

LX7007 Basic

V1.22

Variometer and GPS-Navigation System
With SD card and Flarm interface



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1 General

The instrument consists of two units, the **LX 7007 DU** display unit, and the **LX 7007 AU** LCD Vario indicator unit. The 80 mm unit doesn't include GPS receiver and needs therefore an **external GPS source**. Ideal solution is **Colibri** which is plug and play compatible and all necessary cables to connect LX 7007 Basic and Colibri are delivery included. The unit accepts also **Flarm NMEA** and collision relevant data and this makes possible to visualize the traffic situation on LX 7007 display. The high resolution display with 160x240 pixels offers high comfort for the pilot. The 57 mm diameter (2 1/4") LX 7007 AU is a modern designed vario unit with its own integral micro processor. LX 8000 VU model is also 100% compatible. The unit communicates with the LX 7007 DU via the RS 485 system bus. Optionally, additional LX digital Vario indicators and a wide range of interface devices can be daisy chained using the RS 485 bus.

Note!

The unit hasn't built in GPS receiver and therefore must be fed with GPS signal (NMEA 4800 bps) from external source. See also chapter 5.



Vario functions include:

- Vario with audio, Netto, Relative (Super Netto) and Average
- Smart vario
- Speed command
- Final glide calculator
- TE compensation is selectable for either pneumatic TE tube, or electronic TE

Navigation functions include:

- Airport and airspace database for Europe or USA (up to 5000 airports and 6 airspace sections, nearly the whole Europe)
- 600 turnpoints
- 100 tasks, full AAT capable
- Statistics
- Display of nearest airports and outlanding fields
- Support of AAT (assigned area task)
- Multi pilot function (storing of 30 pilots names with their individual settings)

Interfaces:

- **PDA interface** powers and send data toward PDA. Supported programs: SeeYou Mobile, Winpilot Version 7 or higher
- **SD Card interface** makes possible to exchange data LX 7007- SD card.
- **IGC interface** is used to feed the unit with GPS data. Connection of Colibri or LX 20 is plug and play.

Options:

- **Remote control**, for both seats
- **Double seater** configuration
- **Compass**
- Secondary **LCD vario** indicators
- **Voice Module**, to express information and warnings by voice

1.1 Technical data

- Power input 10-16 V DC
- Consumption: 210 mA @ 12V (without audio and options)
- 80mm (3") standard Aircraft cut-out for LX 7007 DU
- 57mm (2 1/4") standard Aircraft cut-out for LX 7007 AU Lgth 120 mm (incl. connector)
- Three physically separated com. ports:
 - PDA port with 5V power supply. It delivers NMEA and task data for PDA and connects LX 7007 with PDA during data transfer
 - PC port (for PC communication)
 - IGC com port with IGC standard pin out connector, suitable connects Colibri, LX 20 or Flarm
- Memory space to store the whole European airspace (up to 6 sections)
- SD card interface
- External speaker
- System bus enables connection of a wide range of options
- Built in fuse to prevent damages in case of a short on 485 bus
- Data compatible with LX 20 and Colibri
- Weight: apr. 800g

1.1.1 Options

Using of bus system a wide range of optional interfaces can be easily connected to the basic configuration, without any significant installation works. The LX 7007 system bus can be simple extended after using of **485 splitting units**, which allow plug and play connection of optional devices. Following units can be connected to LX 7007 system bus:

- Second seat device
- Remote control, for both seats
- Secondary vario LCD vario indicators (unlimited number)
- Electrical compass device
- Voice module

1.1.1.1 Double seater configuration

The unit installed in the rear seat of the glider, is powered and receives all necessary data from the main unit. The communication between both units is exclusively **via 485 system bus**. An automatic **TP and TSK update** will follow after each power on. The airspace update is done on pilot demand. See LX 7007 D manual for details.

1.1.1.2 Remote control

An extremely ergonomic lather coated handle which includes **8 push buttons** to operate LX 7007 and also two additionally buttons with open wires. This two buttons can be used for instance as PTT for radio and SC/Vario changeover command. Using a double seater configuration, two remote units can be installed, to control front and rear seat separately.

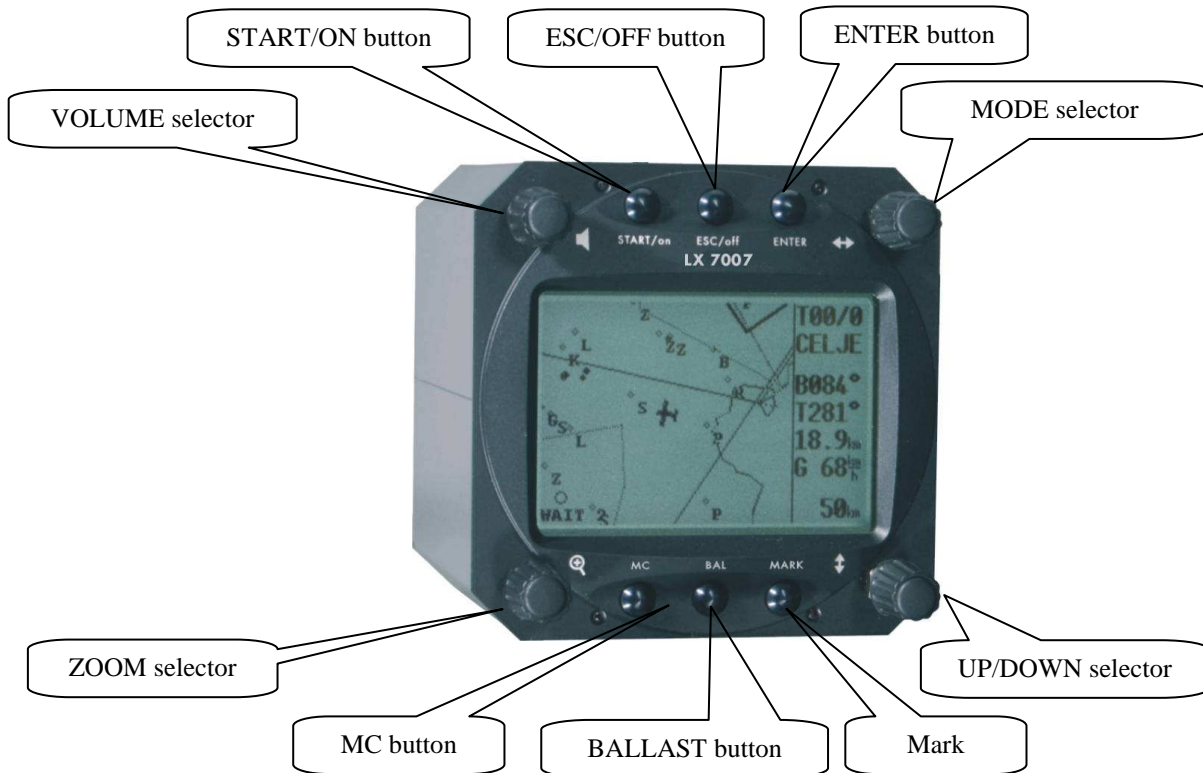
2 System description

2.1 Rotary switches and keys (buttons)

The following controls are mounted on the front face of the LX7007 DU:

- Four rotary selector switches
- Six push buttons

The LX7007AU is an indicator only and has no controls, the displayed information being controlled from the LX7000DU.



2.1.1 ON/START button - Switching the Instrument ON and OFF

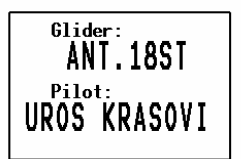
The **ON/START** button is multifunctional. If the instrument is not already powered up, a short press on the **ON/START** button will switch the instrument **ON**.

Note!

After the unit has received power a very typical message will appear for approximately one second, **it isn't a failure report**. How to get the instrument ready for flying see chapter 3.1.

RESTORING DATA

To switch the instrument **OFF**, press the **ESC/OFF** button for a few seconds and the instrument will switch off. If an attempt is made to switch the instrument off during flight, the instrument requires confirmation from the pilot, **so the LX 7007 BASIC can not be switched off by mistake**. On powering the unit, the first screen shows the firmware version, database version, and coded serial number. A second screen shows details of the glider and pilot.



The unit is equipped with a facility of storing up to 30 pilot names. If no names are stored, the unit shows the pilot name as UNKNOWN. By rotating the **UP/DOWN** selector, the display scrolls through the programmed pilots. Once the correct pilot is selected, pressing the **ENTER** button selects the airfield elevation screen and the current elevation should be

entered, again using the **UP/DOWN** selector and the **ENTER** button. Similarly, the current QNH should also be entered. The airfield **elevation** input is **mandatory** while the **QNH** input **optional** (chapter 3.1.2)

During flight the same button is used to **start the task, to see more characters of airport names and, in the edit menu, to go back one step** if an error has been made.

Note!

During flight, if main power is lost for a few seconds, **the unit will not produce two flights**. The most important flight parameter, altitude will remain, which means that the final glide is not affected.

2.1.2 MODE selector (rotary switch) ⇔

The mode selector is used to change modes of operation. This switch has the **highest priority** in the system. Whenever it is operated, **a mode change will occur**.

2.1.3 UP/DOWN selector (rotary switch) ⇕

This rotary switch has a lower priority than the mode selector switch and is active all the time in the selected mode. It is mainly used for selecting sub menus during navigation and to scroll in the edit menu.

2.1.4 ENTER button

The main function of this key is **confirmation**, and **to start edit procedures**.

2.1.5 ESC/OFF button

This is a multifunctional key, which has two main functions. If it is pressed and held for a few seconds, then the instrument will turn OFF.

If a press is made, then the button has the following functions:

- The display will jump to the menu of **the next higher level** (in edit only)
- During alpha-numeric input with the cursor active (blinking), **ESC confirms the whole line** (It is not necessary to press ENTER few times)
- Some special functions can be activated using ESC as described in subsequent paragraphs.

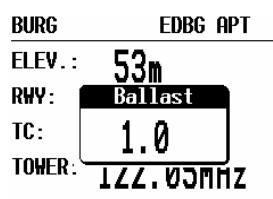
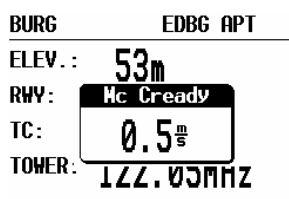
2.1.6 MARK/ Flarm button

Each **long press** on this button will store actual position as one additionally turn point, having attribute MARKER. See chapter 2.4.4.7.

A **short press** will activate Flarm graphic screen which shows traffic situation.

2.1.7 MC and BAL buttons

Pressing these buttons activates the Mc Cready (MC) and ballast setting as shown below. The value is then changed with the UP/DOWN-selector. There is no secondary function of these buttons.



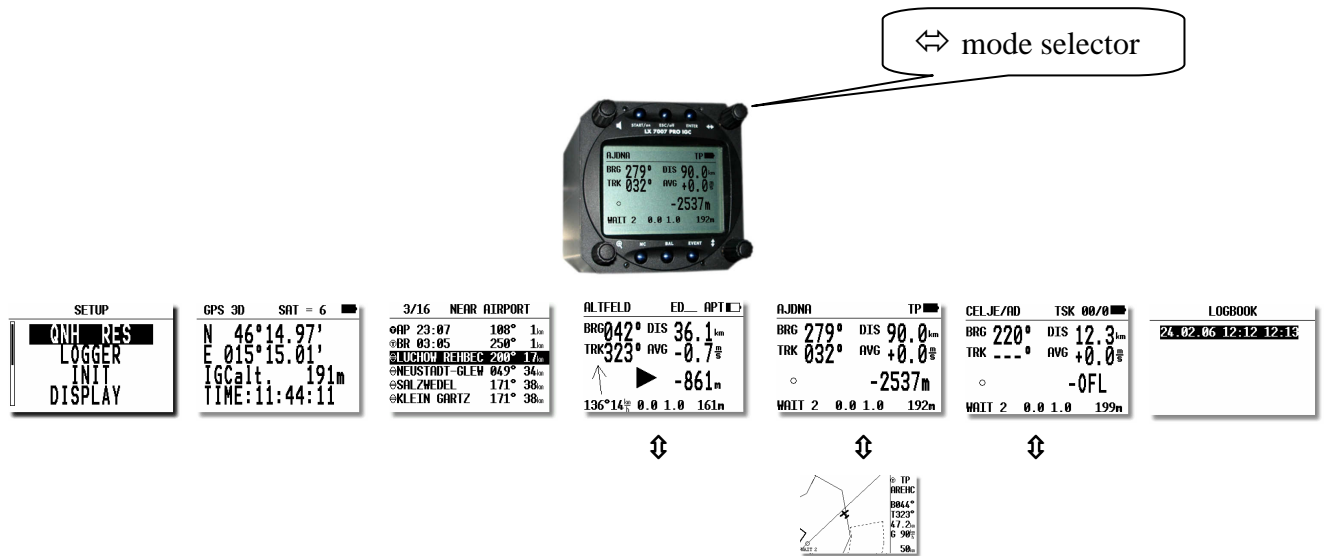
2.1.8 ZOOM (Rotary switch)

This is a **multifunctional** rotary switch. While its main function is to change the **zoom level in the graphic mode**, it can also be used as follows:

- To **select turnpoints** when in the main TP page
- To **select APT** when in the main page
- To **select task** when in the main TSK page
- If an error is made during editing, it is possible **to move the cursor** back by rotating this knob. This can only be done if 'editing' is active which is shown by the cursor blinking

2.2 Operating modes

The LX 7007 BASIC has 7 modes or main menus. All of them are selectable **directly by rotating the MODE switch**. The diagram shows the menu (mode) structure of LX 7007 BASIC.



Navigation menus (APT, TP and TSK) have sub menus, which can be selected using the **Up/Down** rotary switch.

- GPS** **GPS status**, no inputs possible
- NEAR** **Near airport**, select one airport or land able turnpoint of interest, no further inputs are possible
- APT** **Navigation and selection of airports**
- TP** **Navigation, selection and editing of turnpoints**
- TSK** **Navigation, selection and editing of tasks**
- STAT** **Flight statistics and logbook**

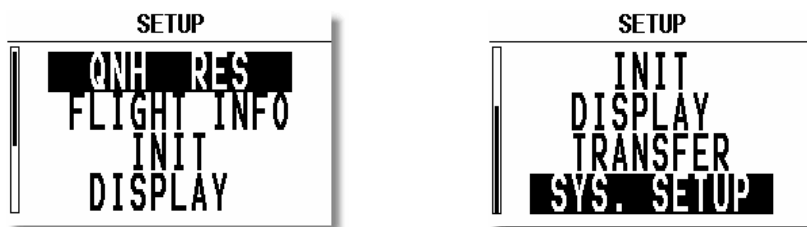
SETUP has two levels. The first level enables direct input of basic parameters. After enter into SYSTEM SETUP global settings can be adjusted.

2.3 SETUP

The SETUP is divided into two parts, **First level** (non system data) and the **Second level** (system data). The inputs done in the first level are connected with daily work around and the settings included in the second level may change system characteristics significant.

2.3.1 SETUP (First level)

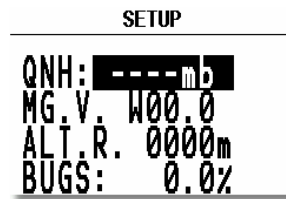
All options are selected with the **UP/DOWN** switch and can be entered at any time; they contain **no system settings**.



Note!
TRANSFER offers no inputs, but enables data transfer LX 7007 to SD Card, PDA, Colibri or PC.

Once the desired option has been selected, press **ENTER** to access the sub-menu.

2.3.1.1 QNH RES (QNH and Safety Altitude input)



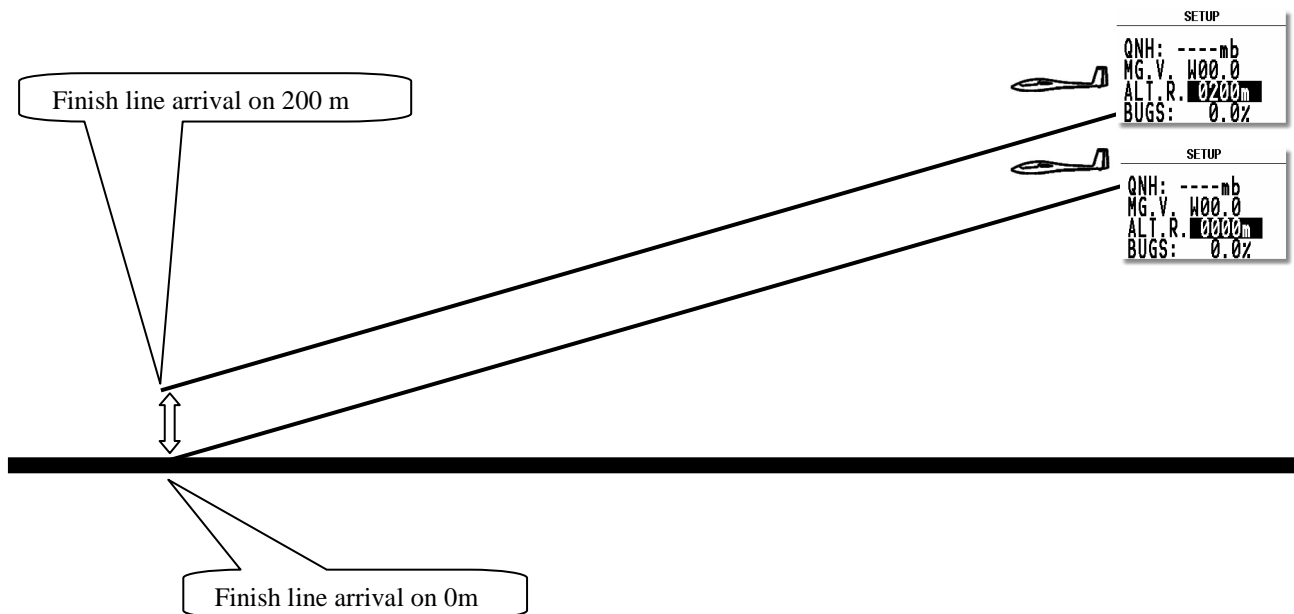
Input Procedure:

- Use the **UP/DOWN** selector to choose the item it is required to change (QNH, MG.VAR, ALT.R. or BUGS)
- Press **ENTER**
- Use **UP/DOWN** to select the value required and press **ENTER** to input it
- Once all changes are complete, press **ESC** top return to **SETUP** menu

QNH: Using this feature it is possible to **offset the altitude datum**, which could have changed due to pressure changes during the flight. During the initial power up sequence, an option to enter the actual QNH was presented. If the actual QNH was entered at that stage, then this feature is active. If the QNH feature was 'stepped over' during power up, then this function is not active. As changing the QNH influences the **indicated altitude**, care should be taken when changing the value as an incorrect setting can upset the final glide calculation.

MG. V. If the GPS receiver sends **magnetic variation** then **AUTO** will be displayed and no input is possible. If **AUTO** is not displayed, then the GPS receiver is not supplying magnetic variation and it is obligatory to input the magnetic variation for the area being flown over. If this is not done, then all calculated winds and tracks flown will be true and not magnetic. See also System setup/Units).

ALT.R. This setting is the **altitude reserve or safety altitude by final glide**, and is the height that the instrument adds to the final glide altitude required, so that the glider arrives over the final glide destination at the selected safety altitude. After safety altitude input, the pilot has to keep **final glide indicator on 0** to arrive on safety altitude.



Note!
The **safety altitude** setting will remain even after power off, only a new input can change this input.

BUGS: This sets the **polar degradation** because of “buggy” wings. The input is in percentage degradation of glide ratio. (5%, means glide ratio degradation is 5%)

2.3.1.2 FLIGHT INFO (Input of pilot data)

All important data, such as the pilot's name, glider type, glider registration, competition number and competition class can be entered. The data is entered with the **ENTER**, **UP/DOWN** and **ESC** routine. Alternatively, this data can be entered with a PC or via a Colibri or LX20 (see Chapter 4). All units having got SD Card Interface are able also to exchange flight info data (read and write) with SD card. Using of ConnectLX or ConnectMe PDA running programs will do the same job.

```

FLIGHT INFO
First name
ED
Last name
HOLLESTELLE
Reg D-KEDY CN A1
Class STD

```

Note!

The instrument is capable of storing up to **30 different pilot's** names. Each pilot's name, which can be also password protected, can have different (personal) settings. This is useful if one likes to fly with a custom polar, fly the glider in different configurations, or fly in decentralized competitions, Online-Contest, Barron-Hilton-Cup, etc. For more information on configuring pilot names see chapter 2.3.2.8, and for setting custom polars 2.3.2.12.

Before leaving the FLIGHT INFO menu, the actual name can be saved into pilot list, if not already present.

```

FLIGHT INFO
Question:
? ADD PILOT
TO LIST? N
Class STD

```

Note!

If only **one pilot** flies the glider, then after entering his name, it is not necessary to enter it into the list. In the above screen 'N' should be selected to do this. The name will then appear automatically on instrument power up together with all the parameters that have been set. An exception to this is if he flies the glider in two different configurations; then he should list his name twice, e.g. once with a suffix of 15m and again with a suffix of 18m with **different polars** in each name.

2.3.1.3 INIT (Input of variometer parameters)

The following can be set using this option.

```

INITIALIZE
VAR.FIL: 2.0 S.V. OFF
VARIO INT.: 20s
VARIO RNG.: 5%
TAB: 1.0% ETA: GS
AUTO SC: OFF
WIND/COMPASS: N.C.

```

- VARIO FIL: This sets the time constant of the vario from 0.5sec up to 5 sec; the default setting is 2.0 sec
- S.V. S.V. means Smart Vario, giving four levels of dynamic damping of the vario indication and off. See chapter 2.5 for details
- VARIO INT: This setting defines integration period for the average in seconds; the default is 20 seconds
- VARIO RNG: This sets the full scale range of the vario
- TAB: This setting defines the width of the audio dead band in speed to fly mode
- ETA: This setting defines the parameter which will be taken in consideration by ETA (Estimate Time of Arrival) and ETE (Estimate Time Elapsed) calculation., **GS (ground speed), VAR or MC**, may be selected. When flying a programmed task, the calculation takes account of the unflown portion of the task, around any TPs not yet reached. Default and also suggested is VAR. This means daily vario average will be relevant parameter for ETA and ETE calculation.

Note!

Suggested setting for competition pilots is VAR or MC.

GS, bases ETA on the achieved groundspeed along track. It takes into account differences between bearing and track of up to 90°. If the difference is greater than this, --:-- is displayed.

VAR is based on the achieved average thermal climb rate and assumes that this is going to continue.

MC is based on the actual Mcready setting.

Note!

All three methods of calculating ETA and ETE take into account glider altitude, wind and safety (arrival) altitude, thus ensuring that the calculation made is the best available

- **AUTO SC:** This option defines the conditions by which the instrument is **switched automatically** between vario and speed command
OFF: Switching is possible exclusively by an external switch, connected to the LX 7007 AU unit
GPS: When the **GPS detects** that the glider is circling an automatic change over to vario will happen, after approximately 10 seconds. Detection of a straight flight will cause a change over to speed command.

TAS: When the **TAS exceeds** a pre-set value. The TAS 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)

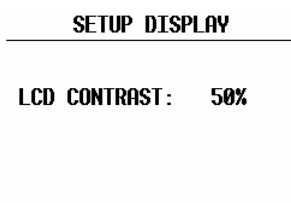
Note!

The external switch wired to LX 7007 AU has absolute priority and will override all other switching methods.

- **WIND/COMPASS:** N.C. means compass option not connected. When the optional compass module is installed, the instrument uses magnetic track to make an additional wind calculation. The calculation requires the glider to **fly straight a specified period**, which is set in this option. The default is 15 seconds, but the longer the period, the more accurate is the calculated wind.

2.3.1.4 DISPLAY

This option sets the contrast of the LC display. The actual contrast can vary with viewing angle, ambient light level and temperature. The contrast is changed by rotating the **UP/DOWN** selector.



Default contrast setting is 50%, setting will remain after power off.

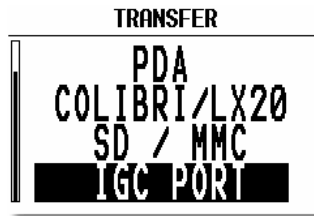
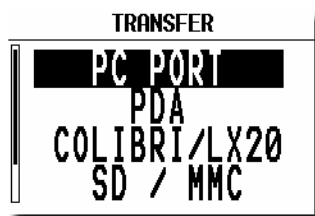
Note!

Operation under extreme temperatures may need some contrast adjustments done by pilot.

2.3.1.5 TRANSFER

This option initiates the transfer of data between the instrument and a connected PC, PDA, LX 20 / Colibri, or SD Card. Data transfer procedure is started by pressing **ENTER** with **TRANSFER** selected.

A dialog will open and the pilot has to select an option of his interest. About details see chapter 4.



Note!
After ENTER on **PC PORT** the communication LX 7007 – PC via **5P connector** usually mounted on the instrument panel will be possible.

After **PDA activation** data exchange LX 7007 – PDA will be possible, suggested program is ConnectLX/ConnectMe, available on www.lxnavigation.si or www.naviter.si.

Note!
PDA port also delivers extended NMEA data sentences **exclusively at 19200 bps** to drive SeeYou Mobile, LX Mobile, Navigator, or Winpilot and powers PDA at the same time.

After Enter on **Colibri/LX 20**, the data exchange with eventually Connected Colibri or LX 20 device will be possible (read/write TP&TSK, read/write flight info, read/write zones). Connector marked as IGC should be used; all necessary cables are delivery included.

Note!
As mentioned before, all three communications ports are physically separated and therefore no data collision problem could occur, even all external devices connected and on.

SD/MMC selection will arrange data exchange LX 7007 – SD memory card.

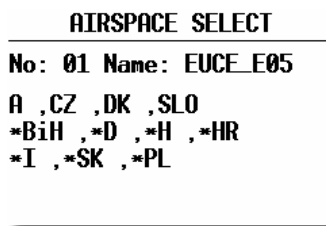
IGC port will offer a PC communication via any IGC compatible cable. A suitable solution is LX AC power supply (Ord. Nr.: COL-AC-PC), which will power LX 7007 at the same time.

2.3.2 SYSTEM SETUP (Second level)

After entering the System Setup, a further 29 system settings are available.

2.3.2.1 AS SELECT (Selection of airspace section)

The unit is able to store up to 6 sections (0 up to 5) of airspace, which means practically the whole European airspace. The unit is delivered fully loaded. Selection of suitable area should be done by pilot using of this menu. Countries included in the section are readable on the display, * means a partly covered country.



Note!
To reload a new airspace section (.CUB format) is done simple by overwriting of an actual active airspace using of LXe PC program, **or SD card**. See chapter 4.1.1.

Note!
To prepare custom airspace, in .CUB format, use our special tool for airspace creation and edit, called **LxAsbrowser**, available for free on www.lxnavigation.si or on LXe CD.

Note!
Activation of any airspace section stored in the LX 7007 memory is possible any time, also during flight.

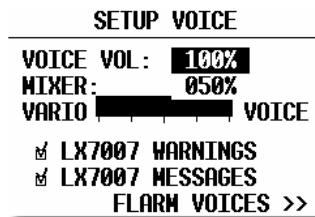
If double seater configuration is used, after each change of airspace section on master an update for second seat will be offered.



Escape will cancel update of second seat unit.

2.3.2.2 VOICE MODULE

LX Voice Module is a LX system bus participant and receives data and power via bus (see also LX Voice Module manual).



VOICE VOL: sets volume (loudness) of expressed voice information (LX 7007 and Flarm)

MIXER : defines percentage of vario volume reduction during Voice Module active time

LX 7007 Warnings: if checked all warnings generated by LX 7007 will be expressed by Voice module (for instance check gear, airspace...)

LX 7007 Messages: if checked all information generated by LX 7007 will be expressed by voice (for instance set elevation.....).

VOICE	W/I	DESCRIPTION
APPROACHING TO FINAL GLIDE	I	Remembers approximately 150 m before reaching final glide, active in TSK only
FINAL GLIDE ESTABLISHED	I	Remembers reaching final glide, active in TSK only
APPROACHING TO AIRSPACE;	W	Warns about AS proximity
WARNING ALTITUDE	W	Warns before reaching of daily altitude limit
TASK DECLARED	I	Informs after successfully task declaration procedure
NO RESPONSE FROM ANALOG UNIT	W	Message that vario unit isn't connected
LOW BATTERY	W	Low battery voltage presence
EVENT MARKED	I	After event marker activation
CHECK LANDING GEAR	W	After (glider altitude) – (nearest airfield elevation) = 200m or less
NEAR ZONE	I	Informs about near to obs. zone of TSK (Logger/Logtime/near TP)
NEAR	I	Informs about near to TP or APT (corresponds on setting Syst.Setup/TP)
INSIDE ZONE	I	Informs about inside zone position (TSK)
OUTSIDE ZONE	I	Informs about outside zone position (TSK)
NEXT TURNPOINT	I	Expressed after change over to next TP (TSK)
TASK STARTED	I	Informs that task has been started (TSK)
SET ELEVATION	I	Requests set of airfield elevation
SET QNH	I	Informs about possibility to set actual QNH
SELECT PILOT	I	Informs about possibility to select a pilot
TWO MINUTES	I	Informs that the glider position is two minutes in front of finish (TSK)
STALL	W	After IAS will go lower than set (Syst. Setup/Input)
CHECK GEAR	I	Remembers 15 minutes after take off

Table of LX 7007 generated voices

2.3.2.3 TP (Turnpoint)

All settings concerning turnpoints can be done in this menu. The LX 7007 BASIC is able to store **maximal 600 turnpoints** in a proprietary LX format (*.DA4).

```

SETUP TP
TP-QUICK POINT NAME
DATE: OFF AP
TP-QUICK POINT AUTO
SELECT: OFF
NEAR RADIUS: 0.5km
TP-SORT: ALPHABET

```

TP-QUICK POINT NAME

The pilot is able to store his **actual position** during the flight by pressing the **MARK** button (long press) in any mode. These turnpoints are called **QUICK TP** and are given the default name **AP** (actual point) and time.

Settings:

DATE: OFF stores the position as **AP: hh:mm**. The numbers are the time that the TP was stored.

DATE: ON stores the position with the date and time (**dd,mm,hh,mm**), for instance **2812130** for **28 Dec. 13:30**.

TP-QUICK POINT – AUTO

When **SELECT: OFF** is active, the actual position **will not** be selected automatically and immediately ready for navigation

When **SELECT: ON** is selected, the actual position point will be selected automatically and ready for navigation in TP menu.

NEAR RADIUS

LX 7007 BASIC has a very useful feature named **“Simple task”** (flying around turnpoints or airports) which is active when a regular task is not started (see chapter 3. When the instrument detects that it is within the **Near Radius** of a turnpoint or airport, then that turnpoint can be treated like a confirmed TP of a simple task. Naturally the turnpoint or airport should be selected and ready for navigation during Near Radius retain time. This gives the ability to provide in-flight statistics for subsequent evaluation without setting a full task. For more information on this feature see Chapter 3.2.6., flying with the LX 7007 BASIC.

TP-SORT

The LX 7007 BASIC is able to sort the turnpoints **either alphabetically** or **by actual distance** from the actual position. If sorted under distance **the nearest TP** will be the first to be displayed when selecting the turnpoints.

2.3.2.4 OBS. ZONE (Observation Zone)

This menu defines turnpoint **sector geometry** and relates only points **of tasks**.

```

SETUP OBS.ZONE
START ZONE
POINT ZONE
FINISH ZONE
TEMPLATES

```

The following items can be chosen:

- The **START ZONE**
- The turnpoint **ZONE**
- The finish line (**FINISH ZONE**)
- **TEMPLATES**
- **RESTORE ALL**

Every **zone (START, POINT, FINISH)** is defined with **two angels, two radius** and **orientation**. Using of this makes possible to create any known zone geometry, separately for start, turnpoint and finish. **All tasks** stored in LX 7007 will match this **“global”** settings, an exception are so called AAT tasks.

The **TEMPLATE** activation will set all zones (sectors) to 500 m cylinder or FAI foto sector. Means the **“global”** zones of all already programmed tasks will be adequate modified.

LX 7007 also supports so called Assigned Area Task (**AAT**). Additionally, **up to 5 (five)** tasks can have individual sector geometries defined, **even for a single turnpoint of one task**. This is done using the **“local”** settings in the corresponding task in the task menu. These local settings are done in the same way as described below but their incorporation in a specific task is covered in chapter 3.1.5.1.

Note!

The **“global”** sectors (zones) will always match settings defined in SETUP/ OBS ZONES, the **“local”** sectors will correspond to the individually set requirements. Those settings can be input exclusively during **TSK EDIT** procedure.

Note!

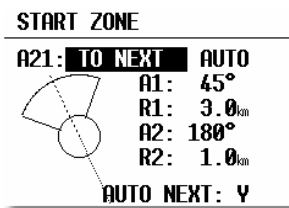
After programming **'local'** sector geometries in specific tasks, those sectors will remain after application of **TEMPLATE** or changes of Start, Point or Finish in **OBS.ZONES** will happen.

RESTORE ALL will set **all sectors** doesn't matter **“local”** or **“global”** corresponding to the momentary active settings of **START, POINT** and **FINISH**.

As will become apparent, the definition of sectors, particularly the start zone is subject to continual change. However, the basic principle of defining the sectors is done as follows:

2.3.2.4.1 START ZONE

To define the start zone geometry, select **START ZONE** and press **ENTER**:



Example of most sophisticated zone where both angles and radius are used

- A21: Orientation options: **TO NEXT, RAD.1. TP,** and **USER VALUE**). If **TO NEXT** or **RAD.1.TP** are selected, then **AUTO** is also displayed not permitting any rotation. If **USER VALUE** is selected, the sector can be rotated.
- A1: First angle
- R1: Radius of the sector having angle A1, e.g. 3km for the FAI photo sector.
- A2: Like A1, used for creating combined sectors.
- R2: Like R1, also used for combined sectors
- AUTO NEXT (Y, N) defines the change over to next point procedure, on reaching the sector.

Note!

Start point AUTO NEXT setting is default N.

At first, this sounds complex, but the following examples will help to clarify the meaning of these settings.

Example 1:

The default setting shown above defines the FAI 90° photo sector combined with a 1km radius cylinder. To modify these settings to set the FAI 90° photo sector as the start zone, modify as follows:

A21 is set to **TO NEXT POINT** and **AUTO** as the start zone wants to be orientated symmetrically about the track to the first turnpoint.

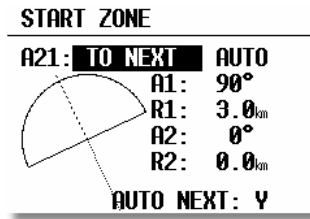
A1 is 45°, because the bisector of the FAI 90° sector is needed.

R1 is 3km, the radius of the sector.

A2 and **R2** are both 0 as a combined sector is not needed.

Example 2:

Program a 180°, 6km Start Zone:

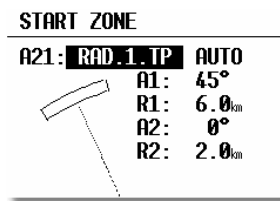


A21: **TO NEXT POINT** and **AUTO**

A1: 90° bisector
 R1: 3km radius
 A2: 0
 R2: 0

Other possible options for the setting of **A21** are:

- **RAD.1.TP:** This type of start sector was used in the 1999 World Gliding Championships in Bayreuth. A radius is drawn from the first turnpoint, through the start point and a second, greater radius is drawn, thus creating a radial segment of defined length orientated symmetrically about the start point. The advantage of this system is that a pilot starting at the extremity of the sector has to fly the same distance to the first turnpoint as a pilot starting directly over the start point. This refinement compares with the classical start line where the distance to the first turnpoint is increased the further one starts from the centre of the line.



A21: **RAD.1.TP** and **AUTO** are selected

A1: This setting is ignored; only R1, which defines the length of the segment, is relevant

R1: Set to 6km, the half-length of the segment, giving a total segment length of 12km

A2: Again, this setting is ignored

R2: This sets the length of the two truncated radials that define the edges of the start sector. The setting is 2km in this example

- **FIXED VALUE:** This setting allows the bearing of the sector to be rotated so that it is no longer aligned with the track to the first turnpoint. The required bearing is entered in **A21** after **FIXED VALUE:**. This option is rarely used for start sectors, but is often used for finish zones which may require to be orientated to a particular runway (see "FINISH ZONE").

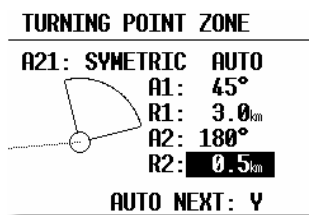
2.3.2.4.2 POINT ZONE

This setting defines the turnpoint zone geometry, sometimes referred to as the observation zone. The procedure is very similar to setting the **START ZONE** except that more options are available for **A21**.

- **SYMMETRICAL:** The axis of the turnpoint zone is orientated symmetrically about the line bisecting the inbound leg from the previous turnpoint and the outbound leg to the next turnpoint.
- **TO PREV POINT:** The axis of the turnpoint zone is orientated towards the previous turnpoint. This option is intended for Cat's Cradle and related tasks.
- **TO NEXT POINT:** The axis of the turnpoint zone is orientated towards the next turnpoint. This option is also intended for Cat's Cradle.
- **TO START POINT:** The axis of the turnpoint zone is orientated towards the start point. Again, this is a Cat's Cradle option.
- **FIXED VALUE:** The axis of the turnpoint zone can be orientated in any specified direction. This is the only option for which **A21** is not set to **AUTO**.

Example 3:

To specify a turnpoint zone that is a combination of the FAI 90° photo sector and a 500m radius cylinder:



HDG: SYMMETRICAL
 A21: AUTO
 A1: 45°
 R1: 3.0km
 A2: 180°
 R2: 0.5km

Note!

It should be noted that when defining combined sectors, the sector with the smaller radius must be designated by A2 and R2 (ie. R1>R2!).

Note!

AUTO NEXT will go automatically to N, if R1 will be chosen bigger than 10 km, AAT is expected.

2.3.2.4.3 FINISH ZONE

This setting defines the **FINISH ZONE** or Line. Highlight the **FINISH ZONE** with the cursor and on pressing **ENTER**, a similar screen as for the previous settings is displayed, except that there are only two options for A21:

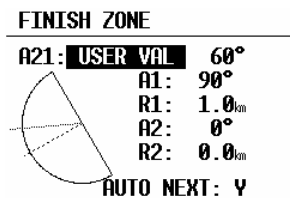
- **TO LAST LEG:** The axis of the FINISH ZONE is orientated directly back to the last turnpoint. This is the conventional setting for National competition flights.
- **FIXED VALUE:** The axis of the FINISH ZONE can be orientated in a specified direction (see example 4).

Example 4:

It is required to orientate the finish line perpendicular to the runway 06/24, which is not related to the bearing to the last turnpoint:

A21: Select **FIXED VALUE** and then enter either 060° or 240°, depending on the direction of the final glide. For example, if the final glide were in direction 240°, then 060° would be entered. The “flat side” of the sector is now directed back to the last leg and the glider will cross the line to enter the sector.

A1: 90°
R1: 1.0km
A2: 0 (not programmed)
R2: 0 (not programmed)

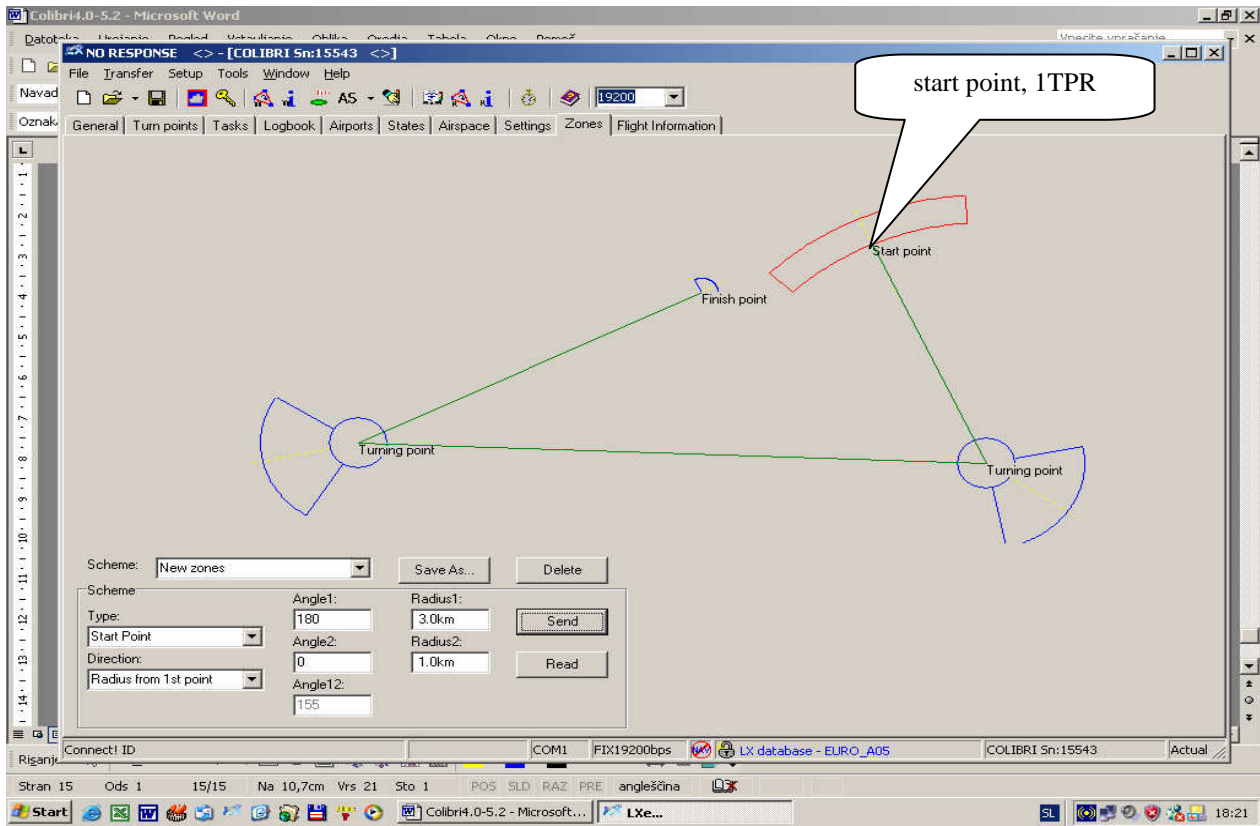


Note!

There are many ways to complete a flight. For instance, when completing flights for FAI badges or diplomas, it is enough to land inside the airfield boundary if the airfield is the finish point. If a remote finish point is specified, then the appropriate sector must be used. If in doubt, consult the competition rules of the FAI Handbook as appropriate.

2.3.2.4 Using of LXe for zone preparation

All possible zone configurations can be prepared in LXe PC program (ZONES) and easily transferred to the LX 7007. This transfer will **influence global** settings.



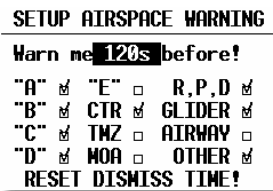
2.3.2.5 WARNINGS (Airspace Penetration and Height Warnings)



2.3.2.5.1 Airspace Warnings

The LX 7007 Basic monitors the glider’s position both horizontally and vertically in relation to SUA, and will give both an acoustic and visual warning prior to the airspace being penetrated. The warning will be activated a specified number of seconds before entering the airspace – **Warn me xxx seconds before**, where XXX is the desired input between 20 and 600 seconds. The default value is 120 seconds. When thermalling, the wind vector is used to calculate the horizontal warning and the achieved climb rate used to calculate the vertical warning. The warning calculation takes into account the specified lower and upper airspace heights and no warning will be given if the predicted flight path is over or under the airspace height limits. The airspace zones for which warnings are required are set by placing a tick in the appropriate box as shown below.

Note!
Setting “Warn me 120s before” will warn the pilot that the glider will enter airspace in two minutes provided that the horizontal and vertical speeds are not changed.



Checked airspace (✓) will cause warnings, and vice versa. Airspace is selected according to the ICAO airspace classifications of A to E. In addition the following other airspace areas can be selected

- CTR control zone
- MTZ mandatory transponder zones
- MOA military operating area
- R,P,D restricted, prohibited, dangerous zones
- GLIDER glider activity zones
- AIRWAYS airways
- OTHER



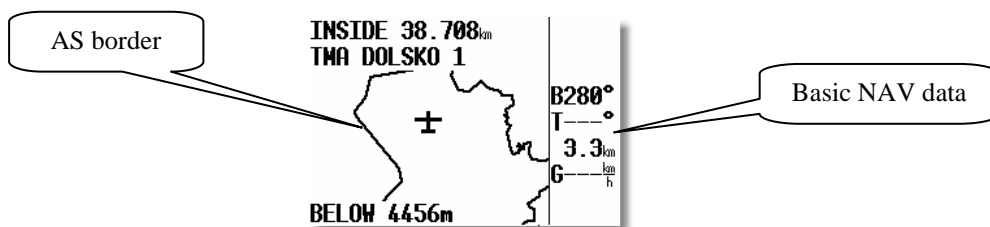
Example of an airspace warning screen

The **DISMISS** function can be used to **deactivate** the particular airspace warning for a period of time. Use the **UP/DOWN** selector to enter the duration for which the warning is required to be deactivated and press **ENTER**. The displayed airspace warning can be **DISMISSED** from 1 minute to permanent de-activation (**ALWAYS**). **DISMISS** selections can subsequently be cancelled.

Note!

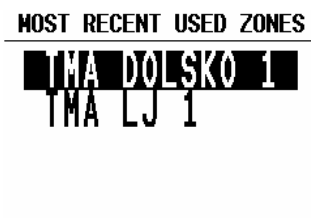
Use the **DISMISS** function to temporarily **deactivate** individual airspace warnings. All warnings can be reinstated using the **RESET DIMISS TIME** command in the **SYST. SETUP/WARNINGS** menu.

After press on **ESCAPE** during the airspace warning presence, the unit will change over into specific graphic screen (**Detailed AS screen**) which enables to fly extremely close to the airspace border. In this configuration the **horizontal or vertical distance** (depends on glider position) to the particular airspace will be continuously present on the display. If a **Voice Module Option** is installed a voice information will also follow.



Example of a Detailed AS screen

Use **ESCAPE to exit** Detailed AS screen. If there is a need of re-enter into the detailed screen after the pilot has already exit, use **EDIT** function in **APT, TP or TSK** and activate **MRU ZONES**. The last 10 AS zones which have caused warnings can be simply recalled.



Example of MRU screen

2.3.2.5.2 Altitude Warning

Altitude warnings can be setup in a similar way and inform the pilot that he is approaching pre-selected altitude limits.

```

SETUP ALTITUDE WARNING
Warn me 60s before,
reaching: 2000m

RESET DISMISS TIME!

```

The warning altitude is always above MSL (Mean Sea Level). The warning will be activated at a specific time before reaching the altitude limitation. While thermalling, the achieved climb rate is used to calculate when the warning altitude is going to be reached and similarly, in straight flight, the descent rate is the controlling parameter. Operation of the altitude warning is the same as for the airspace warning and use of the DISMISS and RESET DISMISS TIME commands are identical.

```

MOTKOPUS TSK 00:00
Approaching:
1000m MSL
Altitude: 1154m
Vario: +0.0%
DISMISS FOR 1 min
WAIT 2 0.0 1.0 862m

```

Example: altitude warning

2.3.2.6 GPS

LX 7007 Basic hasn't built in GPS receiver. GPS position data in NMEA format is expected on IGC marked connector which is on the rear side of the unit. Pin out is compatible to IGC standard, so any IGC compatible cable can be used. This menu makes possible to set two baud rate values, **4800 and 19200 bps** for incoming data. 19200 is recommended for LX Flarm units, Colibri sends always at 4800 bps. It is **obligatory** to set 19200, if collision avoidance data is intended to be shown on PDA after PDA will be connected to LX 7007. Time offset to read local time is also possible in this menu.

```

SETUP GPS
UTC: +00: 09:53:30
GPS EARTH DATUM:
EXTERNAL GPS
BAUDRATE: 4800bps

```

2.3.2.7 UNITS

All known units and their combinations can be programmed in the LX 7007 BASIC. The various units that can be

```

SETUP UNITS
LAT/LON D°MM.MM'
DIST. km SP. km/h
VARIO m/s HDG true
WIND km/h
ALT. m QNH mb
LOAD OVERLOAD

```

selected are outlined below:

- LAT/ LON: degrees and decimal minutes; or degrees, minutes and seconds
- DIST: kilometers (km); nautical miles (NM); or statute miles (ml)
- SP (Speed) kilometers per hour (km/h); knots (kts); or statute miles per hour (mph)
- VARIO: meters per second (m/s); or knots (kts)
- HDG: degrees magnetic (°M) or degrees true (°T)
- WIND: kilometers per hour (km/h); knots (kts); miles per hour (mph); or meters per second (m/s)
- ALTITUDE: meters (m); or feet (ft)
- QNH: millibars (mb); millimeters of mercury (mm); or inches of mercury (in)
- LOAD: **Overload**; kilograms per sq meter (**kg/m²**); pounds per sq foot (**lb/ft²**); **kg, or lbs**

Note!
 After using of **kg or lbs** input, obligatory complete settings in chapter 2.3.2.12 (LOAD).

$$\text{OVERLOAD} = \frac{\text{Glider} + \text{Pilot} + \text{Ballast}}{\text{Glider} + \text{Pilot}}$$

Example:

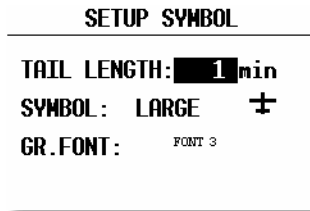
An overload of 1.2 means that the current ballasted flight weight is 20% higher than the unballasted flight weight.

2.3.2.8 GRAPHIC

The graphic display of the LX 7007 BASIC can show a lot of information and if it is all selected, the display can become very cluttered. This particularly applies to airspace information and the user should ensure that only relevant airspace is selected. It should also be remembered that a cluttered display also increases the load on the graphical processor and slows down the rate at which the screen is redrawn.

2.3.2.8.1 SYMBOL

The LX 7007 BASIC graphic display supports three sizes of glider symbol; **large, medium and small**. Rotate the **UP/DOWN** selector to select the desired glider symbol. **TAIL LENGTH** enables a ‘mouse droppings trail’ to be configured that will display the achieved track for the last x minutes. The trail is disabled if the time period is set to zero.



The user is able to sort out four different **sizes of fonts**, this selection will influence on characters in graphic navigation pages only.

2.3.2.8.2 AIRSPACE (Graphics)

This setting allows the pilot to define which airspace types will be **shown on the display**. Each airspace type can be set to **ON, OFF** or a **ZOOM range** beyond which the particular airspace will not be displayed. Selecting **ON** will always show the airspace regardless of the **ZOOM** setting, and **OFF** will never show the airspace. If all airspace is set to **ON**, then at large **ZOOM** ranges, the screen becomes very cluttered and the graphics processor will become overloaded and slow down. To prevent this happening, the **ZOOM range** option allows a range to be set, beyond which the airspace will not be displayed.

SETUP AIRSPACE	
"A"	100 _{km} R, P, D 100 _{km}
"B"	50 _{km} GLIDER 100 _{km}
"C"	100 _{km} TMZ 50 _{km}
"D"	100 _{km} MOA 50 _{km}
"E"	20 _{km} AIRWAY 50 _{km}
CTR	ON OTHER 100 _{km}

Class A will only be shown when the **ZOOM** scale is 100km or lower

Note!
 If, for instance, 100 km is selected, then the airspace will only be shown when the **ZOOM** range is 100 km or lower. When the **ZOOM** range is greater than 100 km, the particular airspace **will not be shown**.

The LX7000 allows the following types of airspace to be shown:

- Class A
- Class B
- Class C
- Class D
- Class E
- CTR. Control zone
- R.P,D Restricted, Prohibited and Danger areas
- GLIDER
- TMZ Transponder mandatory zones
- MOA Military operating areas
- AIRWAY
- OTHER

Note!

CTRs are marked using a bold line, so the pilot is able to separate CTRs from other airspace very quickly.

- **Airspace Customisation**

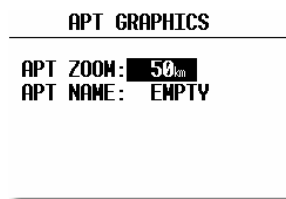
A completely new feature of the LX 7007 Basic is that pilots can customise their own airspace files. Pilots are able to create areas, or to add and remove particular airspace according to their personal requirements. All customisation is done using the well known “**Open Air format**” or “**Tim Newport Piece format**”. Detailed instructions on customisation are described in a separate document, the **LxasBrowser manual**. This manual is supplied with each instrument and is also available on www.lxnavigation.si. Restricting the creation of airspace to a dedicated area where the pilot is usually flying will make the instrument much faster when operating the **ZOOM** function.

Note!

To be able to use all the benefits of the airspace graphics and warnings, it is recommended that some time is taken to study the airspace of the task area. All irrelevant zones should be deleted so that the speed of graphical presentation remains fast and unnecessary airspace warnings are avoided. Some TMAs are built from many sectors and is recommended that these sectors are amalgamated into one large TMA definition, if possible. After modification of .LXW files it is essential that a new .CUB file is built. LXW is a new airspace data base format described in the LxasBrowser manual or on the www.lxnavigation.si website.

2.3.2.8.3 APT (Graphics)

Airports are displayed with aerodrome symbols together with their name, which can be configured in variety of ways.



APT ZOOM: The airport zoom setting defines the **ZOOM** range under which the airports will be displayed. For instance, a 50 km setting will only show the airports when the selected **ZOOM** range is 50 km or lower; at greater **ZOOM** ranges, the airports will not be shown. The permitted settings are: ON, OFF, 5, 10, 20, 50 and 100 km.

APT NAME: The airports are displayed by an airport symbol with the adjacent name or designator as selected below:

- **ICAO** will show ICAO code of the airport adjacent to the symbol
- **2 char, 3 char, 4 char, 8 char** will display the first 2, 3, 4 or 8 characters respectively of the airport name.
- **NONE**, displays only the symbol with no code or name

2.3.2.8.4 TP (Graphics)

The same logic is used for displaying turnpoints except that some further choices are available.

TP GRAPHICS		
TP GRAPHICS	ENABLE	
type	zoom	name
T.POINT	50 _{km}	NONE
AIRPORT	50 _{km}	NONE
OUTLAND	50 _{km}	NONE
MARKER	50 _{km}	NONE

There are four types of turnpoints, and each type is designated by a different symbol on the screen (See also 2.4.4.2).

- **T. POINT** This is simply a turnpoint at which it is not possible to land
- **AIRPORT** This is an airport used as a turnpoint
- **OUTLAND** This is a turnpoint at which an outlanding is possible
- **MARKER** This is used to designate a temporary point, such as a good thermal source. It is deleted when the instrument is switched off (See also chapter 2.4.4)

Note!

If a turnpoint is designated as **OUTLAND**, then it will also be displayed in the **NEAR AIRPORT** screen with the corresponding symbol (See 2.4.2).

2.3.2.9 PILOTS (Pilot list)

The LX 7007 BASIC has the capability of storing up to 30 pilots names, each with their **specific configuration** preferences (settings). The list is active as soon as the first pilot has been entered under **FLIGHT INFO** and copied into the pilot list.

EDIT PILOTS 3/03

First name (Active)
LUCIA
Last name
STEINKE
Password

Advises that this pilot is active and his configuration is selected

Each pilot has the capability, if needed, of **protecting** his configuration by means of a **personal password**. Password input is possible after activation of **EDIT** function. This ensures that a particular pilot's configuration can not be selected and **altered** by another pilot. Without using of password the pilot specific preference settings will match the last settings flown by this pilot, if nobody else has used his name and have made some changes.

New pilots can be added (INSERT) and existing pilots edited simply by pressing **ENTER** in the following screen:

EDIT PILOTS 3/03

First name (Active)
LUCIA
Last name
STEINKE
Password

EDIT
INSERT
DELETE

Note!

Pilot selection from this menu is **not possible**. Switch the unit OFF and ON and select another pilot.

The second way to input a new pilot is transfer of **Flight info** from LXe or Colibri/LX20 or to **Upload flight declaration** from ConnectLX. **SD Card** transfer of Flight info is also possible. After successful transfer open **FLIGHT INFO** and confirm ADD PILOT TO LIST wit Y.

Note!

If the same pilot is flying for instance 15m and 18m variant of the same glider it is recommended to enter two slightly different names, to be able to store two different sets of settings. For instance Peter15 and Peter18.

Pilot proper preference data, SEUP Level 1 (Setup)

	INIT	Display
--	------	---------

Pilot proper preference data, SEUP Level 2 (System Setup)

TP	WARNINGS	GPS	UNITS	GRAPHIC	NMEA
PC PORT	USER PORT	POLAR	LOAD	TE COMP.	INPUT
LCD IND	PAGE 1	PAGE 3	AUDIO	VOICE MOD.	ALARMS
FLARM	INTERFACE	*****	*****	*****	*****

2.3.2.10 NMEA/PDA (NMEA output for PDA)

The LX 7007 BASIC is capable of outputting position data sentences in the NMEA format for use by other devices (PDA). The various output configurations are shown below and by placing the cursor on any one and pressing **ENTER**, the individual NMEA sentences will be displayed. If See You Mobile, LXobile or Winpilot is used, then **PDA** should be selected in this option. Selection **DISABLED** will make computing of **LX 7007 faster**, so it is recommended to **disable** the output, if not used.



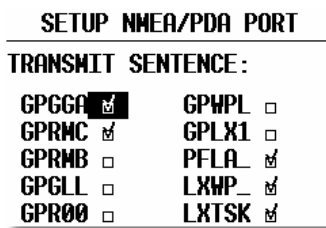
Note!

The NMEA baud rate will be always **19200** bps, doesn't matter any other settings. The data is **exclusively** available on PDA interface connector.

Note!

LX Mobile PDA program users will receive data about active **task** (LXTSK sentences) **automatically**. They have to use PDA setting. PDA is factory set.

After enter on any item a table of enabled NMEA sentences will be shown for a short time. An exception is EXPERTS where the pilot has an opportunity to enable sentences of his interest. Select only sentences which are **necessary for your PDA** operation, to many enabled sentences will load LX 7007 microcontroller without any reason.



NMEA sentence	Information sent	Necessary for PDA operation
GPGGA	Position, time.....	Y
GPRMC	Position time....	Y
GPRMB	Includes information about destination	N
GPGLL	See NMEA standard	N
GPG00	See NMEA standard	N
GPWPL	See NMEA standard	N
GPLX1	Data for SeeYou Mobile and Winpilot	N
LXWP_	Data for SeeYou Mobile and Winpilot	Y
LXTSK	Info about selected task on 7007	Y

2.3.2.11 DEL TP/TSK

This option allows all programmed turnpoints and tasks to be globally deleted. If **Y** (Yes) is selected, then all turnpoints and tasks will be deleted and can not be retrieved. **Be careful with this option.**

2.3.2.12 POLAR

Polars for most gliders are in the library. They are selected by simply rotating the **UP/DOWN** selector.

```

GLIDER POLAR
GLIDER: ASH 25
a = 1.09
b = -1.34
c = 0.80

```

The polars are defined as a quadratic notation with the a, b, and c. If a suitable polar is not found in the library, or it is required to define a **USER** polar, then the program POLAR.EXE, which is contained on the CD accompanying every instrument, should be executed. The program requires that minimum 5 points of the new polar are entered. The new values of a, b and c should be entered into one of the two **USER** polars (rotate **UP/DOWN** anti-clockwise). Finally, the name 'USER' should be replaced with a selected polar name.

```

GLIDER POLAR
GLIDER: USER 1
LO_100
a = 1.90
b = -3.20
c = 2.00

```

2.3.2.13 LOAD

Each time the instrument is powered up, the ballast settings are set to the minimum. By setting the **SWITCH ON LOAD: SET**, the ballast setting will remain at the last setting made on the previous flight and will not be zeroed on instrument power up.

After selection of **kg or lbs** in menu **Units**, a very simple manipulation on the field during water filling procedure and also during the flight will help the pilot a lot. The pilot input of ballast is now in kg or lbs. To make this possible some additionally inputs should be done as follows:

```

SETUP LOAD
SWITCH ON LOAD:
MINIMUM
MIN. TKOFF: 330kg
EMPTY GLIDER: 250kg
PILOT: 85kg
MAX. TKOFF: 550kg

```

MIN.TKOFF : default glider plus minimum pilot weight (see glider operational manual)
 EMPTY GLIDER : empty glider weight (see manual)
 PILOT : pilot weight
 MAX.TKOFF : maximal take off weight

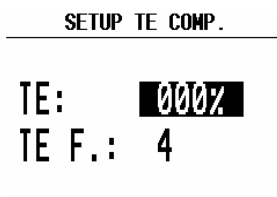
2.3.2.14 TE COMP. (Total energy compensation)

The LX 7007 BASIC offers two methods of vario TE compensation.

- TE tube (probe)
- Electronic TE compensation

Note!

It is important to note that the method of TE compensation is set up when the instrument is installed by 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 (see Chapter 5

**If the TE probe has been installed, then TE: should be set to 000%**

There is no further adjustment of the TE is possible; the quality of the TE tube is the only factor.

If the Electronic TE option has been installed, then TE: should be set to 100%

The TE compensation can be fine tuned during flight with the following procedure. It is essential that this is only done in smooth air; it is not possible to tune the TE accurately when it is thermic.

- Select 100 % and default TEF
- Accelerate up to approximately 160 km/h (75 kts) and keep the speed stable for a few seconds
- Rapidly reduce the speed to 80 km/h (45 kts)

Observe the vario indicator needle 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, then the compensation is too low, increase the TE%; and vice versa. Try another zoomie to assess the change and make further adjustments if necessary.

The **TEF** (TE filter) is the compensation delay. Larger numbers will increase the delay and vice versa. During the first test is recommended to use TEF 4.

Electronic TE is only effective when the pitot 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, then 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 and slowly reduce the speed. Observe the vario indicator. If the static source is good, then 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.

2.3.2.15 INPUT

The LX 7007 BASIC has an input for an external speed command switch, which is wired to **LX 7007 AU**. Using the external switch it is possible to switch between SC and Vario manually. Setting the **SC INPUT** to **ON** means that closing the switch will cause the instrument to enter SC mode, and setting **SC INPUT** 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 (obligatory setting after using of LX Remote).

A voice message "**Stalling**" will be generated if, IAS will go below the value specified in STALL W: xx km/h. Acceptable IAS input is between 60 and 120 km/h. Mentioned function is active exclusively, if LX Voice Module option is used.

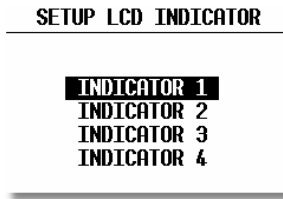
The LX 7007 BASIC is supplied with an external temperature sensor. Selecting **TEMP. ON** will enable temperature measurement by the sensor. Setting **TEMP. OFF** permits the user to **offset** the temperature reading.

Note!

There is another input called **VARIO PRIORITY** on LX 7007 AU. 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.

2.3.2.16 LCD IND. (LCD – Vario Indicator)

The LCD vario indicator is a part of LX 7007 AU. Unlimited number of secondary vario indicators can be also connected to the system using the 485 system bus. The LX 7007 BASIC provides 4 different sets of data that can be displayed on the vario indicators. This means that up to **4 indicators can be set, to display different information**; any further connected indicators are simple repeaters. Each LCD indicator is set up from the following menu:



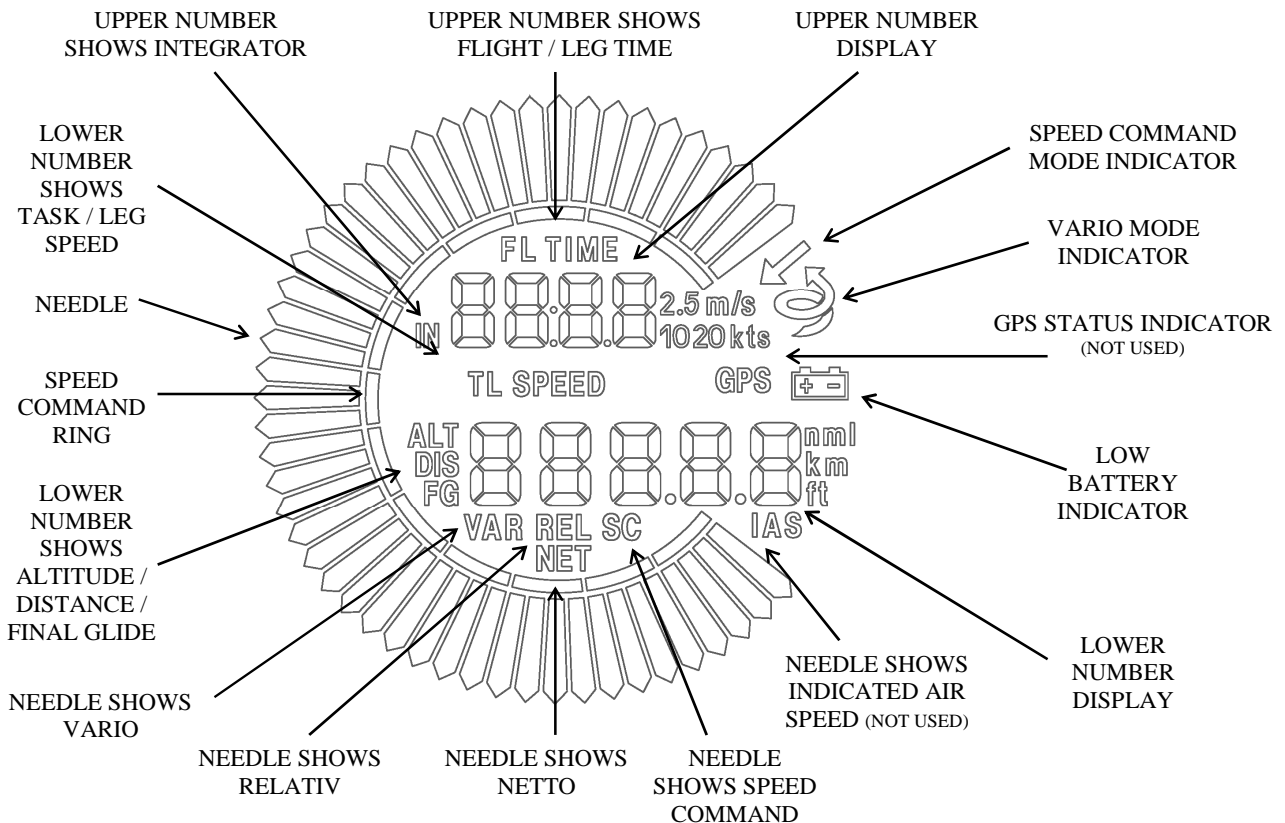
An LCD vario indicator consists of:

- Needle
- Two numerical displays (upper and lower)
- Labels and indicators

These following functions can be set (see next picture):

- Needle Vario needle (Vario, SC, Netto or Relative)
- SC Ring Displays speed command at all times
- Upper Numeric Display Upper line, the capturemeter displayed can be configured in both Vario and SC modes
- Vario Mode Indicator Shows current flight mode (vario or speed command)
- Lower Numeric Display Lower line, the capturemeter displayed can be configured in both Vario and SC modes

The labels will automatically be displayed depending on the current function. The **BAT** warning will be displayed when the supply voltage is below 11 volts.



Note!
The vario indicator built into the LX 7007 AU is always **Indicator 1** (no settings possible).

Each further indicator (available as an option) has a **DIP switch on the rear side** that sets and identifies the indicator and enables it to be programmed under that identification. The positions of the switches are listed below.

SW 1 ON	Indicator set1
SW 2 ON	Indicator set2
SW 3 ON	Indicator set3
All OFF	Indicator set4

All settings should be made for **vario** and **speed command** mode separately (e.g.: VAR NEEDLE =needle in vario mode, SC NEEDLE = needle in SC mode).

LCD INDICATOR 1

```
VAR.NEEDLE: VARIO
SC.NEEDLE: SC
VAR.U.NUM.: INT.
SC.U.NUM.: INT.
VAR.L.NUM.: ALT.
SC.L.NUM.: DIST.
```

Needle settings:

- Vario, SC, NETTO or RELATIVE (= netto – 0.7 m/s),

Upper numerical line:

- Integrator, time, flight time, leg time

Lower numerical line:

- **ALT.** (NN altitude), **DIST.** (distance to the navigation point), **GL. DIF.** (final glide altitude difference), **SPEED** (TAS), **LEG SP.** (speed on leg), **QNH(ft)** (NN altitude in ft), **F.LEVEL** (flight level). The last two items requests version 1.16 or higher of LX 7007 AU.

2.3.2.17 COMPASS

This unit is an optional extra. The compass module is connected by the 485 bus to the LX 7007 BASIC. If the compass is connected, this setting enables the compass to be calibrated and is described in Chapter 6.1. If a compass module is not connected, the COMPASS setting is not active.

2.3.2.18 AUDIO (Adjustment of audio)

A wide variety of audio variants can be configured by user:

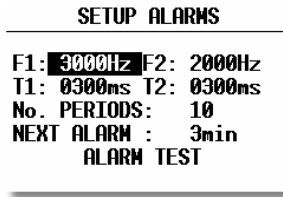
SETUP AUDIO

```
SC: VOL H   SC DEMO!
VARIO: LIN/POS
  0%: 0500Hz
+100%: 1500Hz
-100%: 0200Hz
```

- SC: VOL H audio volume will be increased by speed command (H) or decreased by (L)
- VARIO: Several types of audio can be selected (use DEMO to hear the choices available)
- 0% Tone frequency at 0 m/s
- +100% Tone frequency at full + deflection
- -100% Tone frequency at full – deflection

2.3.2.19 ALARMS

The unit produces an audio alarm on reaching certain confirmation points or, if an airspace or altitude warning will turn up. This screen allows adjustment of both frequencies and number of periods.



Note!
If a Voice Module option is used, the alarms will be **disabled** automatically.

2.3.2.20 FLARM

This page makes possible to read out status data of the Flarm unit which is connected to LX 7007, it is also possible to alter **Privacy** (Stealth) and the **Frequency**.



The orientation of Flarm graphic display can be set as **north up** or **track up** after using of **TRAFFIC INFO** menu.

2.3.2.21 SD CARD (SD card formatting)

The SD card which will be used to communicate with LX 7007 should pass initialisation procedure. This menu does this job. The cards delivered with the LX 7007 are already formatted. If a **new card** will be used it is compulsory to run through **formatting procedure**.



ENTER

Note!
Some cards types may be inserted wrong way, respect that the contacts of the card should be oriented towards black metal part

2.3.2.22 OPTIONS



Options listed above may be connected to LX 7007 system bus. Every active option should be **checked** in this menu.

Note!

Not checked items will be not accepted by LX 7007 and will also **not operate**, even connected to the bus. A very typical message **DISABLED** will appear in **HW Check** procedure during booting. If an option is not present on the BUS a message **Not Detected** will describe this situation. A **Ready** message shows Option ready for operation.

Activation of **Detect NOW** will show actual status and will automatically **enable** (☑) all in the moment present units.

2.3.2.23 PASSWORD

There are several passwords which runs some specific procedures listed below:

PASSWORD	ACTION
01049	“Auto zero” will set vario to and speed to zero

2.3.2.24 INFO

After ENTER on Info, detailed data about firmware will be present for a short time.

2.4 Navigation Functions

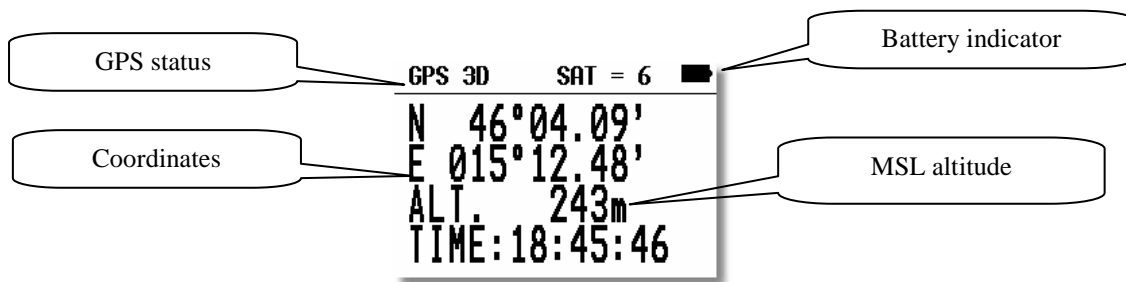
The LX 7007 BASIC has the following navigation functions displayed on six main pages. The pages are selected in sequence by rotating the **MODE** selector:

- **GPS** - Status and Coordinates
- **NEAR AIRPORT**
- **APT**, - Airport
- **TP** - Turnpoints
- **TSK** - Tasks
- **STATISTICS** - These can be accessed both during flight and after flight using the **LOGBOOK** function

2.4.1 GPS Page

This page is purely informative; no configuration is possible.

By rotating the **UP/DOWN** selector the displayed altitude will appear in both m and ft at the same time.



The **TIME** display can be changed to a Stop watch as follows:

- Press **START** status **STOP:** 0:00
- Press **START** status **RUN:** 0:12
- Press **START** status **STOP:** 0:50
- Press **START** status **STOP:** 0:00 Reset
- Press **ENTER** and **TIME:** 11:56:32 is re-activated

Note!
Rotate ↕ to get altitude reading in ft also.

2.4.2 NEAR AIRPORT

This option displays the nearest airports, both from the APT database and the TP list, together with those turnpoints that have been selected as being landable. The airports are sorted by distance with the closest first. Simply place the cursor with the **UP/DOWN** selector on the desired airport and press **ENTER**. The LX 7007 BASIC will change to APT or TP mode and all navigational features will be available.

3/16 NEAR AIRPORT		
⊙AP 23:07	108°	1km
⊙BR 03:05	250°	1km
⊙LUCHOW REHBEC	200°	17km
⊙NEUSTADT-GLEW	049°	34km
⊙SALZWEDEL	171°	38km
⊙KLEIN GARTZ	171°	38km

Note!
The symbol preceding the name indicates which database the landing point has come from. See the examples above.

Voice!
After selection the distance and runway data of selected airport will be expressed.

A reduced airport data base will make computing faster. It is recommended to prepare individual APT data base and to transfer this after using of **SD card** (.LXA files).

2.4.3 APT Airports, TP Turnpoints and TSK Tasks

The three main navigation modes (APT, TP, TSK) are selected by rotating the **MODE** selector. All three options are similar and have nearly identical basic navigation data screens accessed by turning the **UP/DOWN** selector. The first page shows the basic navigation data (bearing, distance, ground track and ground speed).

The airport memory of LX 7007 BASIC has a capacity for approximately 5000 airports. The airport data can not be edited in the instrument; all necessary updates should be done using a **PC or SD card**. The database used in LX 7007 B is a **free database**. The database can be downloaded from the Internet using the following addresses:
www.lxnavigation.si

2.4.3.1 Navigation in APT, TP or TSK

There are five navigation pages; the first one is described below.

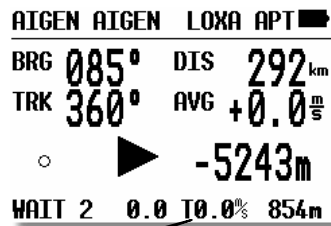
SG/AD TSK04/1 3D/6	
BRG 348°	DIS 25.5 km
TRK 089°	AVG +5.6 m/s
WAIT 1 0.0	-3498m
	221m 332m

Note!

The glide ratio indicator consists of two numbers separated with an **E** (43E77). The left figures show the average glide ratio achieved during the last two minutes, while the right figures show the minimum glide ratio required to reach the APT, TP or finish the task. The over-range indication is '99', which means that the glide ratio is in excess of 99:1. When **flying a task**, the minimum glide ratio is calculated on the total distance to the finish line, including all uncompleted TPs, and any preset safety altitude. This function is very useful when the final glide is being set up around one or more TPs. This indicator is present only **during SC mode**; in **vario** mode NN altitude is indicated.

Note!

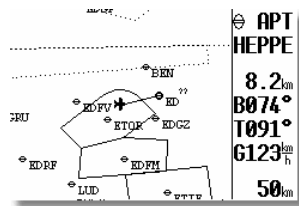
During circling period the **Altitude gain** will be indicated in the lower right corner of the display. The detection of circling is done automatically and couldn't be influenced by pilot. The indicator shows how many **meters or feet** has been gained or lost during the actual circling period. As the glider detects straight away flight, the indicator will change in to so called **Total Averager**. This figure shows the last thermal real average climbing, it is division of gained altitude and the time spent in the thermal..



Total average

The Airport and TP names are normally displayed using 8 characters, but by pressing the **START** button, 12 characters of an airport name will momentarily be displayed. The course correction arrow (Direction Indicator) shows which way to turn (left or right) to reach the desired APT or TP.

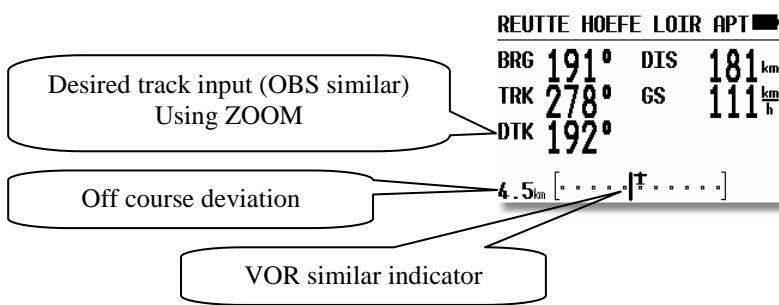
Rotating the **UP/DOWN** selector will bring up the graphic page. The airports will be shown with both symbols and short names or ICAO-code. (See 2.3.2.7.3)



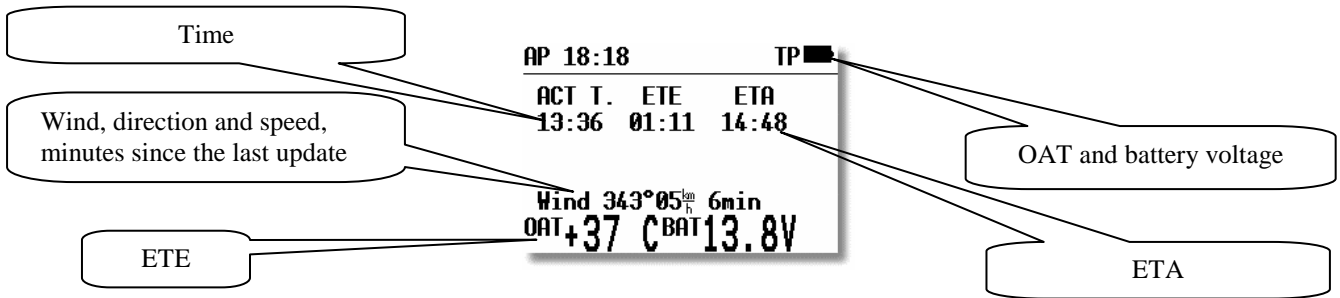
Ground speed

The glider symbol remains in the centre of the screen and the map moves under it. To change the displayed range, simply rotate the **ZOOM** knob anti-clockwise to increase the range or clockwise to decrease it.

The **third** navigation page which includes a course deviation indicator (CDI) can be enabled in setup under the **PAGE 3** option (default option is disabled).

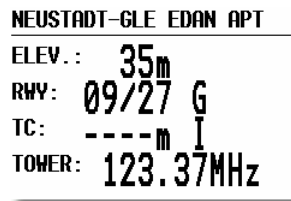


Further rotation of the **UP/DOWN** selector will call up the fourth, or arrival page.



ETA (Estimated Time of Arrival) and **ETE** (Estimated Time Enroute) define the arrival time and the time needed to reach the destination. Both depend on the settings in the INIT menu. Default setting is VAR, this means that ETA and ETE will base on vario average of the actual flight. MC or GS can be also preset. In that case both actual values are relevant.

Continued rotation of the **UP/DOWN** selector will show the last page, where details of the selected airport will be displayed.



The data is self explanatory except for the traffic circuit, **TC** details. The pattern height together with its orientation (N or S) is displayed. The letter **I** means that the pattern details are not defined.

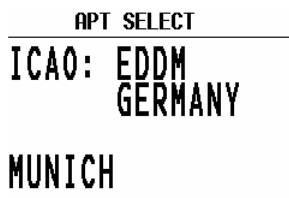
2.4.3.2 Airport Selection, Team function and Wind Calculation

After placing the cursor on the function required and pressing **ENTER**, a menu appears which offers airport selection, the team function, or selection of the method of wind calculation.



2.4.3.2.1 SELECT - Airport Selection

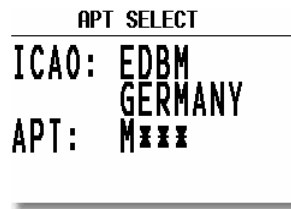
There are two ways to select an airport. If the ICAO locator is known, it can be directly entered when the name of the airport will be displayed.



If an incorrect letter is entered, then either press **START** or rotate the **ZOOM** selector to move the cursor back so that the letter can be re-entered.

If the ICAO locator is unknown, then the following method should be used. With the cursor on **ICAO**, press **ESC** to move the cursor to the country. Select the required country with the **UP/DOWN** selector and press **ENTER**. Four stars will now

be displayed at the airport name. Using the **UP/DOWN** selector and **ENTER**, input the first four letters of the airport name. All airports with the same first four letters will be available and can be cycled through by use of the **UP/DOWN**.



If you input less than four characters, the number of airports that fit the first x letters will be greater. If all four stars are confirmed with **ENTER** or after pressing **ESC**, all airports of the selected state are available and can be cycled through in alphabetical order.

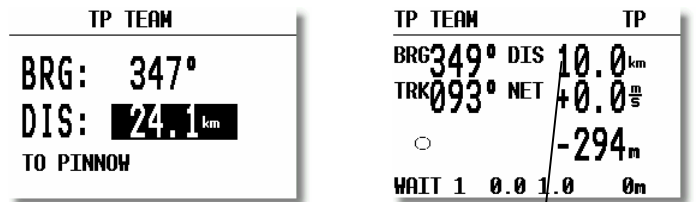
Note!
Rotating of ZOOM will select airports directly. This feature is active only from the upper navigation page.

Voice!
After selection the distance to the airport will be expressed.

2.4.3.2.2 TEAM function

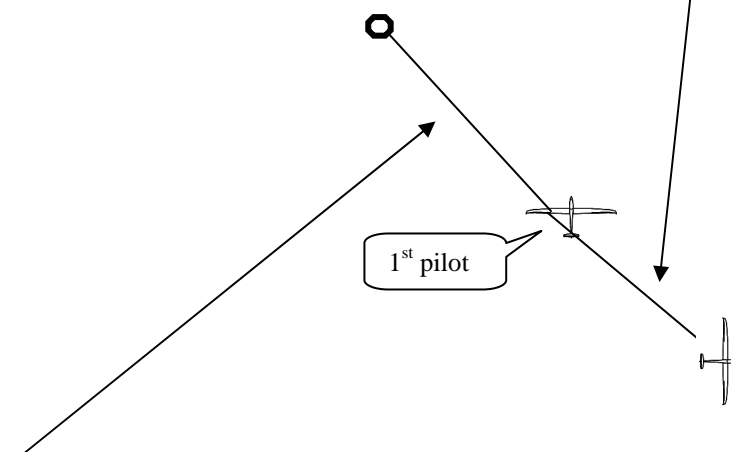
This special function has been developed to help pilots flying in a team to locate each other if they loose visual contact. Both pilots have to select the same destination point (APT, TP or TSK). One pilot then passes his range and bearing to the selected point **by radio**. The second pilot then selects TEAM FUNCTION and enters the range and bearing passed by the first pilot.

Example:



Input

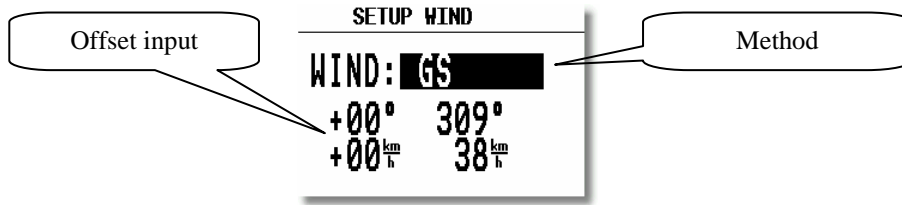
Navigation toward companion



347° and **24.1 km** is the range and bearing given by the first pilot (his navigation data toward common TP). After entering the figures and pressing **ESC**, the instrument installed in the second glider will change to the normal **TP navigation page** and the navigation data will enable navigation toward first pilot. **TP TEAM** will designate this situation. The team function is deactivated **after a new APT or TP** is selected.

2.4.3.2.3 WIND calculation method selection

The LX 7007 BASIC is able to calculate the wind vector. This function is the same in all three navigation modes. A further method, COMPASS, is available only after an optional compass unit is connected to the LX 7007 BASIC RS485-bus. To change the method of wind calculation, use the following menu:



GSPEED DIF. is the simplest method. The calculation is based on measuring ground speed changes while **circling**. A minimum of two full circles are necessary to obtain an accurate wind. The message **WAIT2 or WAIT 1** informs the pilot how many circles are left to get the result. It is very important to **keep the speed constant** while circling to ensure that accurate results are obtained. The pilot is able to adjust the wind using manual corrections through the Offset Input.

POS. DRIFT is the most accurate method. It is based on measuring the drift due to the wind during 6 full circles. These circles have to be flown accurately and at a constant speed to achieve the best results. **WAIT 6 to 1** indicates how many circles are left until a result is produced.

COMBINATION is using a combination of two methods:
 -during the climbing a very reliable method GSPPED DIF. is used and during straight flight an algorithm which calculates wind after input of GS,GT and TAS. The change over between methods is done automatically.

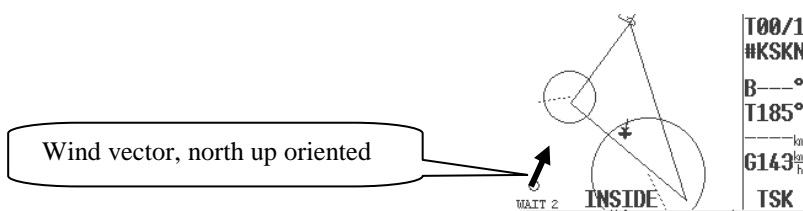
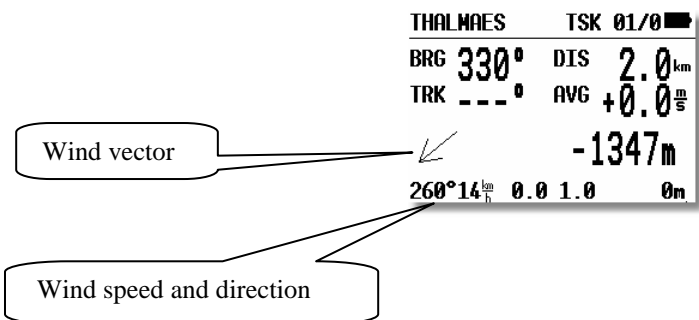
COMPONENT calculates the **wind component** (head or tail wind). The calculation is based on measuring the difference between GS and TAS during straight flight.

FIXED VALUE is not a calculation; it simply allows the pilot to input the wind vector that he wants to use.

COMPASS wind calculation method is available only with the optional compass device. Its use is described in the COMPASS manual.

Note!

The results of wind calculation are present in the left lower corner of the first navigation page as an **arrow symbol** and as numeric **information**. The arrow is track up oriented. The same is present in graphic page also; in this case a **north up** orientation should be respected.



2.4.4 TP - Turnpoints

The LX 7007 BASIC has the memory capacity to store up to 600 turnpoints. The turnpoint name can have a maximum of 8 characters (letters or numbers, **no lower** case letters and **no special signs** except *). The menu structure is the same as in the APT menu - either four or five pages depending on the set up . A turnpoint can be added to the database in one of five ways:

- Manual input
- Copy from APT database
- Data transfer from a PC, PDA, LX20 or Colibri (*.DA4 format)
- Read from SD card (.da4 only)
- Input of actual present position

Note!

Using of **ConnectMe/ConnectLx** PDA programs, makes also possible to transfer turnpoints in **.cup** (See You turnpoint format) format directly into LX 7007. The conversion **.cup**⇒**.da4** will be done automatically. Transfer of LX original **.da4** format is also possible.

The procedure is similar to the method of selecting an **APT**. While in any **TP** page, press **ENTER** and a menu showing **SELECT, EDIT, NEW, DELETE, TEAM** and **WIND** will be presented.

2.4.4.1 TP SELECT

To select a turnpoint simply replace the stars with the first letters of the TP name (as described in 2.4.3.3.1), or use direct method after using of **ZOOM**.

Note!

LX 7007 is able to sort turnpoints by **alphabet** or by **distance**. Default setting is sorting by alphabet (2.3.2.3). Result of selection by distance is (all stars confirmed) selection of nearest TP. Using of ↕ will offer next more distant TPs.

Note!

It is also possible to select TP by **using ZOOM** selector. This works exclusively from **the first page**. To change the TP simply rotate the **ZOOM** selector. This method will work also, if sorting by distance will be active.

Voice!

After selection the distance will be expressed.

2.4.4.2 TP EDIT

This option allows the pilot to change TP data at any time. The turnpoints used in LX 7007 BASIC may have four attributes. Using attributes, when the turnpoints are displayed in graphic pages, they will be represented by different symbols. The four different types of turnpoints are as follows:

- **T.POINT** normal TP, not landable
- **AIRFIELD** landable airfield
- **OUTLAND** landable outlanding place
- **MARKER** temporary marker which will be deleted when the instrument is switched OFF

Tps having an **airport or outland attribute are landable** and are shown on the NEAR AIRPORT page. In front of the name the pilot will see a symbol indicating what kind of landing place it is (see NEAR).

To start **EDIT** press **ENTER**.

```

TP EDIT
BR 03:05 T.POINT
LAT.: N 53°09.52'
LON.: E 011°13.00'
ELEV.: 0000m

```

Name, attribute, coordinates and elevation can be changed at any time.

2.4.4.3 TP NEW

Place cursor on **NEW** and press **ENTER**. The following window will be displayed.



'Y' allows a new turnpoint to be copied from the **APT** database. If it is required to enter a completely new turnpoint, then select 'N'. A second menu will then be displayed allowing the name, co-ordinates, attributes and elevation of the new turnpoint to be entered.

2.4.4.4 TP delete

If this option is selected, then delete confirmation will be requested. If the reply is 'Y', then the turnpoint will be deleted and can not be recovered.

2.4.4.5 TEAM

This function is the same as described under APT in chapter 2.4.3.3.2

2.4.4.6 WIND

This function is the same as described under APT in chapter 2.4.3.2.3.

2.4.4.7 TP QUICK - Storing of actual position

The procedure is activated by pressing the **MARK** button, **mode doesn't matter!**



On activating the procedure, the actual position is displayed with the name defined in one of two forms; **AP** (actual position), or **TIME** (date and time), depending on which option has been selected in the setup (see 2.3.2.3) menu. Once selected, the data can be edited if required. This procedure is useful to store convenient landing places noted during flight, thermals etc. By default, these points are designated with the **MARKER** attribute and are therefore deleted when the instrument is switched off. If these points are required to be stored for future use, then the **attribute** should be **changed** before switching off.

2.4.5 TSK - Task

The LX 7007 BASIC can store up to 100 tasks, with each task containing a maximum of 10 turnpoints (start , 8 turnpoints and finish). Selecting and storing a task confers the following benefits:

- Accurate task statistics
- Simpler navigation
- Automatic change over to next TP after confirmation
- TSK shown on the graphic display
- One further step of **ZOOM** (full task)
- Full AAT support (Assigned Area Task)

Note!

The final glide calculation in TSK mode is calculated from the actual position to the finish line, via all uncompleted turnpoints. Final glide to a single turnpoint or airport is available in the TP or APT modes.

The menu structure is similar to the APT and TP. There are some additional data in graphic page as sector geometry which makes confirmation very easy and full TSK zoom. The ETA/ETE page is extended to support AAT (see also chapter 3). The tasks are numbered from 00 to 99 and the turnpoints building a task are numbered from 0 to 9. Point 0 is always the start point.

When approaching a TP, a **NEAR** message is displayed to inform the pilot that he is closing on the turnpoint. When the glider enters the observation zone, then the message **INSIDE** is displayed.

THALMAES TSK 01/0

BRG 330° DIS 2.0 km

TRK ---° AVG +0.0 g

← -1347m

260°14 km/h 0.0 1.0 0m

Task 01, point 0 (start)

Final glide indicator from actual position to the finish

Altitude (MSL) in vario mode; glide ratio to reach the finish in SC mode

T00/0 THALM

B039°

1.0 km

T222°

G 75 km/h

10 km

INSIDE

2.4.5.1 TSK - SELECT

Select function will help to select any task stored in the LX 7007 memory. The procedure will start after enter on SELECT. Any stored task can be easily selected after using of ↕.

Note!

Using the **ZOOM** knob is possible to select tasks by simply **rotating** the knob. This function is active only from the **main navigation page**. After each selection, the total task distance is shown for a short time to help to decide which task to choose. The total task distance displayed is the sum of the length of all the task legs, **plus** any additional distance to reach the start point.

MATKOPUS TSK 01/0

BRG 360° TOT 427 km

TRK ---° AVG +0.0 g

○ -8021m

WAIT 2 0.0 1.0 239m

Total distance for apr. 2 sec.

Note!

Selection of a new task isn't possible, if a task has been already started. Use RESTART a first.

Voice!

After selection the total task distance will be expressed. After ESCAPE during flight the distance to go will follow.

2.4.5.2 TSK - EDIT

The active (selected) TSK can be edited at any time, doesn't matter on the ground or during flight. An already **over flown** turnpoint can not be edited.

TSK EDIT TSK 01

44.4 km Time: 01:00

0 THALMAES 18.3 km 336°

1 ROTH ROT 26.1 km 073°

2 NEUMARKT

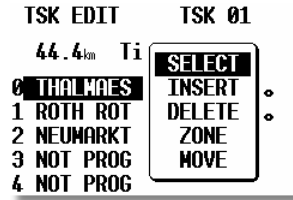
3 NOT PROG

4 NOT PROG

Expected time to complete TSK

The **expected time** to complete the task is entered in hours and minutes. While this input is not obligatory, doing so will allow progress to be monitored during an AAT which normally requires to be completed within a specific time window. Once the task is started, this time runs toward zero and the extended ETA/ETE page will show a lot of additional information (see flying LX 7007 Basic in chapter 3). After a task has been started no input is allowed.

If a turnpoint is to be inserted, changed or deleted, the desired turnpoint should be marked with the **UP/DOWN** selector and on pressing **ENTER**, a sub menu opens up:

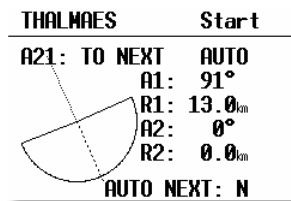


- **SELECT** replaces the turnpoint with another
- **INSERT** adds a turnpoint above the one selected
- **DELETE** removes that turnpoint from the task
- **ZONE** and **MOVE** relate to AAT (see below)

Assigned Area Tasks (AAT) - Special Functions

Up to five tasks of the 100 programmable (from 00 to 99) can be modified as AAT. Each individual task point can be configured for an AAT by using **ZONE** and **MOVE**. If **ZONE** and **MOVE** do not appear on the sub menu, then five tasks are already modified for AAT and the quota is full. The AAT modified tasks are active **for three flights only**. After the third flight all sectors are set back to the default settings (as defined in **SETUP/OBS.ZONES**) This feature allows the competition pilot to make three take offs without loosing the AAT information.

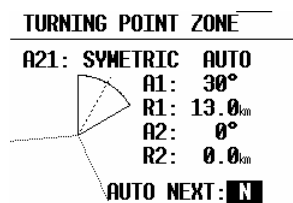
- **ZONE**- Using this function, an individual sector can be defined for each turnpoint of the task. In the following example TP 0, the start sector at Thalmaes is defined



A21, A1, A2, R1 and R2 have the same meaning described in **SETUP/OBS. ZONES** (See chapter 2.3.2.4)

The final option. **AUTO NEXT** defines what happens after reaching the programmed zone. When flying “normal” speed tasks, with **AUTO NEXT** set to **Y** (Yes), the LX 7007 BASIC will change over to next turnpoint immediately, after a fix is recorded in the sector. In an AAT this is not very useful, because of big sectors and the need to use the **MOVE** function. Setting the **AUTO NEXT** to **N** (No) prevents the LX 7007 BASIC from switching to the next turnpoint when reaching the sector. The pilot must switch over manually by making a short press of the **START** button. In the example below an individual sector with 60° has been set at the first turnpoint and the automatic switch over disabled.

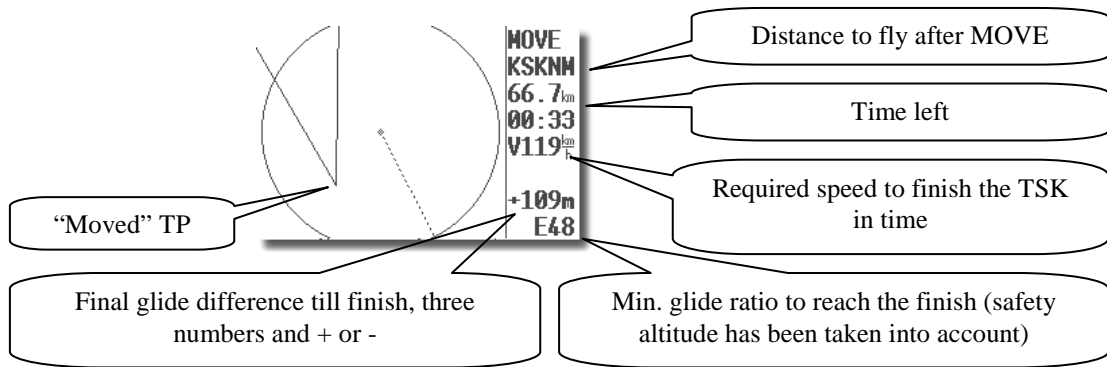
Example:
Selecting R1 more than 10 km, will set **AUTO N** automatically.



Start is default N, the TP will automatically change to N after **MOVE** function is activated.

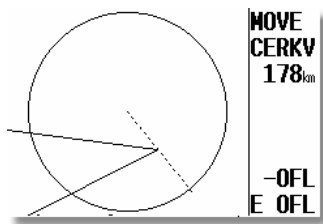
Note!
Editing a task and the corresponding sectors can also be done during flight. (see chapter 3)

- **MOVE** In an AAT the sectors are generally quite large; therefore it is reasonable to consider modifying the task during flight. All AAT's (max. 5, see above) offer this possibility. Moving of the turnpoints is allowed only inside the sector .

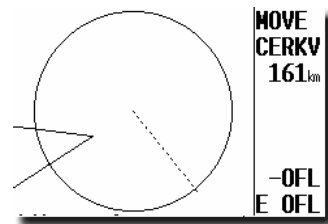


Having used MOVE-function, the “new” point has a '#' as the first character (very significant). The sector and the reference point stay unchanged, but all navigation data is modified corresponding to the new (virtual) point. For example, the final glide is now calculated around the new point, and the statistics are modified in the same way.

The point will move after using the rotary knobs **UP/DOWN** and **ZOOM**. The up down (↕) knob will move the turnpoint radial and zoom will rotate the turnpoint. It is not possible to **MOVE** outside the sector. Use up down knob at first and than zoom. Unless a specified task time (task edit) has been entered, the required speed and remaining time to complete the task will **not be displayed**.



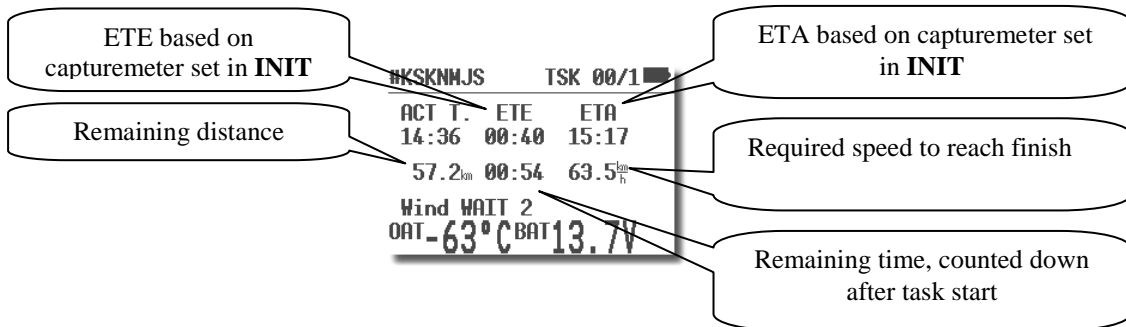
1st step move radial



2nd step rotate

2.4.5.2.1 Extended arrival page

Using of this page will give the pilot extremely important information about arrival, flying a task. Especially after using of MOVE function during AAT.



The **remaining distance** is the distance from actual position to the finish line. If the task has not yet been started, then this distance includes the distance to reach start also.

The **remaining time** is the time left to finish the task, simple count down after task start (active only after input TIME in TSK edit).

The **required average speed** is calculated from remaining distance and the remaining time.

Note!

ETA (Estimated Time of Arrival) and **ETE** (Estimated Time Enroute) define the arrival time and the time needed to reach the destination. Both depend on the settings in the INIT menu. Default setting is VAR, this means that ETA and ETE will base on vario average of the actual flight. MC or GS can be also preset. In that case both actual values are relevant.

By pressing **ESC**, the ETA and ETE calculated up to actual TP are displayed for 3 seconds.

2.4.5.3 TSK - NEW

Pressing **ENTER** with the cursor on **NEW** will select a sub menu asking whether an existing task should be copied. If N is selected, then the next available task with all points un-programmed will be selected. Sometimes it is easier to copy an existing similar task and then amend it; pressing 'Y' allows this to be done.

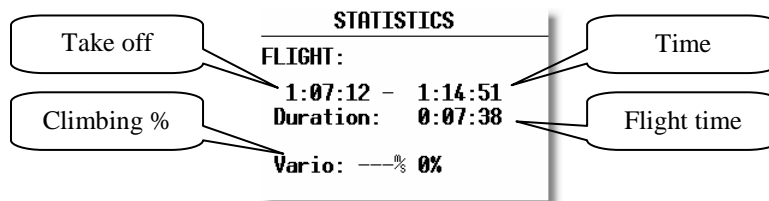
2.4.6 STATISTICS

This mode is exclusively used to give the pilot information about his actual flight. There are two levels of statistics; flight statistics and task statistics. Flight statistics are active immediately after take off and task statistics are activated once a start is made. (See chapter 3.2.4)

2.4.6.1 Statistics during flight

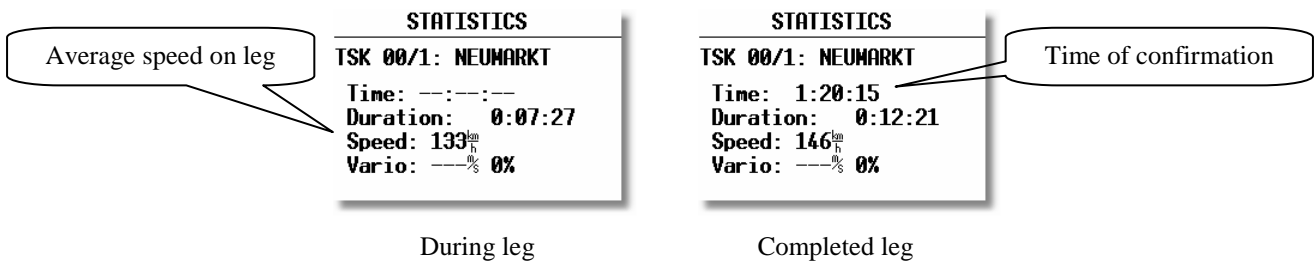
2.4.6.1.1 Flight statistics

The following page is visible during the flight and for a few minutes after landing. A few minutes later this page becomes Log Book.



2.4.6.1.2 TSK Statistics

The following statistics are available after the task has been started. Rotation of the **UP/DOWN** selector permits scrolling through individual legs.



During an active task leg, the time will remain blank as it is the **TP confirmation time** and is never shown until the TP is confirmed. The completed leg display shows time turn made, the time spent completing the leg (**duration**), average speed on leg and % of time spent climbing. The last shown screen always shows the **task statistics** from the start to the current position.

2.4.6.1.3 Log Book

The statistics data will be replaced with Log Book a few minutes after landing. The unit doesn't have flight recorder and therefore no further data is available.

2.5 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.. A custom programmable LCD has been designed to display the vario information as well as many other information. The display is user configurable.

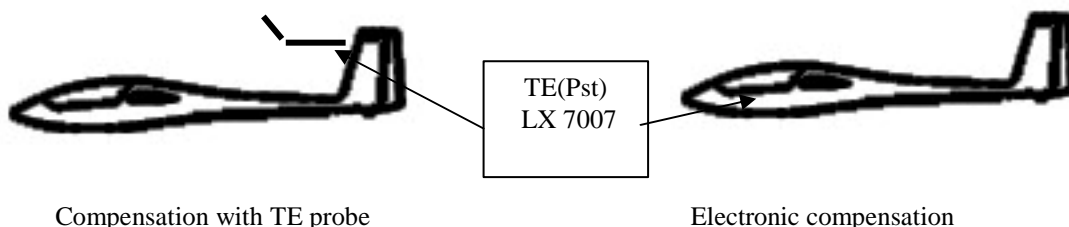
The variometer can be configured to show:

- range 5,10 and 2.5 m/s 10,20 and 5 kts
- five time constants 1s to 5s, in addition there are 4 settings of electronic processing for the vario signal
- netto vario air mass lift and sink
- relative vario shows the lift or sink that would be achieved if the glider was circled at thermalling 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. When using pneumatic compensation after using of TE probe, the LX 7007 BASIC **does not process the signal at all**. The quality of the TE compensation depends entirely on the location, size and dimension of the TE tube. The installation must be leak-proof.

Note!

If electronic TE compensation is selected, then the TE(Pst) port should be connected to a good static pressure source. If pneumatic compensation is selected, then the TE(Pst) port should be connected to the TE probe.



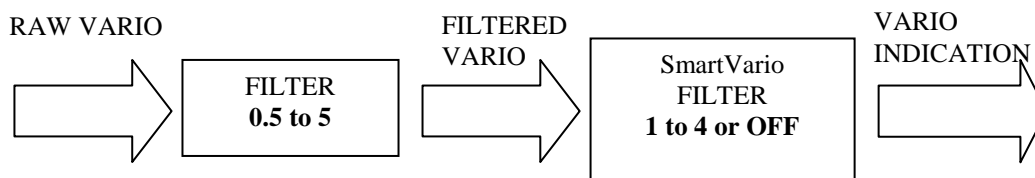
2.5.1 Smart Vario description

The LX system incorporates two configurable electronic filters in the circuitry. The first filter adjusts the time constant and is adjustable between 0.5 and 5 seconds. The 0.5 setting is the fastest while the 5 setting provides maximum damping.

The second filter, called the Smart Vario, is a dynamic filter and controls the rate at which the vario indication moves. When set to OFF, there is no restriction on the rate of movement of the vario indication other than the setting of the time constant filter. When set to 1, the vario indication will not move faster than 1 m/s (2 kts) per second, while when set to 4, the vario indication will not move faster than 4 m/s (8kts) per second. It should be noted that when set to 4, the vario indication will move four times faster than when set to 1.

Summary:

- The Smart Vario should not be used in isolation but in conjunction with the setting of the time constant filter. When the Smart Vario is activated, the time constant filter may need further adjustment to provide optimum indications.



2.5.2 Altimeter

The altimeter of LX 7007 BASIC is temperature compensated from -20°C up to + 60°C. The altimeter is calibrated from 0 to 6000m (20,000ft), but indication goes up to 8000m (26,000ft).

2.5.3 Speed command

Speed command flying based on the McReady theory is a very useful tool to optimise cross country speed. There are many visual indicators (see LCD Vario). 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 were developed:

- Continuous audio signal in + possible (other kinds of signals can be chosen, see setup)
- No audio at correct speed (dead band).

Note!

The SC bar of vario LCD shows continuously SC, mode doesn't matter.

2.5.4 Final glide calculation

The final glide calculator calculates the **final glide altitude difference** to the selected point (APT, TP). In the task mode the final glide is always calculated from the current position, round all uncompleted turnpoints to the goal. A + indication will inform the pilot that the glider is above the final glide slope and vice versa. The final glide takes into account **Mc setting, wind, bugs and safety altitude**.

Note!

The elevation of the finish point is imported from the TP database into the final glide altitude difference. If this elevation is incorrect, or is set to zero, and the altimeter is set to QNH, then the final glide will be in error.

It is therefore important that the elevation of the goal is correctly entered in the TP database.

The safety altitude (reserve) input does not affect the glide difference indication which should be 0 m/ft during the final glide. It simply means that the glider will arrive over the goal at the selected safety altitude.

3 Flying with LX 7007 BASIC

To get the best out of the LX7007, it is important that some precaution is done prior to the flight – trying to configure the instrument or set up a task while flying the glider may spoil your whole day! Pre-flight preparation will ensure that the flight will be both successful and enjoyable.

3.1 Switching ON and selecting pilot

Pressing the **ON/START** button will switch on the LX 7007. The instrument will go through the initialisation phase and stop on the pilot selection. On selecting the pilots name and pressing enter it will continue the initialisation until the **Set Elevation** menu (entering elevation of the take off airfield) is reached. If the instrument has not previously been programmed, the pilot name selected will be 'UNKNOWN' and it will go straight to the **Set Elevation** page, the same will happen, if there is no pilots stored in the pilot list, means a single pilot solution is used.

Note!

It is **recommended** to switch the unit **ON some minutes before take off**, to give time to the GPS receiver to **acquire** enough satellites.

3.1.1 Single pilot option

If only one person fly's the glider, then only his name should be programmed into the instrument through **FLIGHT INFO**. The LX 7007 will then show the name of the pilot during the initialisation procedure and switch automatically to the **Set Elevation** page. Don't confirm **SAVE TO PILOT LIST** with Y.

3.1.2 Multipilot option

Up to 30 pilots can be stored into the pilot list of the LX 7007 pro IGC. The first pilot has to be entered into the **FLIGHT INFO** and then copied into the pilot list via **ADD PILOT TO LIST (Y)**, this command will be activated automatically after leaving of Flight info (ESC). Further pilots can be registered under **SETUP / PILOTS** with **INSERT**, or via **PC/PDA/SD** data transfer at any time. Pilots, who want to have their individual settings **safe**, should use **EDIT** (under **SETUP / PILOTS**) and input a **personal password**. After password input only persons who will know the password will be able to use protected name and settings.

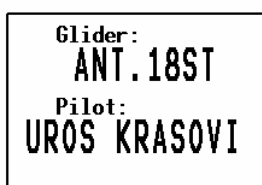
Note!

Individual settings done by pilots will be automatically stored and will be recalled after mentioned pilots name will be selected after power on. To keep individual data safe, the pilot is able to prevent his settings by a password, which is available in **SETUP/PILOTS**.

Note!

After selection of UNKNOWN **the last active settings** will be restored.

If the pilot name has been sent via PC or PDA (usually after declaration transfer) or input by hand and **not saved** (**ADD PILOT TO LIST N**) to the pilot list, such a pilot will be treated like **a temporary pilot** and his data will be lost after a **new selection**, but will remain after power off. Temporary pilot will overtake the **last active settings**.



Glider:
ANT.18ST
Pilot:
UROS KRASOVI

In Summary:

- If **UNKNOWN** pilot name is selected, then the **settings** from the last flight, irrespective of the pilot, will be used.
- If a **Pilot** without a password is selected, then the settings of the last flight **by that** pilot will be used.
- If a **Pilot has protected** his individual settings after input of a password, nobody except him will be able to pass the initial routine and to use his name and settings.

A **temporary** pilot will be offered, if his data has been transferred by PC, PDA (Flight info) or after a manual input and not saved into pilot list. After first subsequent pilot selection this temporary pilot will be deleted permanently.

Note!

If a single pilot flies the glider in different configurations, then it is recommended that he uses the multi pilot option listing his names as 'AN OTHER 15m' and 'AN OTHER 18m' for instance. This will ensure that the correct polar will be used as it is one of the stored individual settings.

Voice!

Set pilot.

3.1.3 SET Elevation (take off elevation input)

We all know that air pressure changes all the time and it is important that the altimeter is re-referenced before each flight. After completing the initialisation, the instrument requires that the elevation of the present position is entered.



Voice!

Set elevation.

This setting is **obligatory**. The instrument will offer the last airport which was on the top of the NEAR AIRPORT list, before power OFF. If this is OK, the pilot can either simply confirm the offered elevation, or alter it. After setting the elevation, an input of the current QNH setting is called for. This is **not mandatory**, but very useful as by entering the QNH will enable the pilot to subsequently alter it as necessary. If the QNH is not entered, it can be ignored by pressing **ESC**, but the pilot will then be unable to subsequently alter the QNH setting during the final glide.



Setting QNH:

- Rotate **UP/DOWN** and 1013 mb will be offered
- Use **ENTER** and **UP/DOWN** to enter actual value

Note!

The unit will offer the elevation of the airfield which was on the top list in NEAR, just before regular power down.

Note!

If the QNH is not set in the start up procedure, it can not subsequently be changed in flight.

Voice!

(Set QNH)

3.1.4 Pre-flight check

It is strongly recommended to check all settings of following items:

- QNH/RES
- INIT
- Ballast, if not defined with **set** in setup LOAD

3.1.5 Preparing a task

It is advisable to prepare the task correctly before taking off and thus avoid mistakes made in haste.

a) Entering the task

- Transfer the task file (.da4) from a,PC,PDA (transfer of .cup also possible), LX20 or Colibri
- Read .da4 from **SD card**
- Copy a similar task using of **Copy** function and edit after (saving of time)
- Enter a new task manually.

b) Check task

- **Right TP's**, sequence, distances between points, bearings and total distance
- **Check visually** task geometry after using of zoom TSK

3.1.5.1 AAT (assigned area task)

Assigned Area Task is in fact a speed task where the task distance isn't predefined. The pilot has limited influence on task geometry due to **bigger sectors** which are regularly set. The pilot decides how deep he will fly into individual sector to reach optimal average task speed. Usually **minimum time** spend on task is also set, to prevent flying to short tasks.

3.1.5.1.1 How to prepare an AAT?

The AAT has the same structure as whichever other task and all known methods to enter are the same as described. The only exceptions are bigger sectors having **specific geometry**. To prepare sectors use **ZONE menu** for each sector individually.

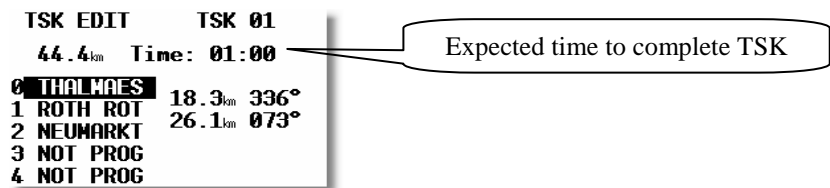


As described in 2.4.5.2, enter the sector geometry:

- Orientation
- R1 and R2
- Angles A1 and A2
- Check and eventually set AUTO : Y/N (automatic change over criteria)

Note!
Setting **R1 bigger than 10km** will set AUTO: N, means change over to next TP of an AAT will follow exclusively on pilot demand.

To be able to exploit all benefits of LX 7007 AAT capability it is strongly recommended to input the **time** which is **expected to complete** the task.



The input depends on **TSK distance**, **weather situation** and **pilot personal prediction**. After successful input the third task page will become complete and will show expected speed over the whole task. The speed is simple division of time and the distance.

	CELJE/AD	TSK 00/0
TSK time	ACT T. 18:28	ETE 93:56
	ETA 16:25	
	543.1_{km}	05:50
	93.1_{km/h}	Expected TSK speed
	Wind WAIT 2	
	OAT-85	CBAT13.5V

Note!

Minimum task time is usually set, by task setter. So, never input **shorter time** than declared in the task sheet. It is suggested to input min. 10 minutes more to avoid premature finish line crossing.

If the expected task speed seems to be not realistic, use **MOVE** function to adapt TSK distance and consequently the speed. MOVE function is available also on ground via edit.

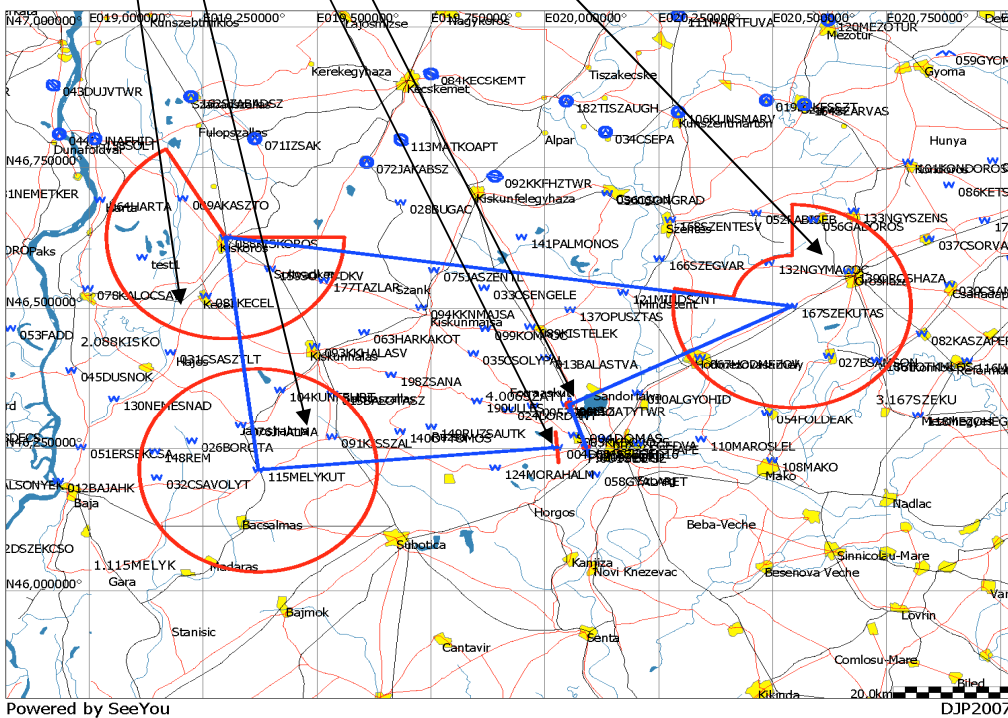
3.1.5.1.2 Example of an AAT

The example listed below represents a sophisticated AAT geometry. The most sophisticated is TP 167 which consists of two segments having different radius and are also oriented under task setter requirements.

Type: Assigned area task with 4 areas
Task time: 02:30:00
Task distance: 163,5km/344,4km

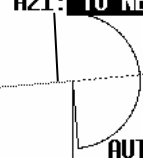
Style	Code	Points	Latitude	Longitude	Dis.	Crs.
Take off		000SZEGE	N46,247500°	E020,091383°		
Start		004DOMAS	N46,252500°	E020,026950°		
1.Point		115MELYK	N46,213050°	E019,371383°	50,6km	265°
2.Point		088KISKO	N46,626383°	E019,299450°	46,3km	353°
3.Point		167SZEKU	N46,504167°	E020,542500°	96,0km	98°
4.Point		006SZATY	N46,329450°	E020,053617°	42,2km	243°
Finish		001SZEGE	N46,252783°	E020,090833°	9,0km	161°
Landing		000SZEGE	N46,247500°	E020,091383°		

Observation zone description:
 Start 004DOMAS: To Next Point, Line 6,0km
[Style=To Next Point, A12=Auto, R1=3,0km, A1=45°, R2=0,0km, A2=0°, LineOnly]
 1.Point 115MELYK: Cylinder R=20,0km
[Style=Symmetrical, A12=Auto, R1=20,0km, A1=180°, R2=0,0km, A2=0°, Assigned area]
 2.Point 088KISKO: R=20,0km, Brg1=150°, Brg2=270°
[Style=Fixed Value, A12=30,1° R1=20,0km, A1=120°, R2=0,0km, A2=0°, Assigned area]
 3.Point 167SZEKU: Rmin=10,0km, Rmax=20,0km, Brg1=100°, Brg2=180°, Cylinder R=10,0km
[Style=Fixed Value, A12=320° R1=20,0km, A1=140°, R2=10,0km, A2=180°, Assigned area]
 4.Point 006SZATY: Cylinder R=500m
[Style=Symmetrical, A12=Auto, R1=0,5km, A1=180°, R2=0,0km, A2=0°, Assigned area]
 Finish 001SZEGE: To Previous Point, Line 100m
[Style=To Previous Point, A12=Auto, R1=0,5km, A1=45°, R2=0,0km, A2=0°, LineOnly]




Inputs on LX 7007 regarding above mentioned task sheet.

004DOMAS	Start
A21: TO NEXT	AUTO
A1:	90°
R1:	3.0 _{km}
A2:	0°
R2:	0.0 _{km}
AUTO NEXT: Y	




Start: line 2x 3 km

115MELYK	1.Point
A21: SYMMETRIC	AUTO
A1:	180°
R1:	20.0 _{km}
A2:	0°
R2:	0.0 _{km}
AUTO NEXT: N	




TP 115MELYKUT: cylinder 20km

088KISKO	2.Point
A21: USER VAL	30°
A1:	120°
R1:	20.0 _{km}
A2:	0°
R2:	0.0 _{km}
AUTO NEXT: N	




TP 088KISKO: cylinder cut out having user orientation

167SZEKU	3.Point
A21: USER VAL	320°
A1:	140°
R1:	20.1 _{km}
A2:	180°
R2:	10.0 _{km}
AUTO NEXT: N	




TP 167SZEKU: combination of cylinder with cut out and cylinder, having user orientation

006SZATY	4.Point
A21: SYMMETRIC	AUTO
A1:	180°
R1:	0.5 _{km}
A2:	0°
R2:	0.0 _{km}
AUTO NEXT: Y	



TP 006SZATY: 500 m cylinder

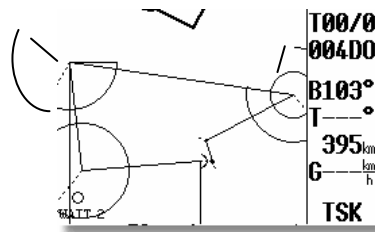
001SZEGE	Finish
A21: TO PREV	AUTO
A1:	90°
R1:	1.0 _{km}
A2:	0°
R2:	0.0 _{km}
AUTO NEXT: Y	



TP 001SZEG: finish line 2x 1km

Note!

Use task graphic page (**zoom TSK**) to verify, if the task shape corresponds to this given in the task sheet.



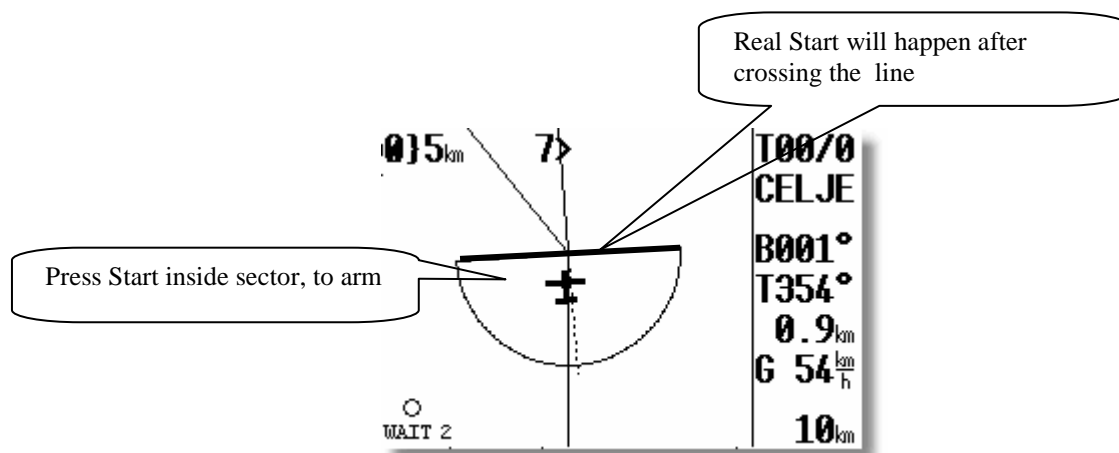
3.2 Performing the flight

After take off, the unit will change over into flying mode. The most significant signal is replacement of **Logbook** with **Statistics page**.

3.2.1 Starting a task

The procedure consists of two parts. The first part may happen as the glider has entered the sector and the pilot wants to depart. The second part is executed automatically immediately after leaving the sector (Start line). The procedure:

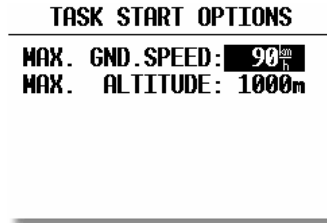
- Wait until the message **INSIDE** appears on the display accompanied with an audio signal or voice. , This indicates that the glider is in the start sector. Before entering a **NEAR** message will inform about approaching to the sector. This message will be activated as the glider will enter 1 km cylinder. Having big sectors this message may not appear
- Press the **START** button (short press), to arm start.

**Note!**

A task can not be started on the ground.

A very clear indication that the start has been armed is change of navigation data. The navigation data will change toward first Turn point. The real start of the task will not happen at this moment. It will happen immediately after the glider will cross the start sector line. This makes start procedure extremely simple, stress less and offers an accurate task statistics, as the statistics will be activated immediately after crossing the start line.

LX 7007 V 1.2 offers a very useful help, if the **altitude and or ground speed** at the line crossing are limited. Both limits are able to be input in TSK Menu/ START OPTIONS.



Note!
 The altitude input should be MSL.

A good start will be indicated with an info page which will be removed after 15 seconds and a bad start will be accompanied with a **warning**, but this will remain until pilot confirmation.



It is also possible to start a task, while the glider is **outside the start sector**. In this case the pilot has to press **START** for a **longer time** (about 6 sec), but in any case long enough until the TSK navigation data to the first TP appears.

3.2.2 Task Restart

Once the task has been started, it can be terminated (**RESTART**) at any time during flight and a new start made. If a task has already been started, press **ENTER** and the following dialog will open:



Confirming **RESTART** with **Y** will restore the actual task. The task is now ready for new start.

Note!
 After a task has been started, it is not possible to select a new one. Use **RESTART** and **SELECT**.

3.2.3 Over Turnpoint (flying a task)

By default, the LX 7007 PRO IGC switches over (automatically) to the **navigation data of the next turnpoint**, as soon as one fix is detected in the sector of the actual TP. This situation will be accompanied with **INSIDE** message, an audio alarm and voice, if Voice Module is installed.

If a turnpoint **can not be reached**, the pilot can manually switch (**jump over**) to the next turnpoint by pressing **START** for **approx. 6 sec.** (just watch navigation data). Alternatively, he can delete the unreachable turnpoint in the **TASK / EDIT** (recommended procedure). **Neither action has any effect on the declaration!**

3.2.3.1 Switch over flying an AAT

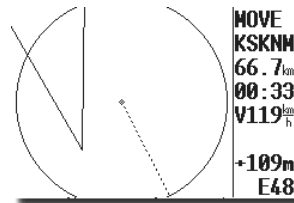
AAT sectors are regularly **big sectors** and the pilot has to decide how far into the sector he wants to fly. It is recommended to make task distance adaptation **before reaching** the sector after using of **move** function. After first MOVE action the actual TP will be renamed. Every such a TP will get a **# symbol** as the first character of its name.

3.2.3.1.1 Use of MOVE function

The **MOVE** function (see also chapter 2.4.5.2) modifies the task significant as the TP is moved., Recalculating of the **remained distance, ETA, ETE, required average speed** (third navigation page of task), **final glide** and the **minimum glide ratio**, will follow.

CELJE/AD		TSK 00/0	
ACT T.	ETE	ETA	
18:28	93:56	16:25	
543.1 ^{km}	05:50	93.1 ^{km} _h	
Wind WAIT 2			
OAT -85 C		BAT 13.5V	

Once the task has been started, the **MOVE** function is immediately available for the actual TP on pressing ENTER, irrespective of which navigation page is selected.



To move TP use ↕ (radius) and ZOOM (rotate).

Note!
It is recommended to **observe average speed** during move procedure to keep speed realistic.

3.2.3.1.2 Switch over procedure

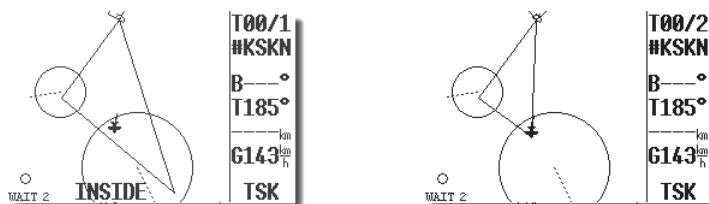
To change over to next TP a short press on **START** button is **absolutely** necessary, after the glider position is inside the sector. MOVE doesn't matter.

Note!

After MOVE **had been used** and, the START pressed the **actual glider position** will be taken as an AAT turnpoint (some kind of automatic move). This will **ensure realistic** ETA, ETE, remained distance and required average speed. If there was no MOVE **at all**, the **default TP** data will be taken in calculation and such a situation will cause wrong statistics information.

Generally it is not necessary **to fly close** to the moved point. A decision to switch over to next point may happen anywhere in the sector. This act will **immediately update** the task and also ETA, ETE, the distance and required average speed to reach finish.

Example:



Before press on Start

After

Voice!
Next turnpoint

3.2.4 Statistics during flight

A few seconds after take off the log book page will be replaced with statistics page. The statistics will inform about some important data special, if a task is flown.

The first page of **Statistics mode** is always active and shows take off time and the duration.

Rotating of ↻ will select individual leg statistics data and the last page is always task statistics data. This page includes a very important data about average speed from start until instantaneous position.

3.2.5 Task end

On entering the finish zone the task stops automatically and a message **TSK END** will appear. If you want to fly a new task without landing, then it is necessary to use RESTART and SELECT. If the MOVE function has been used on the **finish point**, then it will be necessary to finish the task by using the START button as in the AAT sector.

3.2.5.1 Procedure after landing

It is recommended **not to switch off** the unit immediately after landing. Two minutes after landing the statistics data will be replaced with Log Book and this is the right moment to switch the unit off.

3.2.6 SIMPLE TASK (flying around TPs or APTs)

The simple task feature is active prior to **a regular task being started**. The feature is very useful for pilots who do not fly tasks but fly from TP to TP (or to an APT). Simple task permits statistics to be stored like in a real task and which can be displayed on the Statistics page.

Immediately after take off, the **current position** will be considered to be a **start point**. On reaching a TP or APT which has been selected in TP or APT pages, the point will be treated as a confirmed TP of a simple task and so on. The radius to define confirmation of arrival at the TP is set by pilot in „**NEAR TP**“ (SETUP/PASW/TP). The simple task grows more and more as TPs and APTs are reached. The flight statistics is the same as by real task except that TSK S shows that no regular task is being flown. Of course the third navigation page is not complete.

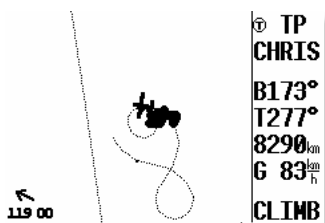
STATISTICS	
TSK S/1: THALMAES	
Time:	0:52:19
Duration:	0:08:11
Speed:	126 ^{km} / _h
Vario:	---% 0%
Engine:	-'-''

To perform more **realistic situation**, the pilot is able to define his start position at any time. After RESTART, the **position** at the time of the restart will be taken as new start point of a simple task.

3.2.7 Climb indicator

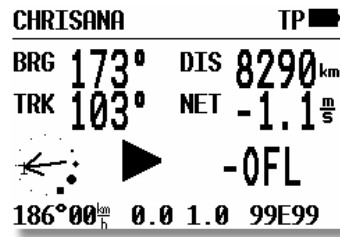
Some additionally help was developed to make pilots searching for the centre of climbing easier.

- After lowest ZOOM, rotate one step to the right and a special graphic page called CLIMB will open. A glider symbol with its route done in the last 60 seconds will be present, each second one sample. Additionally to the position data vario is sampled and a maximum is calculated. The maximum is designated like dot with the biggest diameter. The pilot should steer to fly into this area.



The area is 700 x 700 m big.

- The second variant is offered in the first navigation page.

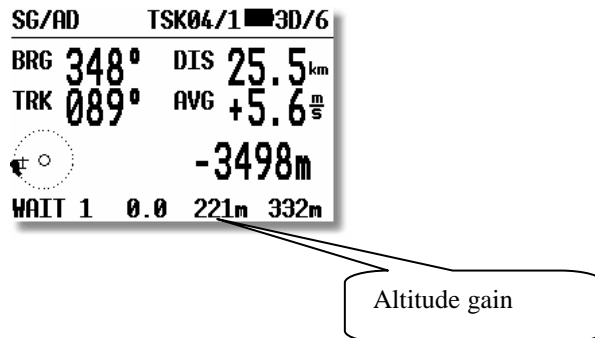


Around the wind vector is build a circular display which dots shows vario samples. The same philosophy like by CLIMB display was taken and the fattest dot shows vario maximum. A small glider symbol is positioned always on the left or on the right side and its position is always stable. During right circles the symbol will be on the left side and vice versa. The pilot should imagine his position in the glider symbol and wait until vario maximum will meet the glider. The wind vector isn't involved.

3.2.8 Altitude gain indicator and Total Averager

3.2.8.1 Attitude gain indicator

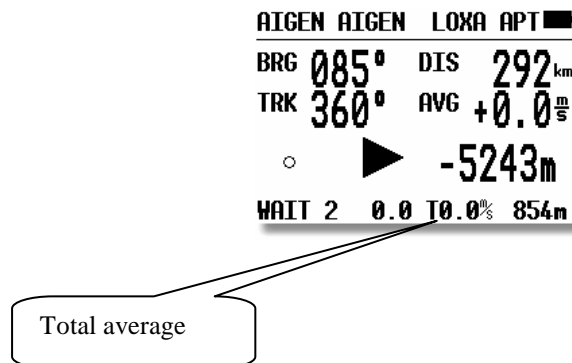
As the glider will **start circling** the altitude gain indicator will became active and will show continuously **altitude gain** of the actual thermal. The circling detection runs automatically and the pilot isn't able to influence the process.



As the glider will leave the thermal and will continue straight away a total average of the last thermal will be shown until next circling.

3.2.8.2 Total averager

This information is also available in the first navigation page of APT, TP or TSK, exclusively during straight flight. VAR/SC status doesn't matter. A **T** accompanied with figure shows division of altitude gain and time spent in the last thermal.



Total average may be also inquired during climbing period, it is necessary to switch into SC for a short time.

3.2.9 Using of PDA like secondary navigation system

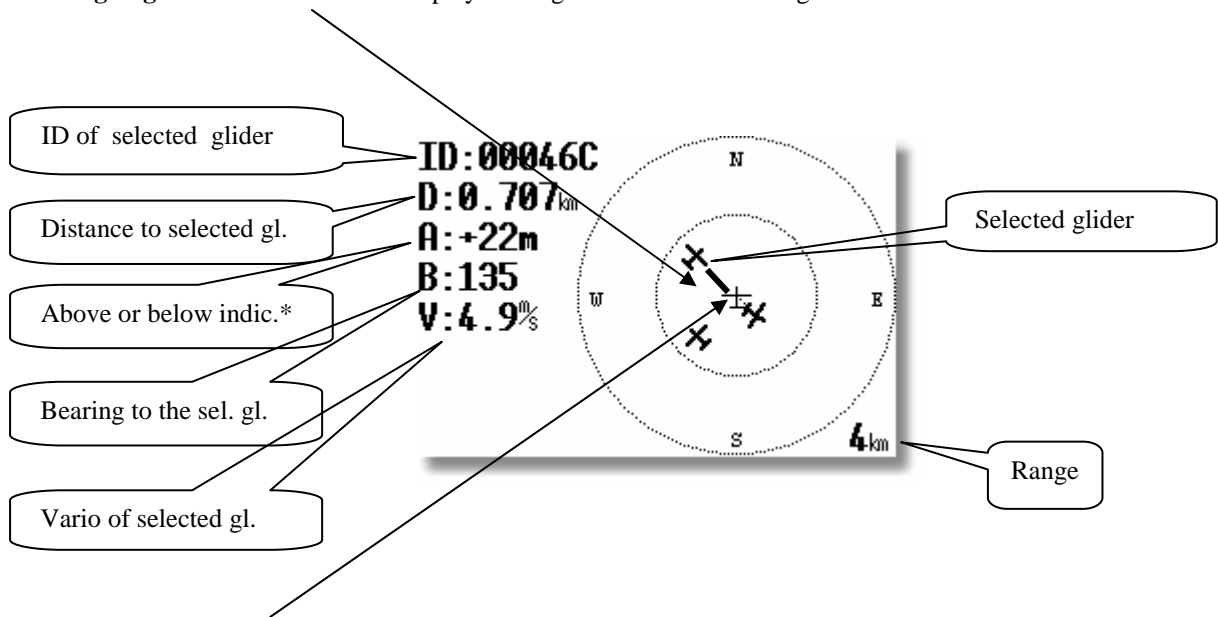
Many PDA running programs will operate using NMEA data send out of LX 7007 PDA interface. Additionally data sentences including altitude, vario, task data, etc. to drive SeeYou Mobile, Winpilot or Navigator are active after appropriate setting in Setup of LX 7007.



3.2.10 Flarm features

If the unit receives Flarm collision relevant data together with NMEA is therefore capable to offer a wide range of very useable functions which will make Flarm in conjunction with LX 7007 much more sophisticated.

After a short press on **Mark** button a Flarm graphic display will open and actual traffic situation will be visualized. The display orientation can be selected in setup Flarm. All near gliders are present on the display and detailed data of **one glider** is displayed in the left upper corner of the display. **The glider selection** is possible after using of **up/down** (⇅) switch. A **line going** from the centre of the display to the glider defines selected glider.

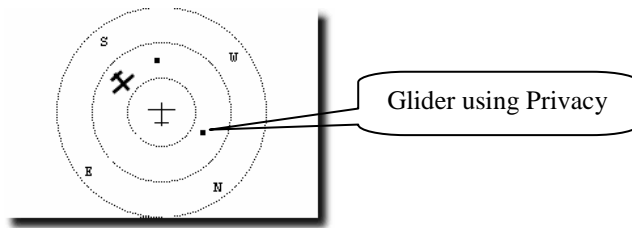


The **central positioned glider** which silhouette is not bold, illustrates reference point of the system in fact this is the glider where the pilot is sitting.

Character A can have + or – sign; + **means above and – means below** in meters or ft.

Range adjustment is possible after using of ZOOM.

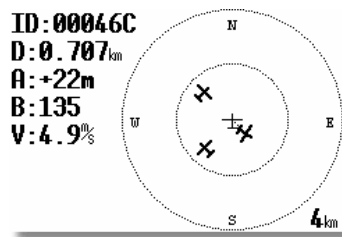
Some pilots are using so called **Privacy function**, also called as Stealt. Doing this they transmit only minimum collision relevant data and such a gliders are not described with glider symbol, they are present like dots on the LX 7007 display. The command to activate Privacy function and vice versa can be also sent from LX 7007, after using of Seup/Flarm.



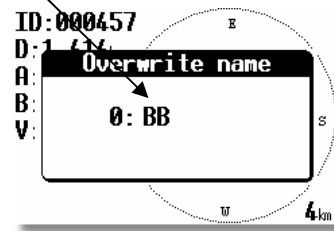
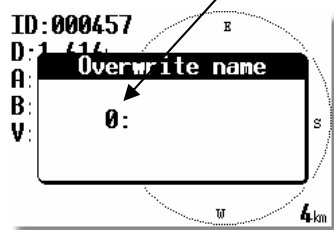
3.2.10.1 Flarm ID customisation

As the Flarm ID number of the near glider doesn't say a lot of, a customisation of mentioned ID is possible for known gliders. If one known glider is in radio range the pilot is able to customize its ID into more covenant form, let say competition number or something similar. After customisation this particular glider will always be represented with its customized ID. The procedure:

-select the glider of interest after using of ↕



-press **enter** and a menu will open, select **successive** number and input **custom ID**



LX 7007 has space to store up to 10 customized Flarm IDs. An already customized ID can be edit at any time.

4 Communication with PC, PDA, Colibri/LX20 and SD Card

Note!

The unit is able to **adapt automatically** to the baud rate of the partner unit, so no more problems if both units don't have the same baud rate. A very typical message **AUTODETECT** will inform about searching for synchronization. After synchronization is established a **CONNECT** status will appear.

The LX 7007 BASIC is able to communicate with a:

- PC, using LXe, SeeYou or Strepla .
- SD card,
- PDA, ConnectLX, Downloader
- LX 20
- Colibri

Note!

The unit is equipped with three **physically separated** com ports, which means no data collision even all possible devices connected and switched on.

Using of LX7007 in conjunction with a LX20 or Colibri, is possible to prepare a flight at home or during the competition briefing and then when at the airfield use the LX20 or Colibri as a data source for LX 7007 BASIC. Similarly, a task can be programmed in a PC and then transferred to a LX20 or Colibri for subsequent loading into the LX7007.

Using of a PDA will do the same, but additionally offers downloading of flights, which means practically no use of PC in cockpit any more.

A CD with the following programs is supplied with LX 7007 BASIC:

- **LXe** Windows program for communication, basic flight evaluation and database management.
- **LxasBrowser** for airspace management and its manual.
- **ConnectLX/connectMe** for data transfer LX 7007 - PDA.

4.1 Communication with PC

After PC communication art was chosen by the pilot, a PC connected to the **5P round** connector, normally positioned on the instrument panel, can do this job. All kinds of PC communication can also be provided after using of **IGC port** which is available on the rear side of the unit. Use IGC standard cables.

Communication with a PC is via the RS232 serial COM port. If your computer only has an USB port and no real serial COM port, then you will need to obtain an USB to serial adapter, available in every computer shop. To couple the unit to the COM port, a special cable is supplied with the LX 7007 BASIC which terminates in a SUB D 9 pin socket, on the PC side.

A CD with the following programs is supplied with LX 7007 BASIC:

- **LXe** Windows program for communication, basic flight evaluation and database management. The user manual is available on LXe CD or www.lxnavigation.si.
- **LXMobile** moving map PDA program
- **LxasBrowser** for airspace management and its manual.
- **ConnectLX** for communication with PDA

Using the LXe program, the following data transfer options can be carried out:

- Read *.da4 (TP and TSK files)
- Read flight info
- Write *.da4 (TP and TSK files)
- Write flight info *.hdr
- Write APT
- Write airspace (**.CUB** files only)

Another very useful function of LXe is the preparation of task details such as start, TP and finish sectors. Using the menu **ZONES** in Lxe, the details of AAT sectors can also be programmed. All this data can then be transferred to the LX7007. LXe can also be used to update the APT and airspace database. Such updates are free and **no update code** is necessary.

Note!

LX 7007 has a memory capacity to store maximal 6 .CUB airspace files. To replace one section with another simple load a new one. Flying a competition where some special versions of airspace are issued, overwrite the airspace which you normally don't use, to prevent missing of airspace data after returning home.

The CONNECT status is achieved as follows:

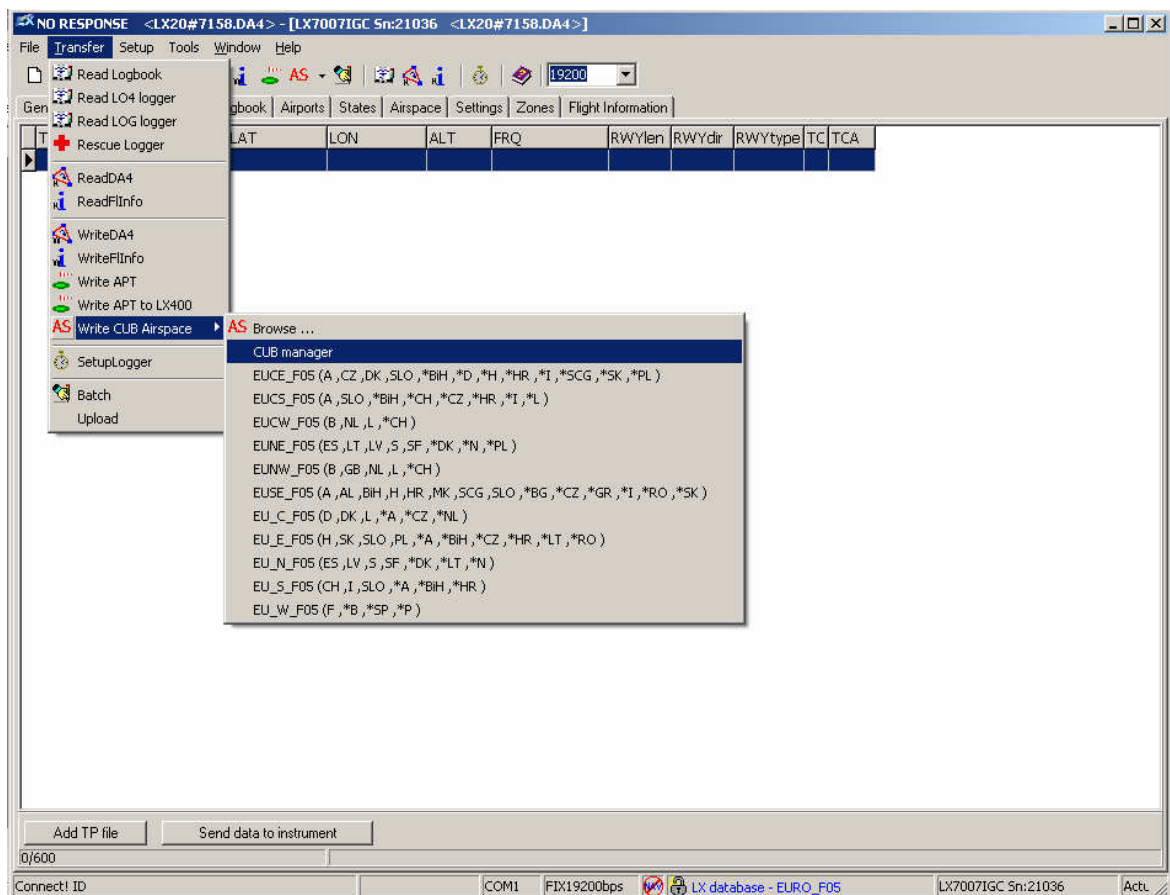
- On the PC run program LXe
- On the LX 7007 BASIC go to SETUP – TRANSFER /PC PORT
- On the LX 7007 BASIC press ENTER and wait some seconds until AUTOCONNECT finish and CONNECT appears

CONNECT indicates that both LX 7007 BASIC and PC have established Connection and are ready for data exchange.

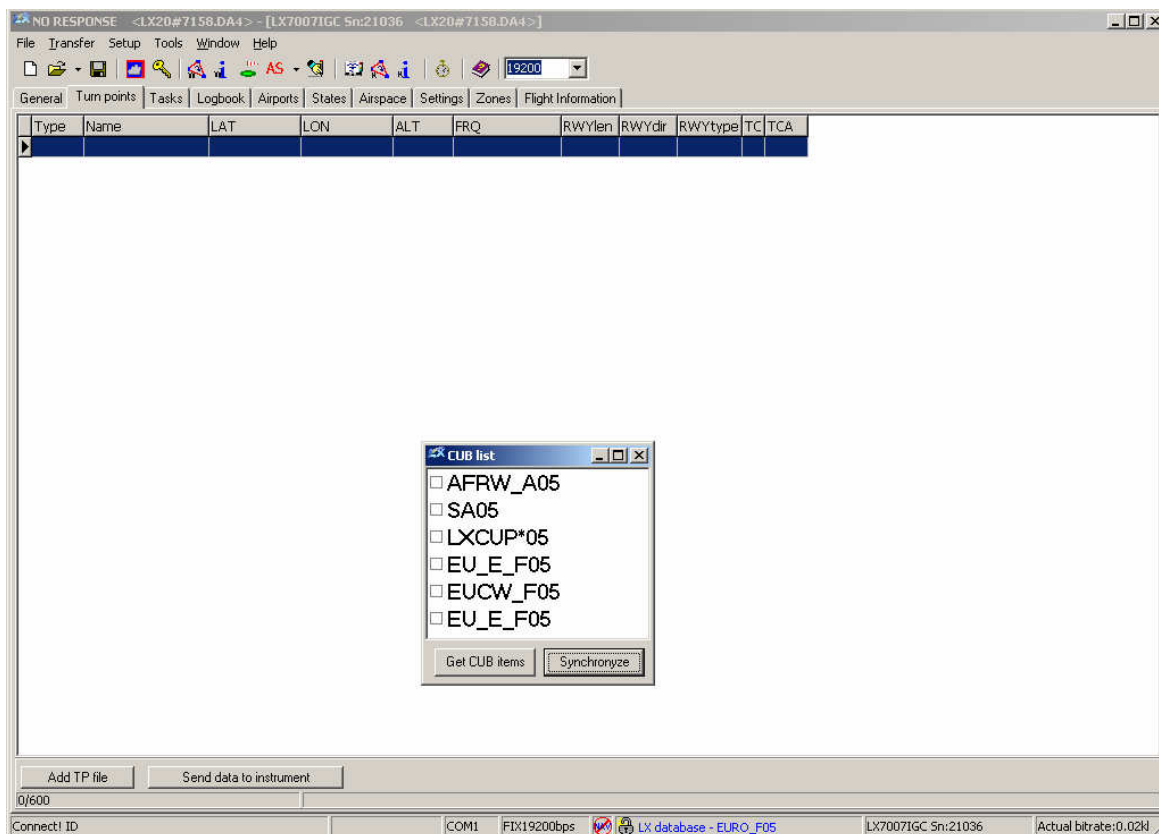
4.1.1 Loading of airspace sections

LX 7007 has capacity to store up to six sections of airspace. All sections can be loaded in one shot. Use LXe build on Jan. 13th 2006 or later. The procedure:

- Establish **CONNECT**
- Press on **Transfer**
- Select **Write CUB** airspace and click on **CUB manager**



- All airspace sections already stored in the unit will be shown.



- Use right mouse click on airspace which you want to replace, a browse function will allow you to select any **.cub**.
- Press on **Synchronize** to transfer checked files into LX 7007.

4.1.2 Some help having problems with communication

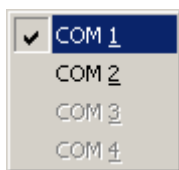
4.1.2.1 General

90% or more problems causes from PC side.

Having mentioned problems, please go carefully through that document, having too little knowledge about PC operating system, please contact experts.

4.1.2.2 Troubleshooting with LXE

- Available communication ports for LXE (Setup→Comm. Port)



Highlighted ports are ready to be selected.

Means that LXE will use checked port for communication with LX, there is no automatically selection by LXE. Selection of comm. port should be done after first run of LXE.

- No ports available

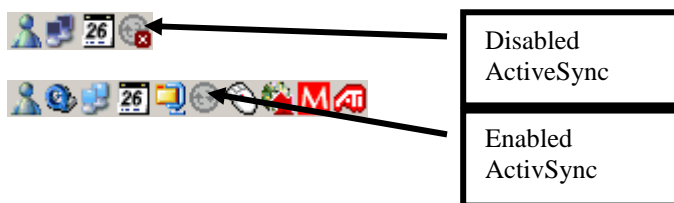


After such message, no communication will be possible.

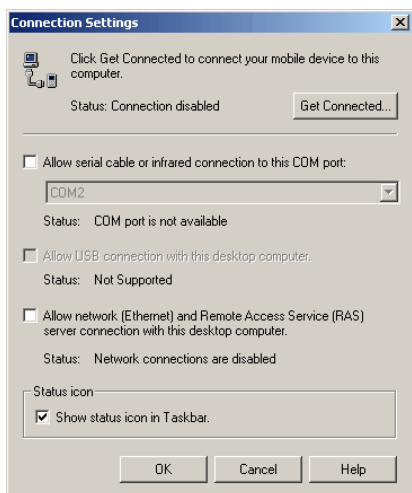
Reasons:

- **PC has no serial ports** (LAPTOP with USB only – the only solution is USB to RS232 adapter – available in computer shops – necessary to install drivers
USB-232 adapter should be plugged in **before starting LXe**)

- Ports are occupied by another applications – programs (E.g. Active sync program for communication with PDA's)



How to disable Active Sync?



After right mouse click on ActiveSync symbol in task bar, choose *Connection settings...* and disable it. (PC's with only one comm. port).

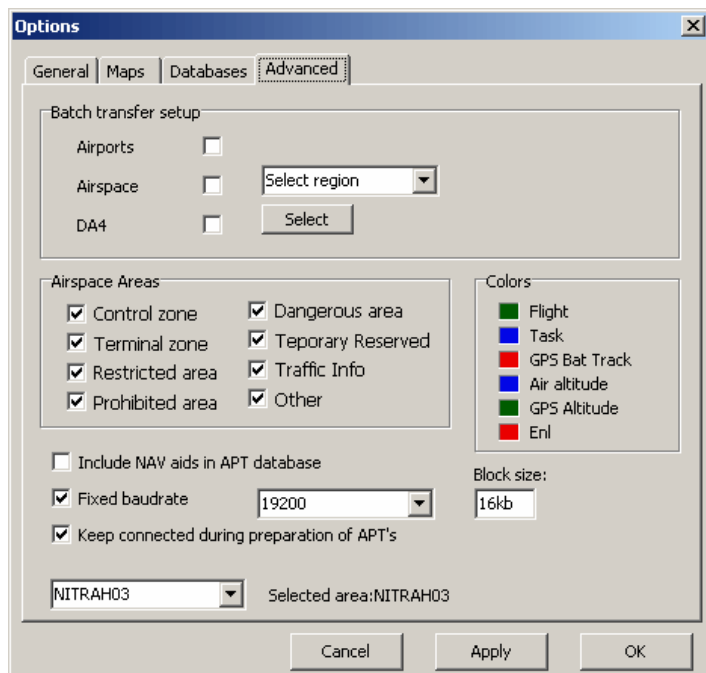
Problems caused by USB to 232 adapters.

Normally PC has more than one USB port. On first use of USB/232 adapter, operating system will detect new USB device. Wizard will guide you through setup process of drivers for specified USB/232 adapter. After successfully installation of USB driver Lxe will detect new additional comm. port. Usually the number of new comport is higher than 4. (COM5, COM6...)

It's recommended to use always the same USB port on PC (physically). If you use another USB port, new installation of USB/232 driver will be necessary. Operating system will add next free communication port.

4.1.2.3 Recommended LXE settings for safe communication

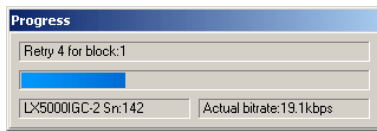
- Fixed baud rate
- 19200 bps
- Keep Connected during preparation....



4.1.3 Having problems downloading flights (read selected flight-command).

Symptoms:

- Baud rate speed is not constant (oscillating from 0k to 19k)
- More retries downloading blocks



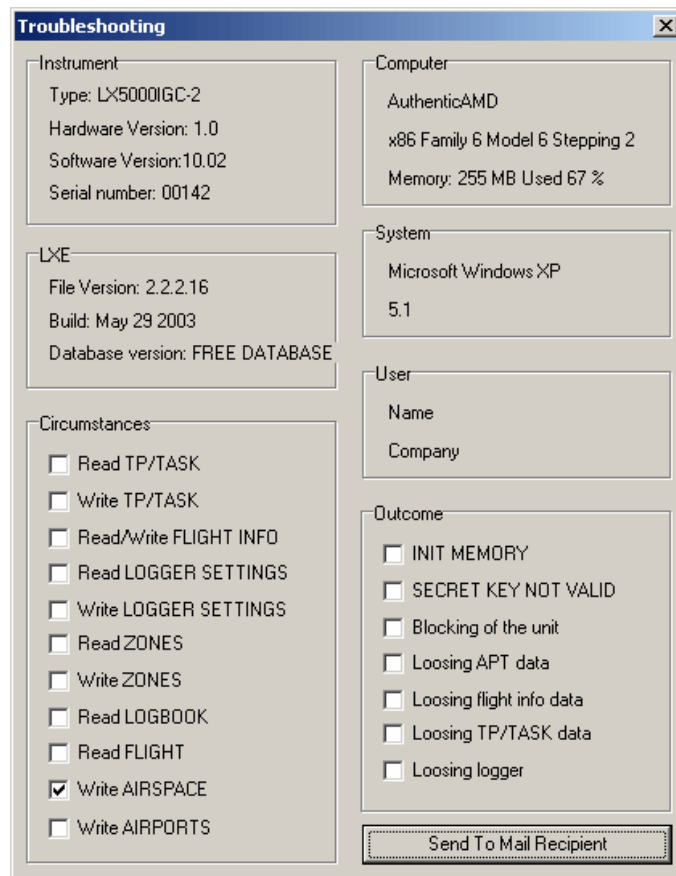
Result could be unsuccessful downloading of the flight.

Workaround:

- Reduce communication speed to 9600 bps or lower and do the same on LX unit. (that is a typical problem by laptops using USB adapter)
- Reduce block size (Options/ Advanced)

4.1.4 Additional help from LX navigation

Haven't found any solution, please use *Help*→*Troubleshooting* form of Lxe and send it to support@lxnavigation.si



4.2 Communication with PDA

A completely separated com. port with its own 9P sub D Connector is situated on the rear side of the unit. LX 7007 has a built in DC/DC converter which ensures 5V power for PDA. A standard LX cable (**1638 or 1636**) will connect practically all iPAQ devices to LX 7007 without any additionally works. Main functionality of the port:

- Sending of NMEA data to PDA, see chapter SETUP/NMEA
- Exchanging of data LX 7007 – PDA including **flight downloading**

Use free PDA program **ConnectLX/ConnectMe** or Downloader from FlywithCE.

Note!

Cable to Connect LX 7007 and nearly all types of iPAQ is delivery included,

Cable LX 1638 will connect:

H22xx, H38xx, H39xx, H41xx, H43xx, H51xx, H54xx in H55xx, H4700

Cable 1636 will Connect:

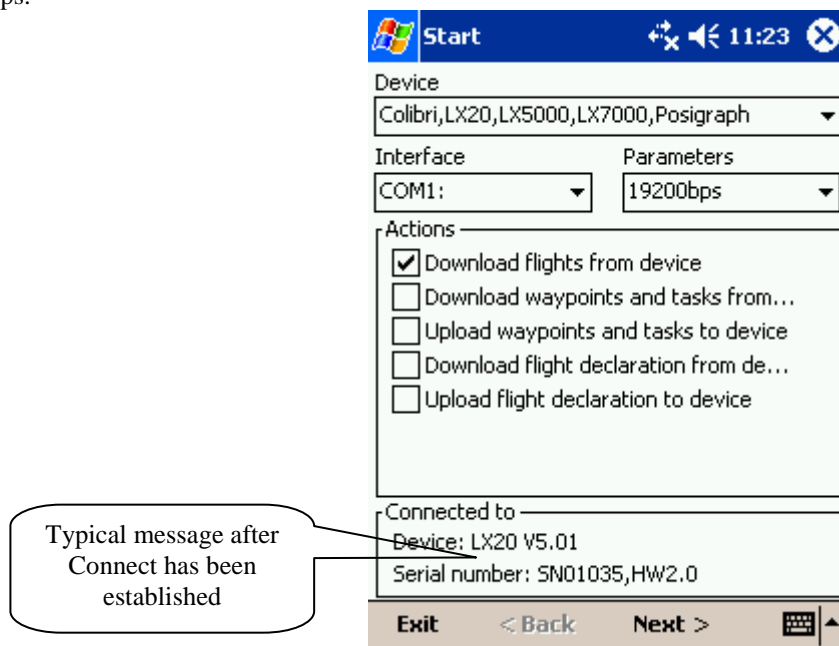
36xx, 37xx,31xx

If not specified cable 1638 will be delivered. After special request cables with open wires can be delivered to make possible connection of third party PDAs.

Using of third party PDA programs check their function at first.

4.2.1 Connect procedure to PDA

Run **ConnectLX/ConnectMe** select Device type like **COLIBRI.....LX7000**, define com port and set com. speed to 19200 bps.



Procedure on LX 7007:

Select **TRANSFER/PDA** on LX 7007 and press Enter. After AUTODECT procedure a very typical message CONNECT will appear on the LX 7007 screen.

Note!

Never run TRANSFER on LX 7007, before PDA is ready for communication

Define art of transfer using **Actions** menu on PDA and proceed with **Next**. For details see ConnectMe manual on www.seeyou.ws.

Note!

Having problems with **Connect** ; make sure those other applications like SeeYou Mobile..... are regularly closed, otherwise they **occupies the com port**. Close the applications using **EXIT**.

After any success, use **reset button on your PDA**.

Note!
 TP/TSK files (**Upload waypoints and tasks to device**) can be uploaded to the LX7007 in **.da4** (LX format) or in **.cup** (SeeYou format). This allows using SeeYou mobile for TP/TSK file creation and ConnectLX/ConnectMe for uploading. Using this way the conversion **.cup ► .da4** will be done automatically.
 Respect LX 7007 TP **capacity!**

4.3 Communication LX 7007, Colibri or LX 20

The LX 7007 BASIC is able to exchange data (bi-directional) with the LX 20, Colibri and Posigraph. The following data can be transferred:

- ***.DA4** files (TP and TSK)
- **Flight Ino**
- Observation **zones** (ZONES)

Note!
 LX 7007 also powers Colibri or LX 20-2000 units connected to the LX 7007 IGC port. For older LX 20 versions order appropriate cable.

4.3.1 Data transfer LX 7007-LX 20

To establish data transfer with the LX20 use the following steps:

STEP	LX 20	LX 7007 BASIC
1	Main MENU / LOGGER	SETUP / TRANSFER/COLIBRI/LX20
2		ENTER
3	READ or WRITE key	Select transfer function
4		ENTER

The LX 7007 BASIC acts as a **master** device and forces the LX 20 to respond to the commands.

Transfer menu on LX 7007 BASIC :

READ TP/TSK
READ INFO
READ ZONES
WITE TP/TSK
WRITE INFO
WRITE ZONES

Read means LX 7007 BASIC will read data from LX 20 or Colibri and vice versa.

Read zones means copy of confirmation zones architecture from Colibri or LX 20 and write means vice versa.

Write setup will write logger setup (recording intervals etc) from LX 7007 Basic into LX20 or Colibri.

After Read/Write INFO data transfer, the flight declaration including pilot data will be transferred.

Note!
 To Connect LX 20-2000 use cable delivered with LX 7007, the cable should be plugged into IGC marked telephone type Connector. Using of 6 pole cable doesn't matter. Having an older unit order an adequate cable

4.3.2 Data transfer LX 7007-Colibri

Communication with a Colibri or Posigraph recorder is much simpler. The Colibri or Posigraph will **CONNECT** automatically after selecting **TRANSFER/COLIBRI/LX 20** then **ENTER** on the LX 7007 BASIC. The **CONNECT** status is signalled by a series of audio beeps from the Colibri or Posigraph. LX 7007 will act as a master. The same features like by communication with LX 20 are available.

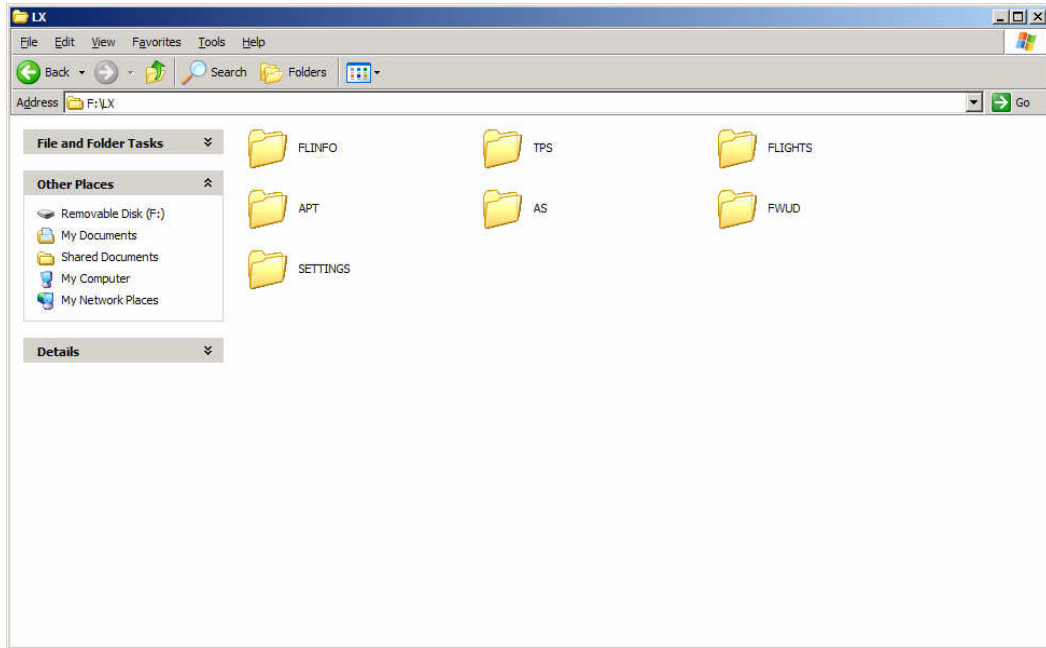
Note!

To connect Colibri use cable delivered with LX 7007, the cable should be plugged into IGC marked telephone type connector. Using of 6 pole cable doesn't matter. Using of this configuration will also power Colibri from LX 7007.

4.4 Data transfer after using of SD card

This is the **simplest and safest** way how to get data into and out of LX 7007.

Every SD card delivered with the instrument is already initialised and ready for operation. The card will be normally found by PC as Removable Disc. The card structure:



Use Windows copy commands to carry data from hard disc to the SD card. Respect that the individual files should be copied into corresponding folders.

4.4.1 Data base data exchange

Select **TRANSFER** and use option **SD/MMC**. A very obvious menu will open:



After **item selection** and Enter the data exchange procedure will start. Any data exchange is extremely fast and needs typically some seconds. **READ** means data transfer **SD card** ⇌ **LX 7007** and **WRITE** vice versa.

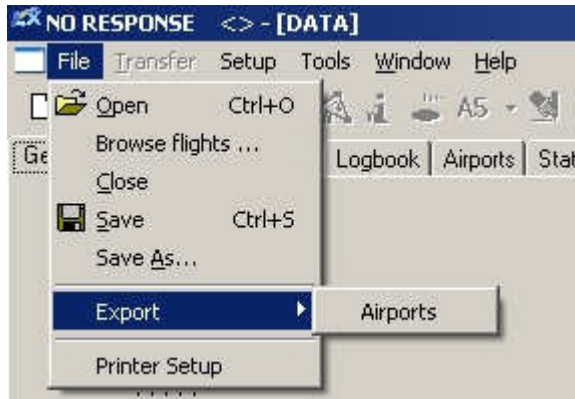
Note!

To leave menu use exclusively **ESCAPE**.

Please respect following **restrictions**:

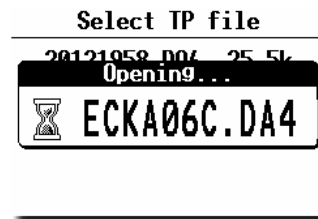
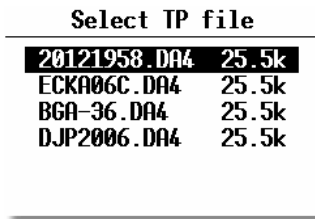
- TP data format **.da4** (LX format)
- Flight Info format **.hdr** (LX format)
- Airspace **.cub** format (use LX original files, SeeYou files are not compatible)

A very simple procedure will help you to copy **.CUB airspace files** directly from LXe to the SD card, after using of **Export** function. Click on **File**, move the cursor to Export and Airport and CUB airspace windows will open.



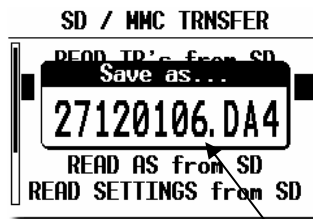
- Airports in **.LXA** format. Any LX airport data base may be converted to .LXA format after using of LXe EXPORT function. Click on File and confirm Export.
- **Settings** are not able to be prepared or edit on PC, it is only possible to store actual personal settings and to reload them back

Examples:



After Enter

Example of **.da4** transfer direction SD card ⇔ LX 7007



Example of **.da4** transfer direction LX 7007 ⇔ SD card
(ESC will confirm offered name)

Note!

After **Write to SD** command has been activated, a **file name consists of date and time** will be offered. The name can be directly modified by user.

After **Read command** all files of the directory will be offered and selection should be carried out.

5 Installation

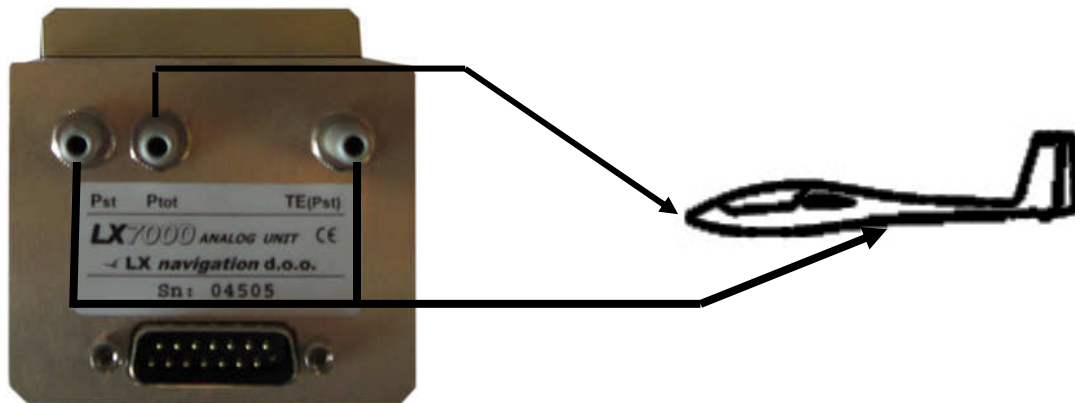
The LX 7007 BASIC main unit (LX 7007 DU) needs one standard 80mm cut-out. The Vario unit (LX 7007 AU) and any additional vario indicators needs a standard 57mm cut-out.

Three pressure Connectors are fitted to the back of the LX 7007 AU. A label shows their functions.

- Ptot = Pitot or Total pressure
- TE = TE probe
- Pst = Static

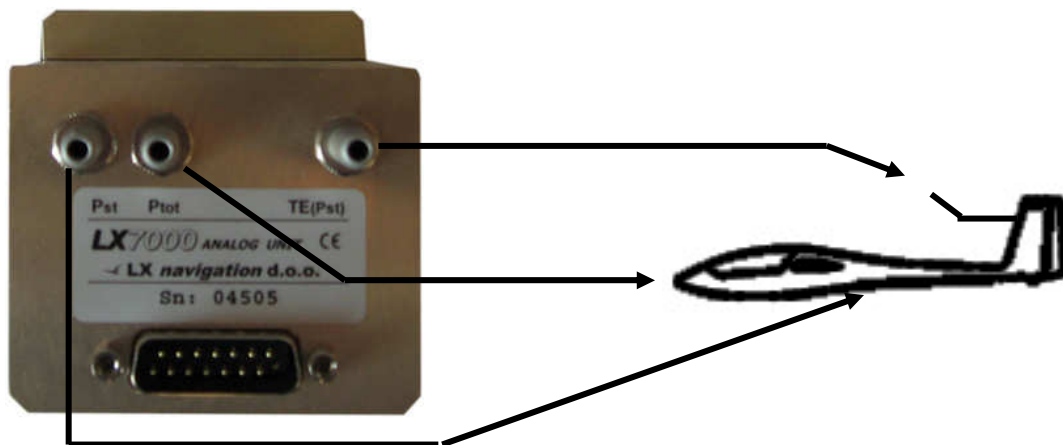
If the unit is to be configured for electronic TE compensation, then the connections are as follows:

- TE/Pst Static
- Pst Static
- Ptot Total pressure (Pitot)



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

- TE/Pst TE tube
- Pst Static
- Ptot Total pressure (Pitot)



Note!

If the Ptot and Static are connected **the wrong way around**, there will be no integrator reading (average climb) during the flight. The LX 7007 DU (80 mm unit) is connected to 12 volt power via the 15 SUB D connector. LX 7007 DU and LX 7007 AU (57 mm) units are connected via the 485 bus and the connectors are marked like **1-1**.

Please check, if both units are connected correctly, before **first power on**. The power wires (red and blue) **should be connected to the 80mm unit**.

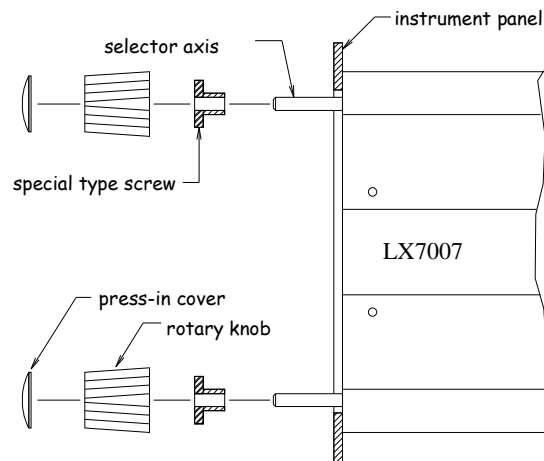
Note!

There is **no fuse in the instrument** so it is **VERY IMPORTANT** to use an external fuse (max. 3A). Power supply cables should use a minimum of 0.5mm² wires (20 avg).

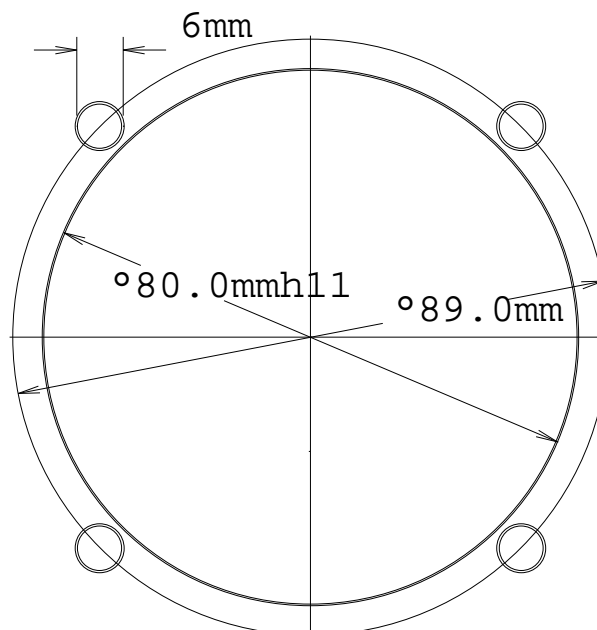
To prevent **damages on LX 7007 80mm** unit after a short on 485 bus, a fuse of blade type (the same fuses are used in modern cars and therefore available on petrol stations) is built on the rear side of the unit. After a short happened 57 mm unit will not work any more, but the reason is not the defect of 57mm unit, but the bowled fuse. Use **3 A** fast acting blade type fuse (violet).

5.1 Mechanical installation

- Prepare the cut-out in the instrument panel according to the drilling template.
- Remove the press-in covers from the four main selectors on the LX 7007 BASIC. You can now see the mounting screws.
- While holding the knobs, slacken the screws with a screwdriver. Now the knobs can be removed (never use power to remove the knobs, you can **damage rotary switches**). By problems **hit on the slacken screw** a little bit.
- Remove the four special type screws.
- Position the LX 7007 BASIC in the cut-out in the instrument panel.
- Tighten the LX 7007 BASIC with the special screws (8 mm tool).
- Tighten the knobs and replace the covers
- LX 7007 AU doesn't need any changes having standard 57 mm cut-out.

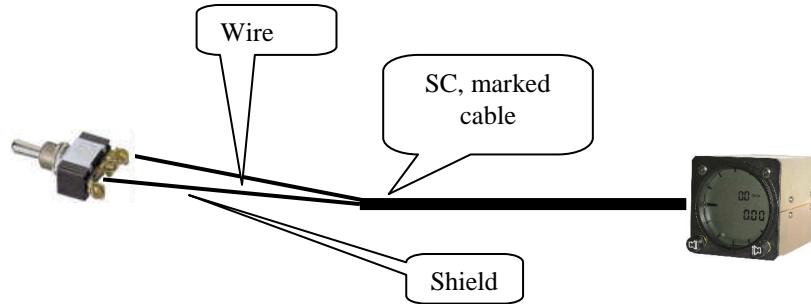


Mounting Template:



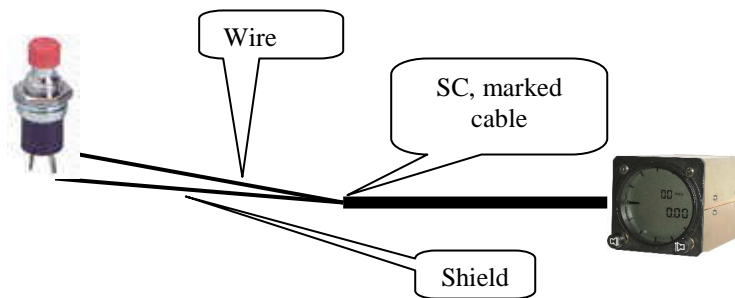
5.2 Vario/SC external switch installation

For this purpose an external switch usually installed on the top of the stick may be used. Flaps gliders uses some solution which closes or opens a contact as flaps is in circling position and vice versa. The configuration can be set in setup **INPUT**.



Wire	Shield	Open	Setting: ON	Staus: VAR
Wire	Shield	Closed	Setting: OFF	Staus: SC
Wire	Shield	Closed	Setting: ON	Staus: SC
Wire	Shield	Open	Setting: OFF	Staus: VAR

Setting **Taster**: will change over (SC/VAR) after each press on the push button. Set this after using of LX Remote.



5.3 Connection of GPS data source

Any NMEA source at **4800 or 19200** bps may be used to feed LX 7007 Basic with GPS position data. Following data sentences should be send as minimum out of the GPS source:

- GPGGA
- GPRMC

Note!

Exclusively **IGC marked** input can be used as GPS data input (NMEA 4800 or 19200 bps)

5.3.1 Connection of Colibri/LX20-2000

To connect use the cable delivered with LX 7007. The cable is clearly marked. Factory settings of Colibri or LX 20 will ensure GPS data reception of LX 7007.

5.3.2 Connection of Flarm units

All kind of Flarm units can supply position and traffic information data to LX 7007 basic. LX 7007 is able to show traffic information data on its display and to transmit Flarm relevant data toward PDA. To be able to use all this benefits, it is necessary to use **19200 bps** communication speed between Flarm and LX 7007.

5.3.2.1 Connection of LX Flarm Red Box

A plug and play connection LX 7007 Basic to LX Flarm Red Box is possible after using of LX Flarm splitter which will split data coming out of Red Box.



Note!
LX Flarm splitter isn't delivery included, it is an option.

Important!
It is recommended to use **19200 bps**. Set 19200 on LX 7007 after using of **System Settings/GPS**.
LX Flarm default setting is always 19200 bps. Flarm data will be displayed on LX 7007 exclusively after “Flarm and Navigation” will be initialized on Flarm. This setting is default by LX Flarm units.

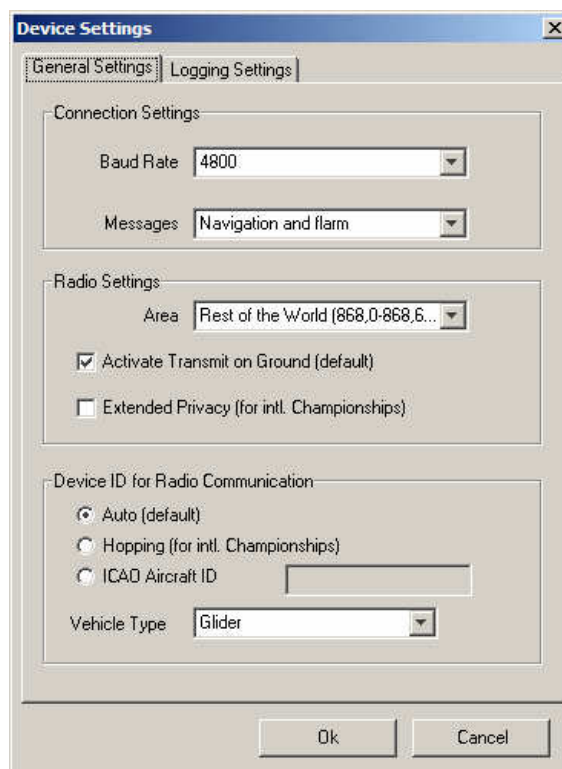
5.3.2.2 Connection of LX Flarm Mini Box

Flarm Mini box is plug and play connectable (power and data) to LX 7007 after using of cable delivered with the unit and marked as; Colibri-LX7007.

5.3.2.3 Connection of original Flarm units

Use **Power/Data** connector of Flarm and connect both units after using of cable marked as; LX7007-Colibri/LX20, which is delivery included. It is a plug and play connection. Using this solution LX 7007 will also power your Flarm. 19200 bps is recommended.

Note!
If **GPS DATA NOT DETECTED** will appear on LX 7007 display, following is to be checked on Flarm:
Messages.: **Navigation and Flarm** should be enabled
Baud rate can also be the reason; LX 7007 is able to receive 4800 and also 19200 bps



5.4 Installation of PDA units

LX navigation offers a wide range of accessories which makes installation of a PDA in conjunction with LX 7007 extremely easy and completely plug and play. LX 7007 has a separate com port specially designed to drive PDA, 5V power for PDA is included. Using of LX standard cables is possible to connect practically all iPAQ units to LX 7007. A cable is delivery included. There are two types of cables.

Cable 1636 for:

31xx, 36xx, 37xx

Cable 1638 for:

H22xx, H38xx, H39xx, H41xx, H43xx, H51xx, H54xx in H55xx, H4700

There are two swivel supports available.

iPAQ Handle for:

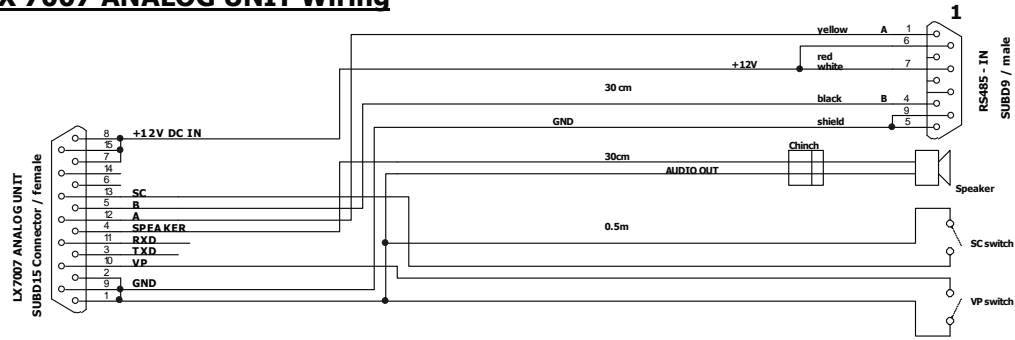
36xx, 37xx, 31xx, H38xx, H39xx, H51xx, H54xx, H55xx, H4700

iPAQ handle 22 for:

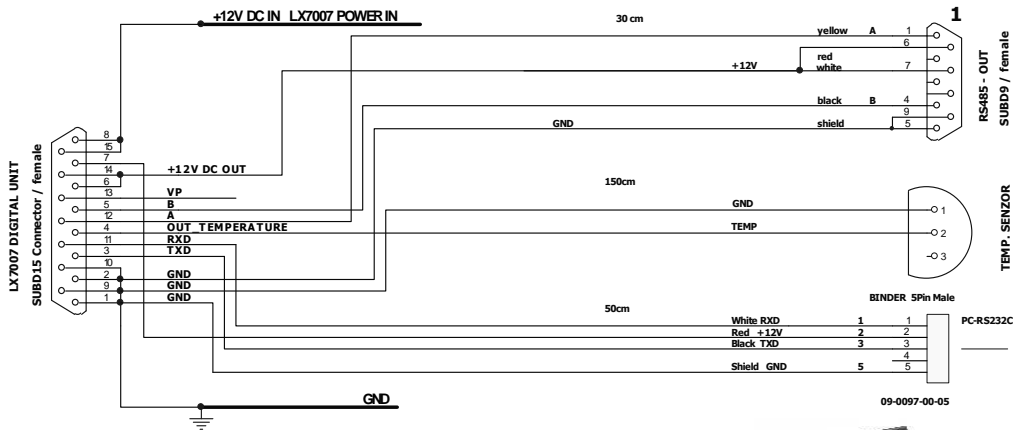
H22xx, H41xx, H43xx

5.5 Wiring

LX 7007 ANALOG UNIT Wiring

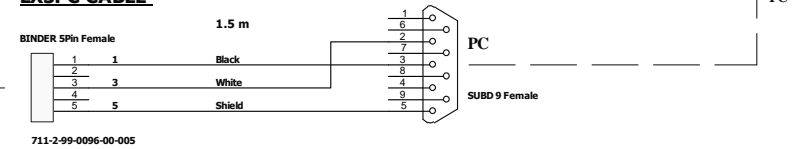


LX 7007 DIGITAL UNIT Wiring

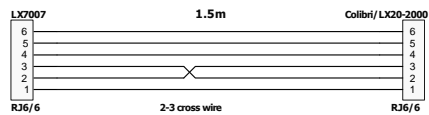


CONNECTED

LX5PC CABLE



LX7COL CABLE

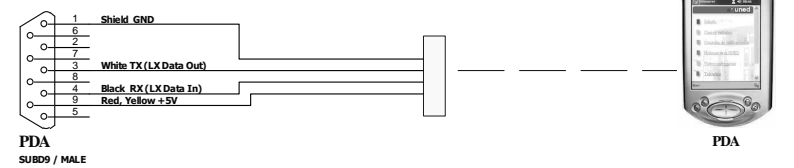


COLIBRI



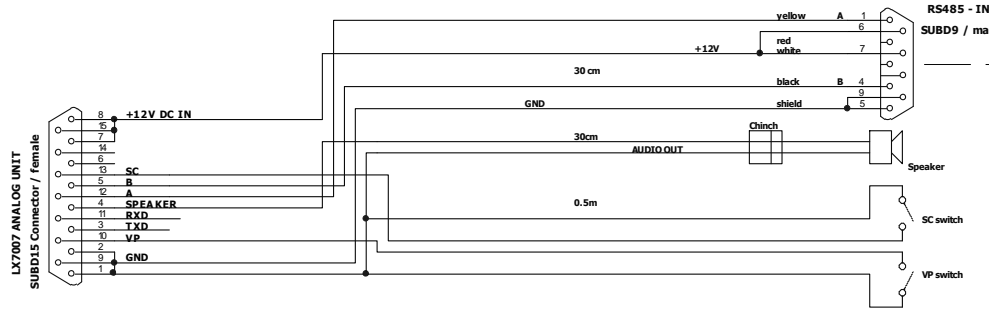
LX20-2000

CABLE LX1636 / LX1638

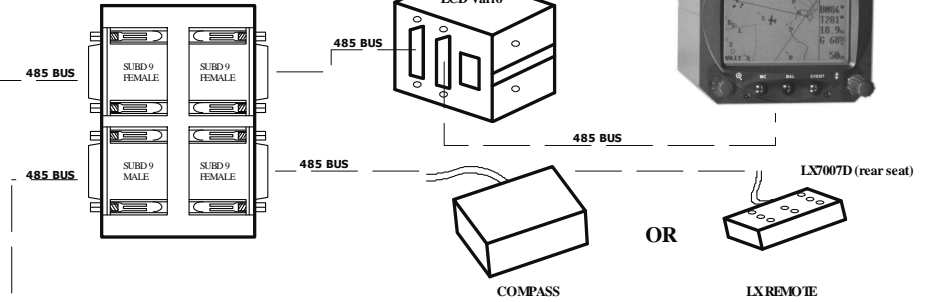


PDA

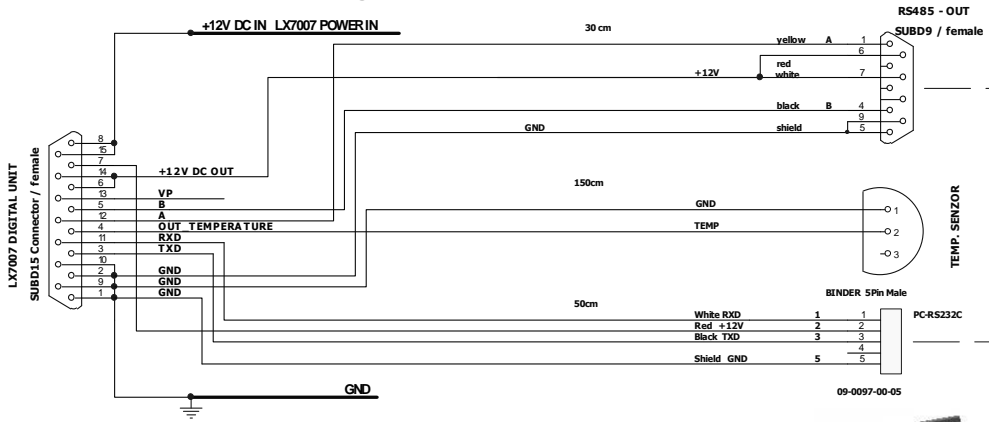
LX 7007 ANALOG UNIT Wiring



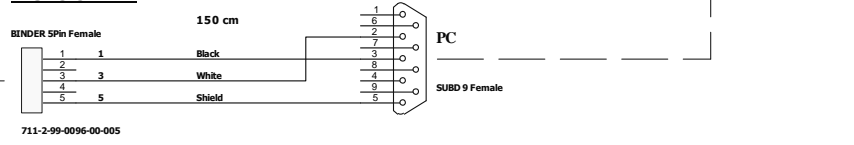
485 Splitting Unit (using additional LCD vario and Kompass)



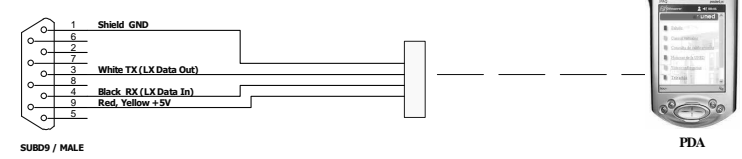
LX 7007 DIGITAL UNIT Wiring



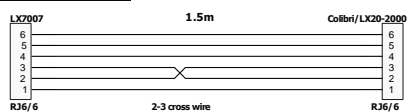
LX5PC CABLE



CABLE LX1636 / LX1638

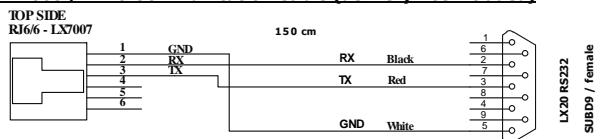


LX7COL CABLE



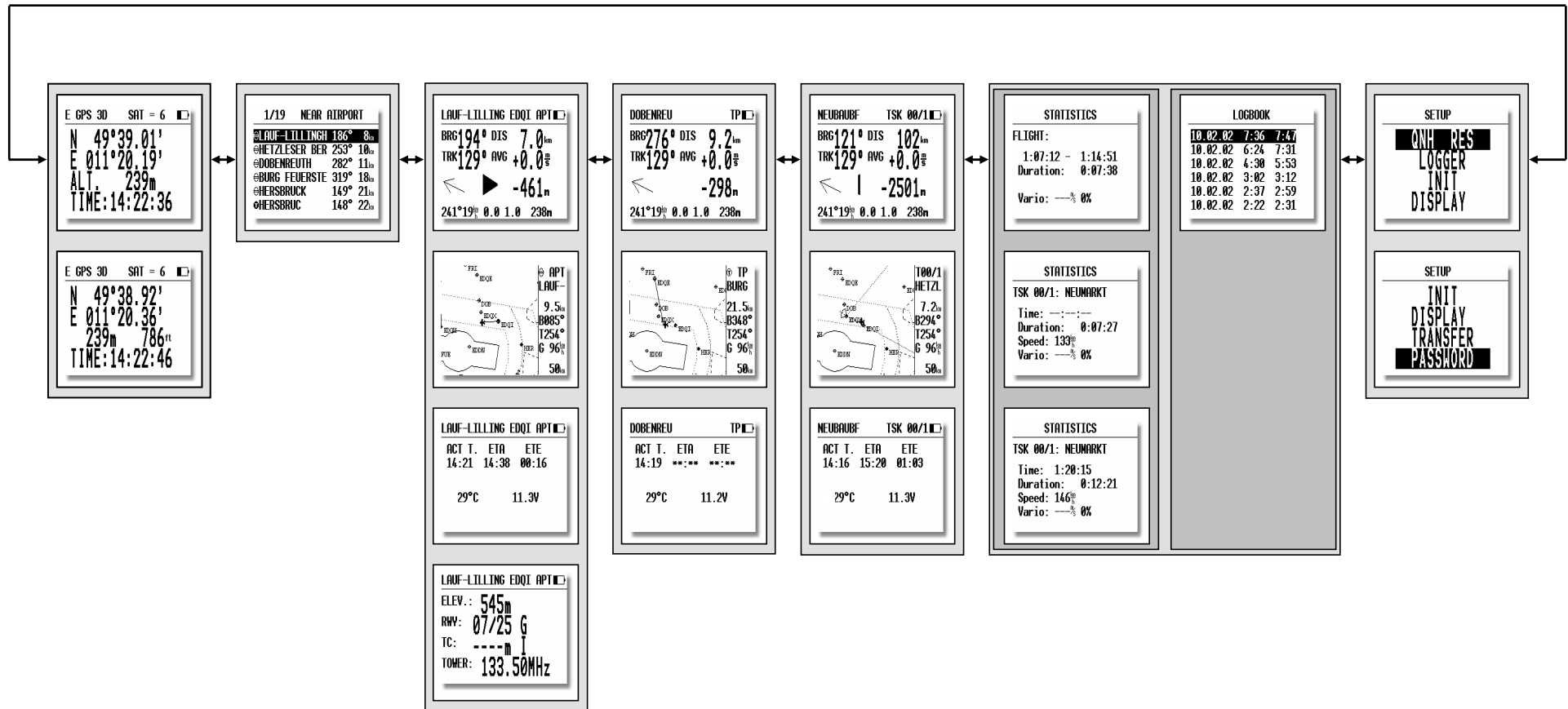
COLIBRI OR LX20-2000

LX7000 / LX20 Communication Cable (delivery not included)




5.6 Tree structure Diagram


←MODE→




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