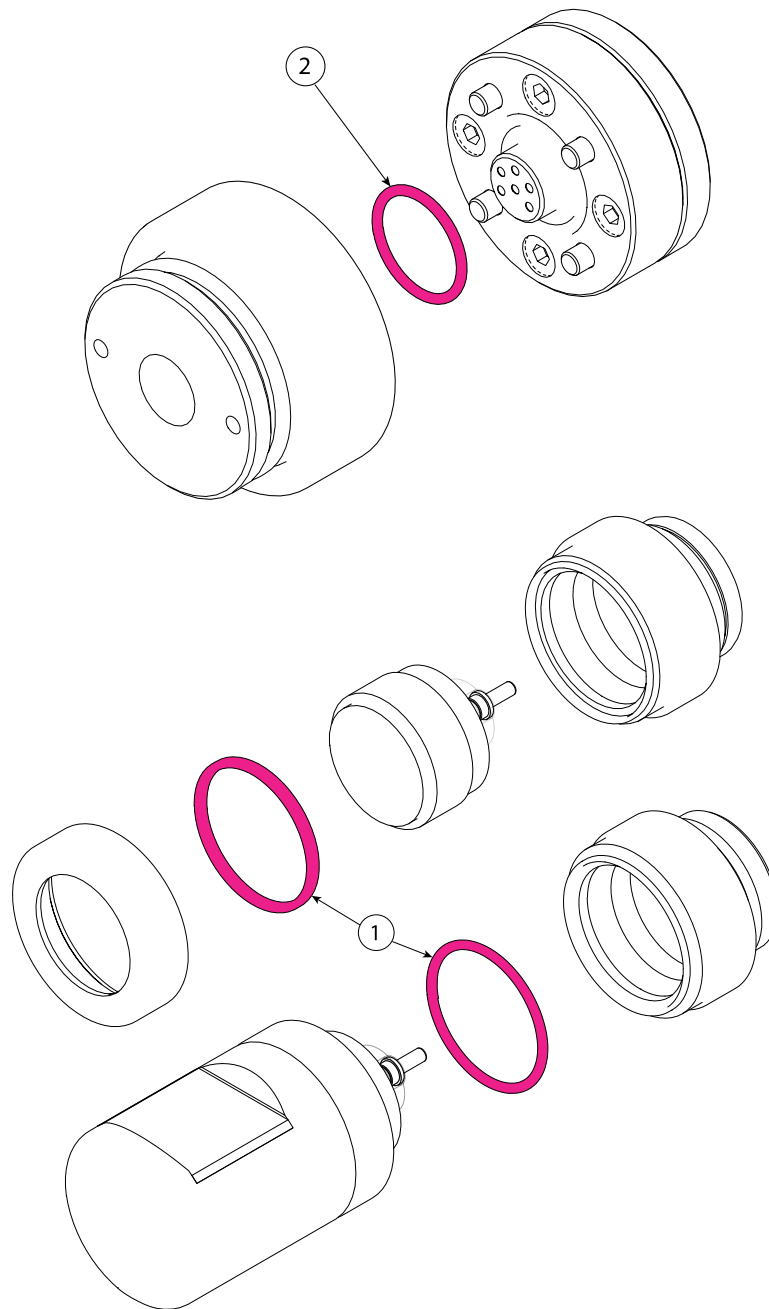


O-rings should be lubricated with Molykote® 111 silicon grease or equivalent.



If o-rings are replaced the Altimeter MKII should be pressure tested to the manufactures recommendations to ensure that the pressure vessel integrity is maintained.





The transducer o-ring (Item 16) is not recommended to be replaced unless during a service at Tritech International or a Tritech Service Centre.

Appendix B – MK3 Comms

MK3 Comms Operation

In order to change the settings or run scanline data for the Altimeter MKII then you first need to place the unit into MK3MODE. This is done by sending the ASCII string

```
MK3MODE<LF>
```



MK3MODE is case sensitive and needs to be send in uppercase with a linefeed.



Line Feeds in this document will be shown as <LF>

Carriage Returns in this document will be shown as <CR>

As soon as the altimeter receives the MKMODE it will be in MK3 mode and respond with

```
MK3MODE OK<LF>
```



If the altimeter is in RS485 and free running it is advised that an ASCII 'z' (0x7A) or 'Z' (0x5A) is sent. This places the RS485 channel on the altimeter into listening mode prior to sending a MK3MODE.

If the instrument is configured for MK3 Comms operation and is configured for RS-232, then the instrument will begin transmitting 'ALIVE' messages at a rate of 1Hz.

These alive messages will be constructed as shown below:

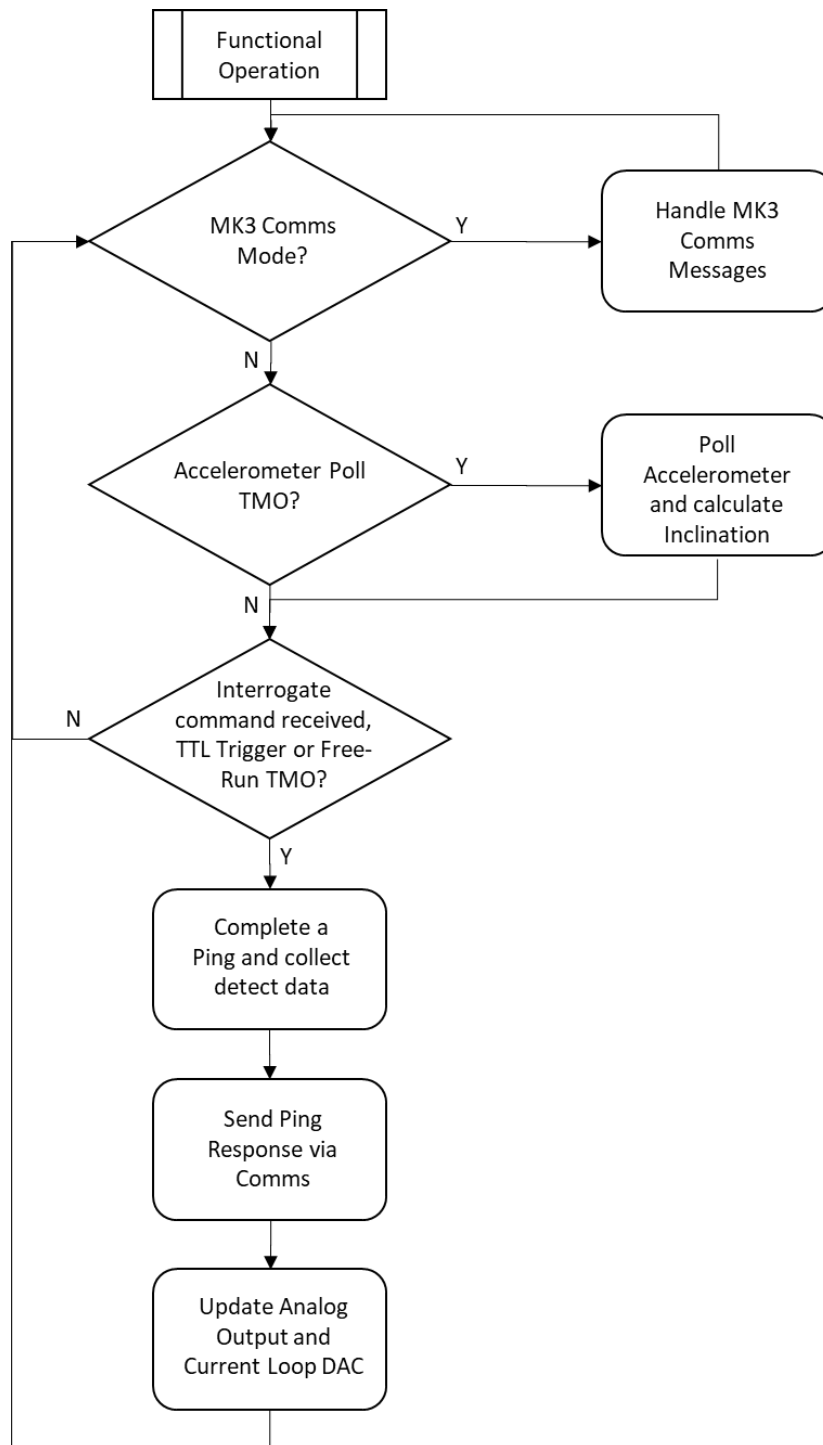
```
ALIVE TIME=nnnnnn SERIAL=xxxxxxxxx NAME="Altimeter MKII"<LF>
```

Command	Description
nnnnnn	Current instrument time in Unix format (seconds since epoch). If the time has not been SET, then the value returned is time since power-on or reboot
xxxxxxxxxx	Unique 10-digit instrument Serial Number

Due to the single-core MCU on the module, any serial message handling (such as programming) will delay the ALIVE broadcasting.

When operating it RS-485 (or half-duplex communications is enabled) the instrument will not broadcast ALIVE messages. They will need to be requested using an ALIVE GET command.

MK3 Comms Flowchart



Command and Responses

Command Encoding

The MK3 comms commands use standard ASCII formatted encoding and are NOT case-sensitive.

Command Structure

The instrument is addressed using terminal-style commands, with global commands structured as follows:

```
COMMAND [OPERATION] [VALUE]
```

Channel specific commands are as above, but with the addition of a channel specifier at the start, such as:

```
CHANNEL COMMAND [OPERATION] [VALUE]
```

Responses from the instrument are structured using the original input command and operation with the value/s (where applicable) appended on the end, separated by spaces. For example, a response to a NAME GET command is shown below:

```
NAME GET "Altimeter MKII"<LF>
```

Many commands utilise the GET or SET operations (e.g. NAME GET returns the friendly name of the module, whereas NAME SET will over-write the module name. Some commands also utilise other standard operations, described in the table below:

Operation	Description
GET	Returns the current value of a parameter
SET	Sets the current value of a parameter.
HELP	Returns help on a command or parameter.
MIN	Returns the minimum allowable value of a parameter.
MAX	Returns the maximum allowable value of a parameter.
DEFAULTS	Returns the 'Factory Default' value of a parameter
UNITS	Returns the units (case sensitive) of a parameter, e.g. m, dB, %, °C. Device communications always use SI units and cannot be switched into other systems.

Any command response that contains encoded data will use the following delimiter characters at the start and end of the data-block:

- “ ” – These are used to contain string data which contains spaces
- [] – These are used to denote data that is Base64 encoded

Commands are finalised by applying a line-feed (<LF> or 0x0A). Carriage-return characters (<CR> or 0x0D) will be ignored if included in the finalisation of a command. If only the command is sent followed immediately by the termination character, the instrument will infer a GET operation response.



Command Timeout - Upon the reception of the 1st character, the remainder of the message/command must be received within 1 second or the command is discarded.

Configuration Commands

Communication Parameters

`COMMS PARAMS` is the command to change the output settings for the altimeter. Adding in a `GET` will return the settings held within the unit and adding a `SET` after params with the commands listed below will set the option. Even sending just a `COMMS PARAMS` to the altimeter will assume a `GET` and reply.

After changing any command you will need to send a `SAVE` to make it persistent in memory.

COMMS PARAMS		
Command	Options	Description
PHYMODE	RS232	Sets RS232 as the comms protocol
	RS485	Sets RS485 as the comms protocol
	TTLTRIG	Sets the altimeter trigger on a TTL pulse ¹
OUTPUTFORMAT	2P2	xx.xxm<CR><LF>
	2P3	xx.xxxm<CR><LF>
	3P2	xxx.xxm<CR><LF>
	3P3	xxx.xxxm<CR><LF>
	BATHY	Bathy output format
	NMEA	\$PADBT,xxx.xx,f,yyy,yy,M,zzz.zz,F*hh<CR><LF>
	NMEA_SDDBT	\$SDDBT,xxx.xx,f,yyy,yy,M,zzz.zz,F*hh<CR><LF>
	TSS	Rxx.xx<CR><LF> (truncates to 99.99)
	POM	\$POM,xxx.xxxm,
	LANINTERROGATE ²	Xxxx.xxxm<CR><LF>
RUNMODE	FREE	The unit starts pinging when power is applied
	INTERROGATE	The unit waits for a ASCII interrogation character
UARTBAUD	2400	The output baud rate of the altimeter
	4800	
	9600	
	19200	
	38400	
	57600	
	115200	
TTLTRIGMODE	RISING	Sets the TTL trigger on the rising edge of the pulse
	FALLING	Sets the TTL trigger on the falling edge of the pulse
TTLTMO	TRUE	Enables a Timeout on the TTL where the unit falls back to Free running if no TTL pulse is received. The Comms will be defaulted to RS232.
	FALSE	The Default for TTL. The unit will wait indefinitely for a TTL pulse
RSTERM	TRUE	Adds 150Ω termination across the RS485 lines
	FALSE	Removes the RS485 termination
SUBNODE	This is the node used when operating in LAN_INTERROGATE or 'DLE_INTERROGATE' mode.	
	For LAN mode, the value can be A, B, C, D, E, F, G or H.	

¹ Analogue Voltage output only. No serial output

² See Appendix C – LAN Interrogate Altimeter



When changing the communication protocol (PHYMODE) the unit will only change protocol when the REBOOT command is sent.
If queried before REBOOT the altimeter will post the communications protocol it has been set too even it being run in a different protocol.



A COMMS SAVE command is requires before REBOOT to make the settings persistent in the altimeter memory.



In TTL mode the unit will wait for 5 seconds before it starts waiting for TTL. In this 5 seconds the altimeter comms are RS232 with the RS232 ground on 0Vdc.

Example 1

You want check the settings on the altimeter

Send	COMMS PARAMS GET<LF>
Receive	COMMS PARAMS GET PHYMODE=RS232 OUTPUTFORMAT=2P3 SUBNODE=0 RUNMODE=FREE RS485TERM=TRUE UARTBAUD=115200 UARTPARITY=NONE UARTSTOPBITS=BITS_1 TTLTRIGMODE=RISING TTLTMO=TRUE SCANLINEENABLE=TRUE <LF>

Example 2

You want to change your altimeter from RS232 to RS485

Send	COMMS PARAMS SET PHYMODE=RS485<LF>
Recieve	COMMS PARAMS SET PHYMODE=RS485<LF>
Send	SAVE<LF>
Recieve	SAVE OK<LF>
Send	REBOOT<LF>

Example 3

You want to change your altimeter from RS232 to RS485 and the baud rate to 19200.

Send	COMMS PARAMS SET PHYMODE=RS485 UARTBAUD=19200<LF>
Recieve	COMMS PARAMS SET PHYMODE=RS485 UARTBAUD=19200<LF>
Send	SAVE<LF>
Recieve	SAVE OK<LF>
Send	REBOOT<LF>

Speed of Sound

The speed of sound for the altimeter is controlled under the `SOS` command.

Adding in a `GET` will return the settings held within the unit and adding a `SET` after params with the commands listed below will set the option. Even sending just a `SOS` to the altimeter will assume a `GET` and reply.

Speed of Sound does not require a `SAVE`, it is saved in non volatile memory during `SET`.

SOS		
Command	Options	Description
SOS	Range is 1400-1600m/s	Change the Speed of sound for the altimeter

Example 1

You want to check the speed of sound the altimeter is using.

Send	SOS GET<LF>
Receive	SOS 1493.00<LF>

Example 2

You want to set the speed of sound the altimeter to 1500m/s.

Send	SOS SET 1500<LF>
Receive	SOS SET 1500.00<LF>

Analogue Output

The analogue output settings for the altimeter as controlled under the `ANAOUT` command.

Adding in a `GET` will return the settings held within the unit and adding a `SET` after params with the commands listed below will set the option. Even sending just a `ANAOUT PARAMS` the altimeter will assume a `GET` and reply.

After changing any command you will need to send a `SAVE c` to make it persistent in memory.

ANAOUT		
Command	Options	Description
RANGESCALE	1-100000 mm	The value which the analogue range which will be scaled across.
VOLTAGESCALE	5 V	0-5 VDC analogue output
	10 V	0-10 VDC analogue output
ENABLE	TRUE	Analogue voltage output ON
	FALSE	Analogue voltage output OFF



In RS232 mode when the unit has analogue output on the RS232 ground is on Power ground.

Example 1

You want to check the analogue output settings. It has the scale set to 50m over 5Vdc but the output is not on.

Send	ANAOUT PARAMS<LF>
Receive	ANAOUT PARAMS GET RANGESCALE=50000 VOLTAGESCALE=5V ENABLE=FALSE<LF>

Example 2

You want to switch the analogue output on then set it to 10 Vdc range scaled over 25m and check it is set correctly.

Send	ANAOUT PARAMS SET RANGESCALE=25000 VOLTAGESCALE=10V ENABLE=TRUE<LF>
Recieve	ANAOUT PARAMS SET RANGESCALE=25000 VOLTAGESCALE=10V ENABLE=TRUE<LF>
Send	SAVE<LF>
Receive	SAVE OK<LF>
Send	ANAOUT PARAMS <LF>
Recieve	ANAOUT PARAMS GET RANGESCALE=25000 VOLTAGESCALE=10V ENABLE=TRUE<LF>
Send	REBOOT <LF>

Max No Echo

The Max not Echo settings for the altimeter are set with the `ECHO` command.

Adding in a `GET` will return the settings held within the unit and adding a `SET` after params with the commands listed below will set the option. Even sending just a `ECHO PARAMS` the altimeter will assume a `GET` and reply.

After changing any command you will need to send a `SAVE` to make it persistent in memory.

ECHO PARAMS		
Command	Options	Description
MAXNOECHO	TRUE	Return maximum end-range when no echo detected
	FALSE	Return minimum end-range when no echo detected

Example 1

You want to set the altimeter to output the maximum range when the altimeter is either out of range or does not receive a valid return.

Send	<code>ECHO PARAMS SET MAXNOECHO=TRUE<LF></code>
Receive	<code>ECHO PARAMS SET MAXNOECHO=TRUE<LF></code>
Send	<code>SAVE<LF></code>
Receive	<code>SAVE OK<LF></code>

Ping Rate

The Ping interval for the altimeter is set within the `ECHO` command.

Adding in a `GET` will return the settings held within the unit and adding a `SET` after params with the commands listed below will set the option. Even sending just a `ECHO PARAMS` the altimeter will assume a `GET` and reply.

After changing any command you will need to send a `SAVE` command to save the information to the sonar.

ECHO PARAMS		
Command	Options	Description
INTERVAL	100-5000 ms	The free run ping interval when in Free-running mode.

Example 1

You want to set the altimeter to free run at a rate of 1Hz.

Send	ECHO PARAMS SET INTERVAL=1000<LF>
Receive	ECHO PARAMS SET INTERVAL=1000<LF>
Send	SAVE<LF>
Receive	SAVE OK<LF>

Scanline Data

When in MK3MODE you can request Scanline data. You would first need use the `ECHO PARAMS` to setup the altimeter and the `ECHO PING` to request a Scanline ping from the unit.

Echosounder Operational Parameters (`ECHO PARAMS`)

This command allows programming or retrieval of the echosounder acoustic and signal processing operational parameters for the instrument.

Any one or all the following parameters can be applied in any order, separating each parameter by a space or tab.

The following parameters that can be set are as follows:

ECHO PARAMS		
Command	Options	Description
INTERVAL	100-5000 ms	Free-running Ping Interval (when not in MK3 Comms Mode).
STARTRANGE	0-99999 mm	Start range.
ENDRANGE	1-100000 mm	End range.
LOCKOUT	10-10000 mm	Lockout period. The period before the altimeter starts to listen.
FISHFILTEREN	TRUE	Fish Filter enable.
	FALSE	Fish Filter disable.
BINCOUNT	10-2048	Number of Bins to be included in the Scanline Data.
SCANDATAFORMAT	STRING	Encoding Type used for Scanline data output. Options are as follows: • ASCII • BASE64
MAXNOECHO	TRUE	Return maximum end-range when no echo detected.
	FALSE	Return minimum end-range when no echo detected.



Unless an `ECHO SAVE<LF>` command is sent this data is held in volatile memory and will be reset when the unit is power cycled.

This may be useful for changing settings but keeping the unit in its preconfigured form. This would require the required `ECHO PARAMS` send when the unit is connected to the software again.

Echosounder Ping (ECHO PING)

This command will cause the instrument to complete an acoustic ping.

The response from this command will include Scanline data. This is dependent on the Echo operational parameter `SCANDATAEN=TRUE` and the Accelerometer operational parameter `INCLINATIONEN=TRUE`. Should either of these be set to `FALSE`, then the `SCANDATA` and `INCLINATION` section of the response will be omitted.

```
ECHO PING DATA=xxx.xxxm INCLINATION=xxx.x° SCANDATALEN=nnnn
SCANDATA="dddddd...dd"<LF>
```

Command	Description
DATA	The detector measured range in mm
INCLINATION	The tilt of the instrument around a 360° arc
SCANDATALEN	The number of 8-bit bins within the scanline data
SCANDATA	Either ASCII Encoded Hex data or encoded using Base64 (determined by reading <code>ECHO PARAMS SCANDATAFORMAT</code>) with a length of <code>BINCOUNT</code> .

ECHO PING example ASCII

In the example below you can see the data back shows an 0.7 m serial detect at an inclination of 0.6°. There are 245 8-bit bins of ASCII data. The first 8 bit bins are show separated by a grey highlight in the example below.

Send	ECHO PING<LF>
Receive	ECHO PING=OK DATA=0.700 INCLINATION=0.6 SCANDATALEN=245 SCANDATA=272610001B1133392E423A353B3C3538454238393933363E 2E352D2E37462F3C482A3B3B3733464530382F2A2C3C262A3321202F1 D3E3030222B1D172D29181F2716233118232E18172B17152B1B13251D 141D2012152310121C151111A15141915111618101216130F101614151 013171216191216111519110D16100D120A100D17171211110B11110C 0F1A09170E13171A160D0F0C0E120E0D1A0C0F0D100D0E121510110D1 00C16110E1417130E110F160F0B0F160E0C0D10171212150F0E0F120E 11100F0F130D1511100C101214091710160E120C0F131013101314141 6070F0F10150B0D1412140D141014130F16130B110B<LF>



Each BIN is an intensity representation on a scale of 0-80dB, with a resolution of 0.5dB/bit.

This would mean that 0x01 would equate to 0.5dB and 0xA0 would equal 80.0dB). Giving a hex range of 0-127.5 rather than 0-255.

ECHO PING example BASE64

In the example below you can see the data back shows an 0.7 m serial detect at an inclination of 0.5°. There are 244 8-bit bins of BASE64. The BASE64 data is contained within square brackets [].

Send	ECHO PING<LF>
Receive	ECHO PING=OK DATA=0.700 INCLINATION=0.6 SCANDATALEN=244 SCANDATA=[AAAAABkUNj0xRT04PT04PEY/OTw7NzVFMzY/MDtLMUFMMz9 GOTpJSDg/PDMxNCwvMh0hNx0gMzAnLysaNCogJSkcIy8bIjccIzUcIDEd Fi4jFCIeFRocDBcfEBMaFA8ZEhUVFRIZFxMWFhEUEBIQGxUZDxISDhUTE RUWERAIFhQJDxcVExMTExMTEQsPExQVDRIVEhIRERAQDQ8YEA8UDQ8WER gVFRAVEREXERISDhEPFBMUFRAOFBILDwwYFRERFA8SDxMOEwkSFQwOFhA VFwsPEQoWDRQWEhcWFBMNFMBMDw8PERMVEBISGRQTFBIOCxEsDA==]<LF >

Accelerometer Parameters (ACCEL PARAMS)

This command allows programming or retrieval of the accelerometer parameters for the instrument.

Any one or all the following parameters can be applied in any order, separating each parameter by a space or tab.

The following parameters that can be set are as follows

ACCELL PARAMS		
Command	Options	Description
ACCELEN	TRUE	Accelerometer Inclination Output Enable (included as part of an ECHO PING message)
	FALSE	Accelerometer Inclination Output Disable
SLANTCORRECTION	TRUE	Slant Correction Enabled.
	FALSE	Slant Correction Disabled

Terminal Programs

PuTTY

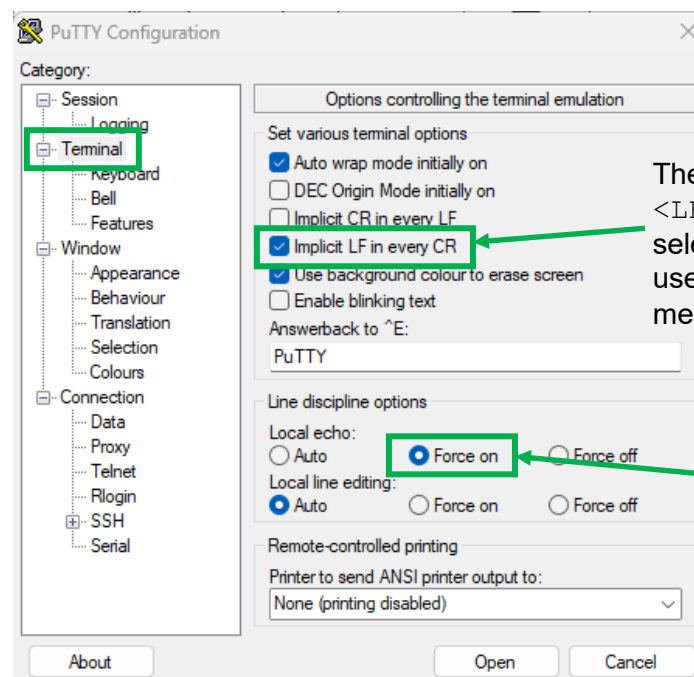


This has been written using PuTTY release 0.62



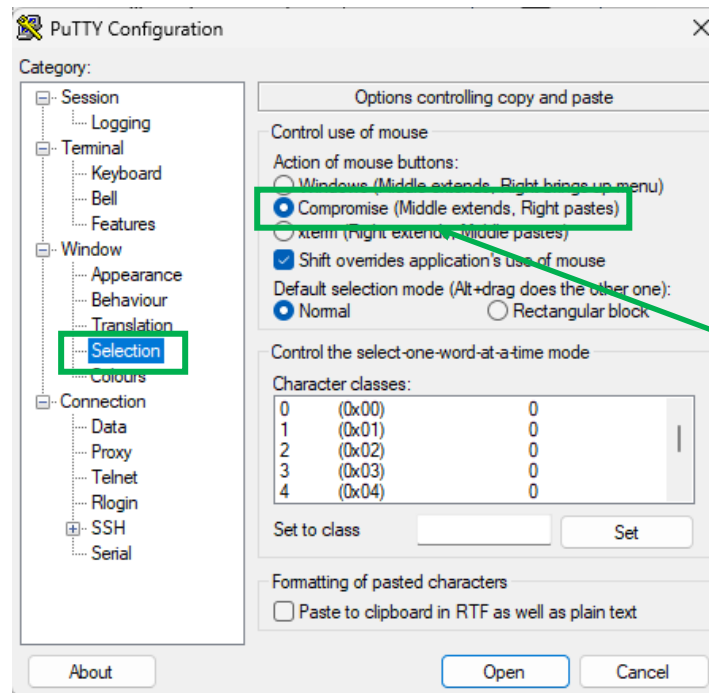
In the PuTTY environment a `<LF>` is CTRL+J

It is recommended that in PuTTY that you put the local echo on so that you see the characters that you are typing into the software as well as checking how you paste into the terminal window.



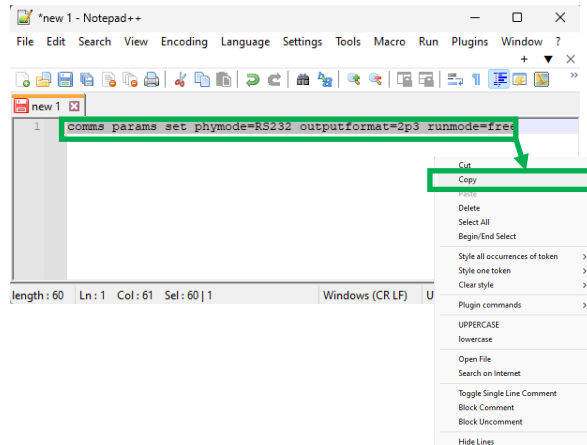
The Altimeter MKII uses a `<LF>` as the terminator and so selecting this will allow you to use a `<CR>` to send the messages

This allows you to see the messages that you are sending to the Altimeter MKII r

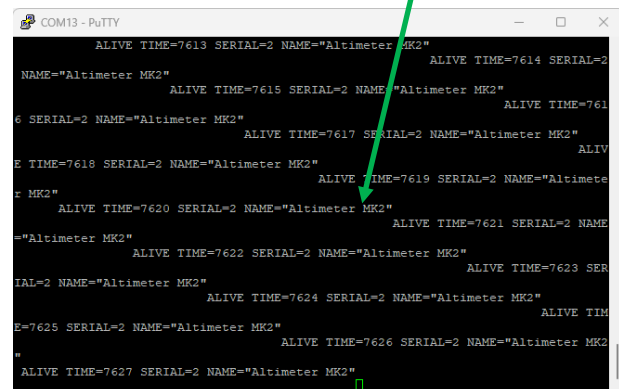


This is the default option. It allows you to use the mouse to paste information in the copy buffer.

When the unit is in RS232 mode and set to MK3 comms the Altimeter MKII will post alive messages. This makes it more challenging to change the settings as the sent ASCII messages are then within the received text. It is recommended that you send a <LF> command to clear the send data buffer and then use a text package like Microsoft Word or Notepad to create the messages, then copy and paste into PuTTY.



Right mouse click on the PuTTY screen and then use CTRL+J to send a <LF>



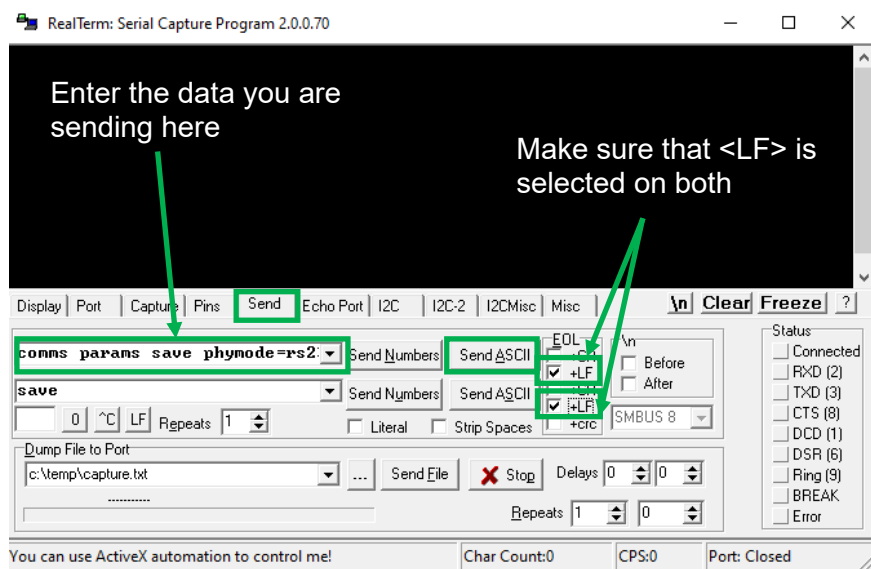
Realterm



This has been written using Realterm release 2.0.0.70.

Realterm allows for packet data sending and also allows you to have a second packet so that you can have multiple commands sitting ready to go.

The [Send] tab is where you can send the data. Make sure that for each line you use there is a <LF> being sent when you press [Send ASCII].



Appendix C – LAN Interrogate Altimeter

The Altimeter MKII may be set up addressable using a single character ASCII address in the range A to H.

The ASCII address is set using the MK3COMMS text based code. When a unit is set as an ASCII addressable unit there are less formatting options available than on a standard altimeter. The altimeters are then always triggered by interrogation (they cannot free run)

The altimeter is interrogated by an ASCII address character (e.g. A), or by the * character which will trigger all addresses. On receipt of the trigger character the altimeter sends its acoustic transmit pulse immediately, after the timeout range associated with the range setting, plus an additional delay as an increment of 26msec dependent on the address, the altimeter then sends an ASCII reply.

The following table shows the reply times in msec for the different addresses.

Range	A	B	C	D	E	F	G	H
10m	18	44	70	96	122	148	174	200
50m	72	98	124	150	176	202	228	254
100m	140	166	192	218	244	270	296	322

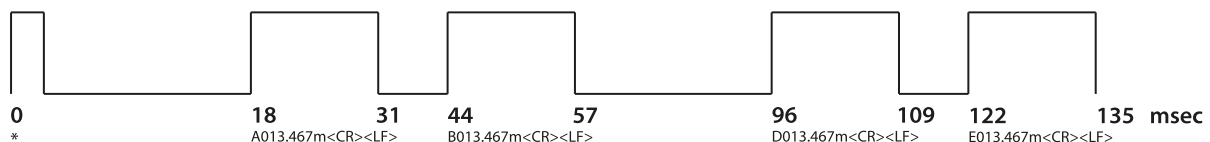
The reply message is constructed as follows:

LAN Interrogate	Yxxx . xxxm<CR><LF>	
	Y	ASCII interrogation character A-H
	xxx . xxx	Range in metres to 3 decimal places
	m	Units label for metres
	<CR><LF>	Carriage return and line feed terminators

The interface uses the user set baud rate, 8bit data, no parity and 1 stop bit for both the interrogate character and the reply. Each reply string lasts about 13msec.

Altimeters may be configured for multidrop RS232 or RS485 communications. When using the * (Asterix) character to trigger a collection of altimeters, each one must have a different address. Whilst waiting for all the expected replies to be received, only **one** * character should be sent.

See below an example timing diagram for four altimeters (A,B,D,E) set for 10m range in response to * interrogate.



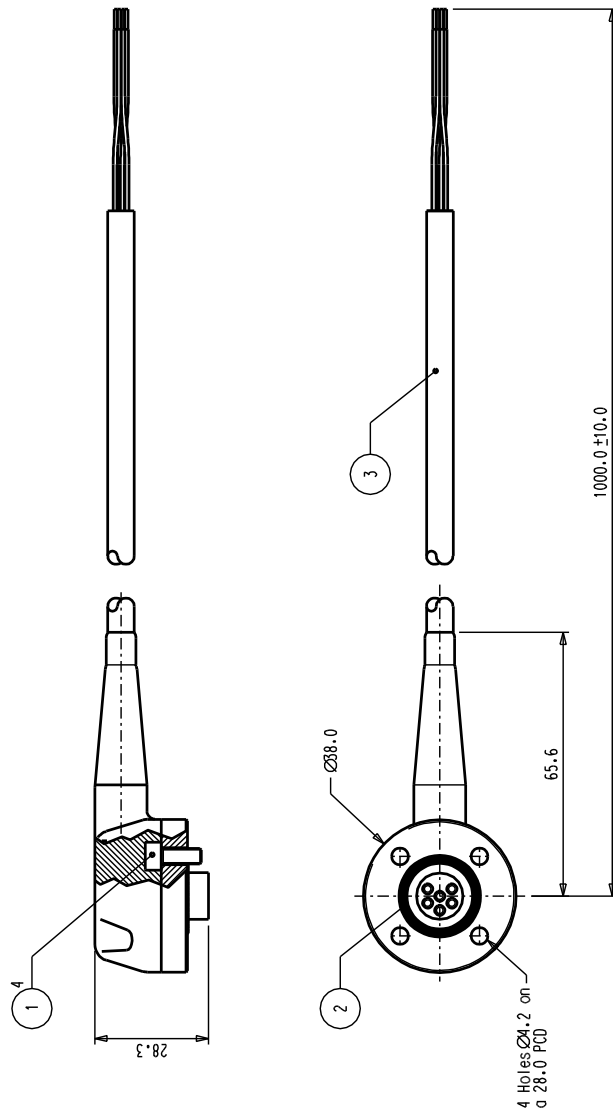
Changing the ASCII address requires either the use of Genesis software to configure or the Subnode setting in Communication Parameters

S00344 1M - Tritech V1 R/A Connector, 1 Metre tail

ITEM	DESCRIPTION	QTY	MATERIAL	ST PART No	DWG. No	SHT. No
1	M4 Socket Head Cap Screw	4	A4 Stainless	00052	N/A	N/A
2	'O' Ring	1	HNBR	00009	N/A	1
3	ST Sonar Connector Cable	1m	N/A	N/A	O46-M0D-00030-0A	1 of 1

Face View

Pin1
Pin2
Pin3
Pin4
Pin5
Pin6

[illegible]

S02015 Cable Specs

Voltage rating	600V	
Resistance @ 20°C	57Ω/km	
Bend Radius	Static	22.5mm minimum
	Dynamic	35.5mm minimum



For a 12V Altimeter MKII with a 12V supply voltage the maximum S0215 cable length is 26m.

Appendix E – Altimeter Power Consumption

Below are details on the specific power requirements of the Altimeter MKII to assist with the installation of the Altimeter within the users setup.



Tests were carried out using 2m of Trittech standard cable.

PA200 Precision Altimeter MKII

Input Voltage (Vdc)	Idle Input Current (mA)	Peak Current (mA)	Mean Current (mA)	Mean Power (W)
9	219	1280	225	2.02
12	163	960	166	1.99
15	133	729	137	2.05
18	114	598	113	2.03
24	83.4	445	88.1	2.11
28	73.6	364	78.0	2.18
36	60.1	290	64.1	2.30
38	57.7	295	61.2	2.32
42	54.6	317	57.9	2.43
44	53.4	309	61.5	2.70
46	56.1	293	60.6	2.78
48	55.6	302	57.4	2.75
50	53.5	302	56.7	2.83

PA500 Precision Altimeter MKII

Input Voltage (Vdc)	Idle Input Current (mA)	Peak Current (mA)	Mean Current (mA)	Mean Power (W)
9	223	797	242	2.17
12	162	583	176	2.11
15	132	451	143	2.14
18	111	383	119	2.14
24	86.9	287	93.6	2.24
28	76.1	238	82.4	2.30
36	61.6	204	67.0	2.41
38	59.7	197	64.1	2.43
42	56.7	212	61.3	2.57
44	55.9	194	61.6	2.71
46	57.6	222	63.4	2.91
48	54.8	229	62.8	3.01
50	53.9	235	59.6	2.98

Appendix F – Frequently Asked Questions

Does my Altimeter MKII need to be calibrated to give the correct reading?

Please see the information on this on the website

<https://www.tritech.co.uk/files/Technical-Retirement-Notices/Technical/0080-TNS-00029-01-Product-Advisory-Calibration-Frequency-Guidance.pdf>

How often should I maintain my Altimeter MKII?

Environment plays a major role in this as well as maintenance data from other equipment in use on the same platform. The main questions are:

- Do you have other subsea equipment in use?
- How often is this serviced?
- How does the equipment look after submergence.

It is best to err on the side of caution get it serviced more regularly and then push the intervals if no issues have arisen.

My Altimeter MKII is not working?

First it need to be determined whether the fault lies with the altimeter or the system it is connected too.

1. Are you getting the required voltage at the end of the cable?
2. Are the data lines connected from the reader to the altimeter? *Check with a continuity tester.*
3. Does your serial system send and receive data? *Check with a terminal program and another transmitter.*
4. Is the altimeter powering up? *Check the current draw with a multimeter or check for internal illumination of the LEDS*

Where can I find the build record for my Altimeter MKII?

The original build record will be sent with the unit, however if this is ever misplaced Trittech will have the original copies. If you contact Trittech Support using the details in Help & Support.

Please note that we only have the original or records after work has been done at Trittech. If parts were changed using third parties then this will not be recorded by Trittech.

How do I enable the analogue output?

Unlike the older Altimeter MKI the analogue on the MKII can be enabled using the MK3 comms, either manually or using Genesis software. The details are shown in the Analogue Output section of Appendix B – MK3 Comms.

How do I know the range of my Altimeter MKII, is it a 10m. 50m or 100m unit?

There is a model distinction which classifies units to either 10-50m as in the PA500 or 50-100m in the PA200.

From there the settings will be displayed on the bodytube of the altimeter on the label. If the labels had been removed it can be checked using the Communication Parameters.

What is MNE and ZNE?

This stands for Max No Echo and Zero No Echo respectively.

This means that when the altimeter does not receive a valid return it will post either the maximum range of the altimeter or zero. This will happen if there is not a valid return that meets the threshold or the value is outwith the range of the unit, for example 50.01m on a 50m unit would be out of range and so the altimeter would with post a 0m (ZNE) or 50m (MNE). Choosing the correct setting is upto the user and the use case. On an auto altitude having 50m might prove problematic.

Does the detector element in the receiver part include the following?

Piezoelectric polymer membranes (excluding PVDF and its copolymer)

Flexible piezoelectric composites

Piezoelectric single crystals of PMN-PT (grown from solid solution)

Piezoelectric single crystals of PIN-PMN-PT (grown from solid solution)

The answer is NO to all the above.