

S8(0) & S10(0)

Digital speed to fly variometer, final glide calculator and navigation system with simple moving map.

IGC Flight recorder with backup battery 

Manual version 5.27 draft



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1 Important Notices

The LXNAV S8(0)/S10(0) system is designed for VFR use only as an aid to prudent navigation. All information is presented for reference only. Terrain, airports and airspace data are provided only as an aid to situation awareness.

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A Yellow triangle is shown for parts of the manual which should be read carefully and are important for operating the LXNAV S8(0)/S10(0) system.



Notes with a red triangle describe procedures that are critical and may result in loss of data or any other critical situation.



A bulb icon is shown when a useful hint is provided to the reader.

A cloud icon is shown when this functionality is supported only on S10(0) systems.

1.1 Limited Warranty




This LXNAV S8(0)/S10(0) product is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, LXNAV will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour, the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorised alterations or repairs.

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To obtain warranty service, contact your local LXNAV dealer or contact LXNAV directly.

2 Packing Lists

- LXNAV S8(0) or S10(0) main unit
- Main power cable for S8(0)/S10(0) + CAN terminator
- Speaker
- GPS cable (IGC-specification included, other types optional)
- PDA cable (optional)
- 2x6 mm screw
- Bluetooth antenna 
- GPS antenna 
- Baro calibration chart 



Second seat

- Main S8(0)D unit
- Y cable splitter (only if compass module, remote stick D is present)
- Main 3m CAN cable

2.1 S80 (80mm) variometer unit:



2.2 S8 (57mm) variometer unit



2.3 S10 (57mm) variometer unit

TO BE DONE

2.4 S100 (80mm) variometer unit

TO BE DONE

2.5 S8(0)D

TO BE DONE

3 Basics

3.1 LXNAV S8(0)/S10(0) at a Glance






LXNAV S8(0)/S10(0) is standalone digital variometer, final glide calculator and navigation system with simple moving map. The LXNAV S8(0)/S10(0) has both GPS/Flarm and PDA/PNA inputs/outputs. The unit has standard dimensions that will fit into a glider panel with an opening of - 80 mm diameter (3.15") or 57 mm diameter. It is also able to supply PDA/PNA with power (5VDC/1A). The unit has an integrated high precision digital pressure sensor and inertial system. The sensors are sampled more than 100 times per second. Real time Data is indicated with the vario needle, airspace map and up to 4 variable number fields displayed on QVGA 320x240 pixel, 3.5 inch (S80/S100) or 2.5 inch (S8/S10), high brightness (1200 nits) colour display. To adjust values and settings, the LXNAV S8(0)/S10(0) has two rotary push button knobs and three additional push buttons.

The LXNAV S8(0)/S10(0) can be expanded with one or more repeaters (LXNAV S8(0)/S10(0)) through the CAN bus. This allows both pilots in a two seat glider to have independent control of all functions of each unit in the front or the rear seat.



S10(0) unit has a built-in, IGC-approved flight recorder, Bluetooth module and its own backup battery which provides up to 2 hours of independent operation.

3.2 LXNAV S8(0)/S10(0) Features

- Extremely bright 3.5"(S80/S100) or 2.5"(S8/S10) QVGA colour display readable in all sunlight conditions with the ability to adjust the backlight.
- Two rotary switches (knobs) with push button function and three push buttons are used for input.
- Pre-loaded polar database for nearly all gliders.
- GPS/Flarm and PDA/PNA inputs/outputs
- Flarm Indication, if Flarm is connected to the GPS/Flarm port
- Programmable "needles" for selectable data such as netto vertical speed, relative (super netto) and vertical speed (vario).
- 320x240 pixels colour screen for additional information such as average, thermal vario, time, speed etc...
- Many custom audio settings
- 100Hz sampling rate for very fast response.
- Speed to fly indication.
- TE compensation can be selected to be either pneumatic TE probe or electronic TE.
- Multilanguage user interface - in a future firmware release
- Audio equalizer, for custom vario sound performance
- Auditable thermal assistant
- Built-in high level, IGC-approved flight recorder 
- Built-in Bluetooth module 
- Backup battery 
- Engine noise level sensor (ENL) 
- Built-in GPS module 

3.2.1 Interfaces

- GPS/Flarm port input/output on RS232 level (RJ12 connector, not Standard IGC)
- PDA port input/output on RS232 or TTL level for PDA/PNA devices with 5V power supply (8 pin RJ 45, 5V output max 1A)
- Audio port (Standard 3mm phone jack)
- 1Mbit CAN bus for extension to S8(0)D repeater or Remote stick (CAN remote)

3.2.2 Options

By using a CAN bus system, a second seat device can be connected. The unit installed in the rear seat of the glider is independently powered and receives all the necessary data from the main unit. The communication between both units is exclusively via the CAN bus system (Remote stick, Compass module, Second seat device).

3.2.3 Technical Data

Power input 10-16 V DC.

3.2.3.1 Power Consumption

Device	Min. brightness (mA)	Max. brightness (mA)
S8	140	190
S8D	90	140
S80	140	190
S80D	90	140
S10	230	270
S100	250	340

3.2.3.2 Size and weight

Device	Size	Weight (g)
S8	57 mm cut-out 61x61x95mm	339
S8D	57 mm cut-out To be done	210
S80	80 mm (3.15") standard aircraft cut-out 81x81x132mm	460
S80D	80 mm (3.15") standard aircraft cut-out 81x81x45mm	290
S10	57 mm cut-out 61x61x70mm	348
S100	80 mm (3.15") standard aircraft cut-out 81x81x64mm	515

4 System Description

4.1 Push Button – rotary switches

The two Rotary switches have a push button function. LXNAV S8(0)/S10(0) can detect short or long presses of the push button. A short press means just a click, a long press means pushing the button for more than one second.

4.1.1 Power Button

The system is powered up using any of the push buttons or a press of either of the rotary knobs. A long press of the upper rotary knob will turn the S8(0)/S10(0) off. Use this instead of the avionics master switch.

4.2 Rotary Switches

The upper rotary knob is designed for direct volume control. Short-press on the upper rotary knob will give an option to select between options and adjust volumes for the Vario, Speech and Flarm beep.

Long-press on the upper rotary knob will shut down the system properly.



The lower rotary knob is used to adjust settings, within the current screen display or within menus. With the lower rotary pushbutton is possible to toggle between MC, Ballast and Bugs settings. In all other menus, this knob is used for setting values and editing texts.

4.3 Buttons (three)

The three buttons between the two rotary knobs have fixed functions. The top button is ESC (CANCEL), the middle is to switch between pages and the lower button is the ENTER (OK) button. Upper and lower buttons are also to rotate between subpages on WPT and TSK screen.



4.4 Switching on the Unit

A press of any of the buttons or rotary knobs will turn on the S8(0)/S10(0). The first LXNAV welcome screen will appear with the system information (Device name, Version, Serial number...)



S8(0)D rear seat unit cannot be powered up if the S8(0)/S10(0) is not already powered up.

When the boot procedure is completed, the setup elevation dialogue is shown.



Upper push button also has power OFF function.

4.5 User Input

The LXNAV S8(0)/S10(0) user interface consists of dialogues which have different input controls. They are designed to make the input of names, parameters, etc., as easy as possible. Input controls can be summarised as:

- Text editor
- Spin controls (Selection control)
- Checkboxes
- Slider control

To move the function from one control to another, rotate the lower rotary knob as follows:

- Clockwise rotation will select the next control.
- Counter clockwise rotation will select the previous control. Lower PUSH button enters the selected feature.
- Faster rotation of the rotary knob will increase the rate at which the value changes. i.e. bigger steps in value.

4.5.1 Text Edit Control

The Text Editor is used to input an alphanumeric string; the picture below shows typical options when editing text/numbers. Use the bottom rotary knob to change the value at the current cursor position.



Turn the bottom rotary Knob to set the character and then press the enter key (bottom key) to move to the next character to the right. Press the escape key to move back to the left. When you have finished editing, press the Enter key. Short-press on the bottom rotary knob to enter or exit an edited field ("control").

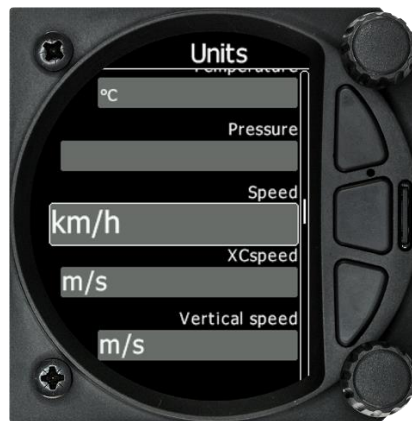
4.5.2 "Spin" Control

"Spin" controls are designed for numeric parameters. Rotate the knob to increase/decrease the selected value. To increase the values in larger steps, spin the bottom rotary knob faster!



4.5.3 Selection Control

Selection boxes, also known as combo boxes, are used to select a value from a list of predefined values. Use the bottom rotary knob to scroll through the list.



4.5.4 Checkbox and Checkbox List

A checkbox enables or disables a particular parameter. Press the bottom rotary knob to toggle the value. If an option is enabled a check mark will be shown, otherwise an empty rectangle will be displayed.



4.5.5 Slider selector

Some values, like volume and brightness are displayed as a slider icon



With a push of the lower rotary button you can activate the slide control and then with rotation of the knob you can select the preferred value and confirm it with the push button.

4.6 Switching off

You will lose your settings if you power down the S8(0)/S10(0) with the panel master-power switch.

To archive your settings, shut down with a Long-Press of the volume (top) knob



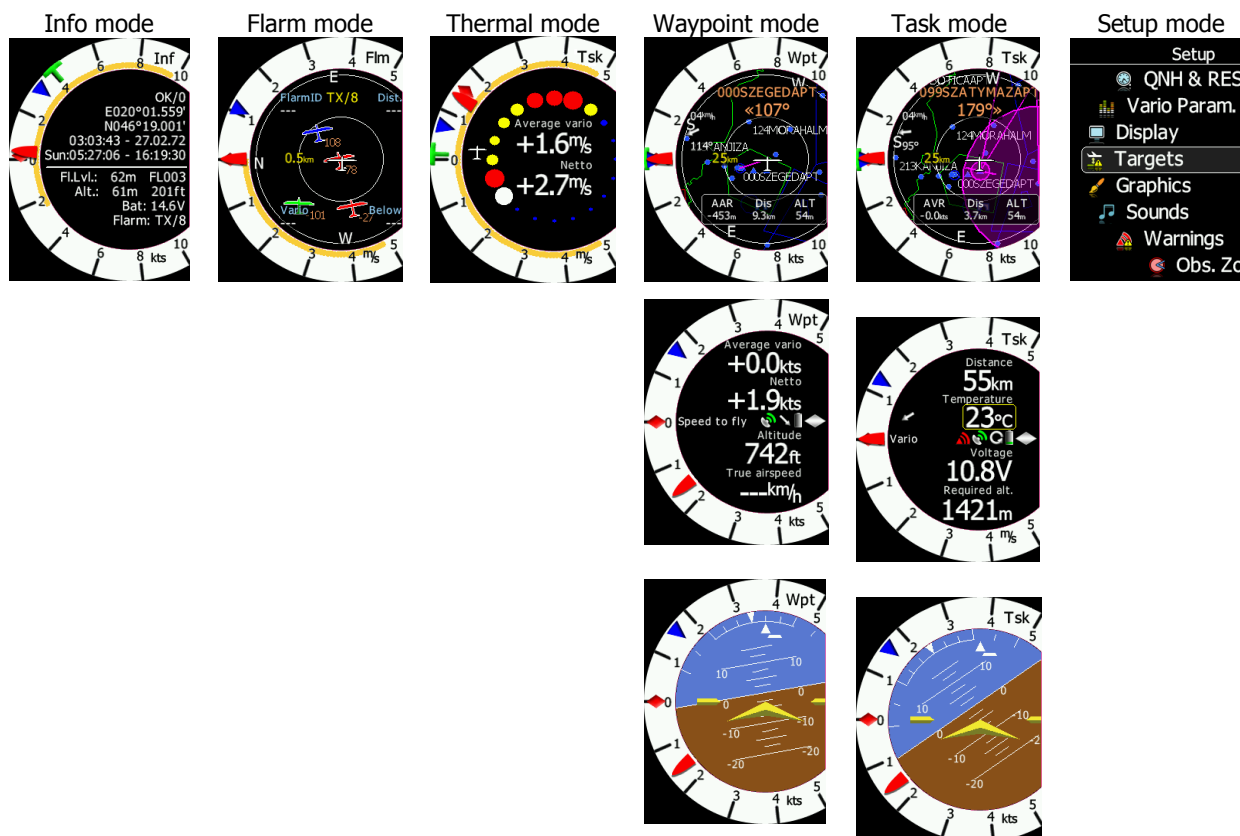
All settings are saved during the power off procedure. We strongly recommend switching off the unit using a long-press of the (top) knob.



If the system is powered off by the master switch, changed data will not be saved. Flight parameters at takeoff such as target altitude and position will remain in the stored memory so your final glide calculations are not affected.

5 Operating Modes

LXNAV S8(0)/S10(0) has five operating modes. The middle (Menu) pushbutton toggles among the 5 display modes, in a circular way. The diagram below shows the mode structure of the LXNAV S8(0). With upper and lower button it is also possible to shift between subpages.



- **Info Screen:** Contains the GPS data, Altitude, Battery voltage and Sunset time
- **Flarm Screen:** Showing Flarm targets in range (if a Flarm device is connected to the GPS port)
- **Thermal screen:** Showing a thermal assistant during circling
- **Waypoint screen:** Simple navigation screen to a waypoint plus subpages
- **Task Screen:** Task screen showing the task and airspace plus subpages
- **Setup screen:** For all aspects of the setup of the S8(0)/S10(0)

5.1 Quick access menus

On each mode is available quick access menu, which is different from mode to mode. Items available in quick access menus are:

- MC/BAL (In all modes)
- Reset G (In all modes)
- NavBoxes (Only in THM, TASK and WPT mode)
- Select (Only in WPT mode)
- Select Near (Only in WPT mode)
- Edit Task (only in task mode)
- Start (only in task mode)

- Next (only in task mode, visible only after press on start)
- Restart (only in task mode, visible only after press on start)

5.1.1 MC/BAL



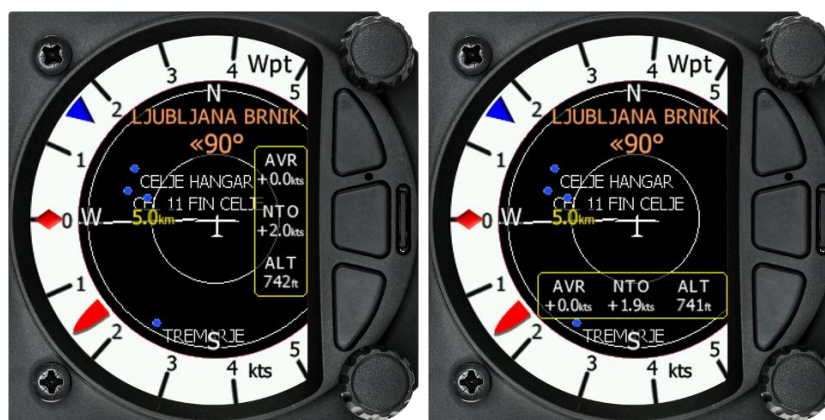
To change the MacCready value, rotate the bottom rotary knob and press on MC/BAL. A short press on the bottom rotary knob moves from MacCready to the Ballast box and pressing the bottom rotary knob again will open the Bugs box. If no action is performed for 3 seconds, the box will close.

5.1.2 Reset G

"Reset G" is a method of re-setting the "G" meter if configured as the yellow bar on the vario scale.

5.1.3 NavBoxes Option

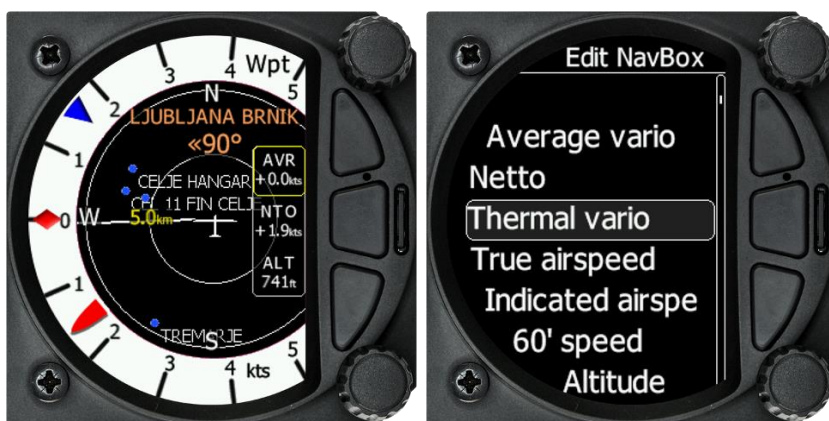
Open the Quick Access menu by pressing the lower rotary knob and select NavBoxes. After that press the knob to select number of NavBoxes visible on the screen. Press on the enter button will give another option to select the position of NavBoxes (only in Wpt and Tsk modes), which can be located vertically or horizontally. Last step is a selection of NavBox to be displayed in selected NavBox.



5.1.3.1 Editing NavBoxes

Selecting the NavBoxes option and then pressing the bottom rotary knob will allow you to select one of the three boxes by rotating the bottom rotary knob and a short press. You can then select the required data for the highlighted NavBox. A short press of the bottom rotary knob selects the desired setting and returns you to the NavBox selection.

After pressing Menu button at any time saves the setting and moves to the main page.



5.1.3.2 NavBoxes with description

List of available nav boxes:

Type	Description
60' speed	Average speed in last hour
Altitude	Altitude in user defined units
Altitude (ft)	Altitude in Feet
Arrival altitude	Arrival altitude on target
ArrMc0	Arrival altitude on target with Mc=0
Average Netto	Average vertical movement of air mass
Average vario	Average vario (average vario time can be set)
Bearing	Bearing to the target if GPS is present
Distance	Distance to the target
Emc	Calculated glide ratio at selected McCready
Flight level	Flight level
Flight time	Airborne time
Ground speed	Speed over ground, taken from GPS
Heading	Heading (from compass)
Indicated airspeed	IAS
Inverse alt	Altitude in opposite unit
Inverse dst.	Distance to the target in opposite unit
MacCready	McCready setting
Netto	Vertical speed of air mass
QFE	Altitude above take-off location
RDL	On radial of selected target
reqE	Required glide ratio to the target
Required alt.	Required altitude to real target elevation
Speed2Fly	Calculated speed to fly from MC setting
Steering course	Steering course to the target
tArrMc0	Arrival altitude on task finish with Mc=0
Task distance	Flown distance on task
Task E	Required glide ratio to task finish
Task remain	Remaining distance of task
Temperature	OAT – Outside air temperature
Thermal vario	Average vario from beginning of circling (Green T)

Time	Local time Offset can be adjusted under Setup-Units
Track	Track over ground taken from GPS
True airspeed	TAS
Voltage	Voltage of power supply
Wind	Wind direction and speed
Wind comp.	Wind component
xTrk	Off distance from the task leg

5.1.4 Select /Select Near (Only in WPT mode)

To **Select** a waypoint, rotate the bottom rotary knob to highlight the select option and then press once. This will open the Waypoint list



The Waypoint can be selected from the alphabetical list of waypoints. (See uploading files section 5.7.12.1). Rotating the bottom rotary knob moves you through the waypoint list in alphabetical order, clockwise increases the value, counter-clockwise decreases the value. To select the first letter of the desired waypoint, press the Enter button (bottom of the three buttons) this moves the cursor to the second letter. Rotate the bottom rotary knob until the second letter of the required Waypoint is highlighted and then press ENTER. Repeat the process until the required waypoint is the only selection available. You can then either press the enter button or press the bottom rotary Knob to select the Waypoint. The screen will then change back to the navigation page and show a line to the Waypoint, Waypoint name and relative bearing.

Select **Near** is to select WYT from the list, which is sorted out by the distance. Selection of a WYT is exactly the same as described above.

5.1.5 Edit Task (only in task mode)

Selecting **edit** task with a short press of the bottom rotary knob will enter the task editing screen. The first time you edit a task it will be blank. A short press of the bottom rotary knob will open another menu with the option to

- Insert,
- Edit,
- Delete,
- Zone.

Selecting Insert will allow you to enter a waypoint from the list as a start point. Rotating the bottom rotary knob will scroll through the waypoints in alphabetical order. Pressing the Enter

button will select the first letter and move the cursor to the right for the second letter. The second letter can be selected by rotating the bottom rotary knob. Repeat the process until the desired waypoint is displayed. Press the bottom rotary knob once to select it. Once the start point is selected, rotate the bottom rotary knob clockwise and click to select the second turn point. Edit the second turn point as above. Repeat for all the points in the task. When you have completed editing the task, press the page (middle) button to save the task and return to the Task navigation page.

You can also change the Observation zone from the defaults for each Waypoint. To do this, select EDIT TASK->select waypoint in the task and then press the bottom rotary knob. The quick access menu allows you to insert, edit, delete or change the zone for the Waypoint. If you select **Zone**, you can modify the zone for that specific waypoint only.



5.1.6 Start Task (only in task mode)

Selecting **start** and a short press of the bottom rotary knob will start a task.

5.1.7 Restart Task (only in task mode)

Selecting **restart** and a short press of the bottom rotary knob will restart the task.

5.1.8 Next Waypoint (only in task mode)

Selecting **next** and a short press of the bottom rotary knob will advance the task to the next waypoint in the task.

5.2 Info Screen

The Info Screen gives you a snapshot of the GPS position, date, and time along with Flight level, altitude, Battery Voltage and Flarm status. Flight Level equivalent is also available in meters or feet as is the Altitude.



Explanation by rows:

- GPS status is described as OK, BAD, NODATA and with number of satellites.
- Latitude and longitude
- Local time and date
- Sunrise and sunset time.
- Flight level also in meters
- Altitude in meters and ft
- Battery voltage
- Flarm status (TX – transmits data / and a number of received Flarms)

5.2.1 Quick access menu

A short press of the (lower) rotary button activates the Quick Access menu. More about Quick access menu can be read in Ch.5.1

5.3 Flarm Screen

If the S8(0)/S10(0) is connected to a Flarm source through the GPS port (in the S10(0) called Flarm port) then the Flarm screen will display a map of relative positions of Flarm targets in range. By rotating the bottom rotary knob, you can change the range of the display from 1km to 150km. With up/down button switching between Flarm targets is possible. Data from a selected Flarm object can be seen in 4 corners, such as: Flarm Id, Distance, Vario and Relative altitude (Above / Below).



Distance, relative altitude and vario indications are related to selected target

5.3.1 Quick access menu

A short press of the (lower) rotary button activates the Quick Access menu. More about Quick access menu can be read in Ch.5.1

5.3.2 Flarm warnings

Regardless of which screen you are on, if a Flarm target triggers an urgent (third warning level) or important (second warning level) warning then the screen will change to the Flarm warning screen automatically.

Snippet from Flarm manual:

Warnings are given in order of the time remaining before a potential collision, not the geometrical distance. The first warning level for another aircraft or an obstacle is delivered at less than 19 - 25 seconds before the possible collision; the second warning level is delivered at less than 14 - 18 seconds before; the third level at less than 6 - 8 seconds before.



The central number and chevrons indicate if the Flarm target is below or above and by how many meters/feet. The number in the bottom right indicates the range in meters/feet. The numbers are related only to the closest or the most dangerous target.

5.4 Waypoint Screen

The Wpt screen is a quick access screen to provide simple navigation to a Waypoint or Airport. By rotating the bottom rotary knob, you can change the range of the display from 1km to 150km.



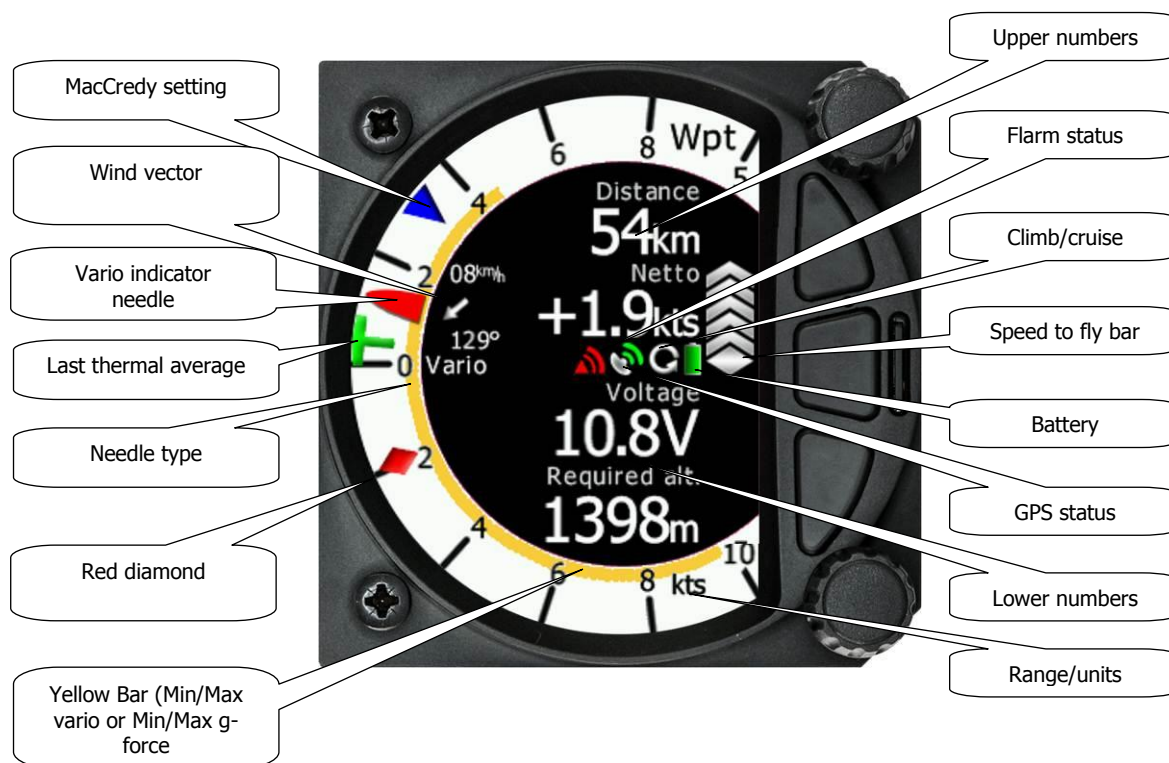
The first page shows a line to a selected waypoint, the name of the selected waypoint at the top of the screen and the relative bearing and chevrons indicating the direction to turn towards the selected waypoint. (The NavBoxes can be configured with distance and arrival Altitude.)

5.4.1 Quick access menu

A short press of the (lower) rotary button activates the Quick Access menu. More about Quick access menu can be read in Ch.5.1

5.4.2 Second Waypoint Page (Numerical Data)

The Waypoint screen has a second page which contains numerical data. Defaults are 4 NavBoxes: Average Vario, Netto, Altitude and True Airspeed. In addition, the central line shows the status of the Flarm, GPS, Cruise/Climb and battery status. This second page can be selected by pressing the enter button once. You can return to the Waypoint navigation page by pressing the Escape button (top button of the three).



- Vario **Needle** can display: the Vario, Netto, Relative or Speed to fly value (Setup->Hardware->Indicator). The scale can be chosen in the range of +/-5 +/-10 or +/-20 (in SETUP-> Vario Parameters). Within the software the range can be set to m/s, kts, km/h, mph or fpm (in Setup, Units, Vertical speed)
- **Speed to fly bar symbol** is indicating which speed you have to fly relative to the current MacCready setting, sink rate and speed. One arrow means 10 units of speed faster or slower. Up red arrows mean fly slower and down blue arrows mean fly faster.
- **Red diamond** symbol can show Netto, Average vertical speed or G-force.
- **Blue arrow** symbol shows current MacCready value.
- **Green T** symbol represents last thermal average value.
- **Yellow Bar** can show Max and Min values of vario over defined time (average vario) or G meter (over whole flight)
- **Flarm Status** symbol indicates the presence of Flarm unit (grey), if Flarm receives any data from other Flarm units, the symbol becomes red
- **GPS** symbol is green, when GPS status is OK, and red, when GPS status is bad. If GPS data is not detected, symbol will disappear.

The numerical NavBoxes can be changed using the quick Access menu with a short press of the bottom rotary knob followed by selecting NavBox from the menu and a further short press of the bottom rotary knob. With the first NavBox highlighted with a yellow border you

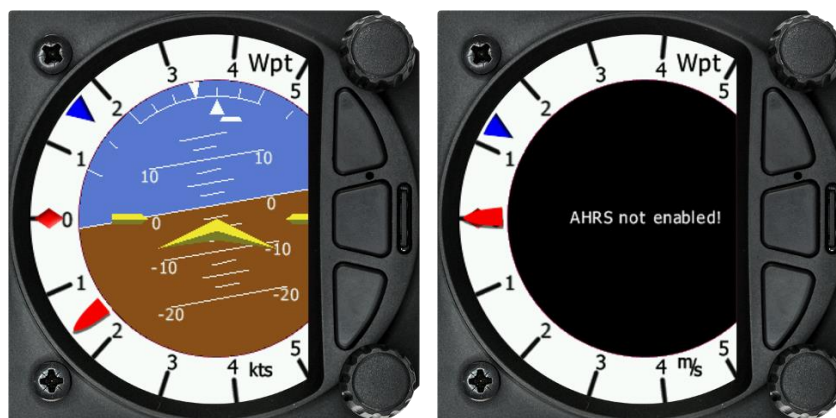
can scroll through the four NavBoxes using the bottom rotary knob. Select the NavBox you wish to change with a short press of the bottom rotary knob. This will open a list of available NavBoxes.



Select the required NavBox and then save this with a short press of the bottom rotary knob. Repeat the process for any other NavBox that needs to be changed.

5.4.3 Third Waypoint Page (AHRS)

The Waypoint screen has a third page which displays the AHRS (if this feature has been enabled. See more in Ch.8.5.4)



Pitch offset can be adjusted with lower rotary knob.

5.4.3.1 AHRS ENABLE/DISABLE

To be done

5.4.4 Quick access menu

A short press of the (lower) rotary button activates the Quick Access menu. More about Quick access menu can be read in Ch.5.1

5.5 Task Screen

The task screen can display a navigation page including airspace and a task. By rotating the bottom rotary knob, you can change the range of the display from 1KM to 150Km.



5.5.1 Quick access menu

A short press of the (lower) rotary button activates the Quick Access menu. More about Quick access menu can be read in Ch.5.1

5.5.2 Second Task Page (Numerical Data)

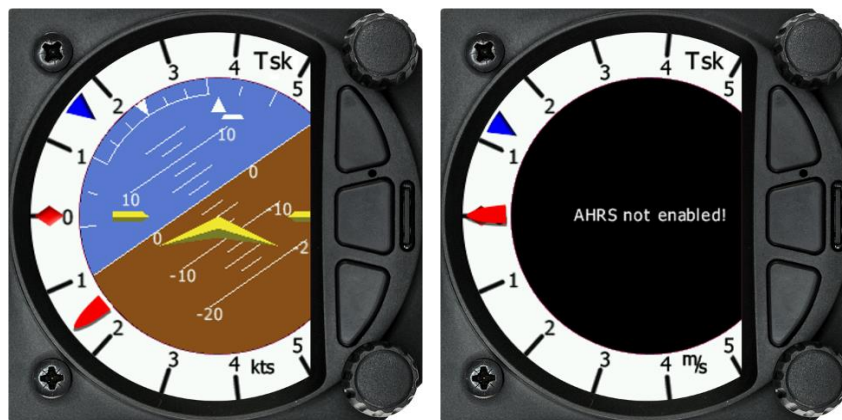
The Task screen has a second page which contains numerical data. Defaults are Average Vario, Netto, Altitude and True Airspeed. In addition, the central line shows the status of the Flarm, GPS, Cruise/Climb and battery status. This second page can be selected by pressing the enter button once. You can return to the task navigation page by pressing the Escape button (top button of the three)



The navigation boxes in this second task page can be changed using the quick access menu and selecting **NavBox**. You can make changes to the NavBoxes as described in chapter.

5.5.3 Third Task Page (AHRS)

The Waypoint screen has a third page which displays the AHRS (if this feature has been enabled. See more in Ch.8.5.4)



Pitch offset can be adjusted with lower rotary knob.

5.5.4 Quick access menu

A short press of the bottom rotary knob activates the quick access menu. In addition to changing Start, Edit Task, MacCready, Ballast and Bugs you can change the NavBoxes through this menu and "Reset the bar".



Changing the Start, Edit, task, MacCready, Ballast and Bugs is the same as Page 1 of the Task screen.



5.5.4.1 Editing NavBoxes

Selecting the NavBoxes option and then pressing the bottom rotary Knob will allow you to select one of the two boxes by rotating the bottom rotary knob and a short press. You can then select the required data for the highlighted NavBox. A short press of the bottom rotary knob selects the desired setting and returns you to the NavBox selection. Pressing Enter at any time saves the setting and returns you to the thermal page.

5.5.4.2 Reset G

"Rest G" is a method of re-setting the "G" meter if configured as the yellow bar on the vario scale.



5.6 Thermal Assistant page



The Thermal Assistant page displays a graphical representation of your location within the thermal. If you are thermaling to the left then there will be an aircraft symbol on the right of the ring of bubbles and the bubbles will appear to rotate clockwise (towards the symbol of the glider). If you are in a right hand thermal, then there will be an aircraft symbol on the left and the ring of bubbles will appear to rotate anti clockwise (towards the symbol of the glider). Large red bubbles indicate the strongest lift within the thermal and small blue dots indicate the weakest lift or sink within the thermal. Yellow bubbles indicate lift equal to your MacCready, average thermal or average climb rate depending on your preferred setting 5.7.4.1. The point of strongest lift is indicated by a white large bubble.

You can use the thermal assistant to visually work out which part of the thermal has the strongest lift and adjust your turn accordingly to manoeuvre the glider in the direction of the strongest lift and away from the weakest lift or sink.

The Thermaling assistant can be set to automatically change to the Thermal assistant page or it can be manually selected. See 5.7.4.2 for settings.

The two NavBoxes within the Thermal assistant Page can be configured using the quick access menu.

5.7 Setup Screen

The setup screen allows you to change the configuration and base settings for the S8(0)/S10(0) vario.



Following items are listed in the setup menu:

- QNH &RES
- Flightrecorder
- Vario Param.
- Thermal As.
- Display
- Graphics
- Sounds
- Warnings
- Obs. Zones
- Units
- Hardware
- Files
- Polar & Glider
- Logbook
- Password
- About

You can scroll up and down the list of settings by rotating the bottom rotary knob and select a setting to change with a short press of the bottom rotary knob.

Some of the Options have sub menus and these are selected in the same way.

5.7.1 QNH & RES

Turn the bottom rotary knob to select the required entry field. Press the bottom rotary knob to select it and start editing the value. A further shot press will enter the value.



5.7.1.1 QNH

This feature may be used to offset the altitude datum as the result of pressure changes during the flight. Since changing the QNH influences the indicated altitude, care should be taken when changing the value as an incorrect setting could upset the final glide calculation.

5.7.1.2 Safety Altitude

This setting is the altitude reserve or safety altitude and is the height that the instrument adds to the final glide altitude required so the glider arrives over the final glide destination at the selected safety altitude. Once the safety altitude has been specified, the pilot has to keep the final glide indicator on 0 to arrive at the safety altitude. (Setup one of the NavBoxes in the primary or secondary pages of waypoint or task screens to be Arrival Altitude)



5.7.2 Flight recorder

S10(0) vario system has a built-in IGC-approved flight recorder. In this menu user can set flight recorder parameters and pilot's data.



S8(0) version 6 or higher also has a flightrecorder which does not have a digital signature and therefor is not approved for badge flights according IGC standards.

5.7.2.1 Recording interval

Set the recording interval from 1 – 20 seconds.

5.7.2.2 Auto finish

If this functionality is enabled, the flight recorder will automatically finish the flight under the following conditions:

- GPS status OK
- Groundspeed lower than 20km/h
- Average vario is between -1 and +1m/s

5.7.2.3 Finish before OFF

If this setting is enabled, flight will be finished, if the user will power down the unit.

5.7.2.4 Logger always on

This setting will enable logging of flight immediately after power on and will log the flight until power down the unit. The only condition to start logging is the presence of a valid time (GPS status BAD or OK). Logging will not start if GPS status is Very Bad (no valid time present).

5.7.2.5 Pilot

Insert the pilot's name, which will be written in the declaration.

5.7.2.6 Co-pilot

If the system is used in a doubleseater the name of the copilot may also be entered.

5.7.2.7 Competition number

Insert the competition number of the glider, which is also written in the flight file.

5.7.2.8 Registration number

Insert the registration number of the glider, which is also written in the flight file.

5.7.3 Vario parameters



5.7.3.1 Vario needle filter

Sets a time constant of the **Vario** needle. The value can be adjusted between 0.1 and 5 s with step 1.0 s or 0.1 s. Default value is 2.0 s.

Lower number (0.1 s compared to 5.0 s) means very sensitive (fast vario).

5.7.3.2 Vario sound filter

Sets a time constant of **Vario** sound. The value can be adjusted between 0.1 and 5 s with step 1.0 s or 0.1 s. Default value is 2.0 s.

5.7.3.3 Netto filter

Sets a time constant of the **Vario Netto** needle. The value can be adjusted between 0.1 and 5 s with step 1.0 s or 0.1 s. Default value is 4.0 s.

5.7.3.4 Relative filter

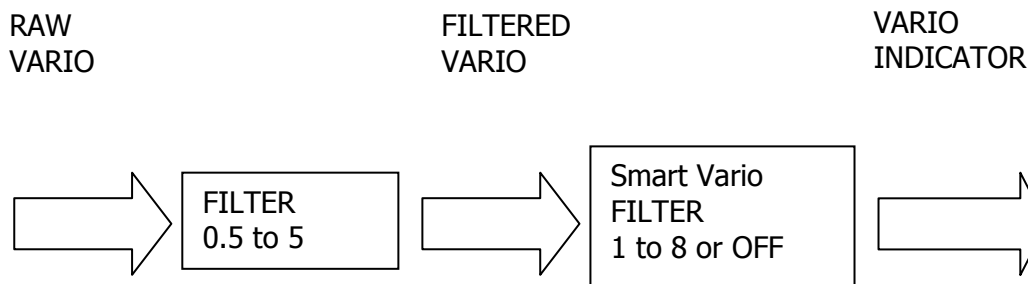
Sets a time constant of the **Vario Relative** needle. The value can be adjusted between 0.1 and 5 s with step 1.0 s or 0.1 s. Default value is 4.0 s.

5.7.3.5 SC filter

Sets a time constant of the **Speed-To-Fly** needle. The value can be adjusted between 0.1 and 5 s with step 1.0 s or 0.1 s. Default value is 4.0 s.

5.7.3.6 Smart Filter

Using **Smart vario filter**, vertical speed can be further filtered. Smart vario filter defines maximum speed of vario needle. "1" is the highest damping, "8" the lowest. Off means no additional filtering.



5.7.3.7 Needle range

Sets full scale range of the vario (2.5 m/s, 5 m/s or 10 m/s). Default value is 5 m/s (10 kts).

5.7.3.8 Auto SC

Defines the conditions, when the instrument will switch automatically between vario and speed to fly mode.

- **OFF:** Switching exclusively by means of an external switch connected to the S8(0)/S10(0). With new versions of Remote sticks, there is no longer a “physical” switch connection between Remote stick and the Vario unit – it is a switch on the Remote stick, which is connected through the software.
- **GPS:** When the GPS detects that the glider is circling an automatic change over to vario will happen after approximately 10 seconds. Detection of straight flight will cause a changeover to speed command.
- **IAS:** When the IAS exceeds a pre-set value. The IAS at which switching occurs can be selected in 5 km/h steps from 100 up to 160 km/h (or the equivalent in knots or mph).
- **G-meter** – for switching between cruise and climb mode based on the G measured by the inertial system. When glider will start circling, S8(0)/S10(0) will automatically switch from cruise to climb mode.



The external switch wired to the LXNAV S8(0)/S10(0) has absolute priority and will override all other switching methods. VP (Vario priority) input can override also hard wired SC switch.

5.7.3.9 TE compensations

The LXNAV S8(0)/S10(0) offers two methods of vario Total Energy Compensation:

- Pneumatic TE Pitot tube
- Electronic TE compensation



It is important to note that the method of TE compensation is set up when the instrument is installed by virtue of the pneumatic connections made to the TE and static ports. Changing the compensation type in the setup screen below **WILL NOT** change the method of compensation – the pneumatic plumbing has to be changed first.



If the TE pitot tube has been connected TE compensation should be set to 0%. There is no further adjustment of TE compensation possible. Quality of the TE tube is the one and **only** factor.



For **electronic** TE compensation, connect the TE port to *static*. Set the Vario Param TE compensation **initially** to 100%, and then adjust this with flight testing, described below.

5.7.3.9.1 TE-fine tuning

The electronic TE compensation can be fine-tuned during flight using the following procedure: it is essential that this is only done in smooth air; it is not possible to tune the TE accurately in turbulent air.

- Set TE compensation to 100%
- Accelerate up to approximately 160 km/h (75 kts) and keep the speed stable for a few seconds
- Gently reduce the speed to 80 km/h (45 kts)
- Observe the vario indicator during the manoeuvre. At 160 km/h the vario will indicate about -2 m/s (-4 kts). During the speed reduction the vario should move towards zero and should never exceed zero (slightly positive indications are acceptable).
- If the vario shows a climb the compensation is too low; increase the TE%; and vice versa.
- Try another "zoom" to assess the change and make further adjustments if necessary.

Electronic TE compensation is only effective when the Pitot tube and static sources are co-located and the pneumatic lines to the instrument are approximately the same length. The best sensor to use is the combined pitot/static Prandtl tube. If problems are experienced with the electronic TE compensation the most likely cause is the glider's static source.

The static source can be checked by plumbing the pneumatic tubes for electronic compensation and then setting the TE: to 0%. In still air accelerate to approximately 160 km/h (75kts) and slowly reduce the speed to 80km/h (45kts). Observe the vario indicator. If the static source is good the vario should immediately start to move to show a climb. If the needle firstly shows increased sink and then moves to a climb, the static source of the glider is unsuitable and there is no way to provide successful TE compensation electronically. The use of a dedicated and accurate fin-mounted pitot/static source such as a Prandtl tube might help.

5.7.3.10 Vario Average Time

Defines the integration period for the average vario in seconds. The default is 20 seconds.
Netto Average Time

Defines the integration period for the average netto vario in seconds. The default is 20 seconds.

5.7.3.11 Integrator reset

If this item is enabled, average vario (integrator) will be reset to 0 in the moment of switching from SC to Vario mode.

5.7.3.12 Temperature Offset

The LXNAV S8(0)/S10(0) is supplied with an external outside air temperature (OAT) sensor. With the offset setting it will correct static errors of temperature measurement.

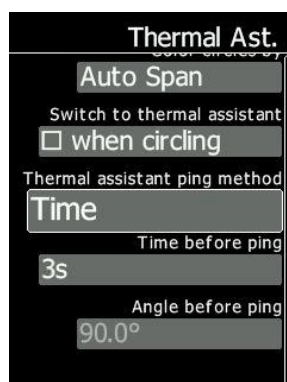
5.7.3.13 Airspeed offset

User has a possibility to make an airspeed offset, if the measurement is not correct.

5.7.3.14 Inertial assisted vario

With the LXNAV S8(0)/S10(0), it is possible to adjust the influence of g-force on the vario. This influence is very small and can be set to OFF or between 0 and 4.

5.7.4 Thermal Assistant



5.7.4.1 Colour circles by

You have three options for the thermal assistant, Auto Span, MacCready and Average Vario.



The colours in the thermal assistant indicate below average (blue), average (yellow), above average (red) and strongest point of thermal (white)

- If Auto Span is selected then the Thermal Assistant will use the average performance of the last turn to calculate below, average and above average climb and indicate accordingly. i.e. Red bubbles for strongest lift and blue dots for weakest lift or sink.
- If MacCready is selected then the Thermal Assistant will use the current MacCready setting to show rate of climb below, MacCready and above the MacCready setting
- If Average Vario is selected then the Thermal Assistant will use the average vario for the flight to show the rate of climb below average vario, average vario and above average vario.

5.7.4.2 Switch to thermal assistant

With this box ticked the S8(0)/S10(0) will change to the Thermal Assistant screen when the glider starts turning in a climb. If the box is left un-ticked then the thermal assistant page can be accessed manually.



The S8(0) will only detect turning if a GPS or Flarm device is attached. The S8(0) uses a combination of change of speed, angle of bank and direction change to indicate circling.



S10(0) has an internal GPS module

5.7.4.3 Thermal assistant ping method

If the Thermal assistant ping method is enabled, user can hear a PING during circling. When the PING is given the pilot must expand the circle to center the thermal. In the settings there are two methods available to trigger the PING: time before thermal maximum and angle before thermal maximum.

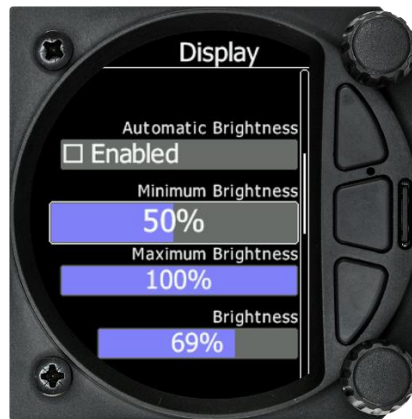
5.7.4.3.1 Time before ping

User will hear PING (different audible signal), selected number of seconds before maximum of thermal.

5.7.4.3.2 Angle before ping

User will hear PING (different audible signal), selected number of degrees before maximum of thermal.

5.7.5 Display



5.7.5.1 Automatic Brightness

If the Automatic Brightness is checked then the brightness will be automatically adjusted between the minimum and maximum parameters set. If the Automatic Brightness is Unchecked then the brightness is controlled by the brightness setting.

5.7.5.2 Minimum Brightness

Use this slider to adjust the minimum brightness for the Automatic Brightness option.

5.7.5.3 Maximum Brightness

Use this slider to adjust the maximum brightness for the Automatic Brightness option

5.7.5.4 Get brighter in

User can specify in which time period the brightness can reach required brightness.

5.7.5.5 Get darker in

User can specify in which time period the brightness can reach required brightness.

5.7.5.6 Brightness

With the Automatic Brightness unchecked, you can set the brightness manually with this slider.

5.7.6 Graphics

The graphics option has a sub menu for Map, Airspace, Waypoints, Glider and Tr, Tasks, Flarm and Theme setup



5.7.6.1 Map

Option to set Track Up or North Up.

5.7.6.2 Tsk

Options to set colors for task and its zones.

5.7.6.3 Airspace



In this dialogue you can define the airspace map presentation. Check the **Show airspace** item to enable airspace displays in navigational pages. If this item is unchecked no airspace will be displayed.

Use **Show only airspace below** to eliminate airspace which is going to be too high for the day. For example, if the forecasted cloud base is to be 1500 m, set this value to 1600 m and your screen will be much more readable.

In the airspace type list you can specify how each airspace type is displayed. You should define each type of airspace zone separately. First choose an airspace type from the list. You can modify the **Transparency** of the selected type. **Zoom** value defines to which zoom level this type is going to be visible. The **Colour** and **Width** items specify how selected airspace zone will be drawn.

All settings mentioned above can be change for airspace classes A, B, C, D, E and F and also for the following types of airspace:

- Control zone
- Restricted zone
- Prohibited zone
- Danger zone
- Glider sector
- Airway sector
- Transponder Mandatory (TMZ)
- Military zone
- Other zone

5.7.6.4 Waypoints



In this dialogue you can define how waypoints are displayed or not, how many characters are displayed the size and colour of the label.

Show waypoint

Check the dialogue box to enable waypoint labels on the Waypoint and Task Screen.

Label Length

You can chose to display all of the characters in the waypoint name or a maximum of 8, 7, 6, 5, 4, 3, 2, 1 or none.

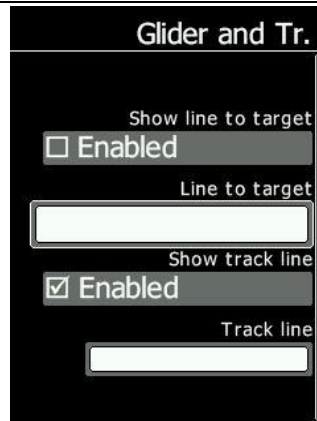
Label Font size

You can choose between 24, 18 or 16 point.

Label Font Colour

You can choose a font colour from the pallet of 12 colours.

5.7.6.5 Glider and Track



In this dialogue you can choose to show a line to the target and your track line along with the colour from the pallet of 15 colours

Show line to target

Check the dialogue box to enable a line to the target

Line to target

You can choose the colour of the target line from the pallet of 15 colours

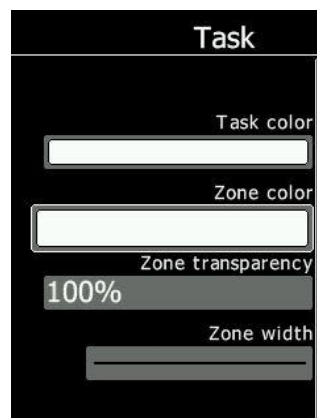
Show track line

Check the dialogue box to enable a line to the target

Track line

You can choose the colour of the track line from the pallet of 15 colours

5.7.6.6 Task



With this dialogue you can change the colour of the task line, turn point zone, zone transparency and Zone line width.

Task colour

You can choose the colour of the task line from the pallet of 15 colours

Zone Colour

You can choose the colour of the task line from the pallet of 15 colours

Zone transparency

With this dialogue you can choose the level of the zone transparency from 0 to 100%

Zone width

This dialogue defines the line width of the zone with a choice of 10 line widths

5.7.6.7 Flarm



In this menu you can choose to show Flarm traffic on the map, change glider colours, adjust Flarm object timeout and graphical settings.

Colours can be set for the following:

- Glider Above Colour
- Glider Below Colour
- Glider Near Colour
- Selected target Colour

Display Flarm Traffic

Check the dialogue box to display Flarm object on the Screen.

Glider colour:

Colours can be set for the following:

- Glider Above Colour
- Glider Below Colour
- Glider Near Colour
- Selected target Colour

Label Text

On the map it is possible to show additional, related text next to the Flarm object. This option can be set to None, Flarm ID, Climb rate, Relative vertical

Active Timeout

Adjusts the time a glider symbol remains on the map after it has last been seen by the Flarm.

Inactive Timeout

Adjusts the time of inactive gliders on the Flarm target list. Inactive gliders are gliders, where the Flarm signal has been lost after Active timeout. The targets became inactive and remain only on the Flarm target list for this time.

Draw Line to selected Target

Check this option to enable or disable a line drawn to a selected Flarm target or not.

Draw History

Select if a trail is drawn behind Flarm targets to show where the targets have been

Plane icon size

To adjust the pixel size of Flarm targets.

5.7.6.8 Theme Setup

With this dialogue you can change the background colour of the vario gage and the inner information circle, the user message transparency and NavBox transparency.

Colour style – Gauge: Inner

With this dialouge you can change the background colour for the vario gage (Outer ring) and the background of the information circle within the gauge. You have the choice of the following:

Gage	Inner
White	Black (default)
White	White
Black	White
Black	Black

User msg. Transp.

With this dialogue you can change the transparency of the user messages when they are displayed overlayed on each screen from 0 to 100%. Default is 50%.

NavBox transp.

With this dialogue you can change the transparency of the NavBoxes which are overlayed on each screen from 0 to 100%. Default is 44%.

Wind symbol size

Here you change the size of the wind symbol from Small – Large.

Show Inactive AHRS screen

User has the possibility to decide whether he wants to hide the AHRS screen, when the AHRS option is not active.

5.7.7 Sounds

The sound option has a sub menu for Equalizer, Vario and Flarm.



5.7.7.1 Equalizer Option

With the bottom rotary knob you can adjust the volume for each frequency. Settings are stored when you exit the screen (with middle button).



5.7.7.2 Vario Sounds



In this menu the user can change all the parameters of vario sounds.



The volume for Vario, Flarm and Speech can also be adjusted directly with the top rotary knob whilst in the Flarm, Waypoint and Task screens.

Vario volume

User can set the default vario volume.

Sound shape

In this menu you can pick between following shapes: Sinus, Triangular and Harmonic.

Vario audio mode

- **Linear positive:** sound is interrupted with silence every few milliseconds when the needle is positive; on negative side sound is linear (not interrupted).
- **Linear negative:** inverse function to **Linear positive**.
- **Linear:** sound is linear and non-interrupted in full scale range.
- **Digital positive:** similar to **Linear positive**, except frequency is not changing linearly but with larger steps.
- **Digital negative:** inverse function to **Digital positive**.
- **Linear positive only:** sound is present only at positive values, for negative values there is silence.
- **Digital positive only:** similar function to **Linear positive only**, except the sound is similar to the digital tone.
- **Digital:** similar function to **Linear**, except the sound is similar to the digital tone.

SC Audio mode

SC audio mode has five modes:

- **SC positive:** sound is interrupted with silence every few milliseconds when the needle is positive; on negative side sound is linear (not interrupted).
- **SC negative:** inverse function to SC positive.
- **SC:** sound is linear and non-interrupted in full scale range.
- **SC Mixed:** for positive relative values the sound represents relative; for negative relative values the sound represents SC (for that setting it is recommended to set SC needle to relative).
- **Netto speed:** variometer will produce exactly the same sound as defined in Vario audio, except it will follow netto vertical speed.

Dead band

Defines the width of the audio dead band in speed to fly mode. Default value is ± 1 m/s.

Audio frequencies

- **Freq at 0%** defines the tone frequency at 0 m/s.
- **Freq at +100%** defines the tone frequency at full + deflection.
- **Freq at -100%** defines the tone frequency at full – deflection.

Equalization presets

We have three options: default LXNAV speaker, flat setting or user defined.



The volume for Vario, Flarm and Speech can also be adjusted directly with the top rotary knob whilst in the Flarm, Waypoint and Task screens

5.7.7.3 Flarm Sounds



Flarm Volume

Adjust the default Flarm volume with the slider.

Flarm Low Alarm

For distant Flarm targets the S8(0)/S10(0) can give a short or long message, just a beep or be turned off. (19-25 seconds before possible collision).

Flarm Important Alarm

For close Flarm targets the S8(0) can give a short or long message, just a beep or be turned off. (14-18 seconds before possible collision).

Flarm Urgent Alarm: For very close Flarm targets the S8(0)/S10(0) can give a short or long message, just a beep or be turned off. (6-8 seconds before possible collision).



The volume for Vario, Flarm and Speech can also be adjusted directly with the top rotary knob whilst in the Flarm, Waypoint and Task screens

At alarm sound user have possibilities to select between beep, short message and long message sounds.

Short message sounds: "Traffic two o'clock"

Long message sounds like: "Traffic two o'clock, two kilometers, two hundred meters above".

5.7.8 Warnings

5.7.8.1 Enable Flarm warnings

Warnings can be enabled or disabled in this section.

The warnings dismiss time can be set from 0 to 120 seconds.

5.7.8.2 Flarm warnings:

Display urgent alarms Third level approximately **8 seconds** before predicted collision

Display important alarms Second level approximately **13 seconds** before predicted collision

Display low alarms First level approximately **18 seconds** before predicted collision

Dismiss while circling: This dismisses Flarm alarms whilst circling for Flarm targets in the same thermal. Flarm warning for urgent alerts over rides this.

5.7.8.3 Altitude Alarm

It can be set in meters/feet. S8(0)/S10(0) will display warning before reaching selected altitude.

Warn me before: Is related to Altitude alarm, it can be set from 10 to 500 seconds, prediction time of reaching alarm altitude is calculated from average vario.

Dismiss time:

If Flarm warning is dismissed, there will be no Flarm warning for number of seconds set in that menu.

5.7.9 Obs. Zones

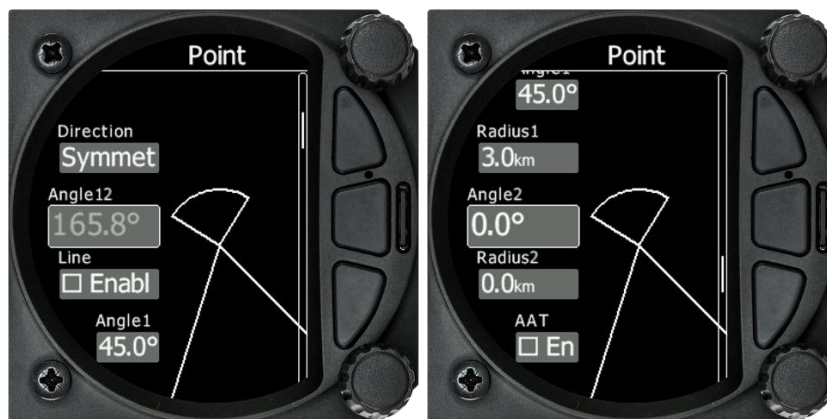
The default Observation Zones can be configured in this section for all tasks.



The Start, Turn point and Finish zone can be configured separately although the setup is very similar.



The Start and Finish zone do not have the option of the AAT check box or Auto next.



- **Direction:** Options include Start, Previous, Next, Symmetrical or Fixed angle
- **Angle 12:** is greyed out unless fixed angle is specified in Direction
- **Line Check Box;** typically used for start and Finish. If line is checked then Angle 1, Angle 2 and Radius 2 are greyed out
- **Angle 1:** Sets the angle of the Turn Point Zone
- **Radius 1:** Sets the radius of the Turn Point Zone
- **Angle 2:** Sets angle 2 for complex Turn Points and Assigned Area Tasks
- **Radius 2:** Sets the radius for complex Turn Points and Assigned area Tasks
- **AAT Check Box:** when checked, the S8(0)/S10(0) considers the area created within the zone as an Assigned area
- **Auto Next:** Typically used in racing tasks, will set the navigation of the S8(0)/S10(0) to the next turn point when a single point is made within the Turn Point Zone.

5.7.10 Units

Use this menu to specify units, UTC time offset and type of ballast input.



- **Distance:** Units available; Miles, Nautical Miles, Kilometres,
- **Altitude:** Units available Feet, meters
- **Temperature:** Units available; Degrees Centigrade or degrees Fahrenheit
- **Pressure:** Units available; Inches of Mercury, mm of mercury, mbar,
- **Speed:** Units available; fpm, m/s, mph, kts, km/h
- **XC Speed:** Units available; fpm, m/s, mph, kts, km/h

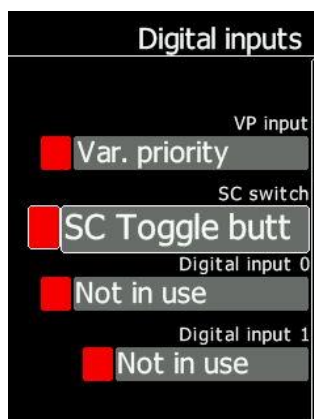
- **Vertical Speed:** Units available; fpm, m/s, mph, kts, km/h
- **Wind:** Units available; fpm, m/s, mph, kts, km/h
- **Weight:** Lbs or Kg
- **Load:** Lb/ft2 or Kg/m2
- **Longitude/Latitude:** DD.ddddd, DDMM.mmmmm', DDMM'SS.ss", DD.dddd, DDMM.mmm', DDMM'SS"
- **UTC Offset:** in half or whole hours plus or minus Zulu
- **Ballast:** weight, Load, overload

5.7.11 Hardware

The hardware setup has a sub menu for Digital inputs, Indicator, Communications, Battery, Remote Stick and Compass module.



5.7.11.1 Digital inputs



VP input

There is another input called VARIO PRIORITY. When this input is activated by grounding the appropriate wire the unit will change over to Vario immediately. This input wire is set open (not grounded) as a factory default on delivery. This switch has priority over all SC switching methods. Means, it will override all other signals for SC and switch unit to vario mode. This input is not wired in standard wiring, but it must be wired by customer.

To be done

5.7.11.1.1 SC switch

The LXNAV S8(0)/S10(0) has an input for an external **speed command switch**. Using the external switch it is possible to switch between SC and Vario manually. Setting the **SC switch** to **ON** means that closing the switch will cause the instrument to enter SC mode. Setting SC switch to **OFF** means that closing the switch will select Vario mode. There is a third option by setting SC INPUT to **TASTER** and connecting a push button to the input; each key press will toggle between SC and Vario (mandatory setting for LX Remote, which has provided push button for SC).

5.7.11.1.2 Digital Inputs 0,1,2,3

The LXNAV S8(0)/S10(0) has 4 external digital inputs which can be set to indicate gear, airbrakes and water open or closed. Wiring is described in Ch. 8.6.2.

5.7.11.1.3 Example of warnings triggered by the input:

1. On the ground:

NO WARNING

- Gear down
- airbrakes locked

WARNING

- if you open airbrakes, you will get the warning: **check airbrakes** (every 30 seconds)
- if you leave unlocked and increase speed, you will get more airbrakes warnings

2. in the air:

NO WARNING

- gear inside
- airbrakes locked

WARNING:

- opened airbrakes, you will get the warning: **check gear** until you will put down the gear.



Input pins are available on rear DB15 connector, but they are not wired.



Input is active when it is short on ground.

5.7.11.2 Indicator setup



Vario Needle: Can be set to Vario, SC, Netto or Relativ

SC needle: Can be set to Vario, SC, Netto or Relativ

Yellow Bar: Can be set to G-meter, Min/Max vario or no bar

Red Diamond: Can be set to No diamond, Average, Netto or G-meter

MacCready: Blue triangle can be enabled or disabled

Thermal: Green T can be enabled or disabled

STF or Speed To Fly: push pull bar can be enabled or disabled

5.7.11.3 Comms. Setup

Used to configure the two ports on the back of the S8(0)/S10(0) for connection to a GPS/Flarm source and to a PDA. Each port can be configured separately.

5.7.11.3.1 Direct link: PDA-GPS link

If your PDA device does not support automatic switch to DIRECT LINK between GPS and PDA port, here is a manual **DIRECT LINK** menu. User can select between PDA-GPS or BT-GPS.

When **automatic baudrate** is enabled, the LXNAV S8(0)/S10(0) will automatically search on all speeds to receive valid data on GPS(FLARM) port. When the S8(0)/S10(0) receives a valid NMEA sentence it will lock on that baudrate and stop searching.



PDA-GPS link is normally automatic, some PDAs softwares require manual settings

5.7.11.3.2 BT-GPS link

To be done – needs testing

5.7.11.3.3 PDA baudrate

Set the baudrate of the PDA port.

Baudrate on PDA port must be set to same as it is on PDA device, otherwise S8(0)/S10(0) and PDA will not hear each other.



Baudrate on PDA must not be lower than the setting on GPS port

5.7.11.3.4 GPS (S10(0)-Flarm port) baudrate

Set the baudrate of the GPS/Flarm port.



To get better performance of LXNAV S8(0)/S10(0) it is recommended that both baudrates are set as high as possible.

5.7.11.3.5 Bluetooth

Enable or disable internal Bluetooth module. 

NMEA output on PDA port (also on BT?? To be checked) can be enabled or disabled. If you are not using a PDA port, to get better performance, this setting should be disabled.

5.7.11.3.6 Beeps controlled by PDA

If a PDA is connected to the S8(0)/10x, the PDA is able to send a beep command to the S8(0). If that feature is enabled, S8(0)/10x will beep on PDA request.

5.7.11.3.7 External target

To be done.

5.7.11.3.8 Target information

Target information (information about selected waypoint on PDA or GPS device) can be selected between GPS port and PDA port, to prevent the collision between devices.

5.7.11.4 Battery Chemistry Setup

A new feature within the S8(0)/10x is the ability to configure your battery chemistry and battery warnings.



Batteries used in gliders today are not just the old style **lead acid battery** but also **Lithium Ion (LiIon)** and **Lithium Iron Phosphate (LiFePo)**.

Each battery type has a different power delivery curve and it is now possible to configure the Low and High Battery warnings

Select Battery from List gives you a drop down list with the suggested battery settings for Full Voltage, Low Battery Voltage and Empty Voltage as pre-sets. Selecting one of these will set the values in the following boxes.



Alternatively you can manually change the Full Voltage, Low Battery Voltage and Empty Voltage if your battery type is not listed.

5.7.11.5 Remote stick (NEW) -TO BE DONE

Remote stick is also connected to CAN bus, main wiring of S8(0)/S10(0). In this menu device has to be registered. Device must be registered in case of double seat device as there is possible to have two remote sticks, one registered to the main device and the other one to the second seat device.

Registering remote stick can be done on following way. Press any button on remote stick, this way S8(0)/S10(0) will detect presence of remote stick on the CAN BUS.

To confirm remote stick, you must press OK button on remote stick.

Same way is done with second remote for S8(0)d repeater unit. Be sure that in time of registering repeater unit, front unit is not in Register mode, otherwise both units will listen same remote stick



Can bus is all the time under power supply, consequently remote stick is also under power. After flight, disconnect batteries or turn off the master switch, to prevent discharging batteries.

5.7.11.6 Compass module

Under development

5.7.12 Files

The Files menu allows you to upload or select Waypoint, Airspace and Flarm Net files.



5.7.12.1 Waypoints File

Selecting the Waypoints option opens a list of .cup files available on the SD card. Selecting a file loads this file for use into internal memory.



Please note that only one Waypoint file can be loaded at any one time.



Filesize of waypoint file is limited to 1MB. Supported format is **CUP**, generated with **SeeYou** program. Some versions of CUP may not be compatible, because they are not made by **CUP** standard, which is proprietary format from Naviter company.

5.7.12.2 Airspace File

Selecting the Airspace option opens a list of .cub files available on the SD card. Selecting a file loads this file for use into internal memory.



Selecting a file loads this file for use.



Please note that only one Airspace file can be loaded at once.

5.7.12.3 Flarmnet File

Selecting the Flarmnet option opens a list of .fln files available on the SD card or in the internal memory. Selecting a file loads this file for use.



Please note that only one Flarmnet file can be loaded at any one time.

5.7.13 Polar and Glider

5.7.13.1 Polar

The Polar and Glider section allows you to load and edit a set of parameters for your glider's Polar. You can select from a pre-defined list of nearly every common Glider or make your own Polar.



Select Glider from List: presents you with an alphabetical list of all the common gliders and associated Polar data. All glider data will be copied from the chosen polar. Check the best glide ratio and minimum sink rate displayed. To see whether the polar data matches your glider's performance, review the MacCready Setting Menu, where you can see /check the numbers.



You can modify the polar by changing coefficients **a**, **b** and **c**. A polar is defined as a quadratic equation with the parameters a, b, and c.

Use the SeeYou program (Tools->Polar) to calculate coefficients a, b and c for a given glider's polar. The program requires three sink points entered at selected speeds (e.g.: 100 km/h, 130 km/h, and 150 km/h). The program will calculate the values of a, b and c, which should be noted and entered into the LXNAV S8(0)/S10(0).

- **Class:** Options for Touring, Ultralight, World, Double seater, Club, 18-meter, 15-meter, Open, Standard and Unknown are available.
- **A, b, c:** Options can be adjusted or entered for a non-listed glider.
- **Stall speed** is used to generate stall warnings which are available with integrated Voice module.
- **Reference load** (wing loading) value represents the value at which the polar was measured.
- **Reference weight** corresponds to the weight value at which the polar was measured.
- **Maximum takeoff .weight** is the maximum take-off weight allowed for the glider. It is not used in the calculation; it is just a reminder to the pilot of the maximum take-off weight. **Empty weight** is weight of the glider without the pilot and ballast.
- **Pilot weight** is the weight of the pilot with parachute and baggage.
- **Co Pilot Weight** is the weight of the co-pilot with parachute and baggage.



$$\text{overload} = \frac{\text{Empty.glider.weight} + \text{Pilot.weight} + \text{Water.ballast}}{\text{Minimum.glider.weight}}$$

In case of a doubleseater configuration, both users have possibilities to change parameters. The last change performed is synchronised into both instruments.

5.7.13.2 Speeds

User can set following speeds:

- Stall speed (VS0)
- Stall speed (VS1)
- Approach speed (Vapp)
- Best climb (Vec)
- Max flaps (Vfe)
- Manoeuvre speed (Va)
- Max speed (Vne)

5.7.13.3 Flaps

TO BE DONE

5.7.13.4 Logbook

The logbook page lists all of the flights in date order.



If GPS data is present the logbook will show present date and time of departure. Manual navigation (without GPS) will show duration and will be marked with "—" marks.



User can download a flight after a short press on the lower rotary button

5.7.13.5 Password

There are several system passwords which run specific procedures as listed below:




5.7.13.6 List of Password functions

DEBUG_INFORMATION_PASSWORD	90000
RESET_TO_FACTORY_DEFAULT_PASSWORD	00666
ENTER_AHRS_LICENSE	30000

5.7.14 About

In the about page, information about the display platform and the sensor box can be found.

User can see following details:

- Software version
- IGC serial number 
- Version built date
- Hardware version

Sensor box details are:

- Software version
- Serial number
- Hardware version



6 Variometer and Altimeter

All signals from the pneumatic sensors (altitude, speed) are derived from high quality pressure sensors, which mean that no flask is necessary. The vario signal is derived from the altitude signal. All signals are temperature and altitude compensated. The colour display shows the vario information as well as many other parameters.

The display is user configurable. The Variometer can be configured to show:

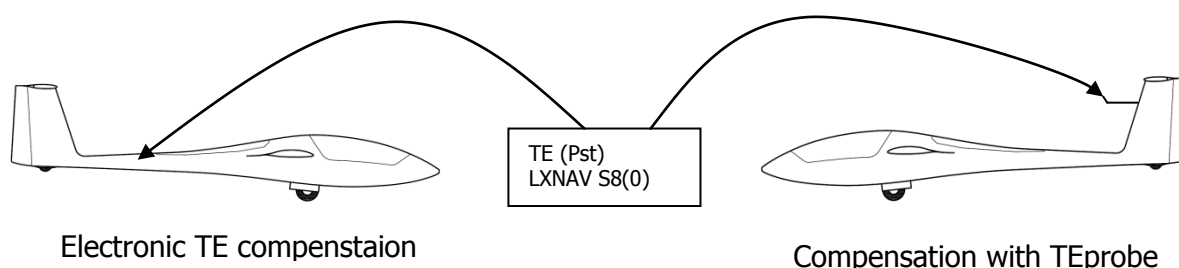
- **Range** 5, 10 and 2.5 m/s or 10, 20 and 5 kts.
- **Time constants** 0.1 s to 5 s, in addition there are 4 settings for electronic processing for the vario signal.
- **Netto** shows the air mass lift and sink.
- **Relative** shows the lift or sink that would be achieved if the glider was circling at the thermaling speed.

•

There are two ways by which the vario indications can be corrected for total energy. Electronic TE compensation based on speed changes with time and pneumatic compensation with a TE probe. The quality of the TE compensation depends entirely on the location, size and dimension of the TE tube. The installation must be leak-proof.



If an electronic TE compensation is selected the TE (P_{st}) port should be connected to a good static pressure source. If pneumatic compensation is selected the TE (P_{st}) port should be connected to the TE probe.



6.1 Altimeter

The altimeter of the LXNAV S8(0)/S10(0) is temperature compensated from -20°C up to +60°C. The altimeter is calibrated up to 20000 m.

6.2 Speed Command

Speed command flying based on the MacCready theory is a very useful tool to optimise cross-country speed. When the instrument changes to speed command mode the audio will change and become a director informing the pilot whether he is flying too fast or too slow. In order to reduce confusion between vario and speed command audio some special features are incorporated

- Continuous audio signal and other kinds of signals can be chosen. For details, see setup.
- No audio at correct speed (dead band).

7 Flying with the LXNAV S8(0)/S10(0)

To get the best out of the LXNAV S8(0)/S10(0) it is important that some preparation is done prior to take-off. Trying to configure the instrument or set a task while flying is very hazardous especially in a competition. Pre-flight preparation will ensure that the flight will be both safe and enjoyable.

7.1 On the Ground

7.1.1 Power on Procedure

Press any of the rotary or push buttons to start the LXNAV S8(0)/S10(0). The LXNAV S8(0)/S10(0) welcome screen will appear. The first screen shows the version of the boot loader, firmware, hardware and serial number. The boot procedure normally takes a few seconds. When completed, the Set Elevation dialogue is shown.

7.1.2 Set Elevation and QNH

This setting is crucial for final glide calculation: therefore please pay careful attention to it.



The instrument will offer elevation over standard pressure level QNE. Use the knob to fine-tune the elevation.

The **QNH** should be changed only when airfield elevation and QNH pressure are given. This might happen in some competitions.

In all other cases the elevation should always match QNH pressure.



The Set Elevation dialogues are not shown if the LXNAV S8(0)/S10(0) is switched off and on during flight.



QNH can be also corrected during flight under Setup-QNH and RES menu.

7.1.3 Pre-flight Check

After elevation setup the LXNAV S8(0)/S10(0) will switch to the Info screen for normal operation mode.

Use the middle (Menu) button to scroll to Flarm, Waypoint or Task Screen to verify that the MacCready, Ballast, and Bugs settings are set to the expected values for the current flight.

In any of these screens, press the bottom rotary button to raise the dialogue box to check or set MacCready, Ballast, and Bugs values.



Rotate the bottom knob to modify any setting. Next, check the safety altitude (height above destination, arrival altitude) setting. Refer to 5.7.1.2 to find out how to define the safety altitude.

7.2 Airborne

7.2.1 Final glide calculation

Final glide is a function calculated from the target distance, target elevation, altitude, wind component, MC setting and Bug setting. The S8(0)/S10(0) will have enough information to calculate this automatically as long as a GPS source is attached and the target to navigate to is set in Waypoint or Task screen. To display the Arrival Altitude (above Safety Altitude) make sure you have configured at least one of the NavBoxes on the primary or secondary screens to Arrival Altitude.

8 Installation

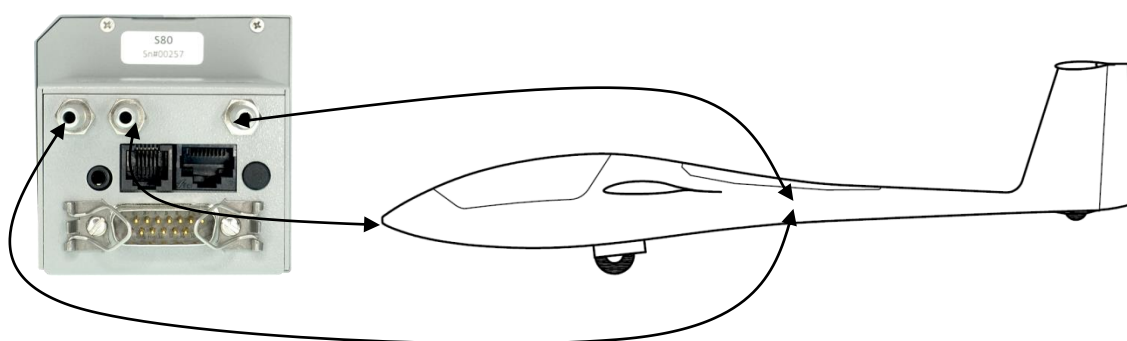
The LXNAV S8(0)/10x requires a standard 57 or 80 mm cut-out.

Three pressure connectors are fitted to the back of the S8(0)/S10(0). A label shows their functions.

- P_{static} means static pressure connector.
- P_{total} means pitot or total pressure connector.
- TE means total energy TE pressure connector.

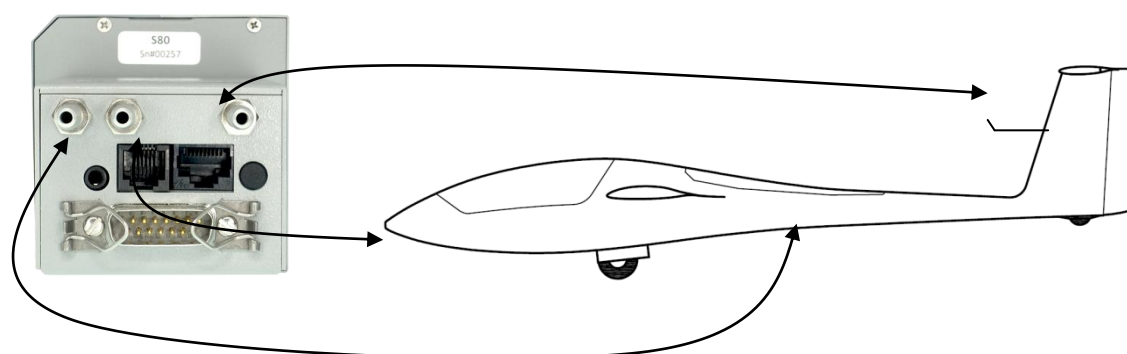
If the unit is to be configured for electronic TE compensation the connections are as follows:

- P_{static} Static
- P_{total} Pitot or Total pressure
- TE/ P_{static} Static



If the unit is to be configured for pneumatic TE compensation using a TE tube, then the connections are:

- TE/ P_{static} TE tube
- P_{static} Static
- P_{total} Pitot or Total pressure



If the P_{total} and Static are connected the wrong way around there will be no integrator (average climb) and speed to fly indication during the flight.

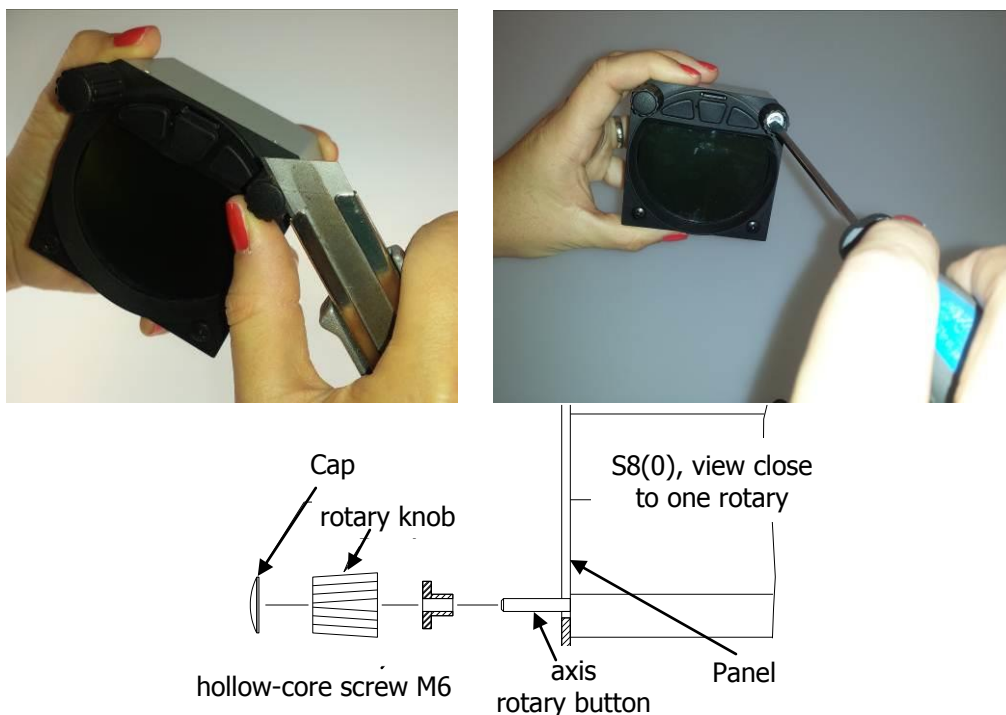
The LXNAV S8(0)/S10(0) is connected to 12 Volt power via the 15-pin SUB-D connector. Optionally LXNAV S8(0)D can be connected via the CAN bus and the connectors are labelled with "**CAN**" at each end.



Instrument has no internal fuse. **3A external fuse is required!** Power supply cables should use a minimum of 0.5 mm² wires.

8.1 Installing the LXNAV S8(0)/S10(0)

The LXNAV S8(0) vario should be mounted in a standard 80 mm hole.



Remove the two rotary knob caps with a knife or flat screw driver, then hold each knob and unscrew it.

Remove the remaining two screws and the two M6 threaded nuts. Install S8(0)/10x into the panel, screw back all screws, nuts and knobs. Make sure that between the knobs and the panel there is some space, to push button.



Be sure that LXNAV S8(0)/10X is placed far enough from compass.

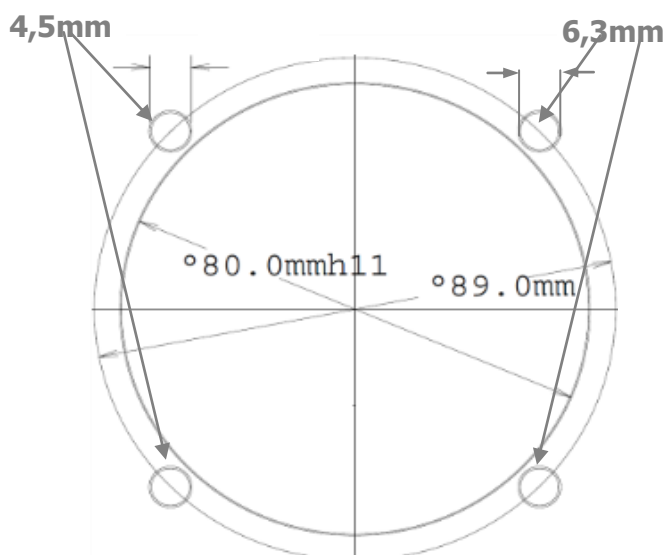
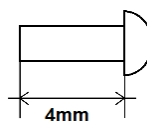
8.2 Connecting LXNAV S8(0)/S10(0)

LXNAV S8(0)/S10(0) is connected to 12V DC power supply. Red wire goes to + positive and blue wire goes to – ground. If you don't use S8(0)D (second seat unit) The Can connector should be left terminated with a CAN terminator. The SC cable is used for external switch, for switching between climb and cruise mode.

8.3 Cutout of S8(0)/S10(0)



Length of screw is limited to max 4mm!



8.4 Available cables for GPS/Flarm and PDA ports

GPS / Flarm port

Device	Cable code
Nano power	CC-NP-LX <i>(RX/TX are crossed)</i>
Generic RS232 with female DB9	V7-GPS-232
Flight recorders, FLARMS with standard 6p IGC connector RJ12 type, Red Box, Colibri, Colibri2, VL	V7-GPS-IGC
Power Flarm (RJ45), K6 mux	V7-GPS-PF
Power Flarm Core	V7-GPS-PFCORE

PDA port

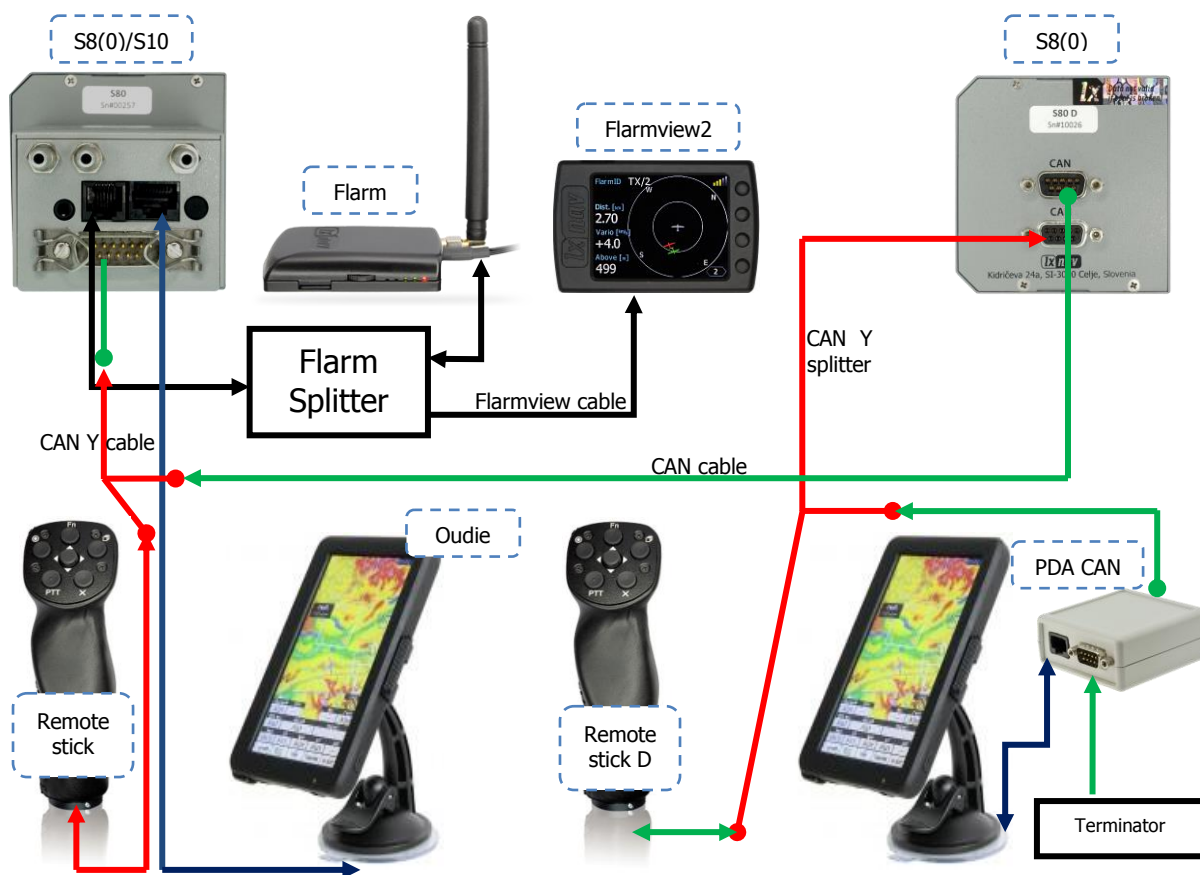
Device	Cable code
OU DIE	CC-NP-OU DIE1
Generic RS232 with female DB9	CC-NP-232
IPAQ 310/314	CC-NP-IPAQ310
IPAQ 38/39xx/47xx	CC-NP-38
MiniMap	CC-NP-LX
Butterfly Connect	CC-NP-BFC



PDA and GPS are not designed in accordance with IGC standard. It can be used only with dedicated cable. Do not plug unknown cable to it as it may damage LXNAV S8(0)/10x unit.

8.5 Installation of options

The LXNAV S8(0) can be optionally connected to a 2nd seat repeater unit LXNAV S8(0)D, remote stick, magnetic compass and AHRS option.



8.5.1 S8(0)D option (Repeater)

In two-seat gliders it is possible to install the LXNAV S8(0)D rear seat device. The S8(0)D looks almost identical to the S8(0). In fact it runs on exactly the same software as on first seat device.

The basic idea of the two-seat configuration is that both devices work independently from each other with the possibility of automatically exchanging various pieces of data (volume, Mc, polar...).

8.5.1.1 Data Exchange

All data is exchanged between front and rear unit. LXNAV S8(0)/S10(0) also exchanges data with GPS and PDA. Change of MC, Bal, Bugs, Volume, polar settings,... on PDA, will also influence on LXNAV S8(0)/S10(0). The same will happen also in opposite way.

8.5.1.2 Cable Wiring (LXNAV S8(0)D)



8.5.2 Magnetic compass (Compass –CAN)

Not supported yet

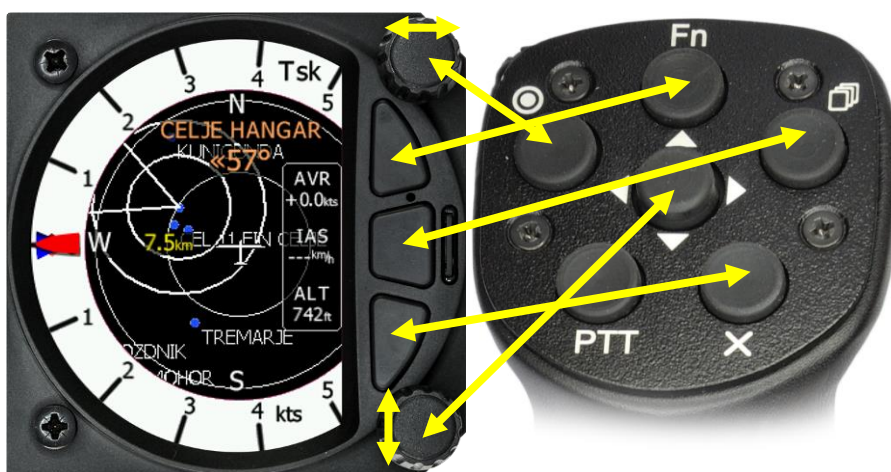


Is simply connected to CAN bus, main unit will recognize it. This option is not released yet but is planned for a future software release.



Can bus is all the time under power supply, consequently compass module is also under power. After flight, disconnect batteries or turn off master switch, to prevent discharging batteries.

8.5.3 Remote stick (Remote-CAN)



Remote stick is also connected to CAN bus. On S8(0)/S10(0) is provided special menu to register remote stick. Device must be registered in case of double seat device, there is possible to have two remote stick, one registered on front and another on rear device.



Registering remote stick can be done on following way. Press any button on remote stick, this way S8(0)/S10(0) will detect presence of remote stick on the CAN BUS, after that go under setup-hardware-remote and register remote stick.

To confirm remote stick, you must press OK button on remote stick.

Same way is done with second remote for S8(0)D repeater unit. Be sure that in time of registering repeater unit, front unit is not in Register mode, otherwise both units will listen same remote stick.



Can bus is all the time under power supply, consequently remote stick is also under power. After flight, please disconnect batteries or turn off master switch, to prevent discharging batteries.

8.5.4 AHRS option

To activate AHRS, an activation code must be purchased.

AHRS option can be activated by the following procedure:

- Enter password 30000
- Enter 13-digit license key and confirm

If the code is correct, you will see an AHRS on AHRS page.

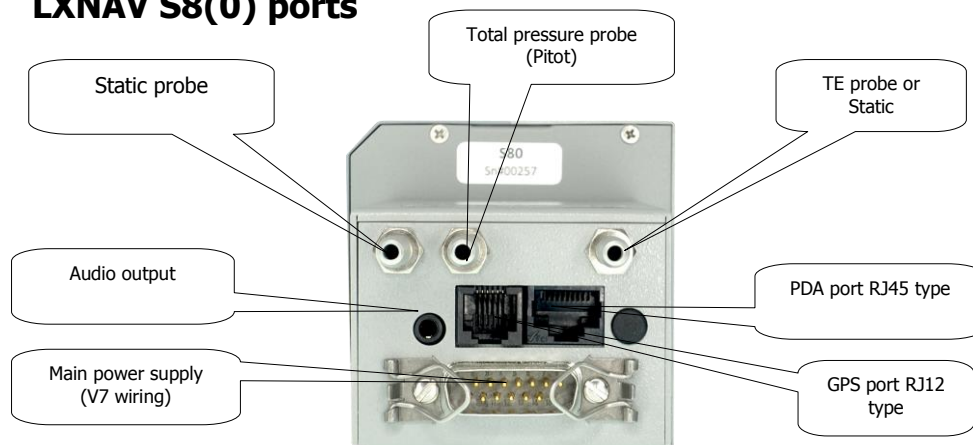


8.5.4.1 Deactivating of AHRS option

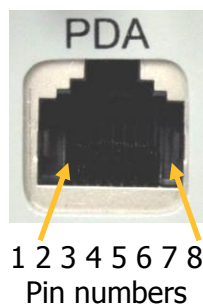
TO BE DONE

8.6 Ports and Wiring

8.6.1 LXNAV S8(0) ports



8.6.1.1 PDA port (RJ45)



Pin number	Description
1,2	Ground
3	(output) Transmit from LXNAV S8(0) RS232 (e.g. Computer, IPAQ38/39xx)
4	(input) Receive to LXNAV S8(0) RS232 (e.g. Computer, IPAQ38/39xx)
5	(output) Transmit from LXNAV S8(0) LV-TTL (3.3V) (e.g. Oudie, HP302, HP31x)
6	(input) Receive to LXNAV S8(0) LV-TTL (3.3V) (e.g. Oudie, HP302, HP31x)
7,8	5V OUTPUT (maximum 1A)



RJ45 plug is NOT designed in accordance with IGC standard. It can be used only with dedicated cable. Do not plug unknown cable to it as it may damage LXNAV S8(0) unit.

8.6.1.2 GPS port (RJ12)



Pin number	Description
1	(output) 12V DC, to supply GPS
2,3	N.C.
4	(input) Receive to LXNAV S8(0) RS232 (e.g.NANO power 232)
5	(output) Transmit from LXNAV S8(0) RS232 (e.g.NANO power 232)
6	Ground

8.6.1.3 Main port

The main port is used to connect the S8(0) to the main wiring loom.

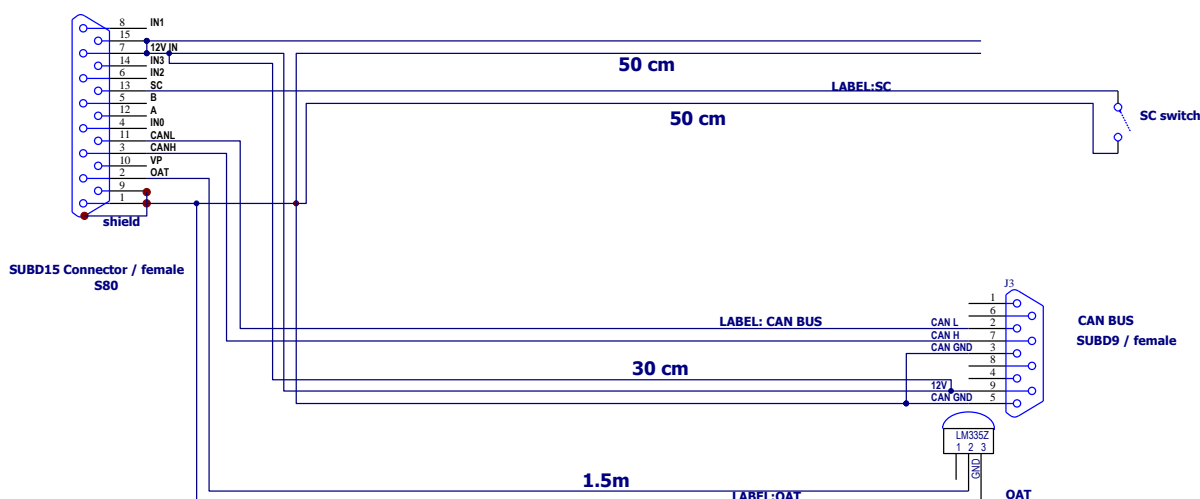
8.6.1.4 Audio port

The supplied speaker is connected with a standard 3mm phono jack.



This port is designed to be connected with an 8 ohm speaker supplied with the S8(0). Please consult with your dealer, if you want to make a different connection.

8.6.2 LXNAV S8(0) wiring



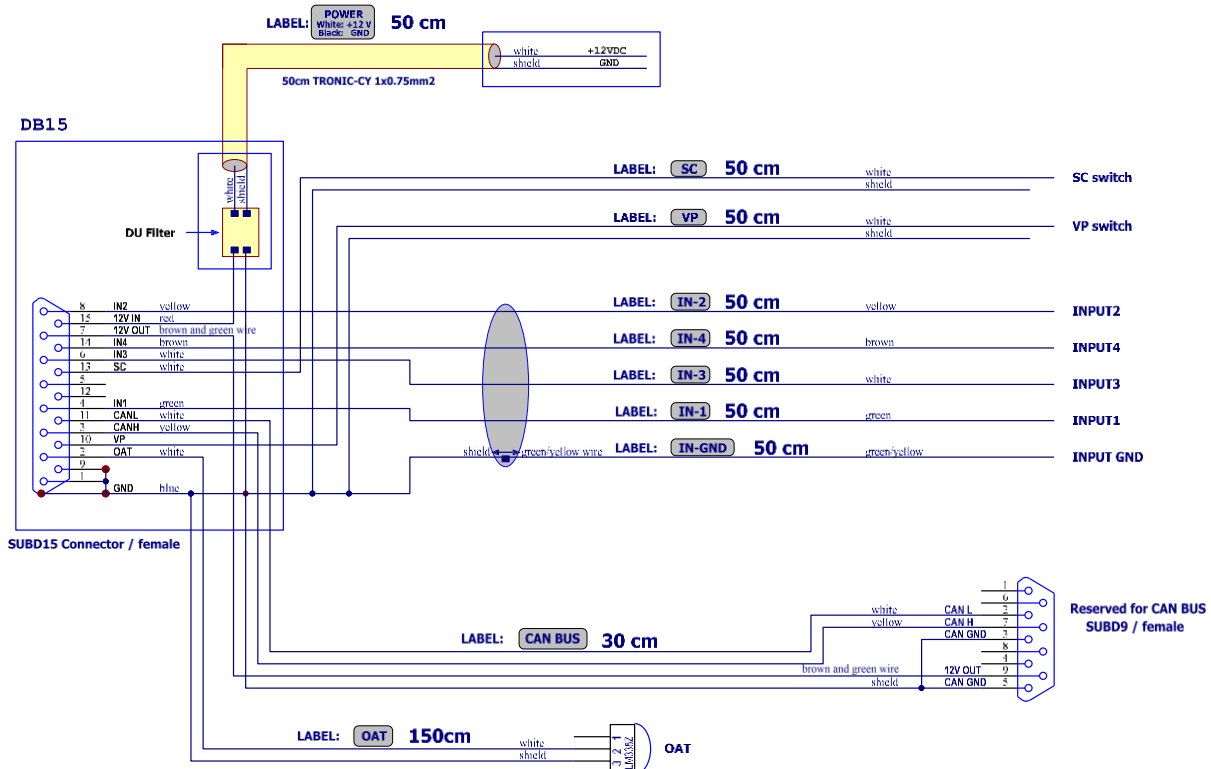


Newer versions of wirings can have power supply cable shielded with black and white color. White color is +12V DC (positive pole) and black is GND (negative pole)



If a CAN BUS cable is not connected to an LXNAV S8(0)D, the CAN connector must be terminated with a CAN TERMINATOR!

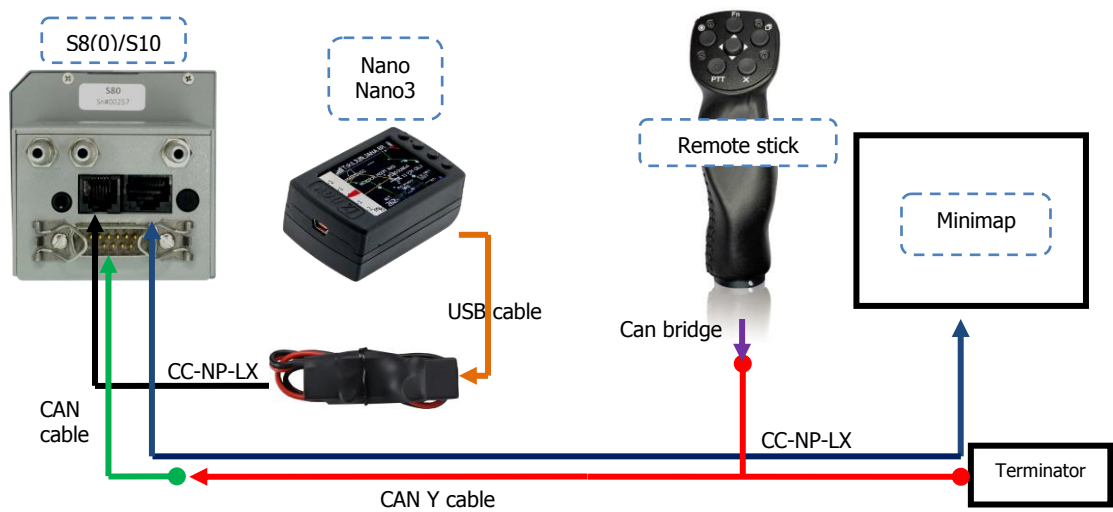
8.6.3 LXNAV S10(0) Wiring



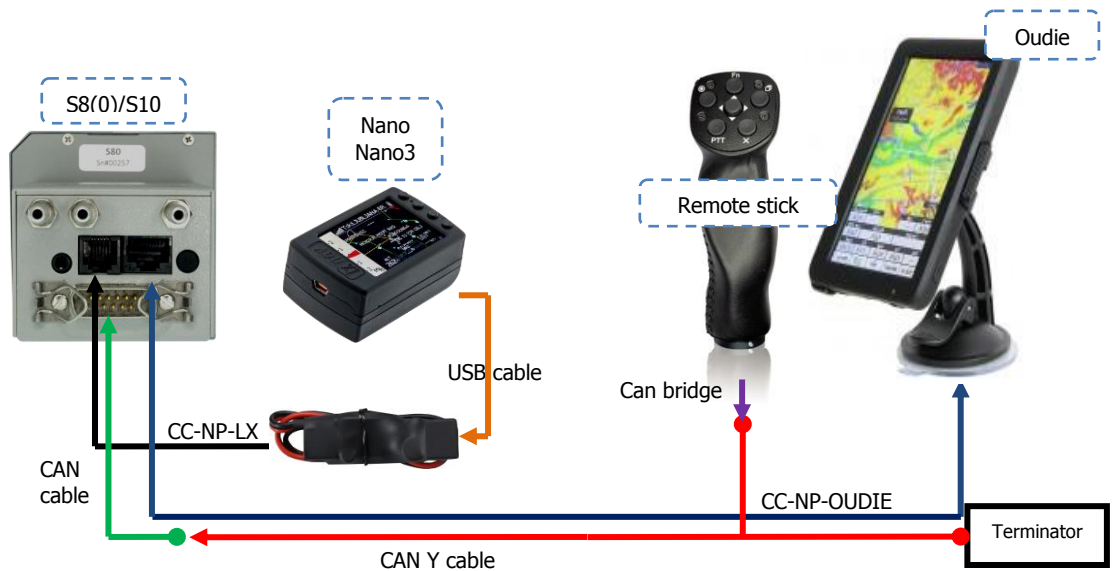
8.7 S8(0)/S10(0) Configurations

TO-DO

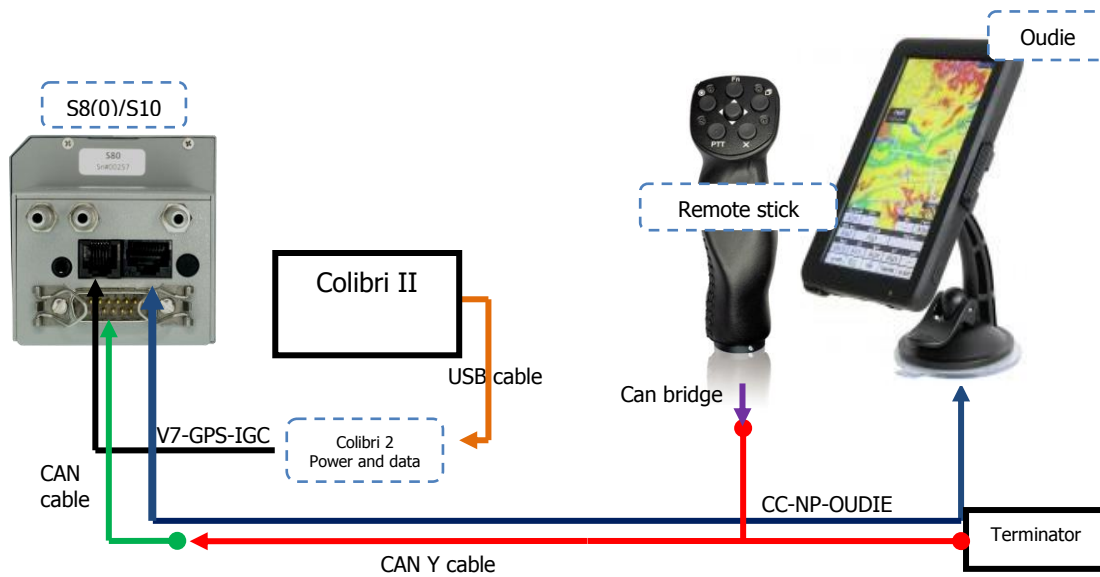
8.7.1 S8(0)/S10(0) – Nano/Nano3 – Remote Stick – Minimap



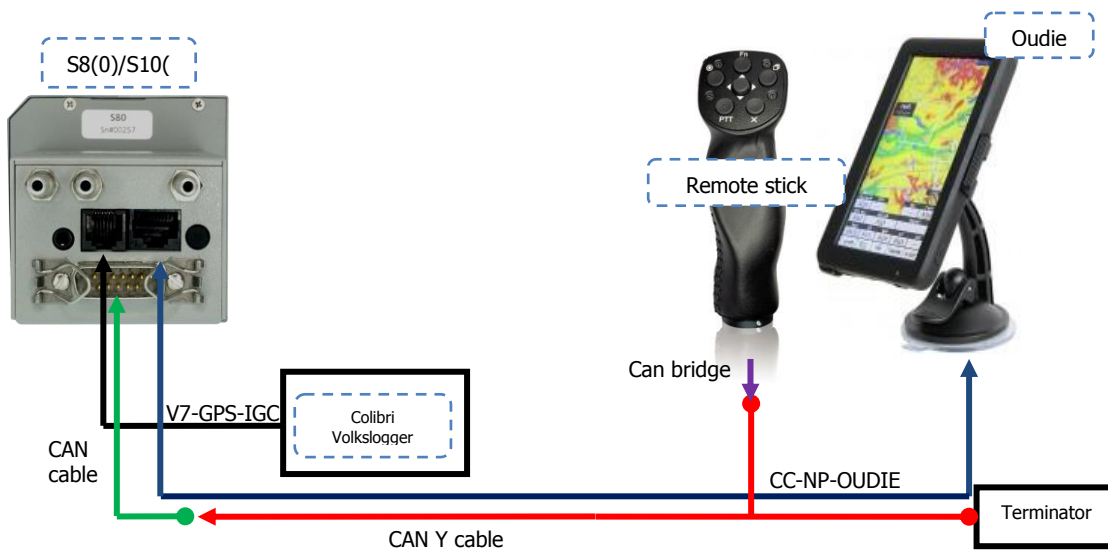
8.7.2 S8(0)/S10(0) – Nano3 – Remote Stick – Oudie



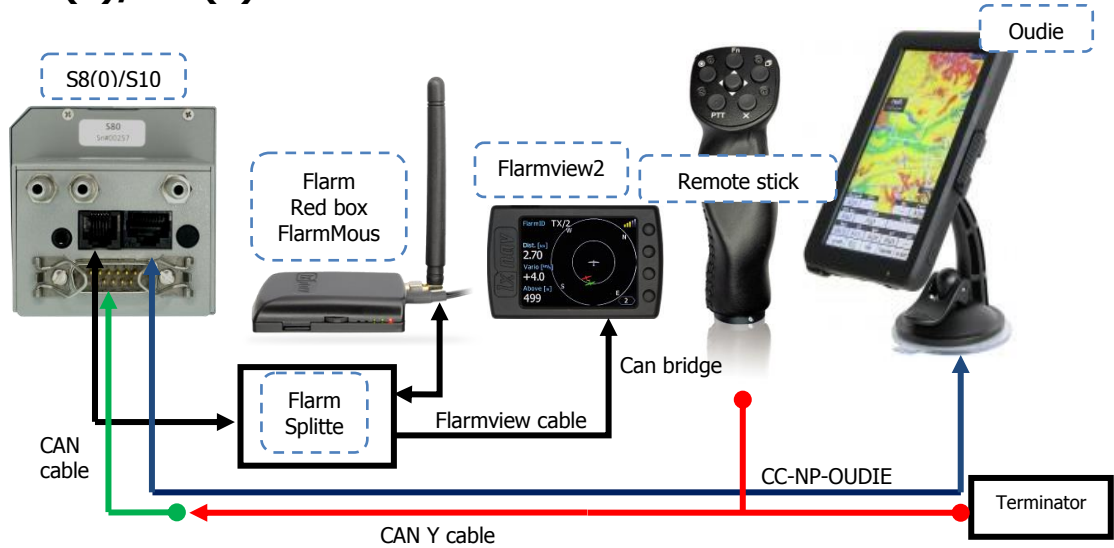
8.7.3 S8(0)/S10(0) – Colibri II – Remote Stick – Oudie



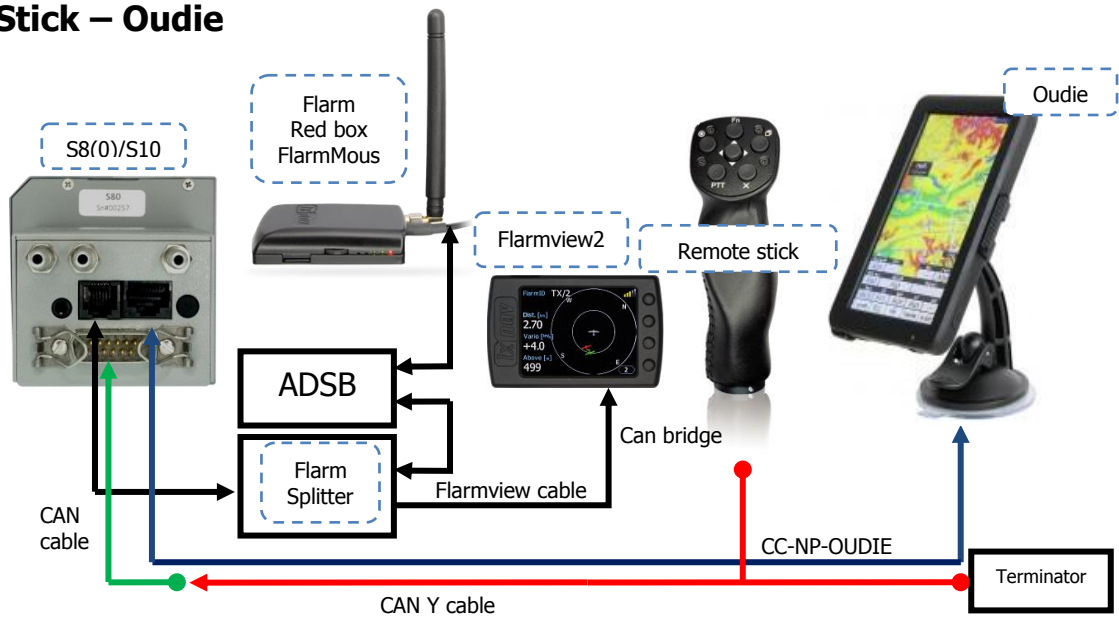
8.7.4 S8(0)/S10(0) – Colibri/Volkslogger – Remote Stick – Oudie



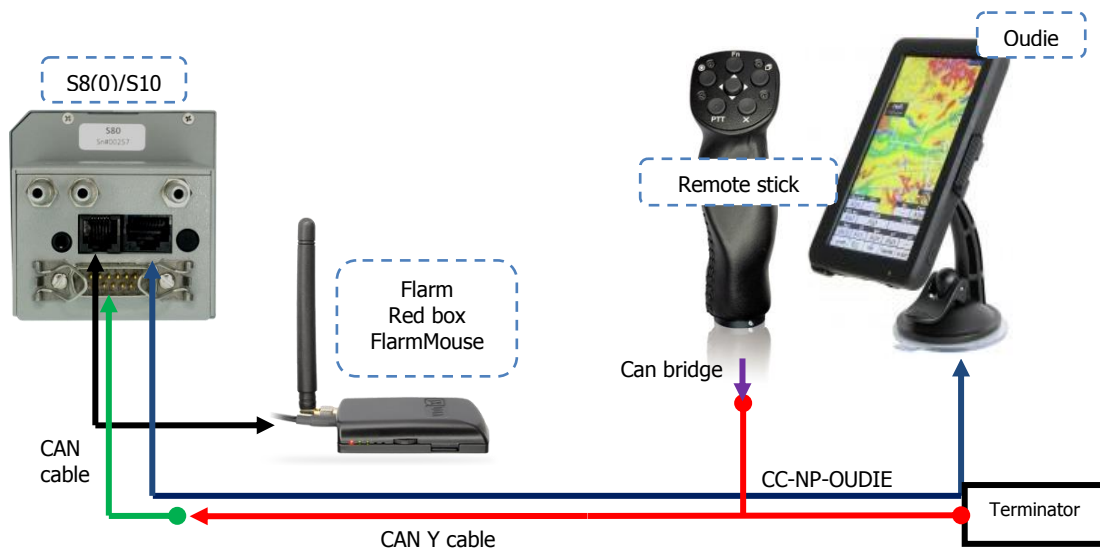
8.7.5 S8(0)/S10(0) – Flarm – FlarmView2 – Remote Stick – Oudie



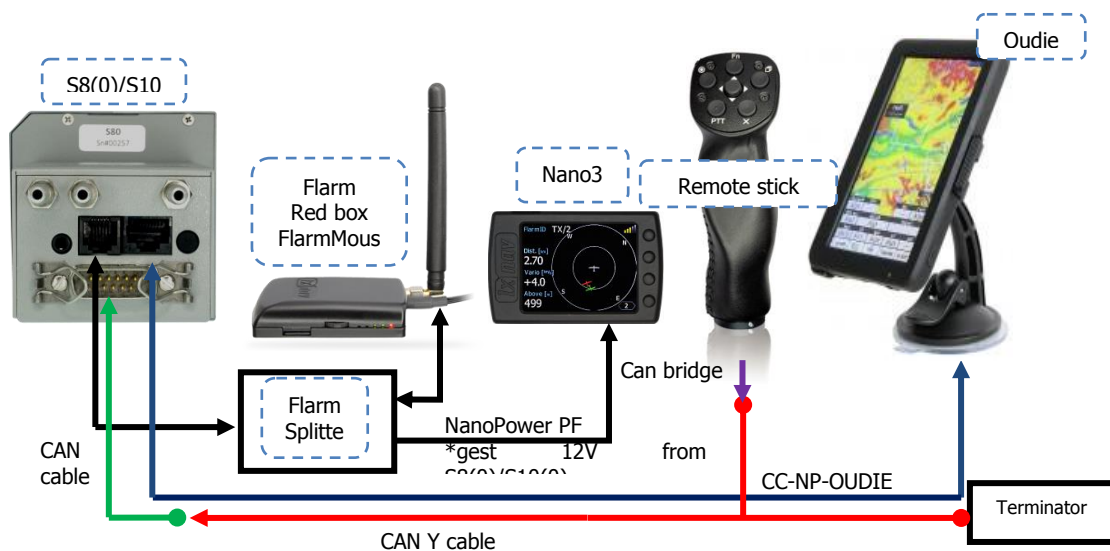
8.7.6 S8(0)/S10(0) – FlarmMouse – ADSB – FlarmView – Remote Stick – Oudie



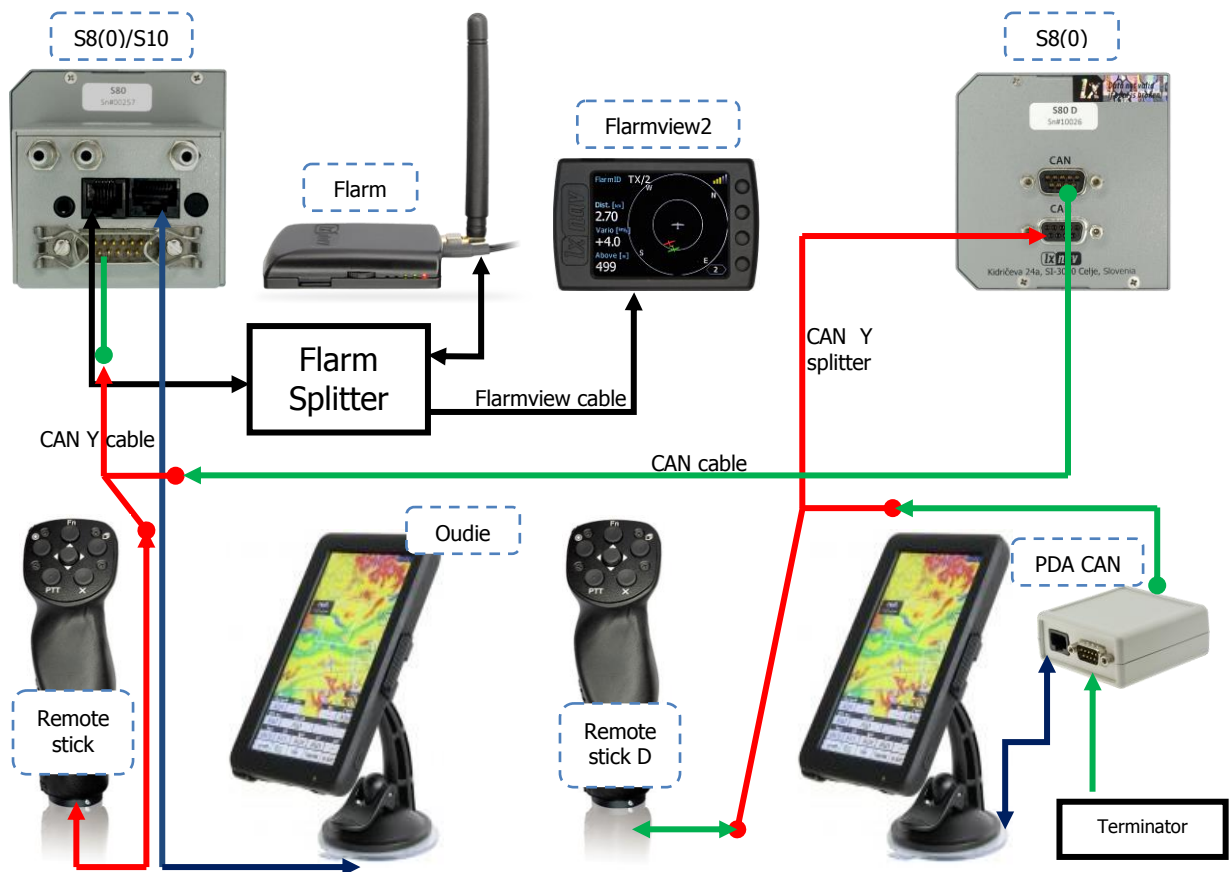
8.7.7 S8(0)/S10(0) – FlarmMouse – Remote stick– Oudie



8.7.8 S8(0)/S10(0) – FlarmMouse – Nano3(as a Flarm indicator) – Remote stick – Oudie



8.7.9 S8(0)/S10(0) – S8(0)d – Oudie(1st) – Oudie(2nd) – Flarm – Flarmview2 – Remote stick (1st and 2nd)



8.8 Data transfer

TO BE DONE

9 Firmware Update

Firmware updates for the main display indicator and vario unit can be easily carried out using the micro SD Card. Please visit our webpage www.lxnav.com and download the firmware update.

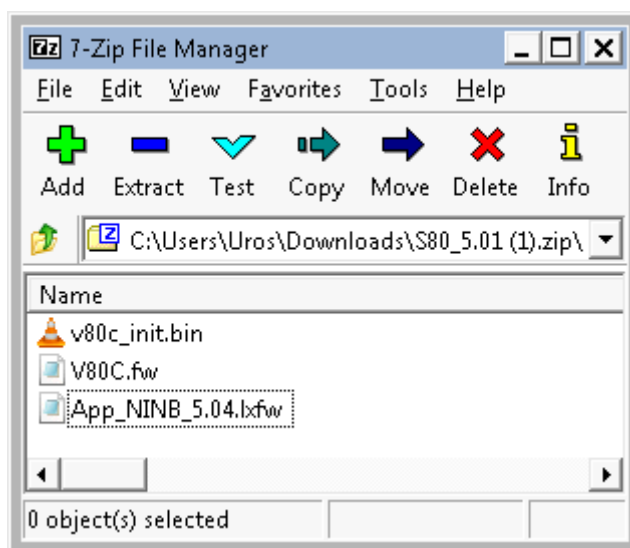
You can also subscribe to a newsletter to receive news about the system automatically.

9.1 Updating LXNAV S8(0)/S10(0) firmware using micro SD card

Firmware consists of two parts vario and display.

Firmware can be downloaded from download-firmware section on www.lxnav.com. It is compressed ZIP file, which must be firstly uncompressed. Inside are three files:

- App_NINB_X.YY.lxfw (this is firmware for vario part)
- V80C.fw (first part of firmware for display part)
- V80c_init.bin (second part of firmware for display part)



If some of these files are missing or it is corrupted, the firmware update will not be successful. Transfer the Firmware update files to the micro SD card and insert it into the S8(0)Xx. Reboot S8(0)Xx and update of display part will be updated automatically.

Go to Setup screen and select the password option.

Enter the password 89891, this will bring you to the firmware update menu.

Choose the right firmware for vario part and press update.



10 Revision History

October 2014	Initial release ver 4.9
November 2014	Updated chapters Error! Reference source not found. ,8.5.2,8.5.3
December 2014	Updated chapters 5.3.2, 5.5.1.2, 7.2.1
January 2015	Updated chapter 5.7.11.3
January 2015	Typos, release 4.97a
January 2015	New cables for PDA and GPS port ch.8.4
March 2015	New sections for thermal assistant and logbook
May 2015	Typos, release 501e
June 2015	Release 501f, updated ch.8.5.3, updated ch.5.7.12.1
June 2015	New chapter Quick access menus 5.1
March 2016	Complete review of the manual, added S10(0)