LXNAVIGATION

Traffic monitor

user’s manual

www.lxnavigation.com

LX Traffic Monitor
[57 & 80]

Device manual

- LX navigation -

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LXNAVIGATION

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Document information

0.1 Abstract

This document represents the user manual for the LX Traffic Monitor. The installation manual, technical datasheet and additional info can be found on **www.lxnavigation.com**.

0.2 Document status

Document status: PUBLIC

Document status	Explanation
Internal	Intended only for LX navigation staff
Public	Available publicly to all
Personal	Intended for a specific person and/or company, noted on this page
Dealer	Intended for a specific dealer, noted on this page
Manufacturer	Intended for a specific manufacturer, noted on this page

0.3 List of applicable products

Device	Version	Build
LX Traffic Monitor 57	1.8	
LX Traffic Monitor 80	1.8	

0.4 Revision history

Document name	Document revision	SW version	Build	Date	Revised by	Approved by	Notes
LX_TMUM	R1	1.8		3.1.2023	A.S.	N.S.	LaTeX edition
	R2	1.8	1215	13.2.2023	A.S.	N.S.	Flarm page details icons

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Important notices

1.1 Using this manual

This manual has been created in LaTeX, giving us the possibility of linking up everything we find linkable. You will find references to other parts of the manual, to other manuals, webpages, etc. throughout the manual.

Linkable content will be **bold and underlined**, i.e. you can find additional info on how to take care of your LX Traffic Monitor in the **Taking care of your LX Traffic Monitor** section of this manual (click on the underlined text).

NOTE
The most recent version of this manual will always be available at
https://lxnavigation.com/support/

1.2 Device operating limits

This instrument may be used under VFR (Visual flight rules) only! Any navigational information is provided for reference only. The pilot takes all responsibility and risk associated with the use of this device.

Have a nice flight.

1.3 Limited warranty

This device is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, LX navigation will, at its sole discretion, repair or replace any components that fail in normal use. Such repairs or replacements will be made at no charge to the customer for parts and labour, the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alterations or repairs.

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EVENT SHALL LX NAVIGATION BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT.

Some countries do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you. LX navigation retains the exclusive right to repair or replace the unit or software, or to offer a full refund of the purchase price, at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY. To obtain warranty service, contact your local LX navigation dealer or contact LX navigation directly.

The manufacturer does not take the responsibility for possible mistakes or misprints in this text and gives no guarantee for accuracy of this manual. This manual has been written with the greatest care and we have done our best to avoid any mistakes but with all respect please check any doubtful statement and let us know. We would be very grateful and we thank you in advance for any comment.

1.4 Sunburned display

Damages to the device, especially the display part, are not covered by the warranty and will be considered as misuse of the device. To learn how to take care of your display and device in whole, check the **Taking care of your LX Traffic Monitor** section of this manual.

1.5 Disclaimer/EULA

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Getting started

2.1 Device overview

The LX Traffic Monitor is a **collision avoidance flight display** compatible with **all** types of **Flarm devices**. It is commonly used in gliders, ultralights and experimental aircraft. Additionally to providing **audio and visual collision avoidance warnings** and a **Flarm radar display**, the Traffic Monitor offers the pilot **two dedicated moving map navigation pages**. These pages offer simultaneous navigation to a **Turnpoint** and **Airport**.

Using a Flarm device with an **ADS-B module** will offer the pilot ADS-B warnings as well.

It comes in two standard circular aviation hole sizes:

- **80mm (3 1/8 inch) standard aviation cut -** with a large 3.5 inch **transflective technology** display.
- **57mm (2 1/4 inch) standard aviation cut -** with a small (2.5 inch) display.

The LX Traffic Monitor's primary function is to alert the pilot of an on-coming collision with audio and visual warnings. The secondary function is to show the pilot all Flarm and ADS-B (if an ADS-B module is installed) objects on the Flarm radar page and the third is to act as a simple navigation device.

The device is designed for simple pilot operation with two push-buttons and two push/rotary knobs.

The unit is capable of providing **APT (airport)** and **TP (turnpoint)** navigation on two dedicated navigation pages. Navigation pages feature navboxes, showing bearing to point, track, distance, ground speed and altitude. It also shows airspace, airports and turnpoints on the map.

LX Traffic Monitor features are:

- 3.5 inch transflective technology sunlight readable display in the larger model
- 2.5 inch display in the smaller model
- Rotary knobs with push functions, for simple and effective handling
- Internal beeper (for Flarm warning)
- Flarm 1 port (input of Flarm data)
- Flarm 2 port (for connecting other Flarm devices)
- Voice module as an integrated part of the system

- External SD Card interface, for firmware updates, flight downloads and TP/APT/Airspace transfers
- Standard 80/57 mm size

Functions:

- Complete TP/APT navigation with airspace information and warnings
- Flarm radar screen
- Logbook
- Flight information with Barograph
- Voice announcement

The unit has the capability of being updated to any later firmware release free of charge.

Basic operation

We will go through the basic gestures and what they do on all pages of the LX Traffic Monitor system.

One important thing to keep in mind is that there are usually multiple ways of doing something on an LX Traffic Monitor and, although we will go through all of the possibilities, the LX Traffic Monitor is envisioned to be used single-handedly and almost all operations are accessible with the right push-rotary knob. Bearing this in mind and getting used to doing all operations with the right push-rotary knob will greatly elevate your user experience.

3.1 Turning the LX Traffic Monitor on

The LX Traffic Monitor is turned on differently depending on the configuration.
Early units with a built-in battery are turned on by pressing and holding the left push-rotary knob (**ZOOM**) until the screen flashes.

Newer units turn on automatically when power is applied (the switch on the aircraft's instrument panel is turned on).

NOTE

If your unit does not turn on in the way you'd like to, you can ship the unit to us for a hardware modification, in order to make it work as noted

Once the device is turned on, a sequence of screens will appear in the following order:

- **LX navigation greeting screen**
- **Second screen** stating the device type, serial number and firmware version

WARNING

When the device is turning on, a warning may appear, indicating limited operation capability to the pilot. You should contact **LX support** as soon as possible. The device might be operable even with the warning present, but full operational capability is not guaranteed.

- **Internal memory error -** there is an issue with the internal memory of the device. Flights will not be saved and settings will not be loaded, but the device will operate.

3.2 Device interface

The LX Traffic Monitor features two push buttons and two push-rotary knobs for pilot-device communication. The front side of the device, represented by figure 1, shows the LX Traffic Monitor's user input interface.
An example page shows how the first page on the LX Traffic Monitor looks in-flight, as well as the buttons a pilot can use for device manipulation.

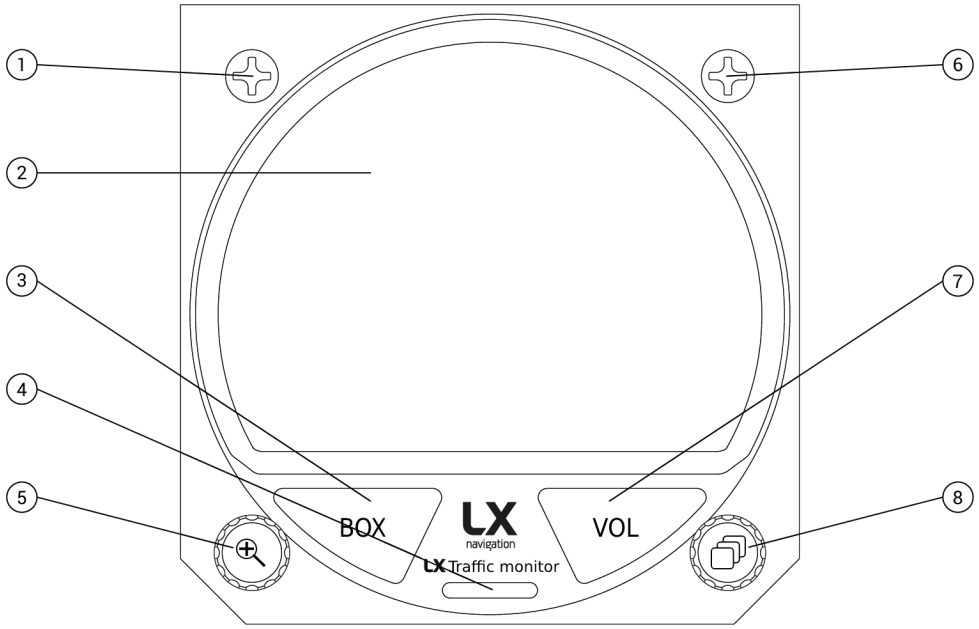

Figure 1. LX Traffic Monitor front plate interface

On the front plate, we can see the following items:

1. M4x6 Phillips head screw
2. LX Traffic Monitor display
3. Left push button **(BOX)**
4. microSD card reader
5. Left push-rotary knob **(ZOOM)**
6. M4x6 Phillips head screw
7. Right push button **(VOL)**
8. Right push-rotary knob **(PAGES)**

We will name the two main push buttons and two main push-rotary buttons by their function (**ZOOM**, **VOL**, **BOX**, **PAGES**).

3.3 User input

The LX Traffic Monitor was envisioned to be simple and intuitive to use. There are two buttons and two push-rotary buttons mentioned in the previous sub-section.

3.3.1 Right push-rotary knob (PAGES)

The right push-rotary is used for the following functions:

- **Changing between primary pages**, clockwise for next, counter-clockwise for previous.
- **Scrolling**, turn clockwise for moving down, right or for choosing larger values, counter-clockwise for moving up, left or changing by smaller values.
- **Turning while being pressed**, acts as noted above, **by 10-fold**.
- **Pressing**, acts as '**Confirm**', '**Enter**'

3.3.2 Left push-rotary knob (ZOOM)

The left push-rotary is used for the following functions:

- **Zooming**, turn clockwise to zoom in, counterclockwise to zoom out
- **Scrolling**, moving down, right or for choosing larger values, clockwise for moving down or changing by larger values, by 10-fold
- **Pressing**, acts as '**Cancel**', '**Exit**'
- **Turning while being pressed**, acts as noted above, by **100-fold**.
- **Holding it for 3 seconds** while the device is turned off will **turn it on**.
- **Holding it for 15 seconds** will perform a **Hard Shutdown**.

3.3.3 Right push button (VOL)

The right push button is used for opening the VOL sub-page, which gives us the settings for **volume** and **brightness** while in any primary page.

3.3.4 Left push button (BOX)

The left push button is used for hiding the **NavBox** line on all navigation pages plus the Flarm radar page.

3.4 Performing an update

In order to be on track with the latest software releases, be sure to regularly follow our **Support webpage**. Once you find an update, contact LX navigation support via the following email: **info@lxnavigation.com** with your contact details, device type, the software version you would like to update to and the serial number of your device.

Once you've received the update file, follow these steps:

1. Copy the desired software update file to the root of the microSD card. The update file should have the word Traffic Monitor within its name and an extension of .lxu. Be sure to use the supplied SanDisk Ultra microSD card.
2. Insert the microSD card and turn the device on
3. Go to **Setup** $>$ **Service** $>$ **Software update**
4. Select the desired update file
5. If prompted, type in the update code '00000'.
6. The device will copy the file to the internal memory and perform the update. It may restart a couple of times.
7. Once the update has finished, verify that the update has been successful by going to **Setup** $>$ **Service** $>$ **Device info** and checking that the Firmware version has changed to the desired one

NOTE

The LX Traffic Monitor will shut down during the update procedure and might require the right push-rotary knob to be pressed in order to turn it on after the file has been copied, in order for the update process to proceed.

WARNING

Great care should be taken not to turn the device off while the updating process is running. Data corruption may occur. If something similar happens, contact LX support immediately, in order to recover your unit.

3.5 Turning the LX Traffic Monitor off

The LX Traffic Monitor can be turned off in different ways, depending on the configuration you have.

Early units with a built-in battery will start the shutdown process once the power supply is cut from the main power lines, unless in flight mode. With some of these units, the automatic shutdown does not start and needs to be done manually, through the Setup menu.

NOTE
If your unit does not shut down in the way you'd like to, you can ship the unit to us for a hardware modification, in order to make it work as noted.

Newer units do not have a reserve battery, meaning it will shut down as soon as it looses the power supply. Make sure the flight has finished prior to taking the power from the device. You can always finish the flight manually, by going to the flight statistics page and pressing **ENTER**.

There is a possibility of a manual shutdown by going to **Setup** $>$ **Shutdown** and confirming by choosing 'Yes'.

In case a device requires a **force shutdown**, **there is a possibility of performing a hard shutdown by pressing and holding the ZOOM push-rotary knob for 15 seconds**.

Advanced operation

Primary pages overview

This section will cover the complete specter of operations possible on LX Traffic Monitor's primary pages.

There are 6 primary pages on the LX Traffic Monitor. You can scroll between these pages by using the right push-rotary knob (**PAGES**). The pages are listed as follows:

1. **Flarm radar page**
2. **Turnpoint navigation page**
3. **Airport navigation page**
4. **Info page**
5. **Logbook/Flight statistics page**
6. **Setup page**

4.1 Flarm radar page

The Flarm radar page shows all surrounding objects reported to the LX Traffic Monitor by a Flarm device. If the said Flarm device has an ADS-B module, the LX Traffic Monitor will show ADS-B objects as well. Flarm objects are shown on a radar screen with track-up orientation.

Figure 2. Flarm radar screen

Figure 3. Flarm radar select circle

Traffic is presented on the screen with corresponding icon.

Pressing the **right push-rotary knob** will invoke the selection of a Flarm object to follow. For a selected object, additional details will be displayed on the bottom of the screen, as depicted on Flarm radar select circle.

The following icons are used for each parameter:

- **- Climb rate**
- **- Ground speed**
- **- Vertical distance**
- **- Bearing**
- **- Track**
- **- Horizontal distance**

Pressing the left push button (BOX) will cycle through four different layouts of object details on the bottom of the page:

- **hidden**
- **all six parameters visible**
- **climb rate, ground speed, vertical distance visible**
- **bearing, track, horizontal distance visible**

Rotating the **left push-rotary knob** will change the zoom of the flight radar screen and pressing it will open the Flarm objects sub-page. In the Flarm sub-page, a list of all visible aircraft is shown. A green dot next to the name of the object shows which object has been select for additional info on the Flarm radar page. Object ID and distance is also shown.

By choosing an object and pressing the right push-rotary knob, additional information can be seen and/or edited, for each object:

- **Callsign**
- **Pilot**
- **Airfield**
- **Registration number**
- **Frequency**
- **Flarm ID (always non-changeable)**

The LX Traffic Monitor supports FlarmNET database files, check **Flarm NET** section for additional information.

Figure 4. List of visible Flarm objects

Figure 5. Additional options for objects

In case Flarm unit reports non-directional targets, they are represented on the Flarm radar page with a red circle as depicted on Flarm warning page.
If the communication with Flarm unit is lost, the Flarm radar page is covered with the red cross and notification stating the failure.

Figure 6. Non-directional object display

Figure 7. Communication failure

An important safety feature of the LX Traffic Monitor is the Flarm warning page. This page pops-up whenever the Flarm device sends a warning sentence, regardless of the menu, page

or setup you're currently in.

Figure 8. Flarm warning page

Figure 9. Non-directional warning

The Flarm warning screen shows the type of object the Flarm is warning you about, from the list of supported Flarm objects (Skydiver shown on figure). It's relative direction to your heading, relative altitude and distance, as well as an angle from the horizon, with the blue/brown scale on the left side of the screen. The relative direction of the object is also written in word with **GLIDER 3 O'CLOCK ABOVE**.

The LX Traffic Monitor can show the following objects with appropriate graphics:

- **Glider -** 
- **Tow plane -** 
- **Helicopter -** 
- **Skydiver -** 
- **Drop plane -** 
- **Hang-glider -** 
- **Para-glider -** 
- **Airplane -** 
- **Jet aircraft -** 
- **UFO -** 
- **Balloon -** 
- **Blimp, zeppelin -** 
- **UAV -** 
- **Obstacle -** 

Warnings received from transponder traffic will be displayed as non-directional warnings which will display perimeter in which the object might be without the direction.

NOTE

A lot of effort was put into the design of the Flarm Warning screen, shown by figure 34. It's sole purpose is to quickly familiarize the pilot with the potential danger. Flarm provides us with three distinctive levels of danger:

- **13 to 18 seconds to impact -** the Flarm Warning screen appears, the LX Traffic Monitor's internal beeper and the flashing of the direction cone are in the same, steady frequency. The lady from the LX Traffic Monitor's internal voice module notifies you of the location of the object.
- **9 to 12 seconds to impact -** same as previous level, both the internal beeper frequency and beeping interval, as well as the flashing interval, intensify (higher frequency)
- **0 to 8 seconds to impact -** as on previous level, with the highest frequency of beeping and flashing.

NOTE

Flarm enable glider pilots to intentionally activate the PRIVACY mode on their Flarm unit. This is especially used at competitions. Gliders in privacy mode send limited data strings and can't be visualized on Flarm radar page. However, all warnings will appear regardless of privacy mode.

4.2 Navigation pages

The LX Traffic Monitor offers 2 separate navigation pages, giving the pilot simultaneous navigation to a **turnpoint & airport**.

The basic layout of each navigation page is the same. In the top of the page, we can see the header. Below the header, we can see the moving map. A zoom scale is present and in the bottom of the page, the NavBox line is positioned.

Pressing the **left push-rotary knob** will show additional info for the point we're currently navigating to. Rotating the left push-rotary will change the zoom level.

Pressing the **left push button** will hide the NavBox line. Pressing it again will show the NavBox line.

Pressing the **Right push button** will open the VOL sub-page on the volume parameter. Pressing the right push button again will change to the next the brightness setting.
While the VOL sub-page is open, the status indicator line can be seen in the top of the display. You can exit the VOL sub-page by cycling through all of the settings, by pressing the left push-rotary knob, or by waiting. Namely, the VOL sub-page closes automatically after 3 seconds of inactivity.

Figure 10. Volume setting

Figure 11. Brightness setting

Pressing the **right push-rotary knob** will open the turnpoint or airport selection sub-page.

4.2.1 The map

The Turnpoint navigation page is based on a map, covering the central part of the screen. The map shows **turnpoints and airports** with small circles and their names, as well as **airspace lines**.

On the Map, an aircraft icon represents your current location. The LX Traffic Monitor supports

both North-up and Track-up orientation, which can be set in the **Graphics** section.

On the right, the map scale is shown.

Two lines can be seen on the screen, starting at the glider. The first one is showing the

Figure 12. A navigation page

direction of your movement, your track, and the second one is showing the direction to your chosen turnpoint, the destination line. Colours can be changed in the **Graphics** setup menu.

4.2.2 The Header

The Header represents the top part of the screen, covering three vital pieces of information: **Turnpoint name, Relative bearing** and **distance** to turnpoint.

In the far top of the screen, we can see **'TP:'** or **'APT:'** written. The **TP** indicates that we are on the **Turnpoint navigation page** and **APT** indicates that we are on the **Airport navigation page**. After the colon, the name of the destination (turnpoint or airport to which we are navigating to) is displayed.

To the lower left of the destination name, relative bearing is shown in degrees. When the relative bearing is 0, we are flying towards the destination.

Since the relative bearing is calculated from the bearing to destination and your current **track** (not heading), **the wind is already calculated into the relative bearing**.

On either side of the relative bearing, a green arrow will show in which direction you should turn by the noted amount of degrees in order to be on course for the destination.

To the lower right of the destination name, distance is shown, in the desired distance unit.

4.2.2.1 The NavBox line

In the lower part of the screen a **NavBox line** containing 4 NavBoxes is shown. The pilot can show or hide the NavBox line with the **BOX** push button.

Data available in NavBox line is:

- **GS -** GPS groundspeed,
- **TRK -** True track,
- **BRG -** Absolute bearing,
- **PR ALT -** Pressure altitude.

4.2.2.2 Status indicators

Flarm status
Is represented with a red Flarm symbol, depicted with **Flarm status indicator icon**. If the Flarm icon is present, the device has an established connection with a Flarm device. On how to get more info from the Flarm device, check the **Info page** section. For information about Flarm objects and the Flarm radar page, check the **Flarm radar page**.

Figure 13. Flarm status indicator icon

GPS status
The GPS status indicator indicates whether or not the device has a valid GPS lock. Under valid GPS lock, a connection to at least four satellites is required.

Figure 14. GPS signal is not valid

Figure 15. GPS signal is valid

Power supply status
White battery outline indicates the device is running on external power and shows the approx voltage of the power supply.

Figure 16. 1 red bar (less than 10.8V)

Figure 17. 2 yellow bars (more than 10.8V)

Figure 18. 3 green bars (more than 12.0V)

4.2.3 Turnpoint navigation page

This page is used for navigating towards a single turnpoint, from the .cup file, loaded into the LX Traffic Monitor. The navigation screen shows turnpoints, airports and airspaces.

Figure 19. Turnpoint page overview

Basic operation on this page has been explained in the **Navigation pages** section. Here, we will explain some specifics of the Turnpoint navigation page, and how to perform basic Turnpoint operations.

Pressing the **left push-rotary knob** will open the TP info sub-page, showing Bearing, Distance, Surface type and Elevation, if available.

Above the Bearing, an arrow is shown. The direction of the arrow indicates the steering course, relative to your current track.

If the arrow is pointing directly to the right, it means you should turn 90° to the right in order to be on track to the turnpoint. The same logic is used in the airport navigation page, as well as in the select airport and select turnpoint menu.

Pressing the **right push-rotary knob**, you will enter the 'Select turnpoint' sub-page. Here, a selection of turnpoints will be shown, along with distance and bearing, as well as **(relative bearing)** as described earlier, with an arrow. These points can be sorted by either Distance, Name, or Code.

Choosing Name or Code will open up the Filter setting, where you can type the name or code lettering. Choosing a turnpoint will set the turnpoint as the navigation point for the turnpoint

Figure 20. Turnpoint additional info

navigation page.

For additional info on how to install database files, check the **Transfer** section of this manual.

Figure 21. Turnpoint selection sub-page

Figure 22. Search by name

4.2.3.1 Choosing a Turnpoint

To recap on how to choose a Turnpoint for navigation, follow these steps:

0. Have a .cup file loaded and selected
1. Go to the Turnpoint navigation page
2. Press the **right push-rotary knob**
3. Select the sorting criteria **Name, code and distance available**
4. Type in the Name or code if Name or code are chosen as sorting criteria
5. Scroll the list until you find the desired turnpoint. You can scroll regularly with the right push-rotary knob, or by 10-fold by rotating the left push-rotary knob
6. Confirm the desired point by pressing the right push-rotary
7. The device will automatically take you back to the Turnpoint navigation page and start navigating to the desired turnpoint.

NOTE

In order to use navigation pages to their full extent, be sure to have airspace (.cub), turnpoint (.cup) and airport (.af) files installed. Some of these, like .cup and .cub files, are available on competitions, from club managers, or governing national air bodies (like DAeC), while other, like the .af file, are provided solely by LX navigation.

NOTE

Files provided by LX navigation (.cub and .af) can be found on **https://lxnavigation.com/support/**. LX navigation does not provide official .cup files, for unofficial turnpoint files, you can check with your club mates and webpages like **https://www.openflightmaps.org/**.

4.2.4 Airport navigation page

The Airport navigation page is set up in much the same way as the **Turnpoint navigation page**, so be sure to check the previous section for additional information.

This page is used for navigating towards a single airport, from the .af file loaded into the LX Traffic Monitor. The navigation screen shows turnpoints, airports and airspaces on the map area.

Figure 23. Airport navigation page overview

Basic operation on this page has been explained in the **Navigation pages** section. Here, we will explain some specifics of the Airport navigation page, and how to perform basic Airport operations.

Pressing the **left push-rotary knob** will open the APT info sub-page, showing Bearing, Distance, Surface type, Elevation, Airport Frequency and Runway directions.

Pressing the **right push-rotary knob** you will enter the 'Select airport' sub-page. Here, a selection of airports will be shown, along with distance and bearing, as well as steering course (relative bearing) as described earlier, with an arrow. These points can be sorted by either Distance, Name, or ICAO code.

Choosing Name or ICAO will open up the Filter setting, where you can type the name or code lettering. Choosing an airport will set the airport as the navigation point for the airport navigation page.

Figure 24. Airport selection sub-page

Figure 25. Airport additional info sub-page

4.3 Info page

The info page shows the current GPS status and additional info, received from the GPS, like the GPS location, UTC time and date.

The device shows the battery voltage of the LX Traffic Monitor's external (airplane) power supply.

Lastly, the page shows the Flarm connection status, and Flarm device ID, if a Flarm device is connected.

Figure 26. Info page overview

4.4 Logbook/Flight statistics page

This page can be either the 'Logbook' or 'Flight statistics page, based solely on if the device is in flight mode.

Flight mode is a term describing a state in which the LX Traffic Monitor is, when the device detects it is flying. For getting into flight mode, one of the following parameters must be met:

1. GPS lock is present, and
2. GPS speed is above 10 m/s.

4.4.1 Logbook

When the device is not in flight mode, this page will be in Logbook mode.

Figure 27. Logbook page

Figure 28. List of flights in the logbook

Entering the Logbook page will show the list of all flights the LX Traffic Monitor has in its memory. Rotating the right push-rotary knob will move down the list.

You can use the left push-rotary knob for jumping through the list of flights by the order of 10. If you press in the push-rotary, while rotating it, it will jump through flights by the order of 100.

4.4.2 Flight statistics

Once the device enters flight mode, which is explained in the beginning of section **Logbook/Flight statistics page**, the Flight statistics page appears.

Figure 29. Flight statistics page

We can see the take-off time, flight duration, maximum altitude and maximum indicated airspeed, as well as an altitude graph.

NOTE

Once the LX Traffic Monitor determines that you are not in flight, it will start the 5 minute countdown to finishing your flight. Once the countdown has finished, it will save the flight to its internal memory.

The conditions for finishing a flight are:

- GPS lock
- Ground speed less than 10 m/s
- Altitude less than 3000 m QNH

NOTE

If you wish to forcefully finish a flight, prior to the LX Traffic Monitor starting the finish procedure, you can do this by going to the 'Flight statistics' page and pressing the right push-rotary knob and confirming the 'End flight?' question, as shown in figure 30.

Figure 30. 'End flight?' dialog box

4.5 Setup page

The Setup page, or Setup menu will be processed in the **Device setup** section.

Figure 31. Setup page

Device setup

This section will go through the complete setup process for the LX Traffic Monitor. Note that although LX Traffic Monitor does not have a pilot select menu like some other LX devices, the Setup menu is anyway divided in the same manner into two sections - the **User** and **System** settings.

5.1 User settings

The user part of setup incorporates the following sub-menus:

- **Voice**
- **Pages**
- **Graphics**

5.1.1 Voice

The Voice setup sub-menu holds a list of available voice warnings to choose from.

- **Flarm traffic**
- **Flarm warning**
- **Flarm obstacle**
- **Flarm h. distance**
- **Flarm v. position**

5.1.2 Pages

The pages setup sub-menu provides the pilot with a list of all primary pages. The pilot can choose to show or hide different pages, i.e. hiding the TP page if you lack the Turnpoint database file.

- **Traffic** a.k.a. Flarm radar page
- **TP page**
- **APT page**
- **GPS info**

5.1.3 Graphics

The Graphics sub-menu provides the pilot with options for personalizing the graphical appearance of the LX Traffic Monitor.

The following sub-pages exist:

1. **Airspace**
2. **Map**
3. **Theme**

5.1.3.1 Airspace

The airspace sub-menu holds the settings for colour and transparency of the fill and outline for the following airspace types:

- **Controlled zone**
- **Prohibited**
- **Restricted**
- **Danger**
- **Terminal area**
- **Airway**
- **Glider**
- **Military**
- **Other**
- **Class A, B**
- **Class C**
- **Class D**
- **Class E**
- **Class F**

Under some airspace type you can find Outline and Fill row. Some have only Outline. By selecting each row you enter the menu with a scroll bar for selecting the colour.
The adjusted colour is confirmed by pressing the right push-rotary knob again. Now the transparency level of the colour can be selected. Level is confirmed once again by pressing the right push-rotary knob. The settings will be saved and the interface will return to the sub-menu. The same logic applies to set colour for Fill.

Figure 32. Airspace sub-menu

Figure 33. Colour selecting menu

5.1.3.2 Map

The Map sub-menu holds settings for the graphical appearance of the Map are on all navigation pages. The following settings are available.

- **Orientation -** offers the two common map orientations - 'North up' and 'Track up'.
- **TP/APT text size -** changes the size of airports and turnpoints names on the map.
- **Dest. line colour -** the colour of the line connecting your current position and your navigation point.
- **Track line colour -** the colour of the line showing your current true track.
- **Display APT names -** whether or not to display airport names (alongisde the icon) on the map.
- **Display TP names -** whether or not to display turnpoint names (alongside the icon) on the map.

> **NOTE**
> APT icons are shown on the map up to a zoom level of 25km. TP icons are shown up to a zoom level of 9km. At higher zoom levels we are only showing Airspace lines, due to the legibility.

5.1.3.3 Theme

The Theme sub-menu offer the pilot to choose between 2 themes:

- **Black panel**
- **White panel**

After the theme is changed the LX Traffic Monitor will show a question box asking the user to restart the device.

Figure 34. White panel

Figure 35. Black panel

WARNING

Changing the theme will cause the unit to restart. Changing the theme in flight is not possible, due to this reason.

NOTE

Experience has shown that in high sunlight conditions, the 'White panel' colour theme is most visible, while the 'Black panel' colour theme is least straining for the eyes in low light conditions. Of course, sometimes it is just a matter of taste, which means **De gustibus non est disputandum**.

5.2 System settings

5.2.1 Aircraft

The following aircraft associated settings can be found in this sub-menu:

- **Category -** which category of aircraft does your aircraft belong to. Changing this will change the aircraft icon, as depicted with the aircraft icons selection below.

Aircraft icon selection:

- **Airplane** - 
- **Rotorcraft** - 
- **Jet** - 
- **Glider** - 
- **Gyrocopter** - 
- **Fighter** - 
- **Motor glider** - 
- **Airship** - 

5.2.2 Units

Sets the units used for different parameters throughout the device. The following parameters and units are available:

- **Altitude -** meters [m] or feet [ft]
- **Climb rate -** meters per second [m/s], knots [kts] or feet per minute [fpm]
- **Speed -** kilometers per hour [km/h], miles per hour [mph] or knots [kts]
- **Wind speed -** kilometers per hour [km/h], miles per hour [mph], knots [kts] or meters per second [m/s]
- **Distance -** kilometers [km], nautical miles [nm] or statute miles [ml]
- **Pressure -** hectopascal [hPa], inches of mercury [inHg] or millibars [mb]
- **Temperature -** degrees Celsius [C] or degrees Fahrenheit [F]
- **Weight -** kilograms [kg] or pounds [lb]
- **Area -** square meters [m2] or square feet [ft2]

5.2.3 Transfer

The Transfer sub-menu setup page holds all microSD transfer related options. In this setup page, we will see how to transfer database and FlarmNET files.

WARNING

LX navigation provides database files on an informative level and can in no way be held accountable implicitly, or otherwise, for and damage, be it material, personal or other, that may occur due to the use of this device. It is the pilot's responsibility to abide to all rules of air safety and to utilize good airmanship practice. In this sense, the information provided by the LX Traffic Monitor is of an informative nature only and should be taken with reserve. No guarantees are made on the accuracy of information found in databases released by LX navigation.

WARNING

It is important to note, that some microSD cards of lower quality may cause issues and not be read by the LX Traffic Monitor. This is why we strongly recommend you use the supplied SanDisk Ultra red/grey micro SD card, supplied with the device, as depicted on the figure below. The microSD card should be formatted to the FAT32 file system. Cards of up to 32 GB of memory were successfully tested on the LX Traffic Monitor.

Figure 36. The correct type of microSD

NOTE

Pilot must be careful to not exceed the file size of 750 kB, except "FlarmNET" file can be max. 5 MB.

NOTE

If you have just inserted the microSD card into your LX Traffic Monitor unit and the files are not showing up, try leaving the transfer setup page and entering again.

5.2.3.1 Turnpoints

Turnpoint files, in the .cup file format, are not supplied by LX navigation, but can usually be found at competitions, various webpages or from club manager and club mates. As a starting point, you can check the **Open flight maps**. You can even create your own turnpoint files either by hand, or using different software.

In order to use turnpoint files on your LX Traffic Monitor, first you need to copy them to the device. In order to do this, you need to have the file saved to the **root of your microSD card**. Once the microSD card is inserted go to **Load** sub-menu and select the file you wish to transfer to the LX Traffic Monitor's internal memory.

Now go to the **Select** sub-menu and select which of the files in the LX Traffic Monitor's internal memory you wish to have active.

You can have multiple turnpoint files active at the same time.

NOTE
The LX Traffic Monitor requires turnpoints in the .cup file format.

5.2.3.2 Airports

Airport files, in the .af file format, are supplied by LX navigation exclusively. For the latest available database files, check the **Support part of LX webpage**.

The airports file holds the frequencies to all airports, which is why it is especially important to use the latest database files available. If inconsistencies are found in the files, please refer them to the **LX navigation support email**.

In order to use a certain airport file, first you need to copy it to the LX Traffic Monitor's internal memory, through the **Load** sub-menu, and then select it as active through the **Select** sub-menu. Only one airports file can be active at a time.

NOTE
The LX Traffic Monitor requires airport files in the .af file format.

5.2.3.3 Airspace

Airspace files, in the .cub file format, can be found on both the **LX navigation database part of webpage**, as well as supplied by competition directors, club managers, club mates and other readily available database sources.

In order to use a certain airspace file, first you need to copy it to the LX Traffic Monitor's internal memory, through the **Load** sub-menu, and then select it as active through the **Select** sub-menu. Multiple airspace files can be selected at once.

Figure 37. Airspace transfer sub-menu

Figure 38. Airspace select sub-menu

NOTE
The LX Traffic Monitor requires airspace files in the .cub file format.

5.2.3.4 Flarm NET

The LX Traffic Monitor allows the utilization of **Flarm NET databases**. If a database is used, and a Flarm object with a Flarm ID found in the database shows up, the LX Traffic Monitor will automatically use the info from the FlarmNET database and assign it to the said object.

5.2.4 NMEA

The NMEA sub-menu is used for setting Flarm ports baud rates.

The following settings are available:

- **Data In -** sets Flarm 1 port baudrate.
- **Data Out -** sets Flarm 2 port baudrate.

5.2.5 Localisation

Contains information regarding the local settings of the LX Traffic Monitor. In this setup menu the language of the device, timezone and a check box for daylight saving time can be set.

At this moment, the following languages are available:

- **English**
- **Dansk**

- **Deutsch**
- **Italiano**
- **Nederlands**
- **Norsk**
- **Slovenščina**

If you wish to contribute and add your language, contact us at **LX support**.

5.2.6 Service

The Service setup page contains various device and service related settings, as noted below:

- **Device info -** shows basic information regarding the LX Traffic Monitor:
  - **Serial number**
  - **Firmware version**
  - **Build**
  - **Hardware version**
- **Flarm info -** shows additional info related to the connected Flarm device
  - **ID**
  - **Hardware version**
  - **Serial number**
  - **Firmware version**
  - **Database**
  - **Database exp. date -** database expiration date
- **Password -** opens up the dialog for admin passwords.
- **Software update -** used for updating the device. For further information, check the **Performing an update** sub-section for additional info.

The following passwords are at the pilot's disposal:

- **46486 -** Deletes all internal files (database files, pilot information, etc.) Can be considered as reverting the device to factory settings.
- **99999 -** Empty logbook
- **08658 -** Voltage offset setup

Taking care of your LX Traffic Monitor

If you were taken here by following the link from the introductory part of this manual, you can get back by clicking on the underlined text - **Using this manual**.

6.1 The internal battery (optional)

The first LX Traffic Monitors had a reserve battery, which was later removed These units have a Li-Ion internal battery, used for powering the unit, if the main power supply of the plane gets cut, during flight.

The internal battery can power the LX Traffic Monitor from **3 to 5 hours**, depending on the brightness level, whether wireless is on, volume and the state of the battery.

To extend the longevity of your LX Traffic Monitor's battery a few key steps should be taken:

- **Avoid using the internal battery, when not needed -** Do not intentionally cut the power to the LX Traffic Monitor, when there is still enough power from your main batteries. Do not intentionally leave it in flight mode.
- **Avoid draining the internal battery -** Draining the battery completely is a known culprit for reducing battery capacity. If you see the LX Traffic Monitor changed to its internal power supply, think about heading to your home airfield, unless on a competition of course!
- **Proper winter storage -** During periods of long inactivity, especially during winter, when cold temperatures are present, the battery capacity is lowered by cold temperatures and it can easily happen that the battery gets completely drained, causing the LX Traffic Monitor to lose its seal and the battery to lose part of its capacity. To avoid this from happening, it is recommended that, whenever the LX Traffic Monitor is in storage, it should be connected to an external power supply regularly, every 4 to 6 weeks, for at least 3 hours, for the internal battery to charge.

NOTE

The LX Traffic Monitor charges the internal battery automatically, when connected to an external power supply.

6.2 Display

Leaving the glider canopy open in the sun is known to have a magnifying glass effect, concentrating the sun rays to a smaller area. This can damage the internals of your cockpit,

as well as the display of the LX Traffic Monitor. Applying excessive heat will make the coating of the display start to become yellow and bubble (best case scenario), or destroy the device completely.

This is why it is prudent to always have your canopy, or your instrument panel, covered from direct sunlight.

6.3 Device housing

Visible external damages to the housing of the LX Traffic Monitor can void your device from a warranty repair.

6.4 RJ connectors

RJ connectors on the back of the LX Traffic Monitor are used for connecting external devices. If the cable is pulled out, without pressing the plastic security pin, the internals of the LX Traffic Monitor's connector may break and get ripped out. One should always be careful when taking the cable out, to press the security pin completely.

6.5 MicroSD card reader

The LX Traffic Monitor features a microSD card reader on the front of the device. The microSD should always be inserted carefully, not to miss the internal microSD card reader electronics.

6.6 Reverse polarity on power

Although the LX Traffic Monitor has diodes protecting it from reverse polarity on the main power lines, one should note the RJ connectors are not protected and internal electronics could still get damaged, if a power supply is connected to the wrong pins on the RJ connectors. Similarly, the LX Traffic Monitor can damage external devices, if a wrong cable is used for connection, as the LX Traffic Monitor provides a 12VDC power supply to other ports.

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