Yacht Devices

User Manual

Alarm Button YDAB-01

also covers models

YDAB-01N , YDAB-01R

Firmware version

1.00

2019

Contents

Package Contents

Device	1 pc.
This Manual	1 pc.
Button with Integrated LED	1 pc.
Sound Speaker 10W 4 Ohm	Not supplied
NMEA 2000 Cable	Not supplied

Introduction

The Alarm Button (hereinafter Device) is a multifunctional NMEA 2000 device with wires for connection of an external button with an LED indicator (supplied with the Device) and a standard 4 or 8 Ohm sound speaker (not supplied). It can be configured for the following functions:

- **MOB button (default mode).** Pressing the connected button for two seconds sounds an alarm and sends AIS MOB messages (emulating the message received from EPIRB and SART devices with AIS VHF support) with the current GPS position. It sets the mark of MOB position on a chart plotter. Pressing the button a second time cancels transmission of MOB messages. Note that messages sent from the Device are not transmitted externally via VHF or AIS, but are available to all NMEA 2000 devices on the vessel.
- **Digital switching alarm unit.** The device acts as an NMEA 2000 binary switch bank with 28 channels, each channel has a unique sound alarm and LED flashing sequence. Channels (and corresponding sound alarms) can be turned on/off from other equipment, including our smart sensors or from the screen of a modern chart plotter. The button connected to the device cancels the alarm.
- **Engines monitoring unit.** In this mode, the Device produces sound alarms according to engine alarms sent by the engine control unit or gateway to NMEA 2000. This mode is useful on boats where the regular engine monitoring instruments are already in need of replacement. The Device can also be programmed to produce a sound alarm itself at a specified temperature, engine revolution reading, etc.

The mode and audio signal level can be configured by pressing the connected button in a special sequence. More settings can be configured using commands sent to the Device in the installation description strings (hardware and software from Yacht Devices, ActiSense or Maretron is required).

The Device contains a 10W amplifier, and the current consumption during the audio playback may exceed listen to the pre-recorded sounds and see led flashing 1 Amp. Therefore, it is recommended to connect the Device near the NMEA 2000 power cable or connect an additional power cable to the backbone socket next to the Device.

Thank you for purchasing our product and happy voyages!

Warranty and Technical Support

1. The Device warranty is valid for two years from the date of purchase. If a Device was purchased in a retail store, the sale receipt may be requested when applying for a warranty claim.

2. The Device warranty is terminated in case of violation of the instructions of this Manual, case integrity breach, or repair or modification of the Device without manufacturer's written permission.

3. If a warranty request is accepted, the defective Device must be sent to the manufacturer.

4. The warranty liabilities include repair and replacement of the goods and do not include the cost of equipment installation and configuration, neither shipping the defective Device to the manufacturer.

5. Responsibility of the manufacturer in case of any damage as a consequence of Device operation or installation is limited to the Device cost.

6. The manufacturer is not responsible for any errors and inaccuracies in guides and instructions of other companies.

7. The Device requires no maintenance. The Device's case is non-dismountable. In the event of a failure, please refer to Appendix A before contacting technical support.

8. The manufacturer accepts applications under the warranty and provides technical support only via e-mail or through authorized dealers.

9. Contact details of the manufacturer and a list of the authorized dealers are published on the website: http://www.yachtd.com/.

I. Specification

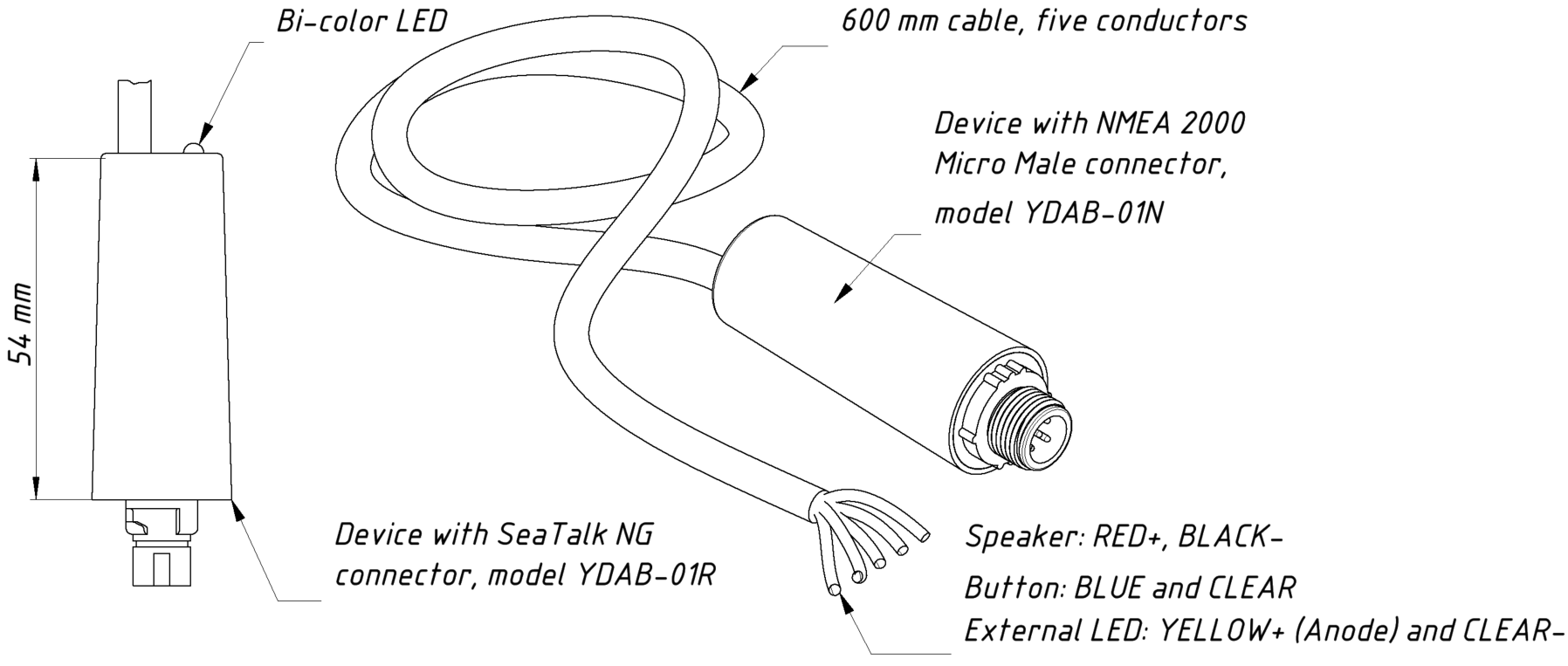

Figure 1. Drawing of YDAB-01N and YDAB-01R models of Device

Our devices are supplied with different types of NMEA 2000 connectors. Models containing an «R» in the suffix of the model name are equipped with NMEA 2000 connectors and are compatible with Raymarine SeaTalk NG. Models containing «N» in the suffix are equipped with NMEA 2000 Micro Male connectors.

Device parameter	Value	Unit
Operating voltage (from an NMEA 2000 network)	7..16	V
Protection against reverse polarity	Yes	—
Average current consumption without playback	50	mA
Average current during playback (sound 1, Appendix B; 13V / 4 Ohm)	200	mA
Maximum current during playback (sound 23, Appendix B; 13 V / 4 Ohm)	440	mA
Audio amplifier output (8 Ohm load at 13V)	10	W
Load Equivalency Number	20	LEN
Built-in current limiting resistor for the external LED	200	Ohm
External LED power supply	3,3	V
Operating temperature range	-40..+80	°C
Weight	37	g
Device case length (without connector)	54	mm
Cable length	600	mm

CE Yacht Devices Ltd declares that this product is compliant with the essential requirements of EMC directive 2014/30/EU and radio and TTE directive 1999/5/EC.

Dispose of this product in accordance with the WEEE Directive. Do not mix electronic waste with domestic or industrial refuse.

II. Device overview

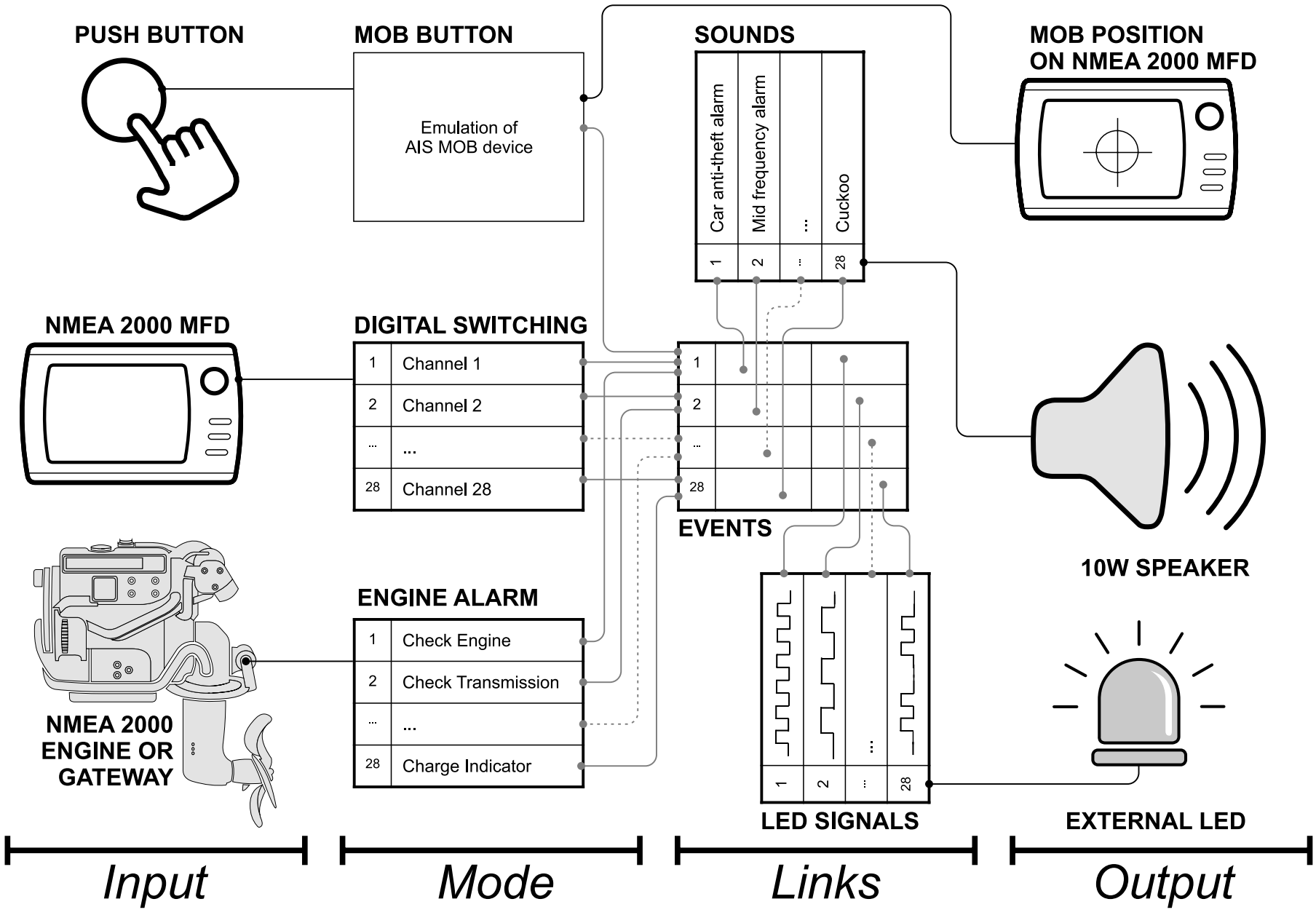

Figure 1. Functional scheme

The Device can function in one of three modes: MOB button, digital switching alarm unit or engine alarm unit. It has five wires to connect the sound speaker (not supplied with the Device) and an external push button with integrated LED.

1. MOB button mode

In this mode (factory default), pressing the connected button for two seconds (can be changed in settings) causes the sending of NMEA 2000 MOB messages (PGN 129038 and 129802), using the GPS position data from NMEA 2000 network. Multifunction displays (chart plotters) will place the mark on the screen. In addition to that, the Device produces a sound alarm and the external LED start "S" flashing, confirming that the MOB alert is activated. The next 2-second press to the button cancels the MOB signal.

For the MOB mark, the Device uses MMSI number 972777XXX, where XXX is an incremental number from 000 to 999. This allows setting the mark next time when the previous MOB alert from the Device has been canceled or suppressed by the MFD user.

Unlike a VHF distress button, or activation of EPIEB, the signal is not sent out from the boat. The only goals of the Alarm Button are to wake up your crew with a sound alert and place the MOB position on all chart plotters on board. The Device is essential for you if you have no chart plotter near the helm, or if your MFD has no hardware MOB button and you need it to comply with racing rules.

2. Digital switching mode

Digital switching means that you can turn some loads (digital switching channels) on or off from the software. For example, using a virtual button on the chart plotter screen you can turn on navigation lights or a bilge pump.

The Alarm Button allows you to turn on and off 28 different sound signals from the chart plotter screen or from other digital switching equipment. Channels can be managed by NMEA 2000 digital switching messages (PGN 127501 and 127502) or with proprietary CZone messages (supported in most modern chart plotters, see the Section VI).

In NMEA 2000, digital switching devices are identified on the network by the bank number (can be changed with YD:BANK command, see the Section V). Devices with the same bank number will be turned

on/off synchronously by external equipment, this allows placement of multiple Alarm Buttons with the same function in different places of the boat.

Temperature, pressure and humidity sensors from Yacht Devices can turn on or off digital switching channels when the measured value is too high or too low. For example, the Digital Thermometer can warn with a sound alarm from the Alarm Button when the temperature in an engine room or live well is too high.

Our NMEA 2000 Wi-Fi Gateway or NMEA 2000 Wi-Fi Router allows managing of digital switching loads from a web browser; it can be used to alarm the crew from the cabin or scare a thief over the Internet.

3. Engine alarm mode

In this mode, the Device will sound warnings and faults received from engines and transmissions. You can also program user alerts for engine revolutions, coolant temperature and boost pressure. For example, you can program the Device to produce a sound alarm when the engine revolutions exceed 3000 per minute for 30 seconds or more.

The list of supported warnings and faults is available in Appendix D. One Device can handle events from all engines, or you can link it with a specified engine. In the second case, you can use different Devices (and different sound speakers) to sound warnings and faults from port and starboard engines.

4. Links and events

You can configure sound alarms and external LED signals linked to different events. In the MOB mode, only the event with number 1 is used. In other modes, 28 events (with numbers from 1 to 28) are associated with 28 digital switching channels or 28 of supported engine and transmission warnings and faults.

The Device memory contains 28 pre-recorded sound signals (see the Appendix B) and 28 LED flashing sequences (see the Appendix C). In the factory settings, the sound signal with number 1 and flashing sequence with number 1 are linked with the event 1 and so on.

You can listen to the pre-recorded sounds and look at LED flashing sequences with YD:PLAY and YD:LED commands and set desired sound and flashing sequence for the event with the YD:LINK command (see the Section V). To disable or enable the event use the YD:EVENT command.

If different events occur same time, the event with the lowest number will have highest priority, and the Device will playback the sound and external LED flashing sequence associated with this event.

In the engine alarm mode, pressing the button will suppress the current event for 30 seconds (can be changed in settings) for all engines. If multiple warnings/faults are occurred in same time, the next event will be activated.

In the digital switching mode, pressing the connected button will turn off the active channel (active event). And if multiple channels are turned on, the next channel (event) will be activated. If all channels are off, pressing the connected button will turn on channel 1 (can be turned off or changed in settings).

For example, if you turn on channels 1, 2 and 4 of the digital switching equipment, the Device will play the sound and show an LED sequence corresponding to the event 1. When you press the button, channel 1 will be turned off and the Device will play the sound and show an LED sequence corresponding to the event 2. Next button press will turn off channel 2 and the Device will play the sound and show an LED sequence corresponding to the event 4. Next button presses will turn off channel 4.

III. Device Installation and Connection to NMEA 2000

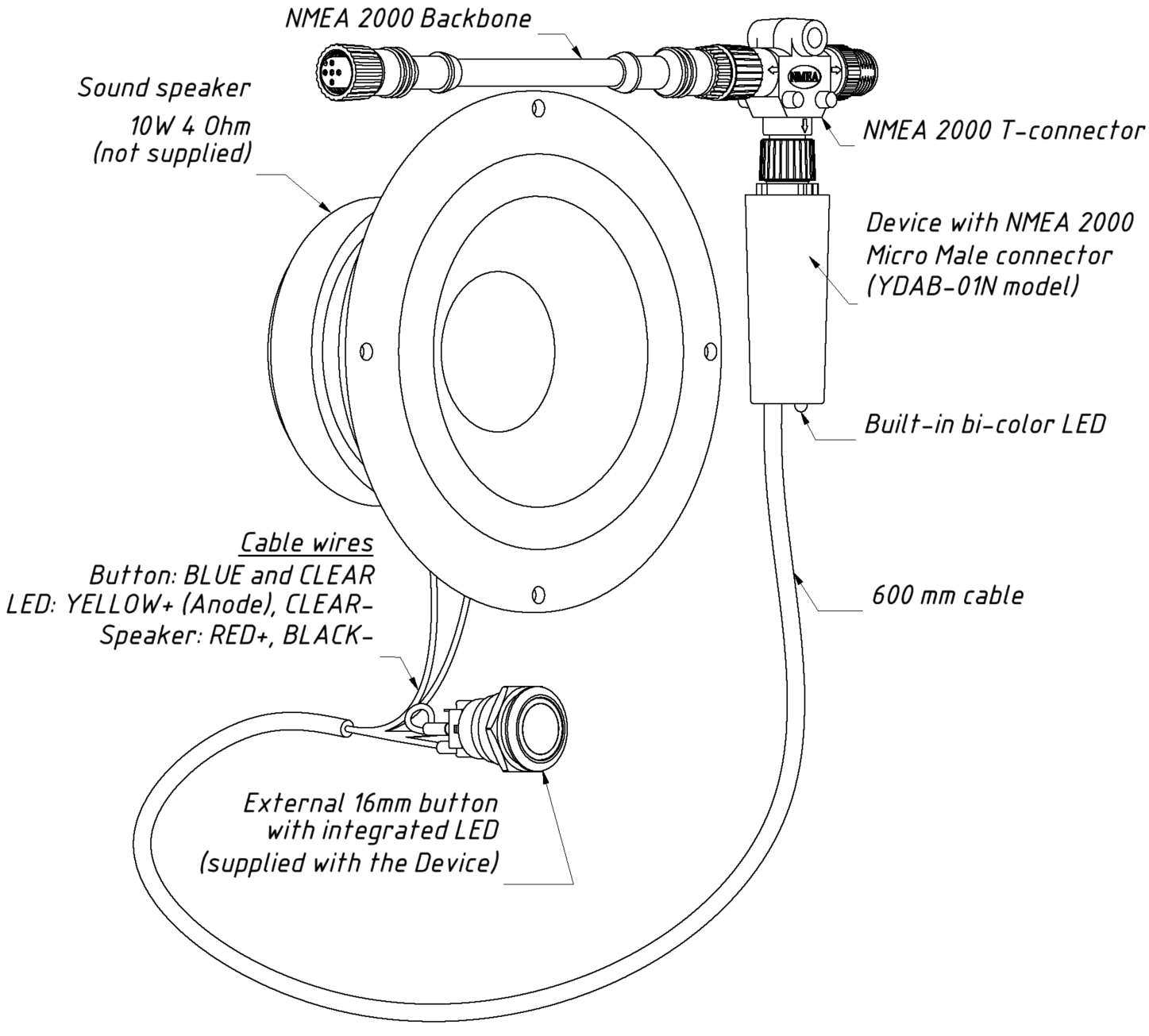

Figure 1. Device connection

The Device requires no maintenance. When deciding where to install the Device, choose a dry mounting location. Avoid places where the Device can be flooded with water, this can damage it.

1. Connecting to NMEA 2000

The Device is directly connected to the network backbone without a drop cable (Figure 1). Before connecting the Device, turn off the bus power supply. Refer to the manufacturer's documentation if you have any questions regarding the use of connectors:

• SeaTalk NG Reference Manual (81300-1) for Raymarine networks

• Technical Reference for Garmin NMEA 2000 Products (190-00891-00) for Garmin networks

Note that the Device is powered from the NMEA 2000 backbone and consumes up to 1 Amp during the playback, and it is better to connect it to the next socket to NMEA 2000 power cable or add additional power tap from the battery near the connection point.

After connecting the Device, close the lock on the connection to ensure its water resistance and reliability. The Device has a built-in LED which flashes red or green. After turning the power in the NMEA 2000 network on, the Device's built-in LED will start flashing (see Section VII).

2. Connection of the external button and LED

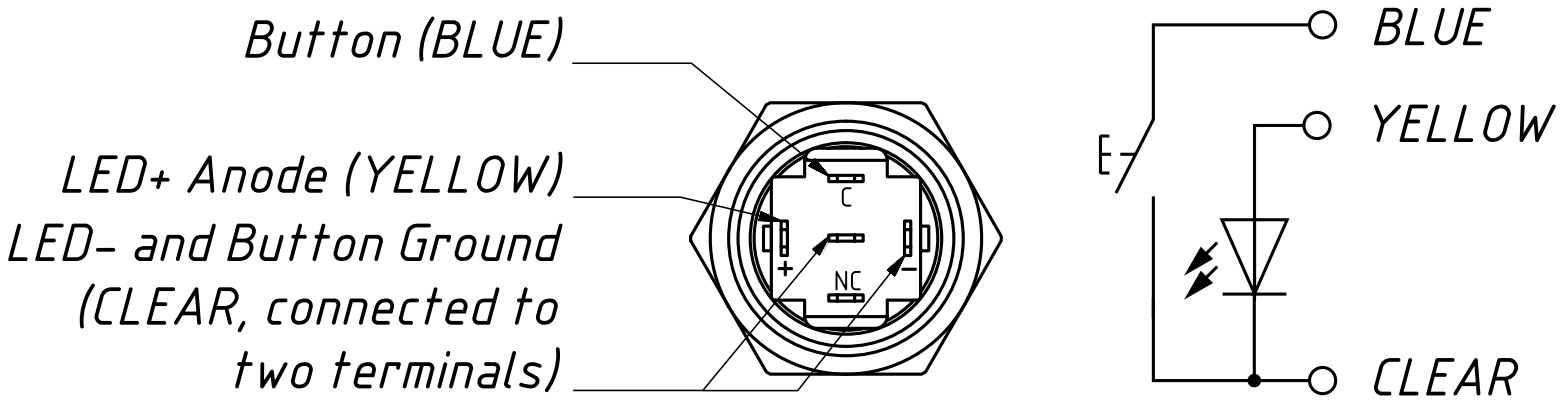

Figure 2. Button terminals and electrical scheme

You can use the supplied button or any momentary push-button you like that matches your boat's interior. Waterproof IP67 buttons of this type with integrated colored LED are widely available from well-known international suppliers like DigiKey Electronics (www.digikey.com), Mouser Electronics (www.mouser.com) and others. For example, Mouser part number 123-82-4151.1153 is an IP67 stainless steel 16mm momentary button with white ring illumination (LED 12V, AC/DC).

The Device provides 3.3 Volts to the external LED wire (YELLOW) and has a 200 Ohm built-in current-limiting resistor (you can connect the LED directly to wires). Buttons with LEDs rated as «12V» will be brighter than the same buttons rated as «24V» (they actually differ in the current-limiting resistor inside). The specified voltage is the maximum allowed and both types are compatible with the Device; buttons with «5V» and «3V» LEDs are also widely available.

The YELLOW wire of the Device must be connected to LED's anode (+), the BLUE wire must be connected to the button, the CLEAR wire must be shared between the LED's cathode (-) and the second button terminal. Terminals of the button supplied with the Device are shown in Figure 2. It is better to crimp the contacts than to solder them. Soldering must be protected from the air with paint or lacquer.

3. Connection of the sound speaker

The Device has a 10-Watt amplifier and outputs the current up to 1A. The best performance will be achieved with 4 Ohm speakers, the 8 Ohm speaker will sound a little quieter. Piezoelectric sound emitters can also be used, but they may have adequate performance with tone signals only.

Please, be mindful of the correct polarity when connecting the speaker. The RED wire of the Device should be connected to the «+» terminal of the speaker, the BLACK wire should be connected to the «-» terminal of the speaker (see Figure 1). The sound volume can be adjusted in the settings (see Sections IV and V).

IV. Configuration with External Button

Configuration with the external button is limited and allows changing the volume and the Device's mode (see the Section II). To enter configuration mode:

- in the MOB button mode: quickly press the button 5 times;
- in other modes: hold the button for 5 seconds.

The Device confirms configuration mode with a 5-second signal of the external LED. Press the button one time during LED signal to enter mode programming, or the Device will enter volume programming after the LED signal.

In the mode programming, the external LED will continuously flash, depening on the current mode:

- 1 short flash: MOB button mode;
- 2 short flashes: digital switching mode;
- 3 short flashes: engine alarm mode.

In the volume programming:

- 1 short flash: 1% of volume;
- 2 short flashes: 20% of volume;
- 3 short flashes: 40% of volume;
- 1 long flash: 60% of volume;
- 2 long flashes: 80% of volume;
- 3 long flashes: 100% of volume.

Pressing the button will sequentially switch modes or volume level.

To apply settings, do not press the button for 10 seconds, and the Device will save the current settings and return to normal operation mode.

V. Configuration with Installation Description Strings

Installation description strings are usually written by installers to specify the device location or to leave notes or contact information. This can be done with professional PC software (with a hardware connector to NMEA 2000 network) and it may be supported by some models of chart plotters. Please refer to your software or chart plotter documentation for details.

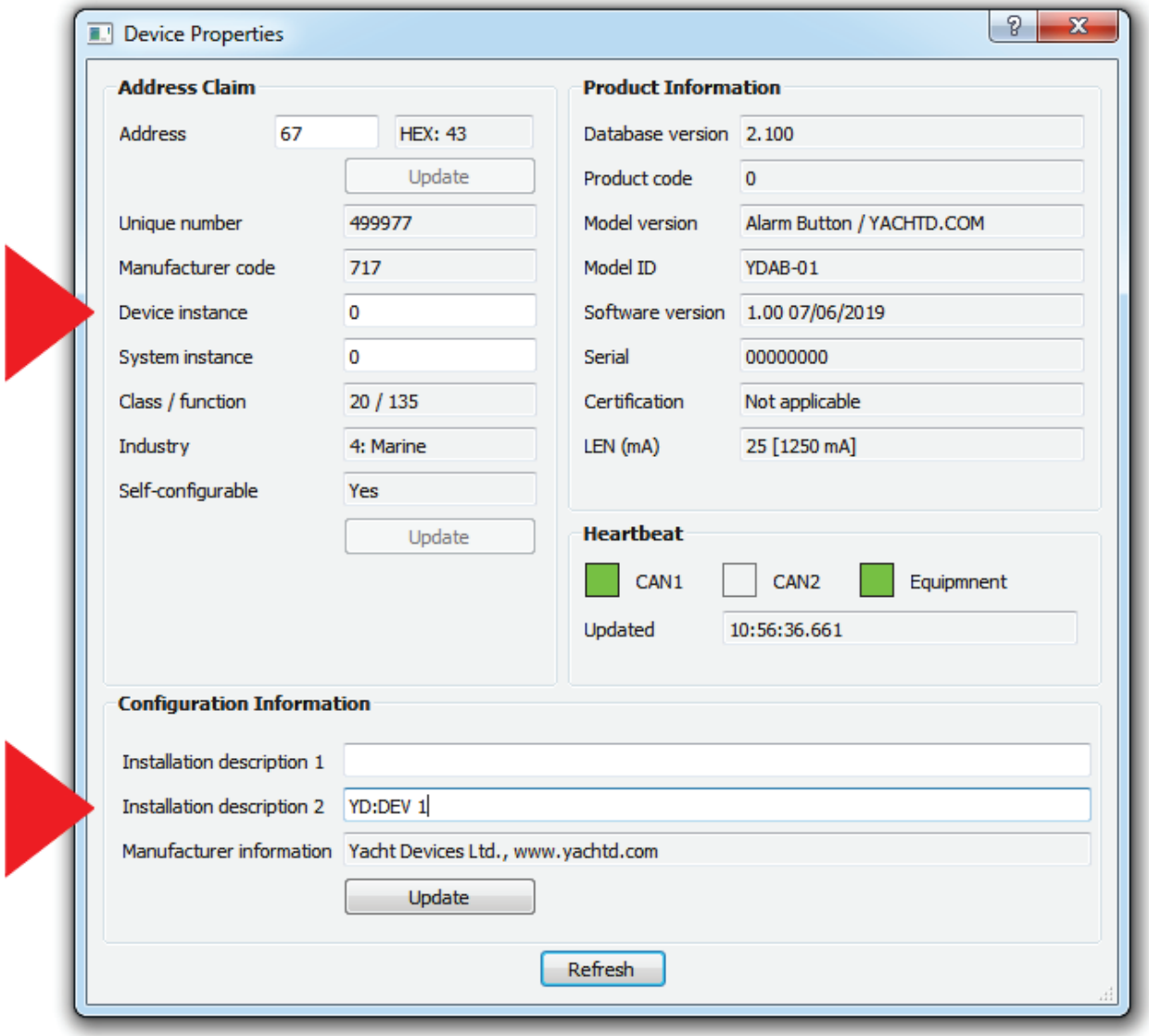

Figure 1. Programming with CAN Log Viewer

To program the Device, enter a special string starting with «YD:» to the installation description field 2 in the Device properties. For example, «YD:DEV 1» (without quotes) will change the NMEA 2000 device instance of the Device to 1. If the command (except «YD:RESET») is accepted by the Device, it will add «DONE» to the entered text and «YD:DEV 1 DONE» will be displayed in the case of our example. Note that the Device always accepts correct strings regardless of the current settings, etc.

In Figure 1 on the previous page, you can see the process of programming the Device with free CAN Log Viewer software (to open this window, select the item «NMEA 2000 Devices» in the «View» menu, refresh the list of devices, select the device and click «Properties» button). You can download this program (runs on Microsoft Windows, Mac OS X and Linux) at http://www.yachtd.com/downloads/, Yacht Devices NMEA 2000 Wi-Fi Gateway, Yacht Devices NMEA 2000 Wi-Fi Router or Yacht Devices NMEA 2000 USB Gateway is required to connect the PC with NMEA 2000 network.

In the software you can also modify the NMEA 2000 device instance by entering a value in the dedicated field (see «Address Claim» group on the screenshot). After entering the command as shown in Figure 1 (click «Update» button to apply changes), the value in the «Device Instance» field will be changed to 1, and «Installation Details 2» field will be changed to «YD:DEV 1 DONE».

The full list of special strings is in Table 1. Parameters in square brackets can be omitted to get the current value of the setting from the Device.

Table 1. Special strings

String format	Examples	Description
System commands		
YD:RESET		Reset all settings to factory values, including installation description strings.
YD:DEV [0..255]	YD:DEV 0	Sets NMEA 2000 device instance value (0 - 255). Factory setting 0.
YD:SYS [0..15]	YD:SYS 0	Sets NMEA 2000 system instance value (0 - 15). Factory setting 0.
YD:PGN <pgn> [interval | OFF]	YD:PGN 126993 60000 YD:PGN 127501 2000	Sets the interval in milliseconds between outgoing periodic NMEA 2000 messages. The default setting for Heartbeat (PGN 126993) is 60000, for the Binary Status Report (PGN 127501) is 2000 milliseconds. Valid range is 50 – 60000, OFF or 0 values turns off message transmission.
Commands available in all modes		
YD:MODE [MOB | DS | ENGINE]	YD:MODE MOB	Sets the mode. Device will be rebooted after two seconds. Factory setting is MOB. Note, that NMEA 2000 device class and function will be changed after reboot, and you may need to refresh NMEA 2000 devices list in the software.
YD:PLAY [0..28]	YD:PLAY 1	Plays sound at specified number (1 – 28) or stops playback (0). See Appendix B.
YD:LED [0..28]	YD:LED 1	Runs indication sequence at specified number (1 – 28) on external LED or stops indication (0). See Appendix C.

Table 1 continued

String format	Examples	Description
YD:STOP		Stops the playback and external LED indication.
YD:VOLUME [0..100]	YD:VOLUME 100	Sets the sound volume in percent, 0 turns off all sound signals.
YD:LINK <1..28> <SOUND | LED> [1..28]	YD:LINK 1 SOUND 1 YD:LINK 2 LED 2 YD:LINK 2 LED	Links specified sound or LED indication sequence with the event. In the MOB mode, only the event with number 1 is used. One sound or sequence can be linked with multiply events.
YD:EVENT <1..28> <OFF | ON>	YD:EVENT 3 OFF	Enables or disables the event with specified number. This setting is ignored in the MOB mode.
YD:INTERVAL <1..28> [0..6000.0]	YD:INTERVAL 1 0.5 YD:INTERVAL 3 60	Sets the interval (in seconds, second parameter) between sound playbacks for specified event. One sound can be linked with multiple events.
MOB mode commands		
YD:MOB [TEST | ACTIVE]	YD:MOB TEST	The type of MOB event. Note that messages sent from the Device are not transmitted externally via VHF or AIS. Both types are displayed in the same way on chart plotters, the difference is only in the text displayed.
YD:HOLD [1..10]	YD: HOLD 2	Duration of pressing the button in seconds to activate or deactivate the MOB signal.
YD:DURATION [OFF | 0..600]	YD:DURATION 10	Duration of the sound signal in seconds. 0 value or OFF sets perpetual playback.

Table 1 continued

String format	Examples	Description
Digital switching (DS) mode commands		
YD:BANK [0..252]	YD:BANK 0	Sets the bank number, factory setting 0.
YD:OFF <1..28> YD:ON <1..28> YD:TOGGLE <1..28>	YD:OFF 1 YD:ON 2 YD:TOGGLE 2	These commands change the state of the specified channel.
YD:CHANNEL [OFF | 0..28]	YD:CHANNEL 3	Sets the channel number (event) which will be activated by pressing of button. If 0 or OFF value is specified, the button will only deactivate events.
YD:MARETRON [OFF | ON]	YD:MARETRON OFF	Turns on or off compatibility mode with Maretron equipment.
YD:CZONE [ON|OFF|AUTO]	YD:CZONE ON YD:CZONE AUTO YD:CZONE OFF YD:CZONE	Factory setting: AUTO. Activates features required to control loads from chart plotters with CZone support. See Section VI for details.
Engine mode commands		
YD:ENGINE [ANY | 0..252]	YD:ENGINE ANY	Selects associated engine. The port or single engine is identified as 0, the next has number 1. Factory setting is ANY.
YD:SUPPRESS [1..100000]	YD:SUPPRESS 3600	The button press suppress the active event for specified number of seconds. Factory setting is 30.

Table 1 continued

String format	Examples	Description
YD:COOLANT [OFF | 0..600 0..600]	YD:COOLANT 300 60 YD:COOLANT OFF	Turns on event 4 «Over Temperature» when coolant temperature is above the specified temperature in Celsius (first parameter) during specified number of seconds (second parameter, 0 – turns on the event immediately). Factory setting is OFF.
YD:TR_TEMP [OFF | 0 ..600 0..600]	YD:TR_TEMP 200 1 YD:TR_TEMP OFF	The same as above, but for transmission oil temperature, turns on the event 6 «Transmission: Over Temperature».
YD:RPM [OFF | 0..20000 0..600]	YD:RPM 3500 180 YD:RPM OFF	Turns on the event 14 «Revolutions Limit Exceed» when engine revolutions are above the value specified in the first parameter during specified number of seconds (second parameter, 0 – turns on the event immediately). Factory setting is OFF.
YD:BOOST [OFF | 0..6553 0..600]	YD:BOOST 1000 0 YD:BOOST OFF	Turns on event 11 «High Boost Pressure» when the absolute boost pressure in kPa is above the value specified in the first parameter during specified number of seconds (second parameter, 0 – turns on the event immediately). Factory setting is OFF.

VI. Control from a MFD with CZone Support

You can turn on and off signals of the Alarm Button in the digital switching mode from most of modern chart plotters with CZone support. This includes Garmin, Lowrance, Simrad, B&G, Furuno chart plotters and recent models from Raymarine (Axiom, eS and gS series). Unfortunately, standard NMEA 2000 (PGN 127501/127502) messages are not supported by chart plotter manufacturers.

If you already have CZone equipment installed, you will overwrite the exiting CZone configuration with our file and your CZone equipment will not function correctly.

You need to do the following; the process will take a minute:

1. Visit the product's page on our website and follow the link to related article.
2. Fill the form with the desired button names and download personalized configuration file for your MFD.
3. Turn on CZone support on your MFD and configure the Dip Switch setting (not required on Raymarine MFDs).
4. Import the configuration file to the MFD (usually, from MicroSD card).

The only exclusion is Furuno chart plotters. They support uploading of configuration file over NMEA 2000 network only. This can be done with free CAN Log Viewer software (see Section V) connected to NMEA 2000 with one of our gateways (please see details at our web site).

The Alarm Button has a setting which activates CZone support (see Section V). With the factory value (AUTO), CZone support is automatically activated on the Alarm Button when the configuration file downloaded from our web site is uploaded to the MFD.

If you have more than one Alarm Button in digital switching mode on the network, it can cause a conflict, because all Devices will be activated. To prevent unnecessary activation, switch the CZone setting from AUTO or ON to OFF (see Section V).

VII. Built-in LED Signals

Programming of the Device should not be performed at sea.

The Device is equipped with bi-color built-in status LED. Signals of the external LED are described in Section IV and Appendix C.

The Device produces a half-second GREEN flash after powering on indicating that the Device is successfully initialized. After initialization, the Device produces three short (quarter of second) GREEN flashes indicating that it has successfully connected to the NMEA 2000 network.

If the device fails to get an NMEA 2000 address, it will constantly flash RED (one second flash with one second intervals).

1. Signals in MOB button mode

Device flashes once in two seconds: RED – no GPS data received, GREEN – GPS position was updated in last 10 seconds.

2. Signals in digital switching mode

Device flashes GREEN when it sends periodical PGN 127501 «Binary Status Report». Default interval is 2 seconds, can be changed in settings (see Section V).

3. Signals in engine alarm mode

Device flashes once in two seconds: RED – no engine data received, GREEN – engine data was updated in last 10 seconds.

4. Signals during firmware update

Signals during firmware update are described in the next Section.

VIII. Firmware Updates

Firmware updates can be done with free CAN Log Viewer software (version 1.28 or later) running on Microsoft Windows, Mac OS X and Linux:

http://www.yachtd.com/products/can_view.html

The program must be connected to an NMEA 2000 network with NMEA 2000 USB Gateway YDNU-02, NMEA 2000 Wi-Fi Router YDNR-02 or NMEA 2000 Wi-Fi Gateway YDWG-02.

You can download the latest firmware version from our website:

http://www.yachtd.com/downloads/

Open the downloaded .ZIP archive with the update and copy the YDAB01.BIN file to the disk. The README.TXT file inside the archive can contain important information regarding the update.

1. Click the «NMEA 2000 Devices» item in the «View» menu.
2. Click the «Refresh» button (see Figure 1 at the next page) in the opened window and wait for the Device to appear in the list.
3. Select the Device and click the «Firmware Update» button.
4. Locate and select the update file on the disk.
5. Wait while the firmware is uploading. If in doubt, see the video with the update procedure on our web site.

During the firmware upload, the Device's status LED flashes RED very fast. When the firmware is updated, Device status LED gives off five RED half-second signals and the CAN Log Viewer also informs you that the update is successfully done.

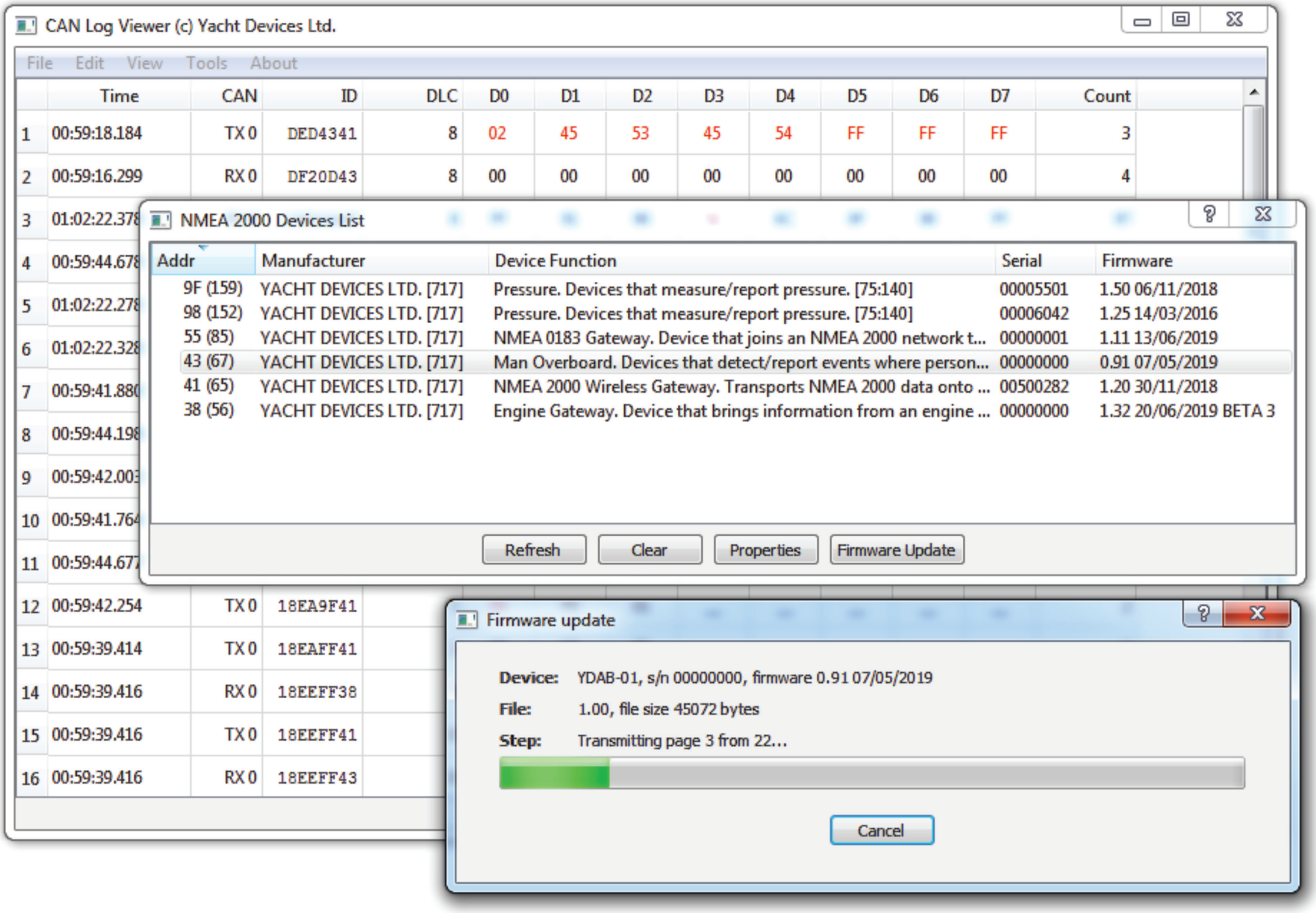

Figure 1. Firmware update of Alarm Button YDAB-01

Appendix A. Troubleshooting

Situation	Possible cause and correction
The Device built-in LED does not signal after the NMEA 2000 network is powered on.	**1. No power supply to the bus.** Check if the bus power is supplied (NMEA 2000 network requires a separate power connection and cannot be powered by a plotter or another device connected to the network). **2. Loose connection in the power supply circuit.** Treat the Device connector with a spray for cleaning electrical contacts. Plug the Device into another connector.
The Device built-in LED flashes every two seconds, but the Device is not displayed in the list of external NMEA 2000 devices on the plotter	**1. Loose connection in the data circuit.** Treat the Device connector with a spray for cleaning electrical contacts. Plug the Device into another connector. **2. Problems in the NMEA 2000 network.** The network segment is not connected to the plotter or there are missing terminators in the network. Plug another device into the selected connector and make sure it appears in the list of devices on the plotter.
No sound	**1. Speaker is connected incorrectly.** See section III. 3. **2. Wiring issue.** Check the speaker wiring for a short or a bad contact. **3. Speaker issue.** Check the speaker impedance with an ohmmeter. **4. Sound volume is set to 0.** Check and modify the volume setting with an external button (see Section IV) or the YD:VOLUME command (see Section V).
No external LED indication	**1. External LED is connected incorrectly.** See section III. 2. Pay attention to the LED polarity. **2. Wiring issue.** Check the LED wiring for a short or a bad contact. **3. LED issue.** Check the LED with a tester.

Table continued

Situation	**Possible cause and correction**
External button does not work at all	**1. External button is connected incorrectly.** See section III. 2. **2. Wiring issue.** Check the button wiring for a short or a bad contact. **3. Button issue.** Check the button with a tester.
External button does not work as expected	**1. Wrong mode.** Check the current mode with an external button (see Section IV) or the YD:MODE command (see Section V).
Digital switching mode: Device does not work in sync with NMEA 2000 digital switching equipment in digital switching mode	**1. Wrong bank.** Check that the NMEA 2000 digital switching equipment has the same bank. Reconfigure the Device with the YD:BANK command (see Section V). **2. You are using Maretron NMEA 2000 digital switching equipment but the Maretron support is turned off.** Turn on Maretron support with the YD:MARETRON ON command (see Section V). **3. You are using CZone NMEA 2000 digital switching equipment but the CZone support is turned off.** Turn on the CZone support with the YD:CZONE ON command (see Section V).
Engine alarm mode: Device does not get engine data, built-in LED flashes red every 2 seconds	**1. No engine data in NMEA 2000 network.** Check that engine data is available on a NMEA 2000 network. **2. Wrong engine ID setting.** Check and modify the engine ID setting with the YD:ENGINE command (see Section V).

Appendix B. List of Sound Signals

Number	Sound
1	Car anti-theft alarm
2	Mid frequency long alarm sound
3	Mobile phone vibration
4	Big ship horn
5	Sequence of four high frequency horn sounds
6	Sequence of two chimes (low to high frequency)
7	Sonar ping
8	Old telephone
9	High frequency beeper
10	Whistle
11	Sequence of two bell rings
12	Mechanical alarm clock
13	Engine order telegraph
14	Small ship horn
15	Mid frequency beeper
16	Car horn
17	Alien laser burst
18	Emergency vehicle siren (low to high frequency)
19	Sequence of two low frequency horn sounds

Table continued

Number	Sound
20	Emergency vehicle siren (fast)
21	Emergency vehicle siren (slow)
22	Emergency vehicle siren (high to low frequency)
23	Square wave 2500 Hz
24	Emergency vehicle horn, alternating two tones
25	High frequency bell
26	Low frequency buzz (150 Hz)
27	Bicycle bell
28	Cuckoo

Appendix C. List of External LED Signals

Number	LED indication descriptions	LED indication description
1	One short flash, followed by short delay	100 ms ON, 400 ms OFF
2	Two short flashes, followed by short delay	100 ms ON, 150 ms OFF, 100ms ON, 400 ms OFF
3	Three short flashes, followed by short delay	100 ms ON, 150 ms OFF, 100ms ON, 150 ms OFF, 100ms ON, 400 ms OFF
4	One short flash, followed by long delay	100 ms ON, 1 s OFF
5	Two short flashes, followed by long delay	100 ms ON, 150 ms OFF, 100ms ON, 1 s OFF
6	Three short flashes, followed by long delay	100 ms ON, 150 ms OFF, 100ms ON, 150 ms OFF, 100ms ON, 1 s OFF
7	One long flash, followed by long delay	500 ms ON, 1 s OFF
8	Two long flash, followed by long delay	500 ms ON, 250 ms OFF, 500 ms ON, 1 s OFF
9	Three long flashes, followed by long delay	500 ms ON, 250 ms OFF, 500 ms ON, 250 ms OFF, 500 ms ON, 1 s OFF
10	Blinking with short flashes	100 ms ON, 100 ms OFF
11	Blinking with intermediate flashes	500 ms ON, 500 ms OFF
12	Blinking with long flashes	1 s ON, 1 s OFF
13	Fast rising luminosity	400 ms rise time
14	Medium rising luminosity	1300 ms rise time
15	Slow rising luminosity	4 s rise time

Table continued

16	Fast falling luminosity	400 ms fall time
17	Medium falling luminosity	1300 ms fall time
18	Slow falling luminosity	4 s fall time
19	Fast alternating luminosity	400 ms cycle
20	Medium alternating luminosity	1300 ms cycle
21	Slow alternating luminosity	4 s cycle
22	One short flash, followed by long delay	100 ms ON, 3 s OFF
23	One short flash, followed by very long delay	100 ms ON, 5 s OFF
24	One short flash, followed by extremely long delay	100 ms ON, 7 s OFF
25	One short flash, followed by one long flash	100 ms ON, 200 ms OFF, 400 ms ON, 200 ms OFF
26	Two short flashes, followed by two long flashes	[100 ms ON, 200 ms OFF] x2 times, [400 ms ON, 200 ms OFF] x2 times
27	Three short flashes, followed by three long flashes	[100 ms ON, 200 ms OFF] x3 times, [400 ms ON, 200 ms OFF] x3 times
28	SOS: Three short flashes, followed by three long flashes, followed by three short flashes	[100 ms ON, 200 ms OFF] x3 times, [400 ms ON, 200 ms OFF] x3 times, [100 ms ON, 200 ms OFF] x3 times

Appendix D. Faults and Warnings of Engine and Transmission

NMEA 2000 Warning or Fault	Event (Priority)	NMEA 2000 Warning or Fault	Event (Priority)
Engine		*Engine*	
Check Engine	1	Emergency Stop Mode	3
Over Temperature	5	Warning Level 1	4
Low Oil Pressure	9	Warning Level 2	7
Low Oil Level	15	Power Reduction	8
Low Fuel Level	23	Maintenance Needed	24
Low System Voltage	11	Engine Communication Error	22
Low Coolant Level	12	Sub or Secondary Throttle	25
Water Flow	13	Neutral Start Protection	26
Water in Fuel	17	Engine Shutting Down	27
Charge Indicator	28	*Transmission*	
Preheat Indicator	Not used	Check Transmission	2
High Boost Pressure	14	Over Temperature	6
Rev. Limit Exceeded	18	Low Oil Pressure	10
EGR System	19	Low Oil Level	16
Throttle Position Sensor	21	Sail Drive	20

Appendix E. NMEA 2000 Messages

Message	Receive	Transmit	Note
PGN 59392 ISO Acknowledgment	Yes	Yes	
PGN 59904 ISO Request	Yes	Yes	
PGN 60160 ISO Transport Protocol (DT)	Yes		
PGN 60416 ISO Transport Protocol (CM)	Yes		
PGN 60928 ISO Address Claim	Yes	Yes	See Note 1
PGN 65240 ISO Commanded Address	Yes		
PGN 126208 NMEA Group Function	Yes	Yes	
PGN 126464 PGN List (Rx / Tx)		Yes	
PGN 126993 Heartbeat		Yes	See Note 3
PGN 126996 Product Information		Yes	
PGN 126998 Configuration Information		Yes	
PGN 127488 Engine Parameters, Rapid	Yes		Engine mode only
PGN 127489 Engine Parameters, Dynamic	Yes		Engine mode only
PGN 127493 Transmission, Dynamic	Yes		Engine mode only
PGN 127501 Binary Status Report	Yes	Yes	DS mode only, Note 2
PGN 127502 Switch Bank Control	Yes	Yes	DS mode only
PGN 129025 Position, Rapid Update	Yes		MOB mode only
PGN 129029 GNSS Data	Yes		MOB mode only
PGN 129038 AIS Class A Position Report		Yes	MOB mode only
PGN 129802 AIS Safety Related Broadcast		Yes	MOB mode only

Note 1: In the MOB button mode, the NMEA 2000 device class/function is 20 (Safety) / 135 (Man Overboard); in the digital switching (DS) or engine alarm modes, the NMEA 2000 device class/function is 120 (Display) / 140 (Alarm Enunciator).

Note 2: Periodic message with 2.000 ms default interval, can be changed in settings (see Section V).

Note 3: Periodic message with 60.000 ms default interval, can be changed in settings (see Section V).