APPLIED ACOUSTICS
Underwater Technology

1082 Smart Switch
Firmware Version 1.12
Operation Manual

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Revision History

Issue	Change No.	Reason for change	Date
11	1852	Additions for 1100 Series Beacons and Sigma2, refer to DCR note.	15/08/17
10	1501	Addition to Section 3.4.1 Identified Beacon Model and Configuration Message, refer to DCR note.	22/07/14
9	1480	Addition to Section 3.5.1 Channel, refer to DCR note. Other minor amendments.	13/06/14
8	1335	Minor amendments to Sections.	29/05/13
7	1330	Addition to Section 3.8.3 Fast Charge Termination, refer to DCR note. Other minor amendments.	02/05/13

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

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

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Email: techsupport@appliedacoustics.com

Applied Acoustic Engineering Ltd has made every effort to ensure that the information contained in this manual is correct at time of print. However our policy of continual product improvement means that we cannot assume liability for any errors which may occur.

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

1. Introduction to the 1082 Smart Switch

The AAE 1082 Smart Switch is a pocket size solution to configuration, testing and charging of AAE 1000 / 1100 Series beacon ranges.

Main features are: -

- AAE 1000 / 1100 Series beacon configuration, including channel and depth telemetry transmission selection.
- AAE 1000 / 1100 Series beacon fast charge activation and monitoring.
- Compatible AAE beacon trickle charging.
- Compatible AAE beacon responder mode testing.
- Internal rechargeable battery.
- Firmware field upgradeable.

The 1082 Smart Switch has limited compatibility with other AAE beacon ranges. Refer Section 3 Smart Switch Operation for details.

On delivery, check the following is included: -

- 1082 Smart Switch.
- 30VDC power supply unit (100-250VAC mains input).
- Mains lead (IEC).
- Beacon Connection Cable (9-way ‘D’ plug to MCIL5F 5-way socket).
- RS232 serial cable (9-way ‘D’ plug to 9-way ‘D’ socket).

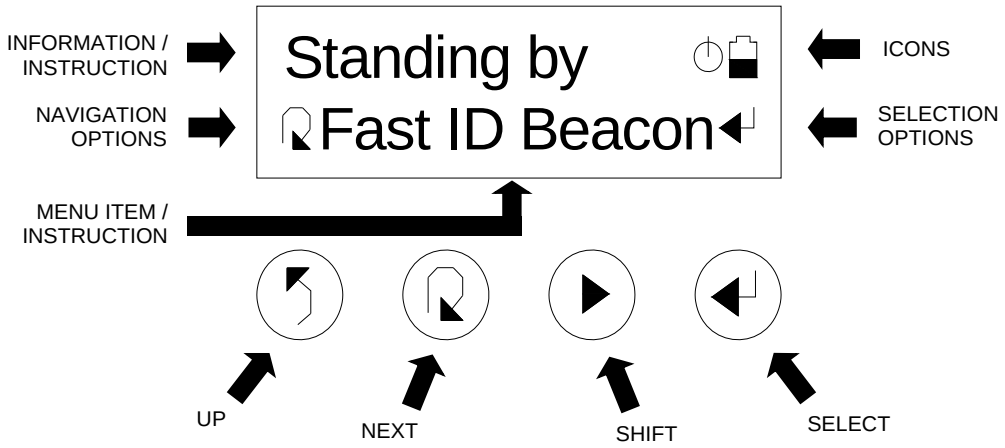
Please check contents for transit damage. If any is found, do not use the equipment and return it to your supplier.

2. Getting Started

2.1 User Interface

The Smart Switch user interface comprises a 2-way backlit L.C.D. and four stylised selection keys on the face of the unit. The Smart Switch does not include a power switch the unit is ‘always on’. After two minutes of no user activity, i.e. no key presses, the Smart Switch will revert to very low power standby with a blank display. In standby, pressing any selection key will ‘wake’ the Smart Switch to its state prior to standby. The L.C.D. backlight is enabled for a brief period when any selection key is pressed. The backlight can be disabled if required. Refer Section 3.9 Smart Switch Configuration for details.

Fig. 1



The L.C.D. top line displays information or instructions for the user together with icons indicating Smart Switch operating status: -


Smart Switch internal battery charge


Serial communication inactive


Attempting serial communication with beacon


Serial communication active with beacon

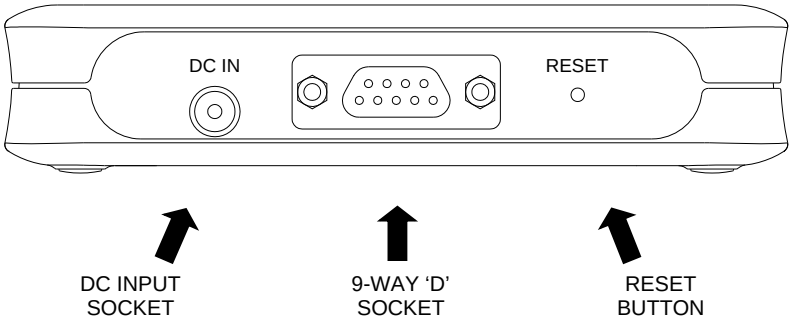

Trickle charge or fast charge active

The L.C.D. bottom line displays the current menu item for selection or selected menu item instructions. Icons representing the four selection buttons are displayed to the left and to the right of the menu item. Icons to the left represent navigation options. Icons to the right represent selection options (if available).

2.2 Connector Panel

A connector panel includes a DC input socket for the included 30VDC power supply unit, a 9-way 'D' socket for RS232 serial communication and beacon charging, and a reset button concealed against accidental operation. Refer Section 10 Appendix for details.

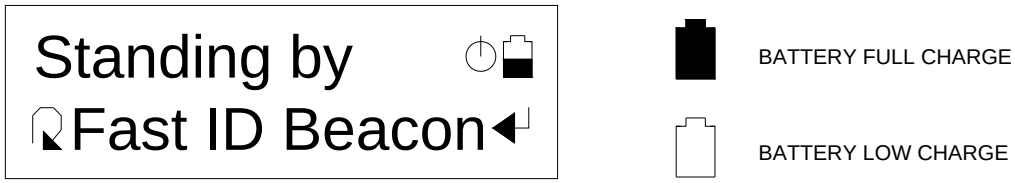
Fig. 2



2.3 Internal Battery

The Smart Switch is powered from an internal rechargeable NiMH battery pack. With the Smart Switch 'awake' and operational, the L.C.D. displays a battery icon at all times, representing the current internal battery charge.

Fig. 3

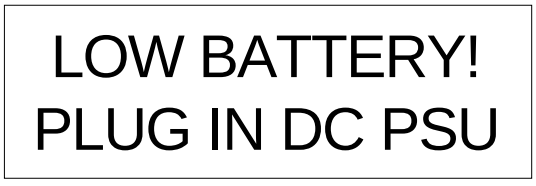


Operational life is typically 2 days with constant use and with the backlight enabled. Standby life is typically 5 months.

The Smart Switch internal battery is trickle charged at 40mA when the included 30VDC power supply unit is inserted. When inserted, the Smart Switch is powered directly from the power supply unit.

When the internal battery is near exhausted, the Smart Switch will constantly display a low battery warning, as Fig. 4.

Fig. 4



The Smart Switch will be non-operable until the internal battery has been partially charged. Insert the included 30VDC power supply unit. After a period of trickle charging, the Smart Switch will reset and become operable.

3. Smart Switch Operation

3.1 Connecting to a Beacon

Your Smart Switch arrives supplied with a Beacon Connection Cable for connection to compatible AAE beacons. Connect the cable between the Smart Switch connector panel 9-way ‘D’ socket and compatible AAE beacon 5-way MCBH5M bulkhead plug.

When trickle charging or fast charging a connected beacon, it is recommended the Beacon Connection Cable be locked securely to the beacon and to the Smart Switch. Refer Section 3.7 Trickle Charge and Section 3.8 Fast Charge.

3.2 Serial Communication

The Smart Switch and a connected 1000 / 1100 Series beacon support RS232 serial communication at 9600 baud only. Refer Section 8 Specification for serial communication specification.

NOTE: - Serial communication is only possible when a connected beacon is switched ON

NOTE: - Serial communication is not possible when a connected beacon is fast charging. Serial communication is possible when a connected beacon is trickle charging.

The Smart Switch and a connected beacon communicate in an AAE defined command format, including error checking of serial messages.

The Smart Switch will display a “Selected!” or “Refreshed!” message if a serial message from a connected beacon indicates it processed a user selection correctly.

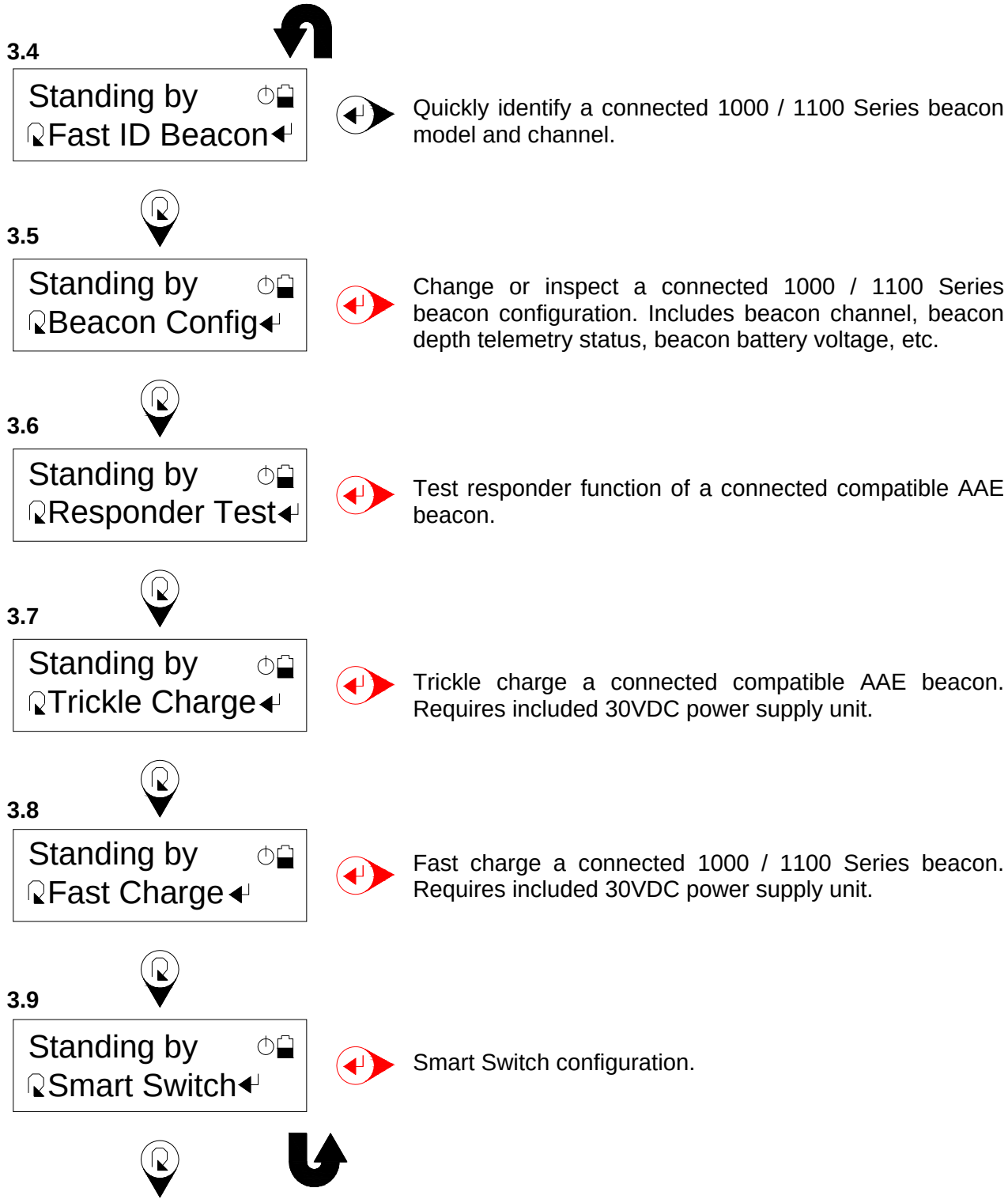
The Smart Switch will display a “Failed!” message if a serial message from a connected beacon indicates it did not successfully process a user selection.

The Smart Switch will display a “Comms error!” message if a serial message from a connected beacon fails error checking.

3.3 Main Menu Options

The Smart Switch menu structure has a top tier of 6 main menu options. Press ↻ for next main menu option. Press ↵ to select a main menu option: -

Fig. 5



3.4 Fast ID Beacon

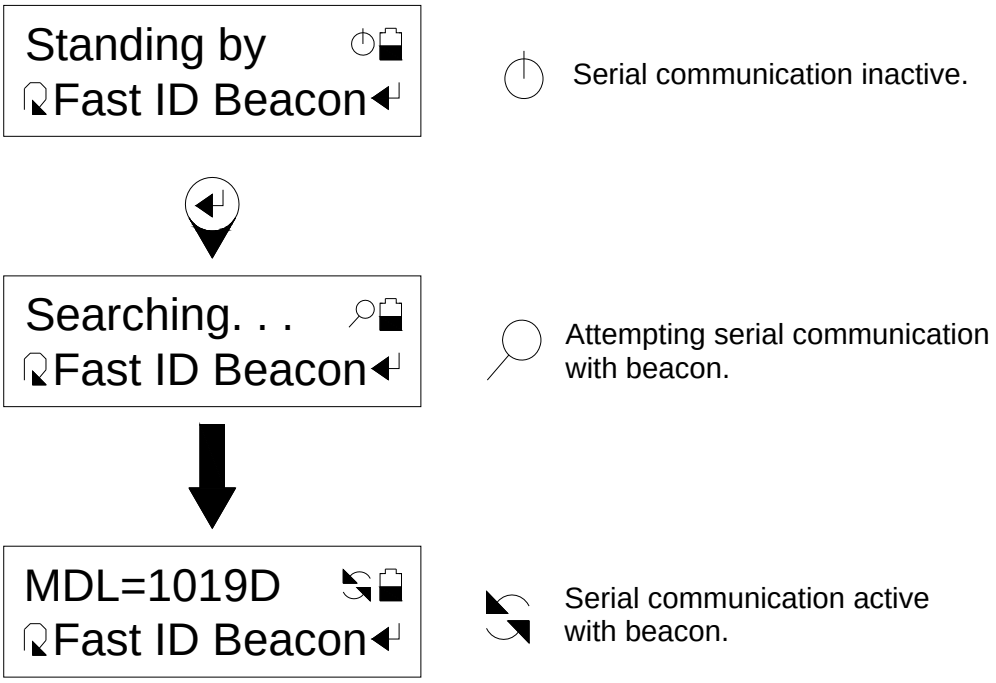
Quickly identifies a connected beacon model and configuration.

NOTE: - This action is not required prior to configuring a connected beacon. Refer Section 3.5 for further information.

Press ↵ to initiate. The Smart Switch will attempt serial communication with a connected beacon, indicated by a “Searching...” message to the user.

If a connected beacon is ‘found’, the identified beacon model and channel configuration will be displayed as a scrolling message to the user. Once communication has been established with a connected beacon, the Smart Switch will maintain communication with the beacon. If no beacon is found after a fixed number of attempts, the Smart Switch will stop communication and revert to “Standing by”.

Fig. 6



NOTE: - Fig.6 beacon model for example only.

3.4.1 Identified Beacon Model and Configuration Message

An identified beacon model and configuration is displayed as a scrolling message to the user. This message is composed from the following: -

Beacon Model

“MDL=1019D”	Beacon model, 1019D in this example.

Enabled Options (only displayed for beacons with MCU firmware revision 4.00 onward)

“OPT=1,3”	Options 1 and 3 are enabled in this example. Contact Applied Acoustics for details.

Configuration

“CFG=AAE”	AAE defined “channel” configuration (including Sigma1™).
“CFG=SIGMA2”	AAE Sigma2™ configuration.
“CFG=IXB”	iXBlue (IXB) compatible configuration.
“CFG=SWB”	Sonardyne Wideband™ (SWB) compatible configuration.

Depending on configuration, the message is completed from the following: -

AAE Defined “Channel” Configuration

“CH=01”	AAE “channel”, 01 in this example.

AAE Sigma2 Configuration

“QS=1”	Sigma2 “Quickset” configuration, 1 in this example.
“WUT=0”	Wake-Up Tone (WUT), 0 in this example.
“IC=00”	Interrogate Code (IC), 00 in this example.
“RC=00”	Reply Code (RC), 00 in this example.
“TATX=0100ms”	Turn-Around-Time Extension (TATX), 100ms in this example.

iXBlue (IXB) Compatible Configuration

“IF=19.5kHz”	Interrogate Frequency (IF), 19.5kHz in this example.
“RC=00”	Reply Code, 00 in this example.
“TAT=020ms”	Turn-Around-Time (TAT), 20ms in this example.

Sonardyne Wideband™ (SWB) Compatible Configuration

“QS=A1”	“Quickset” if configuration matches, A1 in this example.
“IC=CIF”	Interrogate Channel (IC), CIF in this example.
“ACA=0101”	Acoustic Command Address (ACA), 0101 in this example.
“TAT=062.5ms”	Turn-Around-Time (TAT), 62.5ms in this example.

Example

“MDL=1019D CFG=AAE CH=01”

NOTE: - Refer AAE beacon manual for AAE “channel” listings.

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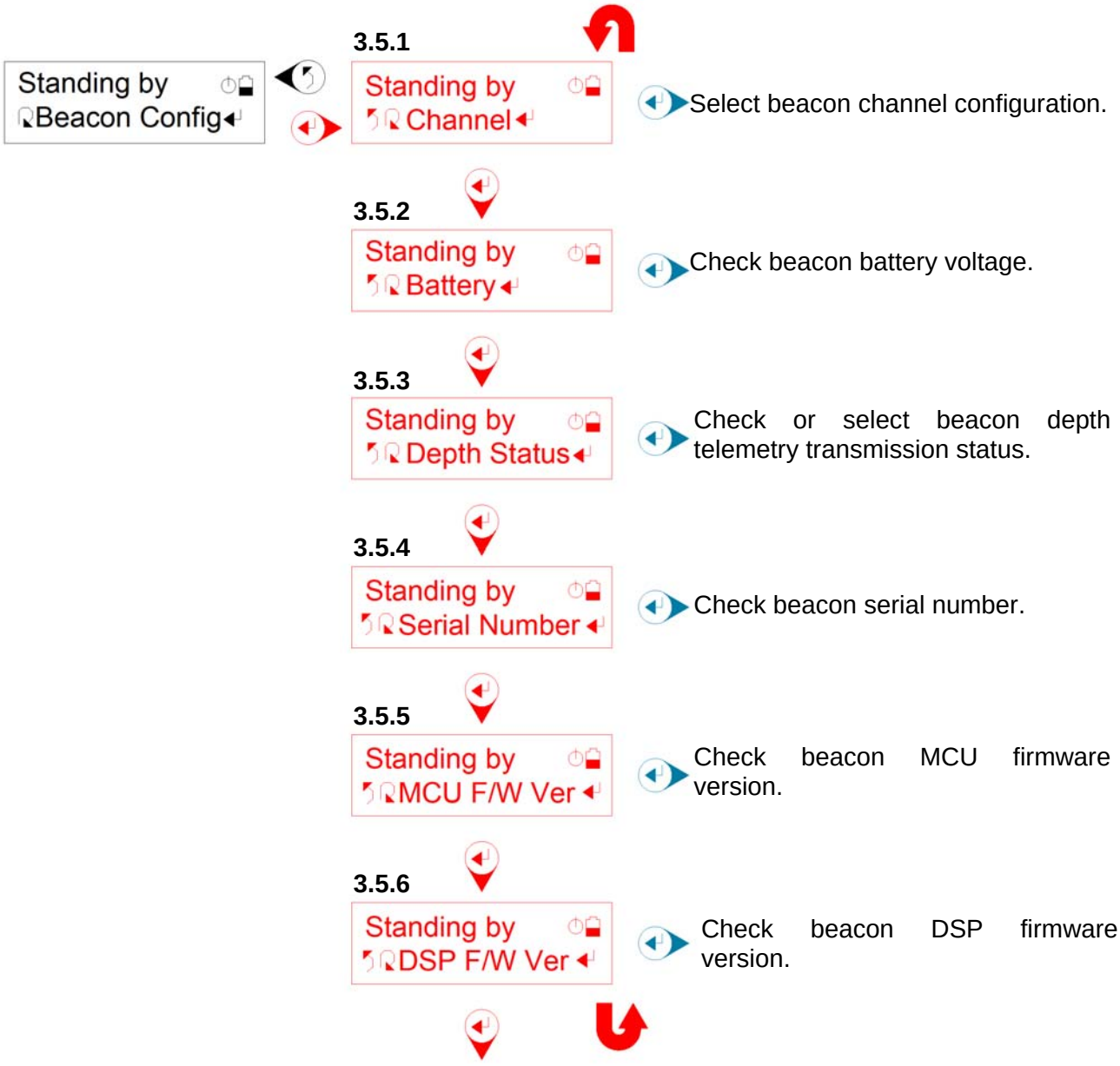
3.5 Beacon Configuration

Contains further sub menu options for beacon configuration: -

Fig. 7



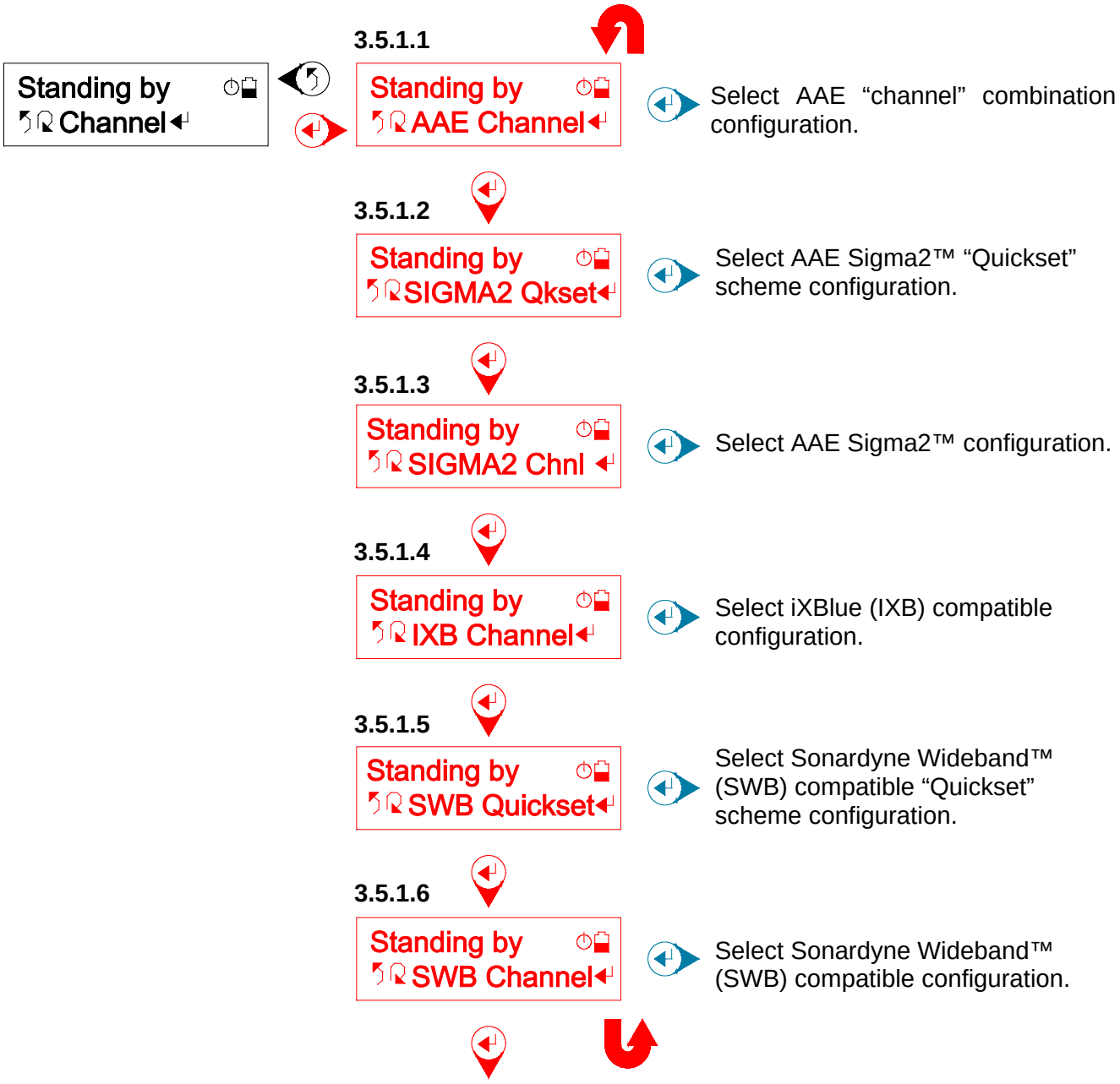
Press ↺ to return to top tier menu option “Beacon Config”. Press ↻ for next sub menu option. Press ↵ to select a sub menu option.

On selection of a sub menu option except “Channel”, if the Smart Switch is not currently communicating with a connected beacon, i.e. is “Standing by”, the Smart Switch will first attempt serial communication with a connected beacon, indicated by a “Searching...” message to the user. If a connected beacon is ‘found’, the beacon model and configuration will be identified and the selected sub menu options display updated accordingly. Once communication has been established with a connected beacon, the Smart Switch will maintain communication with the beacon. If no beacon is ‘found’ after a fixed number of attempts, the Smart Switch will stop communication and revert to “Standing by”.

3.5.1 Channel

Contains further sub menu options for channel configuration: -

Fig. 8



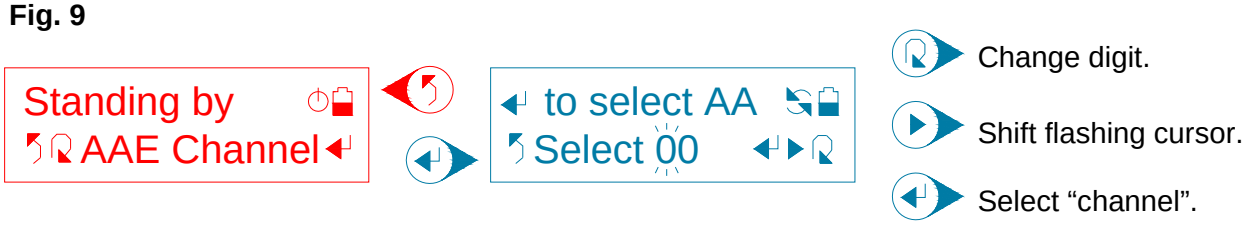
Press ↰ to return to previous tier menu option “Channel”. Press ↷ for next sub menu option.
Press ↵ to select a sub menu option.

On selection of a sub menu option, if the Smart Switch is not currently communicating with a connected beacon, i.e. is “Standing by”, the Smart Switch will first attempt serial communication with a connected beacon, indicated by a “Searching...” message to the user. If a connected beacon is ‘found’, the beacon model and configuration will be identified and the selected sub menu options display updated accordingly. Once communication has been established with a connected beacon, the Smart Switch will maintain communication with the beacon. If no beacon is ‘found’ after a fixed number of attempts, the Smart Switch will stop communication and revert to “Standing by”.

3.5.1.1 AAE Channel

A user selection with flashing cursor highlighting one digit is displayed: -

Fig. 9



Press ↺ to return to the previous tier sub menu option “AAE Channel”. Press ↻ to change the highlighted hexadecimal digit. Press ▶ to shift the flashing cursor to highlight the next digit of the user selection. Press ↵ to select the “channel”. The Smart Switch will display a “Waiting...” message followed by either a “Selected!” message on confirmation from a connected beacon that it has configured successfully, or a “Failed!” message instructing the user to retry selecting.

After a “Selected!” message, the Smart Switch will automatically return to the previous tier sub menu option “AAE Channel” and re-establish communication with a connected beacon. The user can then verify configuration from the identified beacon model and configuration message. Refer Section 3.4.1.

NOTE: - Refer beacon manual for AAE “channel” listings.

NOTE: - For unavailable AAE “channels”, on selection the Smart Switch will display “Unavailable!” message.

3.5.1.2 Sigma2 Quickset

A user selection for AAE Sigma2™ “Quickset“ scheme is displayed: -

Fig. 10

Press ↺ to return to the previous tier sub menu option “SIGMA2 Qkset”. Press ↻ to change the “Quickset” scheme 1 through 8. Press ↵ to select the “Quickset” scheme. The Smart Switch will display a “Waiting...” message followed by either a “Selected!” message on confirmation from a connected beacon that it has configured successfully, or a “Failed!” message for the user to retry selection.

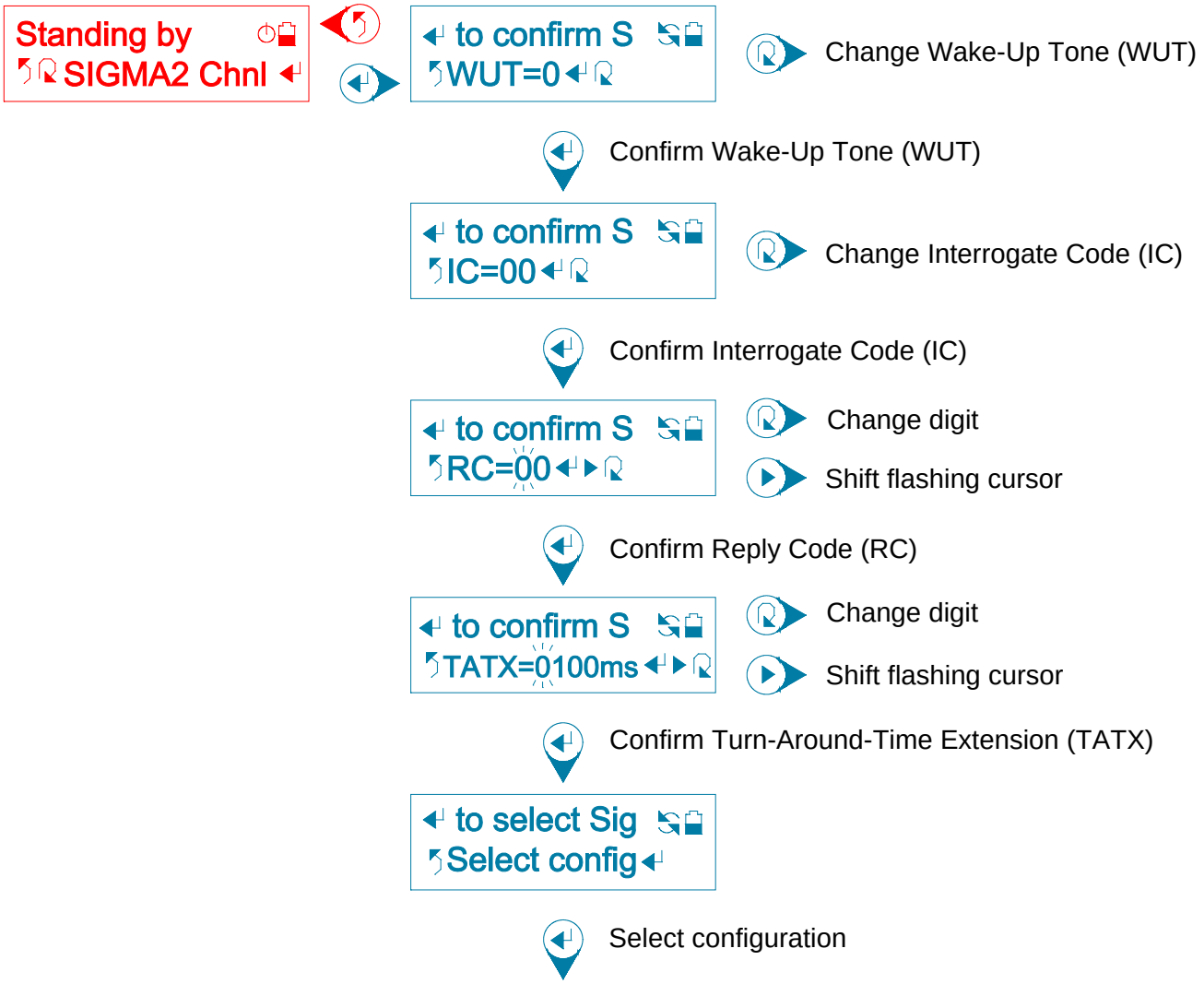
After a “Selected!” message, the Smart Switch will automatically return to the previous tier sub menu option “SIGMA2 Qkset” and re-establish communication with a connected beacon. The user can then verify configuration from the identified beacon model and configuration message. Refer Section 3.4.1.

NOTE: - For 1000 series beacons that are not AAE Sigma2™ compatible, on selection the Smart Switch will display “Unavailable!” message.

3.5.1.3 Sigma2 Channel

Sigma2 Channel configuration consists of confirming a Wake-Up Tone (WUT), Interrogate Code (IC), Reply Code (RC) and Turn-Around-Time Extension (TATX) in sequence before selecting the confirmed configuration: -

Fig. 11



First, a user selection for Wake-Up Tone (WUT) is displayed. Press ↖ to return to the previous tier sub menu option “SIGMA2 Chnl”. Press ↻ to change the Wake-Up Tone (WUT) 0 through 7. Press ↵ to confirm the Wake-Up Tone (WUT). The Smart Switch will display a “Confirmed!” message.

Next, a user selection for Interrogate Code (IC) is displayed. Press ↺ to return to the previous tier sub menu option “SIGMA2 Chnl”. Press ⟲ to change the Interrogate Code (IC) 00 through 15. Press ↵ to confirm the Interrogate Code (IC). The Smart Switch will display a “Confirmed!” message.

Next, a user selection for Reply Code (RC) with flashing cursor highlighting one digit is displayed. Press ↺ to return to the previous tier sub menu option “SIGMA2 Chnl”. Valid Reply Codes (RC) are between 00 and 63. Press ⟲ to change the highlighted decimal digit. Press ▶ to shift the flashing cursor to highlight the next digit of the user selection. Press ↵ to confirm the Reply Code (RC). The Smart Switch will display a “Confirmed!” message if the Reply Code is valid or “Unavailable!” if outside limits 00 to 63.

Next, a user selection for Turn-Around-Time Extension (TATX) with flashing cursor highlighting one digit is displayed. Press ↺ to return to the previous tier sub menu option “SIGMA2 Chnl”. Valid Turn-Around-Time Extensions (TATX) are between 0ms (0000ms displayed) and 9999ms in 1ms steps. Press ⟲ to change the highlighted decimal digit. Press ▶ to shift the flashing cursor to highlight the next digit of the user selection. Press ↵ to confirm the Turn-Around-Time Extension (TATX). The Smart Switch will display a “Confirmed!” message.

Finally, select configuration is displayed, together with a scrolling message reviewing user confirmed Wake-Up Tone (WUT), Interrogate Code (IC), Reply Code (RC) and Turn-Around-Time Extension (TATX). Press ↺ to return to the previous tier sub menu option “SIGMA2 Chnl”.
Press ↵ to select the configuration. The Smart Switch will display a “Waiting...” message followed by either a “Selected!” message on confirmation from a connected beacon that it has configured successfully, or a “Failed!” message for the user to retry selection.

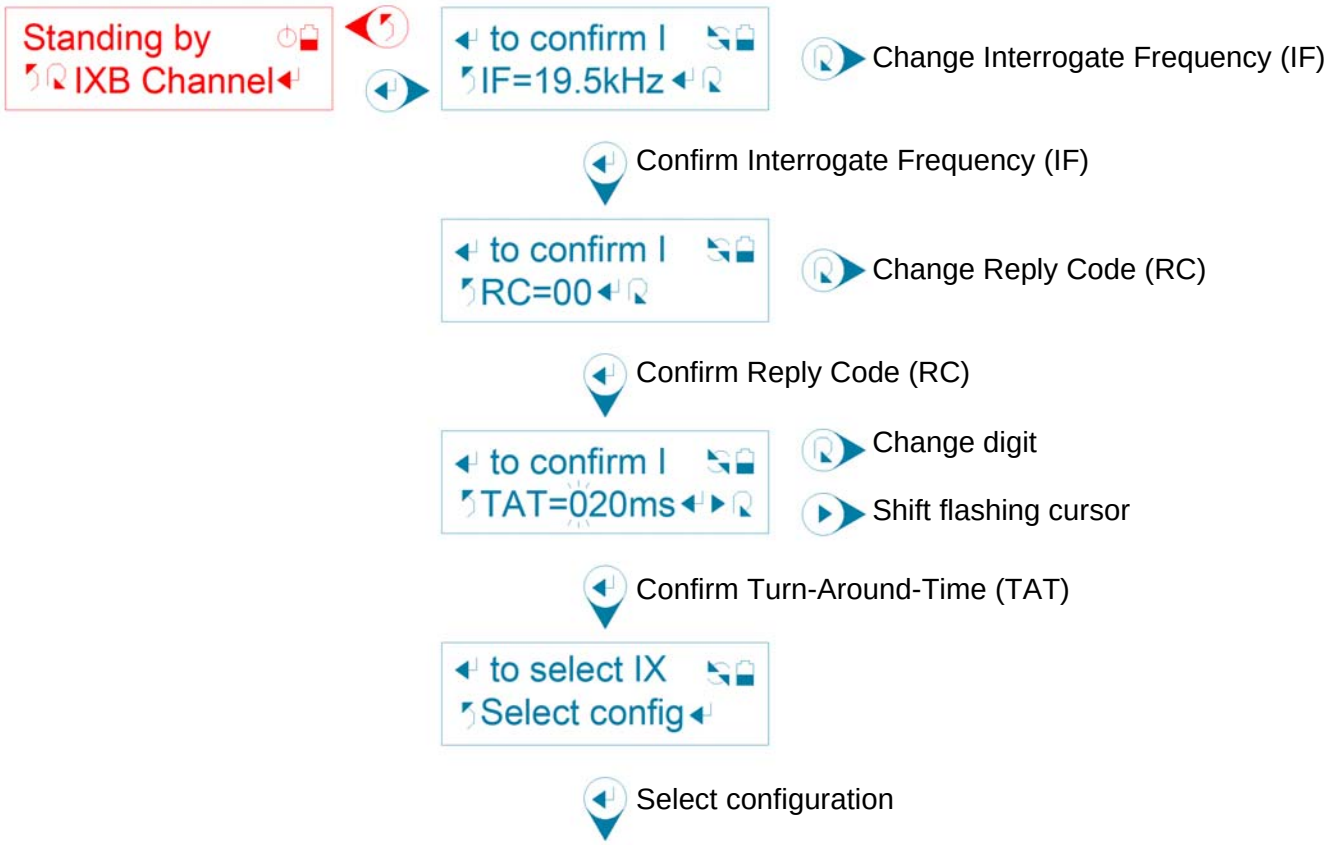
After a “Selected!” message, the Smart Switch will automatically return to the previous tier sub menu option “SIGMA2 Chnl” and re-establish communication with a connected beacon. The user can then verify configuration from the identified beacon model and configuration message. Refer Section 3.4.1.

NOTE: - For 1000 series beacons, on selection the Smart Switch will display “Unavailable!” message.

3.5.1.4 IXB Channel

iXBlue compatible configuration consists of confirming an Interrogate Frequency (IF), Reply Code (RC) and Turn-Around-Time (TAT) in sequence before selecting the confirmed configuration: -

Fig. 12



First, a user selection for Interrogate Frequency (IF) is displayed. Press ↺ to return to the previous tier sub menu option “IXB Channel”. Press ⟳ to change the Interrogate Frequency (IF) 19.5kHz through 22.5kHz in 1kHz steps. Press ↵ to confirm the Interrogate Frequency (IF). The Smart Switch will display a “Confirmed!” message.

Next, a user selection for Reply Code (RC) is displayed. Press ↺ to return to the previous tier sub menu option “IXB Channel”. Press ⟳ to change the Reply Code (RC) 00 through 09, 22 & 23. Press ↵ to confirm the Reply Code (RC). The Smart Switch will display a “Confirmed!” message.

Next, a user selection for Turn-Around-Time (TAT) with flashing cursor highlighting one digit is displayed. Press ↰ to return to the previous tier sub menu option “IXB Channel”. Valid Turn-Around-Times (TAT) are between 20ms (020ms displayed) and 200ms in 1ms steps. Press ↻ to change the highlighted decimal digit. Press ▶ to shift the flashing cursor to highlight the next digit of the user selection. Press ↵ to confirm the Turn-Around-Time (TAT). The Smart Switch will display a “Confirmed!” message if the Turn-Around-Time (TAT) is valid or “Unavailable!” if outside limits 20ms to 200ms.

Finally, select configuration is displayed, together with a scrolling message reviewing user confirmed Interrogate Frequency (IF), Reply Code (RC) and Turn-Around-Time (TAT). Press ↰ to return to the previous tier sub menu option “IXB Channel”. Press ↵ to select the configuration. The Smart Switch will display a “Waiting...” message followed by either a “Selected!” message on confirmation from a connected beacon that it has configured successfully, or a “Failed!” message for the user to retry selection.

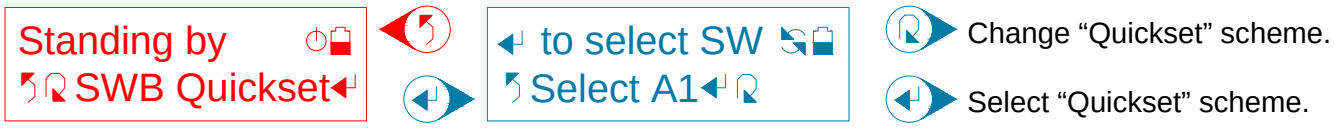
After a “Selected!” message, the Smart Switch will automatically return to the previous tier sub menu option “IXB Channel” and re-establish communication with a connected beacon. The user can then verify configuration from the identified beacon model and configuration message. Refer Section 3.4.1.

NOTE: - For beacons that are not iXBlue compatible, on selection the Smart Switch will display “Unavailable!” message.

3.5.1.5 SWB Quickset

A user selection for Sonardyne Wideband™ compatible “Quickset“ scheme is displayed: -

Fig. 13



Press ↺ to return to the previous tier sub menu option “SWB Quickset”. Press ↻ to change the “Quickset” scheme A1 through C3. Press ↵ to select the “Quickset” scheme. The Smart Switch will display a “Waiting...” message followed by either a “Selected!” message on confirmation from a connected beacon that it has configured successfully, or a “Failed!” message for the user to retry selection.

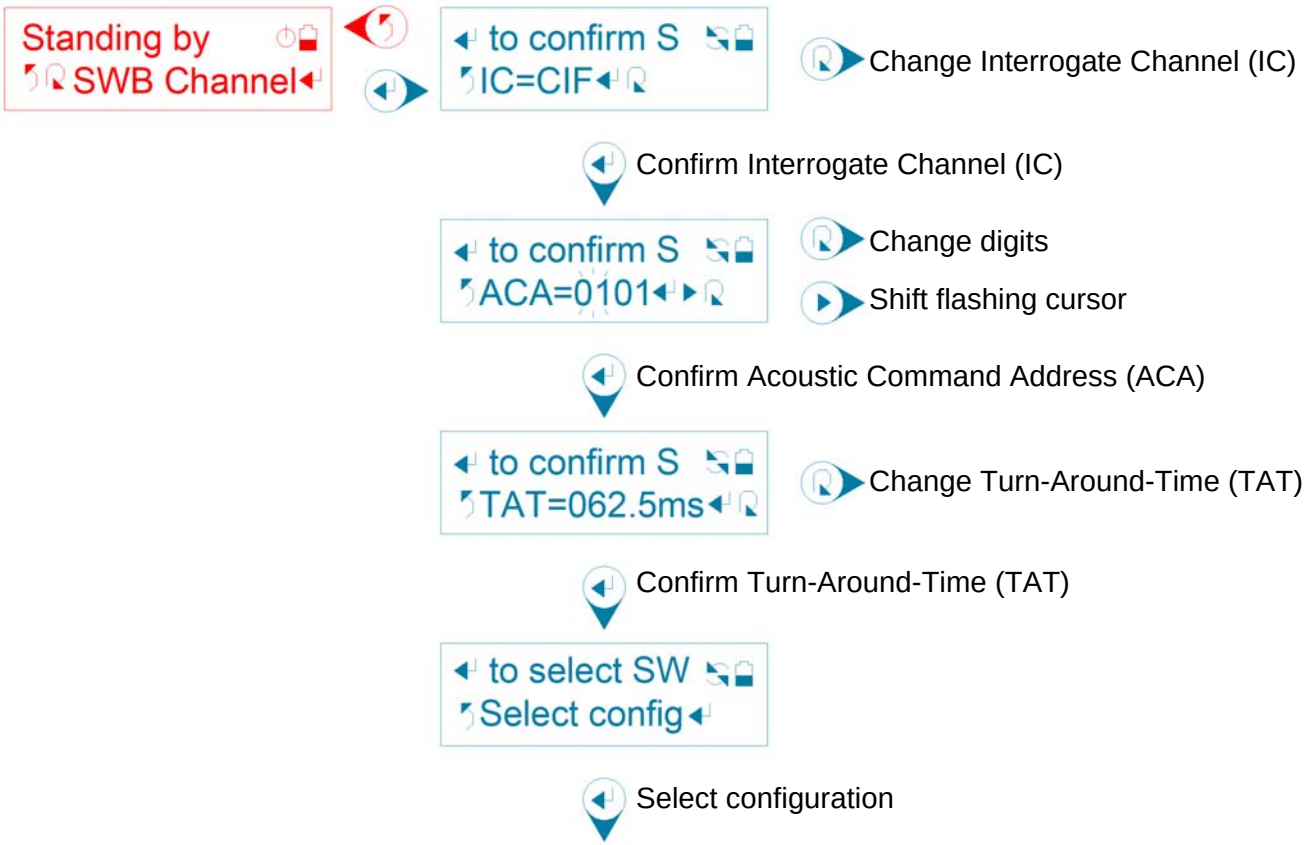
After a “Selected!” message, the Smart Switch will automatically return to the previous tier sub menu option “SWB Quickset” and re-establish communication with a connected beacon. The user can then verify configuration from the identified beacon model and configuration message. Refer Section 3.4.1.

NOTE: - For beacons that are not Sonardyne Wideband™ compatible, on selection the Smart Switch will display “Unavailable!” message.

3.5.1.6 SWB Channel

Sonardyne Wideband™ compatible configuration consists of confirming an Interrogate Channel (IC), Acoustic Command Address (ACA) and Turn-Around-Time (TAT) in sequence before selecting the confirmed configuration: -

Fig. 14



First, a user selection for Interrogate Channel (IC) is displayed. Press ↺ to return to the previous tier sub menu option “SWB Channel”. Press ⟲ to change the Interrogate Channel (IC) CIF through MF14. Press ↵ to confirm the Interrogate Channel (IC). The Smart Switch will display a “Confirmed!” message.

Next, a user selection for Acoustic Command Address (ACA) with flashing cursor highlighting two digits is displayed. Press ↺ to return to the previous tier sub menu option “SWB Channel”. Press ⟲ to change the highlighted decimal digits. Press ▶ to shift the flashing cursor to highlight the next two digits of the user selection. Press ↵ to confirm the Acoustic Command Address (ACA). The Smart Switch will display a “Confirmed!” message.

Next, a user selection for Turn-Around-Time (TAT) is displayed. Press ↺ to return to the previous tier sub menu option “SWB Channel”. Press ↻ to change Turn-Around-Time (TAT) 62.5ms (062.5ms displayed) through 875.0ms. Press ↵ to confirm the Turn-Around-Time (TAT). The Smart Switch will display a “Confirmed!” message.

Finally, select configuration is displayed, together with a scrolling message reviewing user confirmed Interrogate Channel (IC), Acoustic Command Address (ACA) and Turn-Around-Time (TAT). Press ↺ to return to the previous tier sub menu option “SWB Channel”. Press ↵ to select the configuration. The Smart Switch will display a “Waiting...” message followed by either a “Selected!” message on confirmation from a connected beacon that it has configured successfully, or a “Failed!” message for the user to retry selection.

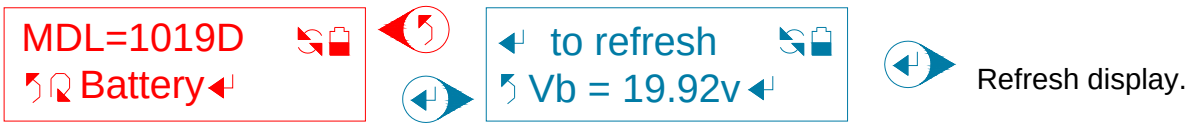
After a “Selected!” message, the Smart Switch will automatically return to the previous tier sub menu option “SWB Channel” and re-establish communication with a connected beacon. The user can then verify configuration from the identified beacon model and configuration message. Refer Section 3.4.1.

NOTE: - For beacons that are not Sonardyne Wideband™ compatible, on selection the Smart Switch will display “Unavailable!” message.

3.5.2 Battery

A connected beacons battery voltage is displayed: -

Fig. 15



Press ↺ to return to previous tier sub menu option “Battery”. Press ↵ to refresh the displayed beacon battery voltage. The Smart Switch will display a “Refreshed!” message indicating it has received and refreshed the displayed beacon battery voltage.

NOTE: - Fig. 15 beacon model and battery voltage for example only.

3.5.3 Depth Status

A connected beacons depth telemetry transmission status and a user selection are displayed: -

Fig. 16

Press ↺ to return to the previous tier sub menu option “Depth Status”. Press ↻ to change the selection OFF (disabled) or ON (enabled). Press ↵ to select depth telemetry transmission status. The Smart Switch will display a “Selected!” message on receiving confirmation from the connected beacon that it has configured successfully.

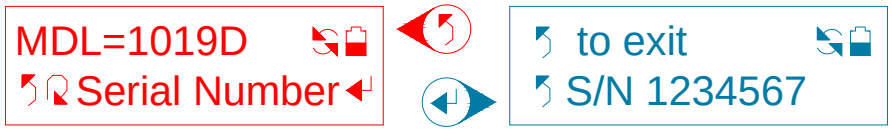
NOTE: - Fig. 16 beacon model and depth telemetry transmission status for example only.

NOTE: - For non-‘D’ suffix beacons, on selection the Smart Switch will display “Unavailable!” message.

3.5.4 Serial Number

A connected beacons serial number is displayed: -

Fig. 17



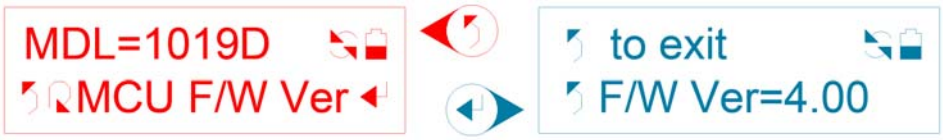
Press ↺ to return to the previous tier sub menu option “Serial Number”.

NOTE: - Fig. 17 beacon model and serial number for example only.

3.5.5 MCU Firmware Version

A connected beacons MCU firmware version is displayed: -

Fig. 18



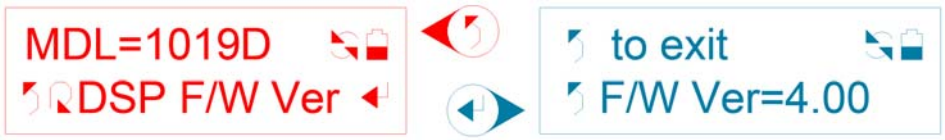
Press ↺ to return to the previous tier sub menu option “MCU F/W Ver”.

NOTE: - Fig. 18 beacon model and firmware version for example only.

3.5.6 DSP Firmware Version

A connected beacons DSP firmware version is displayed: -

Fig. 19



Press ↺ to return to the previous tier sub menu option “DSP F/W Ver”.

NOTE: - For non-DSP version beacons, the Smart Switch will display “Unavailable!” message.

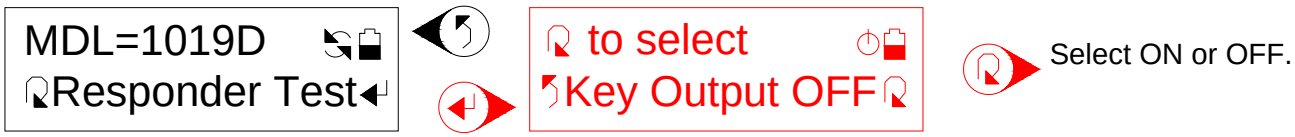
NOTE: - Fig. 19 beacon model and firmware version for example only.

3.6 Responder Test

Test responder operation of a connected compatible AAE beacon. Refer beacon manual for compatibility details: -

NOTE: - Refer beacon manual for compatibility and responder details.

Fig. 20



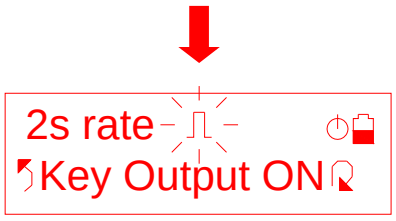
Press ↺ to return to top tier main menu option “Responder Test”. Press ↻ to select responder key output OFF (disabled) or ON (enabled).

NOTE: - Fig. 20 beacon model for example only.

If communication had been established with a connected beacon prior to selecting responder test, communication will be suspended. On returning to previous tier main menu, the Smart Switch will attempt to re-establish communication with the connected beacon.

With key output selected ON, a 5ms key pulse at RS232 electrical specification is output at 2 second rate. The Smart Switch briefly displays a pulse symbol when a key pulse is output.

Fig. 21

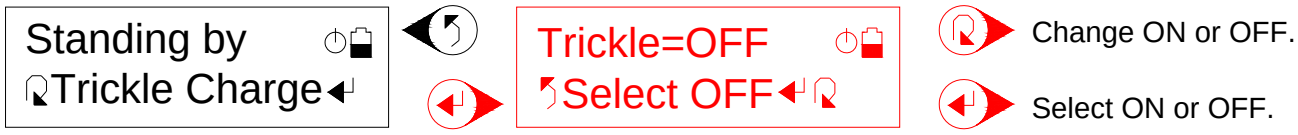


3.7 Trickle Charge

Trickle charge a connected compatible AAE beacon. Trickle charge activation is controlled by an electronic switch within the Smart Switch, sourcing power for beacon trickle charging from the 30VDC power supply unit: -

NOTE: - Refer beacon manual for compatibility and trickle charging details.

Fig. 22



Press ↺ to return to top tier main menu option “Trickle Charge”. Press ⟳ to change the selection ON or OFF. Press ↵ to select trickle charge ON or OFF.

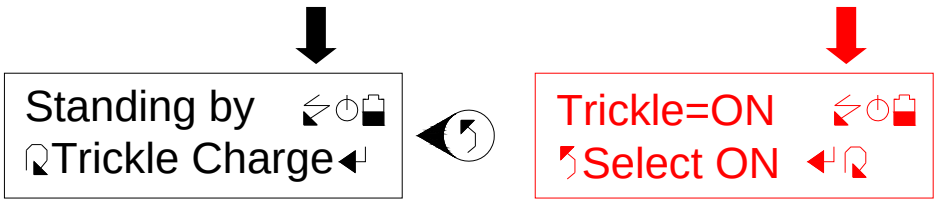
The Smart Switch will not activate trickle charging if it does not detect the 30VDC power supply unit. If the 30VDC power supply unit is not detected, the Smart Switch will indicate “No DC PSU!”.

Insert the 30VDC power supply to activate trickle charge ON. The Smart Switch will indicate “Selected!”. The electronic switch within the Smart Switch will close and the L.C.D. charge active icon will be displayed.

NOTE: - Serial communication with a connected beacon is stopped on selection of trickle charge menu option. To re-establish serial communication with beacon, select main menu option “Fast ID beacon” or a “Beacon Config” sub menu option.

While trickle charging is active, the Smart Switch can continue to be used for connected beacon configuration and responder testing. The L.C.D. charge active icon will continue to be displayed. Trickle charging will remain active if the Smart Switch enters very low power standby after 2 minutes of user inactivity.

Fig. 23



The Smart Switch continually monitors the 30VDC power supply unit while trickle charge is active. If the Smart Switch does not detect the 30VDC power supply unit, the electronic switch within the Smart Switch will open and the L.C.D. charge active icon will be removed. Trickle charge will have to be re-activated if required.

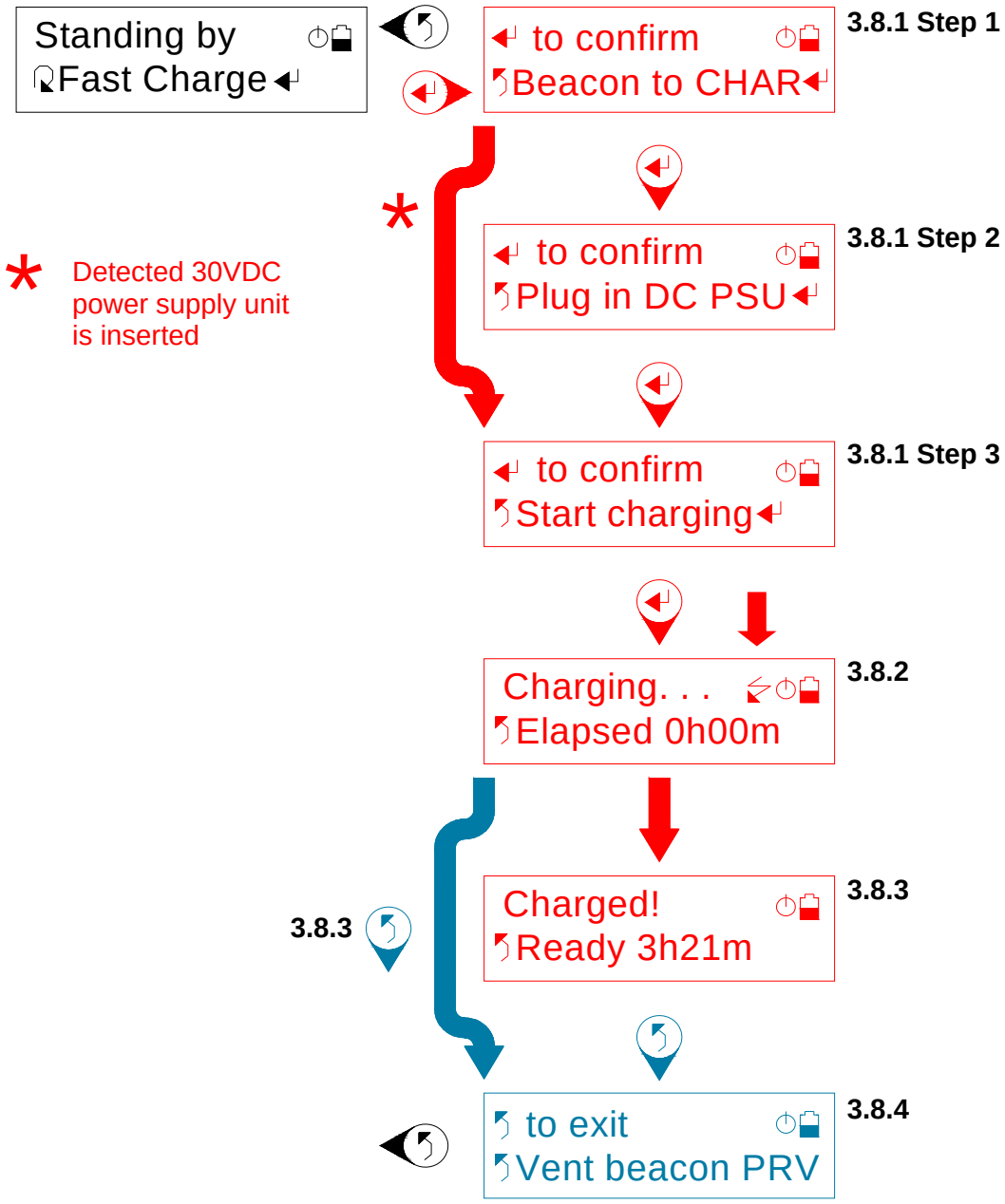
3.8 Fast Charge

NOTE: - A connected beacons selector switch has a dedicated position for fast charging. Refer beacon manual for details. Refer Section 3.8.1 Fast Charge Activation Step 1.

NOTE: - For fast charging Model 1060 Beacons ensure Smart Switch firmware is V1.08 or above.

Activate fast charging of a connected beacon. Fast charge activation is controlled by an electronic switch within the Smart Switch, sourcing power for beacon fast charging from the 30VDC power supply unit: -

Fig. 24



NOTE: - Fig. 24 charge time for example only.

NOTE: - Trickle charging is deactivated and serial communication with a connected beacon is stopped on selection of fast charge main menu option.

3.8.1 Fast Charge Activation

1000 / 1100 Series beacons feature an on-board fast charger for a typical 3 hour charge time. Charging is activated in a short succession of steps.

Press ↺ to terminate fast charge activation and return to top tier main menu option “Fast Charge”.

Step 1 “Beacon to CHAR”

A connected beacons selector switch must be set to the dedicated fast charge position CHAR for fast charge activation to occur, prompted by Step 1 “Beacon to CHAR”. Press ↵ to confirm this.

Step 2 “Plug in DC PSU”

If the Smart Switch detects the 30VDC power supply unit is already inserted, Step 2 “Plug in DC PSU” is omitted.

Fast charge activation will not proceed beyond Step 2 “Plug in DC PSU” if the Smart Switch does not detect the 30VDC power supply unit has been inserted. The Smart Switch will display “No DC PSU!” after ↵ is pressed. Insert the 30VDC power supply unit. Press ↵ to confirm this.

Step 3 “Start charging”

Press ↵ at Step 3 “Start charging” to activate fast charging of a connected beacon. The electronic switch within the Smart Switch will close and fast charging will begin.

3.8.2 Fast Charge Status

NOTE: - The Smart Switch will not enter low power standby while a connected beacon is fast charging.

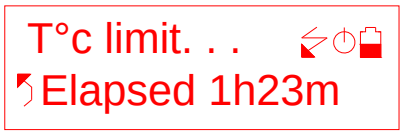
After fast charge activation, the Smart Switch continually monitors fast charge status information from a connected beacon. The Smart Switch also continually monitors the inserted 30VDC power supply unit. While fast charging, the Smart Switch displays a charging message and charge active icon, together with elapsed time in hours and minutes. Refer Fig. 18.

Fig. 25

NOTE: - Fig. 25 elapsed time for example only.

A temperature sensor embedded within the battery pack of a connected beacon is monitored by the beacons onboard fast charger. If an under temperature or over temperature limit is exceeded, fast charging will pause. The Smart Switch displays a temperature limit has been exceeded. Refer Fig. 19. Note fast charge cycle continues, indicated by charge active icon and elapsed time updating.

Fig. 26



NOTE: - Fig. 26 elapsed time for example only.

Fast charging will resume when battery pack temperature is within limits. The Smart Switch again displays a charging message and charge active icon, together with elapsed time in hours and minutes. Refer Fig. 19.

NOTE: - Fast charge cycle will not terminate if temperature limit exceeded.

NOTE: - Battery pack temperature will increase toward the end of a fast charge cycle.

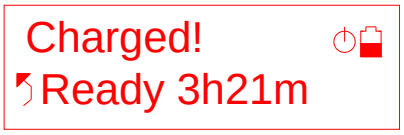
3.8.3 Fast Charge Termination

NOTE: - After charge termination, the Smart Switch will now enter low power standby mode after 2 minutes of no user activity.

When fast charging terminates, the electronic switch within the Smart Switch will open, isolating the beacon from the 30VDC power supply unit. The Smart Switch will display why fast charge terminated, together with the time to termination in hours and minutes. Fast charge termination is also indicated by removing the charge active icon. Fast charge termination can be due to: -

Beacon Battery Charged

Fig. 27



Refer 3.8.4

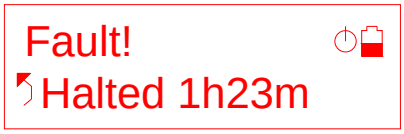
Beacon onboard fast charger indicates battery is fully charged, together with overall charge time in hours and minutes.

NOTE: - Fig. 27 ready time for example only.

Press ↰ to exit fast charge termination display.

Beacon Fast Charger Fault

Fig. 28



Refer 3.8.4

Beacon onboard fast charger has detected a fault. Check the following: -

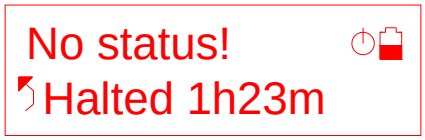
- Has the beacon pressure relief valve vented?
- Was the beacon battery pack already fully charged? Attempting to recharge a fully charged battery may reduce the life of the battery and cause damage.
- Is the beacon battery pack approaching the end of its operational life? Fast charging may have timed out if the battery pack was not charging correctly.
- None of the above. Return the beacon to Applied Acoustic Engineering for evaluation.

NOTE: - Fig. 28 halted time for example only.

Press ↰ to exit fast charge termination display.

No Beacon Fast Charger Status

Fig. 29



Refer 3.8.4

The Smart Switch does not detect fast charge status information from a connected beacon. Check the following: -

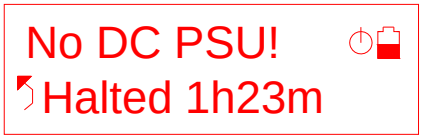
- Is the beacon selector switch set to CHAR position?
- Is the Beacon Connection Cable secure?
- Is the beacon battery pack open circuit?
- Is the beacon battery pack exhausted? Set the beacon to the OFF or CHAR position and trickle charge for 10 minutes before attempting to fast charge.

NOTE: - Fig. 29 halted time for example only.

Press ↺ to exit fast charge termination display.

30VDC Power Supply Unit Not Detected

Fig. 30



Refer 3.8.4

The Smart Switch does not detect the 30VDC power supply unit is inserted. Check the following: -

- Is the 30VDC power supply unit inserted into the Smart Switch?
- Check the mains lead and mains supply.

NOTE: - Fig. 30 halted time for example only.

Press ↺ to exit fast charge termination display.

Smart Switch Terminates Charging After Timeout

Fig. 31

Refer 3.8.4

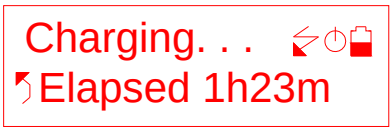
The Smart Switch terminated beacon charging. The Smart Switch monitors overall beacon charging time. If the overall charging time exceeds a defined time limit or “timeout”, the Smart Switch terminates beacon charging. This ultimate safety feature is independent of the beacon chargers own timeout.

NOTE: - Timeout is defined automatically from a connected beacon model.

NOTE: - Fig. 31 halted time for example only.

User Terminates Fast Charging Before Completion

Fig. 32



Refer 3.8.4

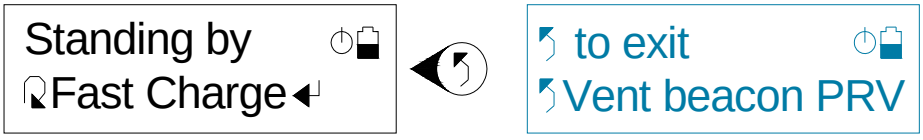
Fast charging can be terminated by the user. Press ↰ to terminate fast charging.

NOTE: - Fig. 32 elapsed time for example only.

3.8.4 Post Fast Charge Termination

The Smart Switch will now instruct the user to vent the beacon pressure relief valve.

Fig. 33

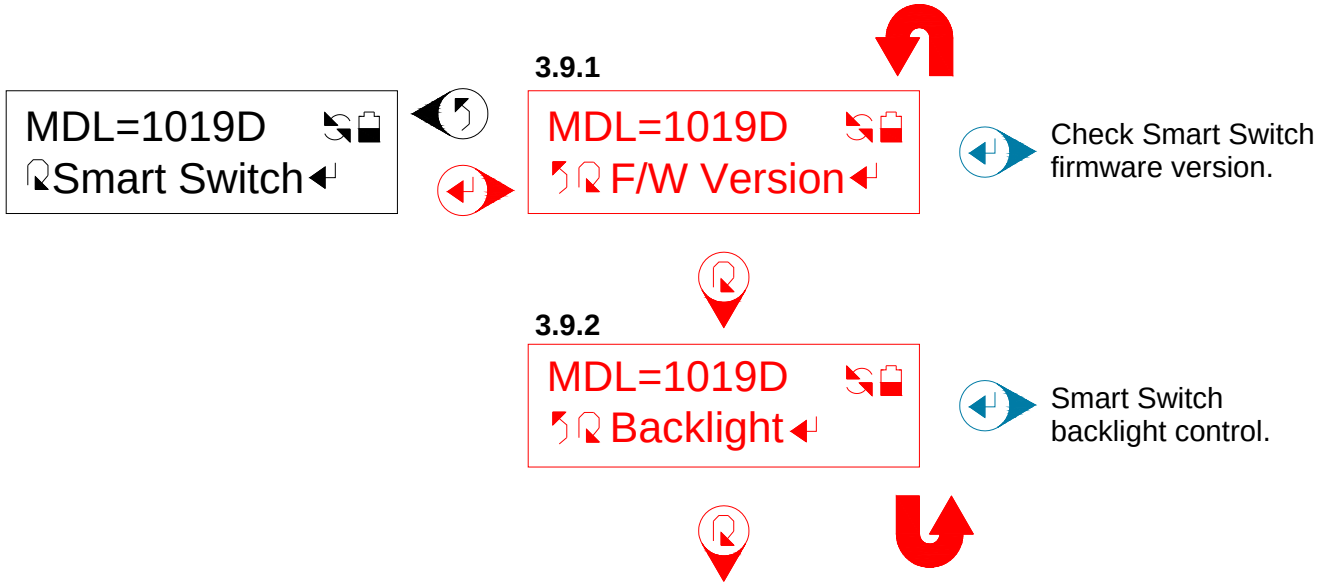


Press ↰ to return to top tier main menu option “Fast Charge”.

3.9 Smart Switch Configuration

Contains further sub menu options for Smart Switch configuration: -

Fig. 34



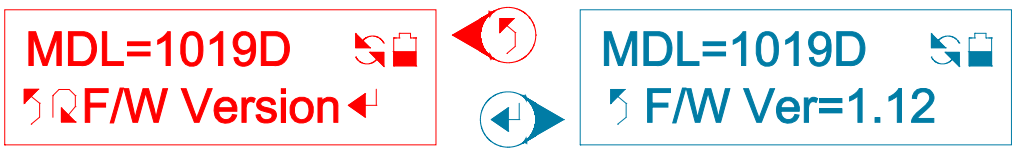
Press ↺ to return to top tier main menu option “Smart Switch”. Press ↻ for next sub menu option. Press ↵ to select a sub menu option.

NOTE: - Fig. 34 beacon model for example only.

3.9.1 Firmware Version

The Smart Switch firmware version is displayed: -

Fig. 35



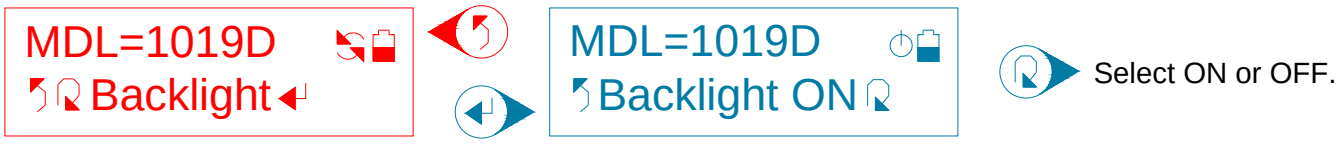
Press ↺ to return to previous tier sub menu option “F/W Version”.

NOTE: - Fig. 35 beacon model and Smart Switch firmware version for example only.

3.9.2 Backlight

Configure Smart Switch L.C.D. backlight operation: -

Fig. 36



Press ↺ to return to previous tier sub menu option “Backlight”. Press ↻ to select Smart Switch backlight ON (enabled) or OFF (disabled) when a selection key is pressed.

NOTE: - Fig. 36 beacon model for example only.

4. Firmware Upgrade

The Smart Switch firmware is field-upgradeable. The firmware loader resides in Smart Switch protected memory and cannot be overwritten. Hence, if a failure occurs during a Smart Switch firmware upgrade, i.e. a power interruption, the update process can simply be repeated.

See Appendix C for firmware update instructions.

5. Battery Replacement

In due course, rechargeable batteries will require replacement. Return the Smart Switch to Applied Acoustic Engineering for battery replacement.

6. Product Recycling / Disposal

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

7. Spares

The following spares are available from stock: -

Beacon Connection Cable
RS232 serial cable
30VDC Power supply unit (100-250VAC mains input)
Mains lead (IEC)
1000 Series PRV Actuator

8. Fault Finding

The Smart Switch doesn't work, what can we do?

Most instances of failure are due to mechanical damage or user error but the possibility of component failure is always there.

Did the Smart Switch ever work?

If the answer is yes, either the battery is not charged or the Smart Switch is faulty. Look for mechanical damage and also check if the connectors are damaged.

Try resetting the Smart Switch by depressing the reset button.

If there are no signs of mechanical damage, try charging the Smart Switch.

Check the 30VDC power supply unit is operational.

Check the Beacon Connection Cable for damage. Damage could affect all Smart Switch functionality with a connected compatible AAE beacon.

If cannot establish communication with a connected 1000 series beacon, turn beacon off and leave for minimum of 1 minute, then turn beacon back on and retry communication.

If these tests do not help or resolve the problem, contact Applied Acoustic Engineering immediately for technical assistance.

WARNING: - If there are any signs of mechanical damage, return the Smart Switch to Applied Acoustic Engineering for repair.

9. Specification

Physical

Dimensions	117mm x 73mm x 24mm
Weight	160g
User Interface	4 selection buttons 2-line backlit liquid crystal display
Other	Reset button
Operating Temperature	0°C to 30°C
Storage Temperature	0°C to 55°C

External Connectors

Comms / Charging	9-way ‘D’ socket
DC Input	2.1mm DC power socket 30VDC

Battery

Type	Internal rechargeable NiMH 4.8V
Operational Life	2 days minimum constant use with backlight enabled Reverts to very low power standby after 2 minutes of no user activity
Standby Life	5 months typical
Charge Time	17 hours typical (exhausted to full charge)
Charge Method	Trickle charge @ 40mA with 30VDC power supply unit connected

Although unlikely, published specifications are subject to change. Please consult the factory if a particular specification is critical. Changes to the existing design are possible - please consult the factory for information.

CE. These units conform to the European directive 89/336/EEC for electromagnetic compatibility when used in the proper manner.

Operation

Modes	Fast I.D. Beacon Beacon Configuration Responder Test Trickle Charge Fast Charge Smart Switch
Firmware	Field upgradeable

Electrical

Serial Comms	RS232 compliant 9600 baud rate 8 data bits 1 stop bit No parity No flow control
Responder Test Output	5ms pulse @ RS232 electrical specification 2 second rate output
Trickle Charge	140mA maximum @ 27VDC (30VDC power supply unit inserted)
Fast Charge	1.35A maximum @ 30VDC (30VDC power supply unit inserted)

Included Accessories

Beacon Connection Cable	9-way ‘D’ plug to 5-way MCIL5F socket 0.5 metre
Power Supply Unit	30VDC 1.2A terminated with 2.1mm DC power plug 100-250VAC mains input
1000 Series PRV Tool	
RS232 serial cable	9-way ‘D’ socket to 9-way ‘D’ plug
Mains lead	I.E.C.

Although unlikely, published specifications are subject to change. Please consult the factory if a particular specification is critical. Changes to the existing design are possible - please consult the factory for information.

CE. These units conform to the European directive 89/336/EEC for electromagnetic compatibility when used in the proper manner.

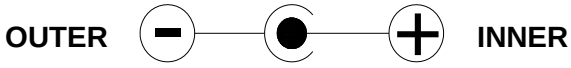
10. Transportation by Air

NiMH Battery Pack

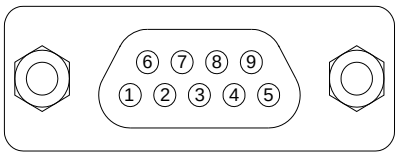
These battery packs are **not** classified as dangerous goods for transportation by air. It is advised that any paperwork accompanying the Smart Switch state this clearly.

11. Appendix A Connector Details

Smart Switch DC Input Socket



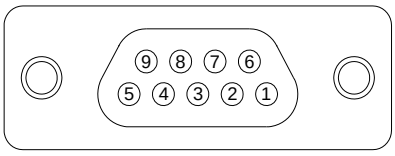
Smart Switch 9-Way ‘D’ Socket



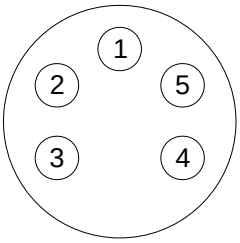
9-WAY ‘D’ SOCKET
FACE VIEW

9-WAY ‘D’ SOCKET	FUNCTION
2	RS232 TXD / KEY PULSE
3	RS232 RXD / FAST CHARGE
5	0V
9	FAST CHARGE STATUS / TRICKLE CHARGE

Beacon Connection Cable



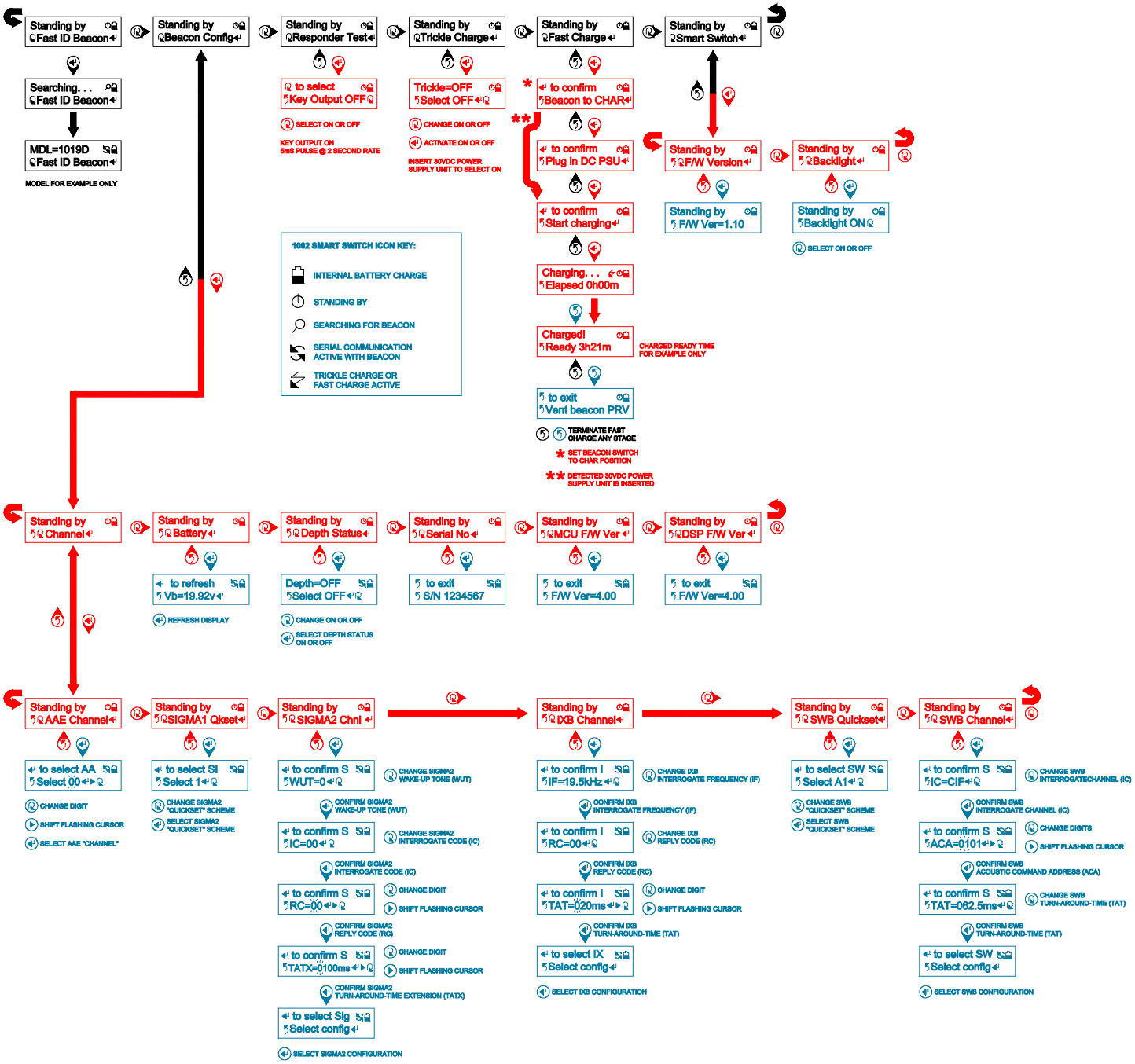
9-WAY ‘D’ PLUG
FACE VIEW



MCIL5F PIGTAIL
FACE VIEW

9-WAY ‘D’ PLUG	MCIL5F PIGTAIL
2	1 (BLACK) / 5 (ORANGE)
3	3 (RED)
5	2 (WHITE)
9	4 (GREEN)

12. Appendix B Quick Start Guide



13. Appendix C Firmware Update Instructions

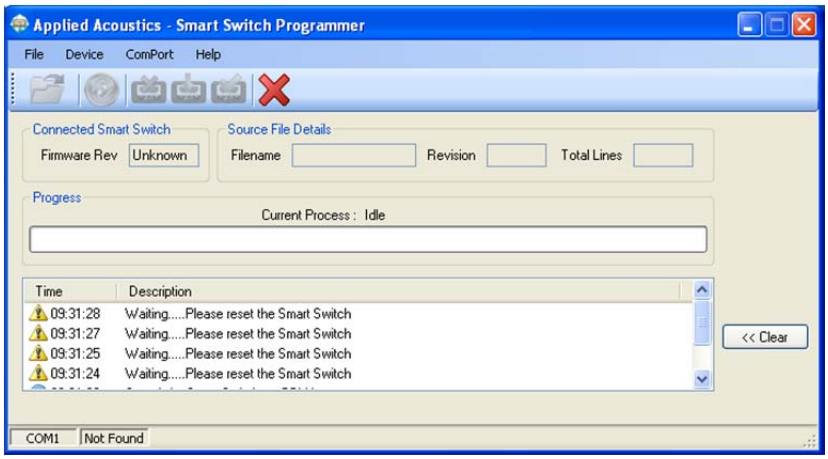
Required:

- 1082 Smart Switch.
- PC with serial com port and “Smart Switch Programmer” software installed.
- Latest version of software (hhXXX.ss.hex).
- RS232 serial cable (1 to 1, not crossover cable).

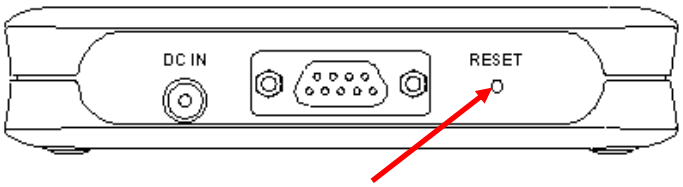
Instruction:

1. Connect 1082 Smart Switch to PC com port via serial lead.

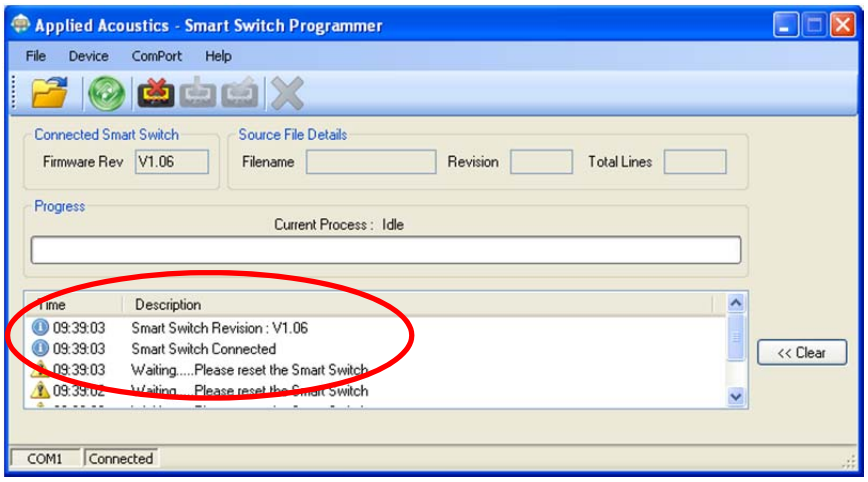
2. Run “SmartSwitchProgrammer.exe”. The software will automatically start searching for a connected Smart Switch. (The software will automatically use the com port that was last used with the software, if this is incorrect, please select correct com port from the menu)



3. Reset the Smart Switch

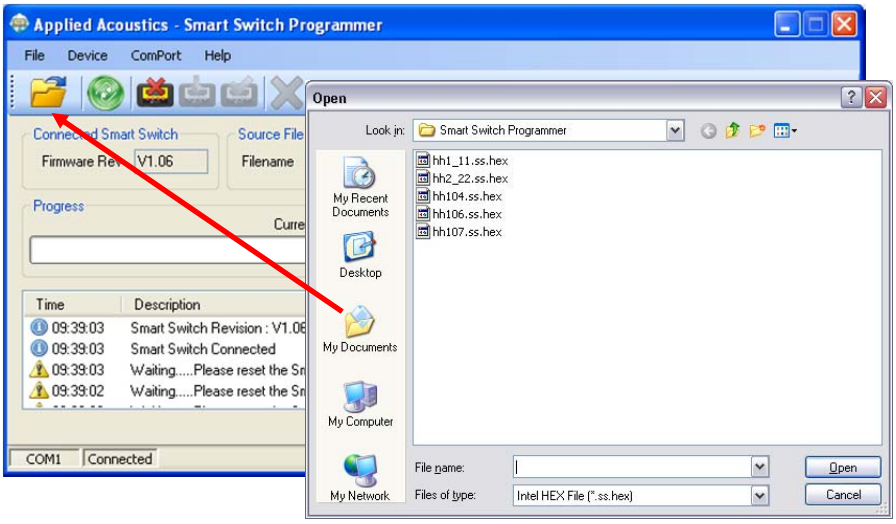


4. Program will try to detect a connected Smart Switch and display the current firmware revision.



If the software does not detect a Smart Switch within approximately 15 seconds the detection will be aborted. To attempt a reconnect you may press the ‘Search’ button on the tool bar 

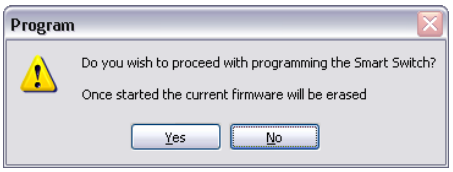
5. Select “Open source file” and open latest firmware version (hhXXX.ss.hex).

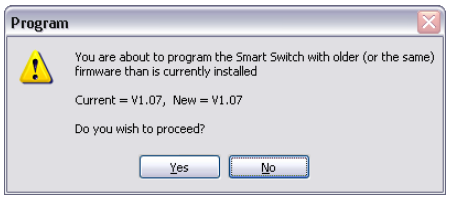


6. Program the Smart Switch 

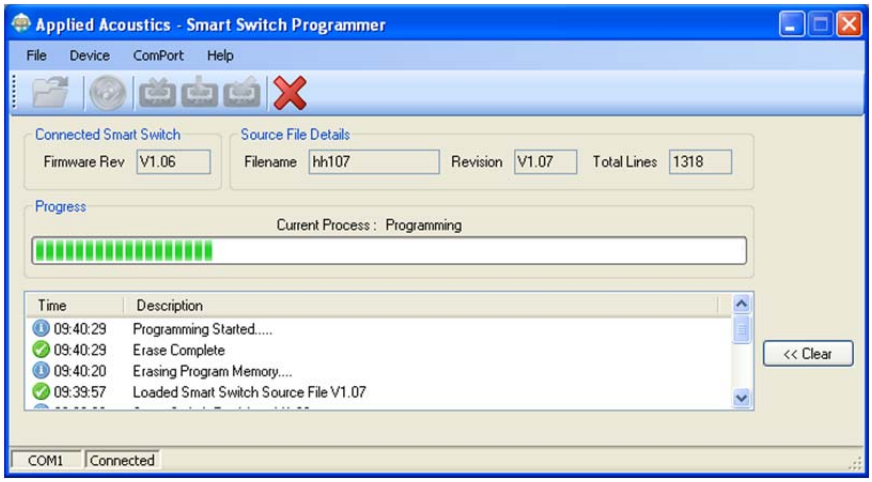
Press the ‘Program Smart Switch’ button on the tool bar to proceed with the programming of the Smart Switch

Click “Yes” to confirm programming. You will be alerted if the version you are attempting to program to the Smart Switch is the same, or older, than the currently installed version

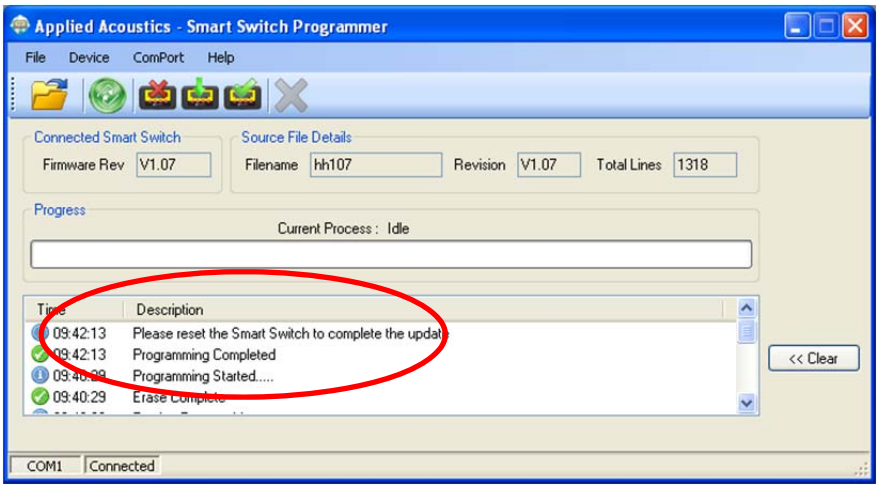




7. The programming will proceed. The progress will be shown as below



8. When programming is complete reset the Smart Switch.



9. Disconnect serial lead from Smart Switch, switch on and confirm correct firmware version.

Applied Acoustic Engineering is a leading company in the design and manufacture of a wide range of subsea navigation and positioning products, and marine seismic survey equipment.

The extensive product range includes the innovative USBL tracking system, Easytrak, a variety of positioning and release beacons and seismic devices for offshore geotechnical and seabed analysis known as sub-bottom profiling.

All products use acoustics, underwater sound waves, in location, positioning, navigation and data acquisition applications.system, Easytrak, a variety of positioning and release beacons and seismic devices for offshore geotechnical and seabed analysis known as sub-bottom profiling.

Certificate No. 6447
BS: EN: ISO9001 : 2000

APPLIED ACOUSTICS
Underwater Technology

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