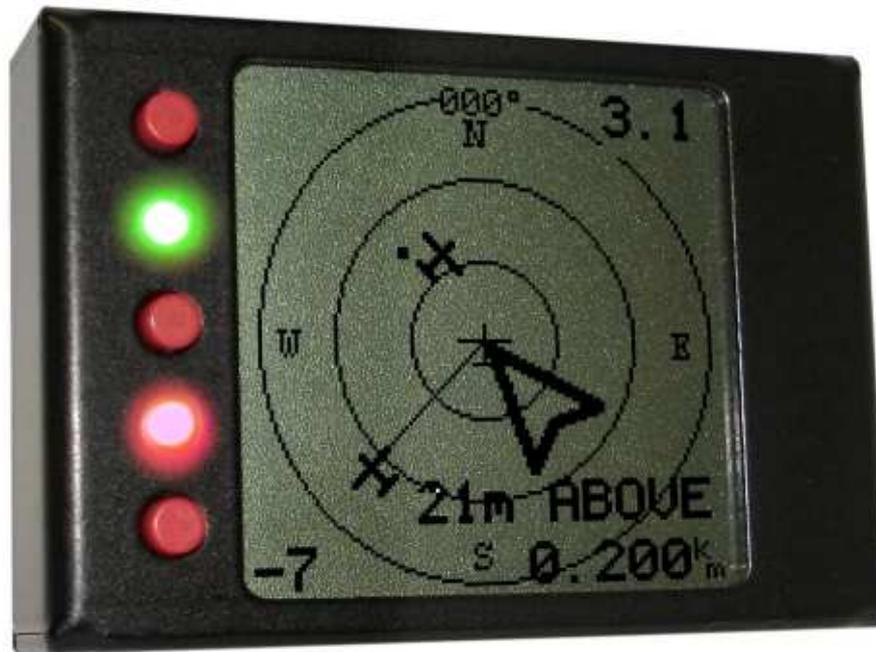


LX Flarm Graphic Display

V1.02

A high tech solution for your safety

Users manual



- High resolution graphic display (128 x 128 dots)
- Replaces conventional Flarm LED display
- Connectable to any Flarm unit via 6P telephone type connector, power and data
- No external 12 V necessary; it is powered by the Flarm
- Practical layout. Dimensions (55x40x15 mm), simple to install anywhere in the cockpit (Can be surface mounted on the panel)
- No instrument panel cut out necessary
- All gliders within range are visible at the same time
- Display of near glider IDs, incl. their flight data
- Two colour LED's (red and green) as a status display
- 3 push buttons for easy manipulation and inputs
- Buzzer for acoustic warning and a big arrow on the display as visual warning
- User friendly setup menu, allows many custom solutions

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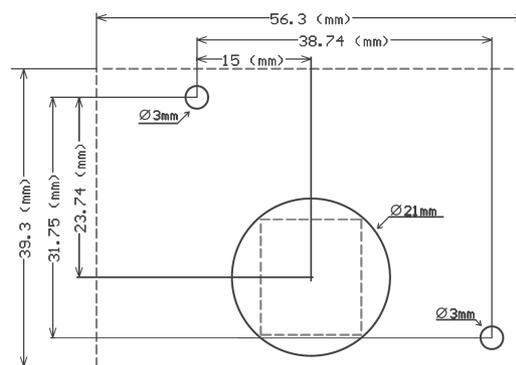
1 Introduction

The unit was developed to improve traffic situation impression of the pilot, after he has got a graphic screen which makes all gliders being in radio range visible at the same time. To make the unit more efficient, two high intensity LED's and a buzzer are also built in. Three push buttons makes operation and inputs extremely user friendly and easy.

The unit is connectable to any Flarm unit via 6P telephone type connector and doesn't need **separate power** supply. The LX Flarm Graphic Display may be connected in parallel to other types of Flarm external displays.

2 Mechanical installation

The unit is rectangular (56x49x15mm) and can be installed anywhere in the cockpit. Only 3 holes should be drilled into the instrument panel, one for connector and two to fix the device.



Front view

A special angled adapter is available as an option and this solution enables installation on horizontal surface.

3 Electrical installation

The unit receives its power via data cable and doesn't require any external power. If many units are connected to the same data bus, use splitters.

Note!

The LX Flarm graphic display units may be also installed in the second seat of a double seater, no special settings required. Use suitable splitting units, also available by LX Navigation.

3.1 After power ON

After the unit has received power, a demo display is active for approximately one minute. After this period the unit is ready for operation without any pilot manipulation.

4 Push buttons, LED's and buzzer

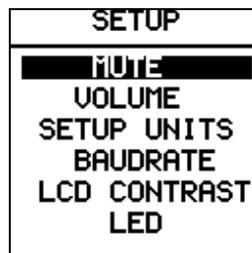
Three push buttons makes possible to operate the unit during flight and to provide all necessary setup inputs. The central positioned button serves as **Enter** command, upper and lower buttons as **Up/Down** (↑, ↓) selectors. Two high intensity LED's, one red and another green informs continuously about some important statuses of the unit. The light intensity may be adjusted in setup.

A build in **buzzer** expresses some important information in audio form. The intensity may be adjusted in setup.



5 Setup

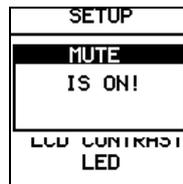
The setup enables input of user system parameters. All three push buttons are necessary to be used by inputs. It is important to point out that a **“long”** and a **“short”** press on central positioned button (☒) will activate or close some actions. A **long press** on Enter (☒) for about two seconds, will open setup.



Now individual settings can be changed or simple checked.

5.1 MUTE

A **short press** on MUTE will disable buzzer and vice versa. After the action is finished the unit will change over to basic graphic traffic information display automatically. A very clear message MUTE is ON or MUTE is OFF will inform about the status before exit.



5.2 NEAR MODE

After near mode has been enabled (NEAR MODE ON), red LED will always be ON, after receiving a signal from at least one Flarm unit. If near mode is OFF, red LED will be on only in case of a warning.

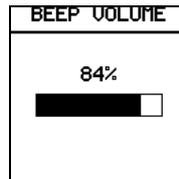
5.3 ZOOM

Select zoom level of the graphic screen with using up/down selector (↕). Short press on Enter will return to main graphic page.

5.4 VOLUME

Select VOLUME after using of down selector (↕) and press **short** Enter. A bar will show you the preset audio level. Use up and down buttons to adjust buzzer intensity.

A **short press** on Enter will return to setup and **another long press** will change over to graphic screen.



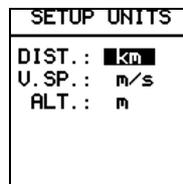
5.5 UNITS

The LX Flarm Graphic Display doesn't show only positions of near gliders. The distance, vertical speed (vario) and the altitude of near gliders are also available.

The units, in which mentioned data will be displayed, can be set in this menu. Default setting is metric.

The philosophy is very similar as described in previous chapter. A **short press** (Enter) on individual unit will enable a change, after using of **up/down** selectors. A short press on Enter will close the procedure.

Use **long press** to return into Setup.



5.6 BAUDRATE

Different Flarm products are using different communication speeds between Flarm unit and the display. To avoid problems the LX Flarm Graphic Display offers several com. speed (baudrate) variants.

Note!

The screenshot shows a rectangular display with a black border. At the top, the text "No GPS data!" is displayed in a large, bold font. Below it, the text "Waiting at 19200bps" is displayed in a smaller font. The background of the display shows a partial view of a flight display with a heading scale from 000 to 360, a vertical speed scale from -0.8 to +108, and a speed scale from 0 to 8. The heading is set to 000, and the vertical speed is -0.8. The speed is 0. There is a small 'N' at the top and an 'S' at the bottom of the heading scale.

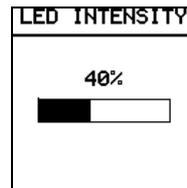
This type of message informs that the unit is waiting for Flarm data at 19200 bps and is not operative. Immediately after Flarm data will be received the message will disappear. **Adjust baudrate** after using of not LX Navigation products.

5.7 LCD CONTRAST

The display contrast can be individually adjusted in this menu. The procedure is same as above.

5.8 LED

There are two high intensity LED's mounted on the front of the unit. The light intensity can be adapted to any personal requirements.



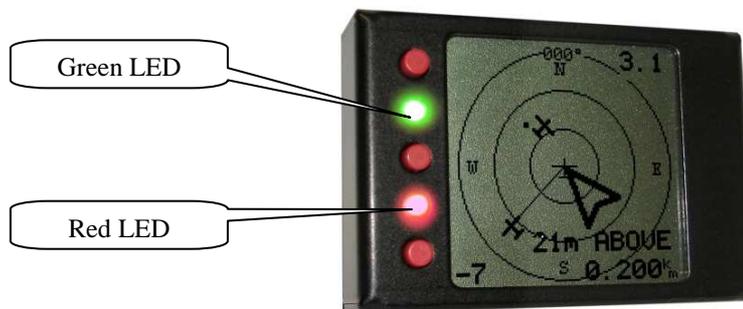
5.9 INIT MEMORY

This is some kind of general reset and will restore all settings to factory default (also customized Flarm IDs). A significant message on the display and an audio signal will inform about this action.

6 Operation

6.1 LED status indicators

Two led mounted on the front of the unit informs the pilot about statuses.



GREEN LED:

- Flashing ⇒ GPS BAD
- Continuously ON ⇒ GPS OK

RED LED:

- Flashing ⇒ Collision warning, flashing intensity will increase, if the collision risk will increase
- Continuously ON ⇒ Informs about near gliders within radio range, which don't cause a warning

6.2 Buzzer

The built in buzzer will be activated after a collision warning appears. Buzzer activation is always connected with red LED flashing. The intensity of buzzer signal depends on the collision risk.

6.3 Graphic display

6.3.1 General

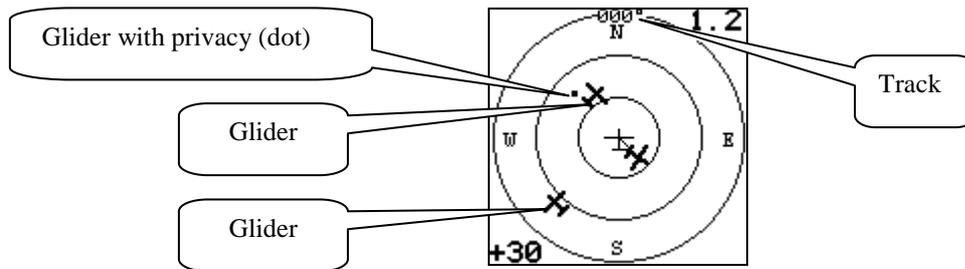
The graphic display is divided into 3 circular sections and the sections are separated by the distance (1km, 2km, 3 km). The glider symbol (not bold) which is positioned always in the **middle** of the screen (doesn't move at all) shows the glider where the LX Flarm Graphic Display is built in. The near gliders are presented as **bold**. **All gliders** located in radio range, will be simultaneous on the display.

Note!

The graphic display orientation is always **track up**. The track is also presented on top of the screen. To improve notion, N, E, W and S are added to the display

There are two symbol types presenting near gliders.

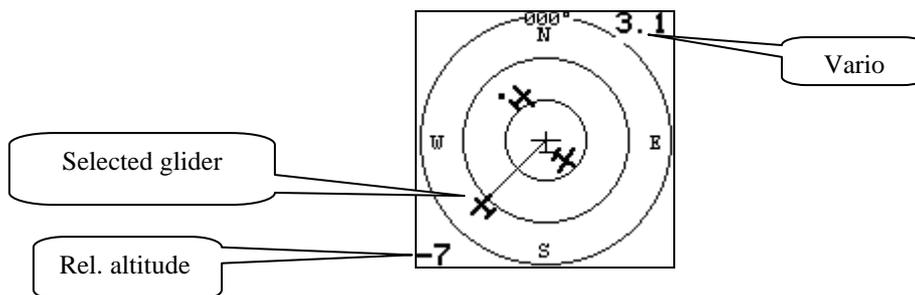
- Like a **glider symbol** including track information
- Like a **dot** without track information

**Note!**

Glider presented like a **dot** on the screen, are gliders where pilots have intentionally activated so called **PPIRVACY** function on their Flarm units. Such gliders send limited data strings and **couldn't be visualized** completely. The warnings will appear regularly.

6.3.2 Glider selection

The unit is able to show vario and altitude difference (relative altitude) for **one near glider** at the same time. To select the glider use \uparrow , \downarrow . Selected gliders are visualized via a **line** going from the glider symbol to the centre of the screen.



6.3.3 Showing of extended data

After glider selection an additional page showing extended glider data, may be activated after a **short press** on Enter.

```

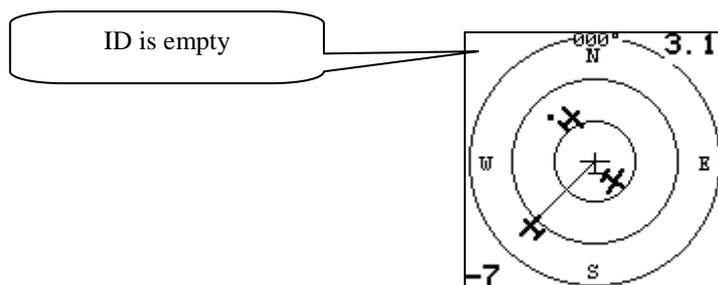
ID:001111
Dist:2.500km
RelAlt:+220m
BRG:307
Var:-1.3ms
Age:1s
RX TX
GPS 3D - STOP

```

ID:	ID number of the selected Flarm unit or it's already customized variant (see also 6.3.4)
Dist:	the distance to the glider
RelAlt:	above or below in m or feet
BRG:	bearing to the near glider
Var:	vario of near glider
Age:	time from the last update
Rx,Tx	Status
GPS	GPS status

Note!

Original Flarm IDs (to many characters) will not be shown in the main graphic page. Only already **customized IDs** will be present. Information how to edit an original ID you will find in capture 6.3.4.



To step back to the main screen, use **short** press.

6.3.4 Edit of original IDs

The received unique Flarm original ID can be converted into a more useable form (maximal 3 characters) any time on ground or during flight. The only condition is that the glider of interest is shown on the display, means its Flarm data is received. This makes possible to identify known near gliders very easy.

Note!

Edit procedure is possible to be carried out only during radio contact period. There is space to store **maximal 20** customized IDs. Converted ID will remain also after power off.

The procedure:

- **Select** glider of interest after using of \uparrow and \downarrow , in the main graphic screen
- Press **short** Enter and extended glider data screen will appear
- After next **long** Enter select number under which the custom ID will be stored (0-19) and use **short** Enter
- Custom ID input field will became active, **input custom** ID after using of \uparrow , \downarrow and Enter, custom ID may consist of **maximal 3 alphanumerical** characters

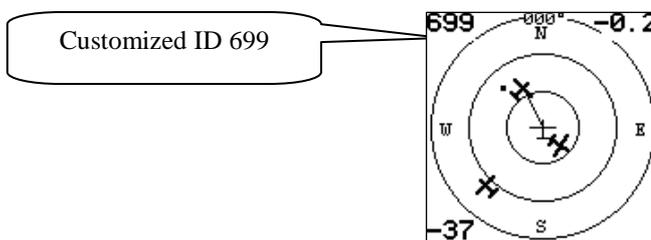


Note!

The customized ID will be always present in the left upper corner of the display. Non customized IDs will not appear at all.

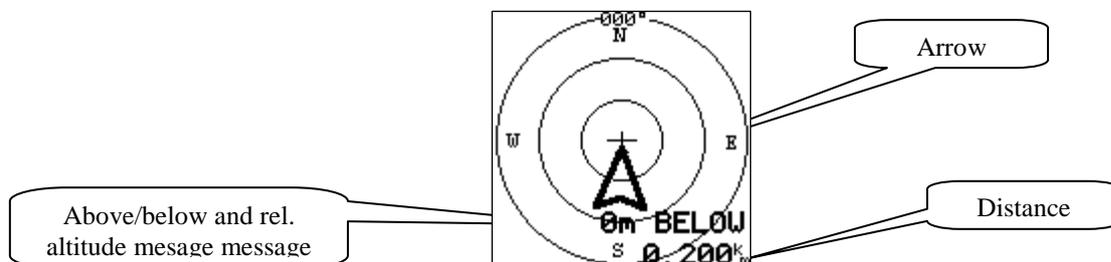
Suggestion!

It seems to be practical to convert Flarm original IDs into competition numbers of known gliders.



6.3.5 Expression of collision warnings in graphic

After a warning will be sent from the Flarm unit an additionally **bold arrow** will appear on the display and also a bold text will inform about **above/below** and **the distance** in adequate units.



Example:

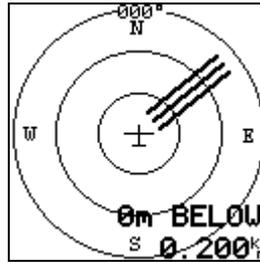
- Collision risk from 6 o'clock
- Below 0m
- Distance 200m

Note!

After a warning is activated (only for **one glider** at the same time) a big **arrow will appear on the display**. Flashing of red LED and buzzer will **increase** with increased **collision risk**.

6.3.6 Expression of obstacle warnings

After obstacle data base is loaded into Flarm unit, approaching to the obstacle may cause a warning. During obstacle warning three parallel lines will appear on the display and their orientation will show the direction. The LED and buzzer will react as by collision warning.

**Example:**

- Obstacle 2 o'clock
- Below x meters
- Distance 200m

7 Conclusion

<i>Item</i>	<i>Flashing</i>	<i>ON</i>	<i>Arrow</i>	<i>Parallel lines</i>
RED LED	Warning	Near gliders	x	x
GREEN LED	GPS BAD	GPS OK	x	x
Buzzer	Warning	x	x	x
Display	x	x	Warning	Obstacles

8 Safety

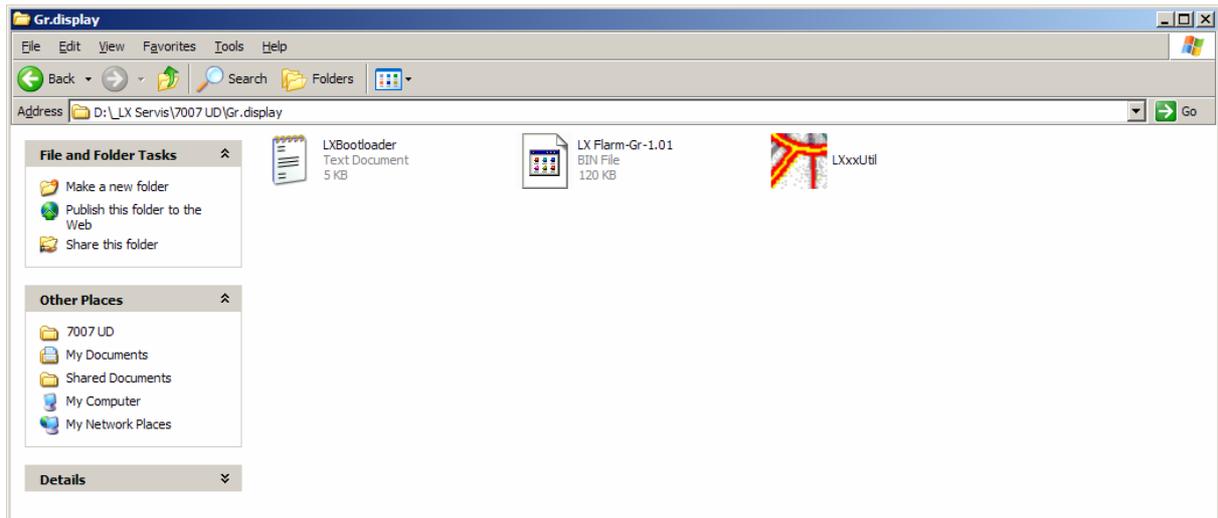
Please read **carefully** manual of the Flarm unit to which LX Flarm Graphic Display is connected, to be informed about all details, how the system works. LX Flarm External Display is some kind of slave unit expressing status data send by Flarm unit.

9 Firmware update procedure

The update of the firmware may be carried out through any person having a little PC experience. Necessary tools:

- Windows running PC with com port or USB to 232 adapter
- LX interface (Ord Nr.: GR-D-INT) which makes possible to connect LX Flarm graphic display to the com port

Three files should be copied into a folder, one .TXT file one .BIN and LXBootloader.

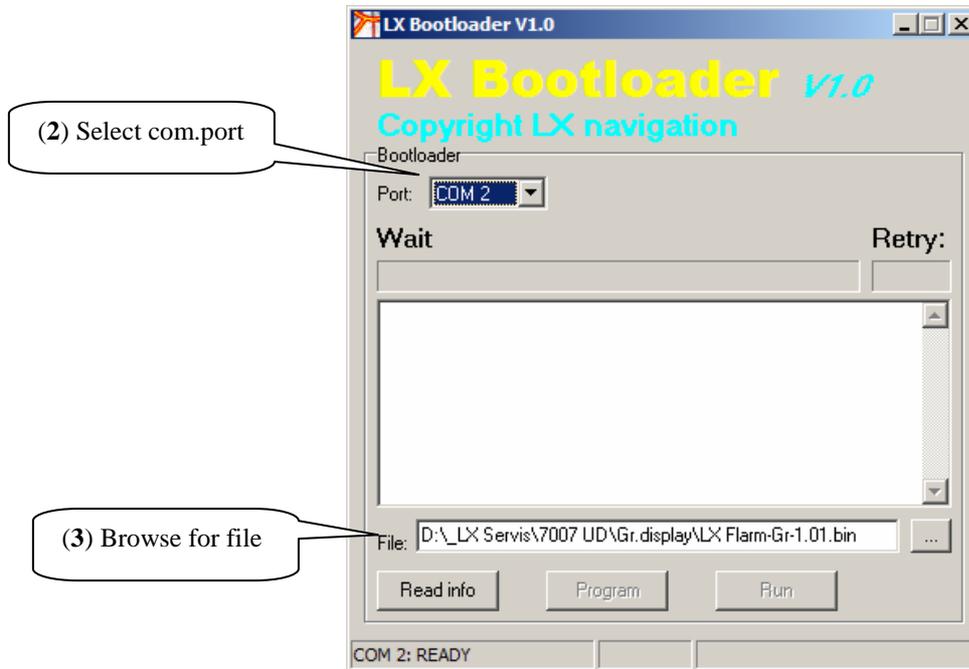


Note!

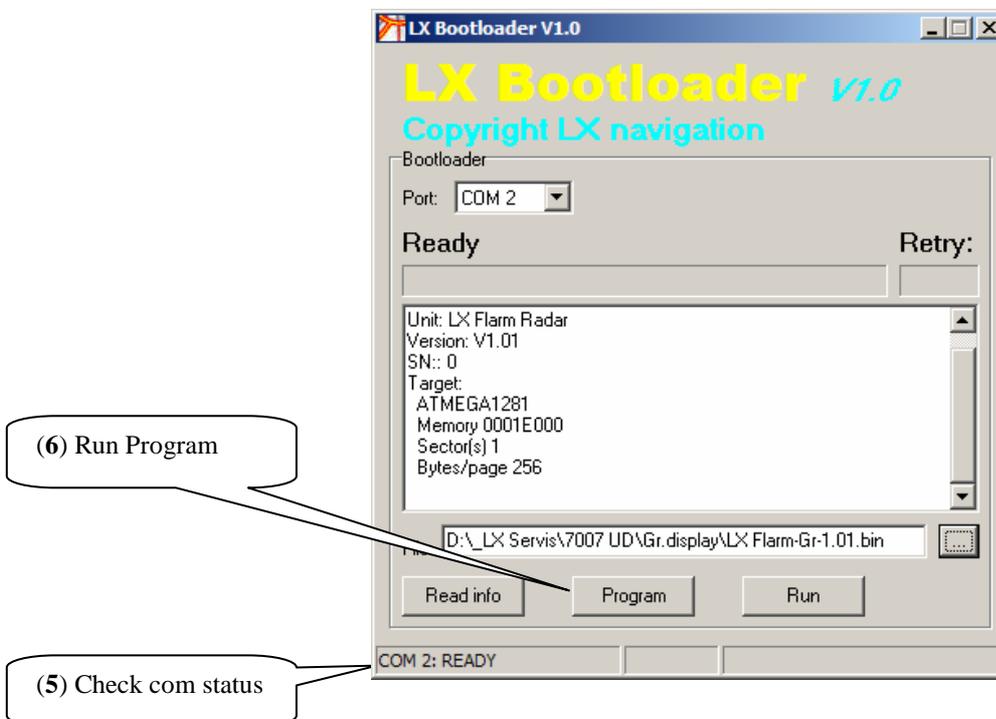
To be able to carry out the update procedure also in the glider, it is necessary to connect a **9V battery** (E-Block) to the interface. The battery will power the display during the update procedure.

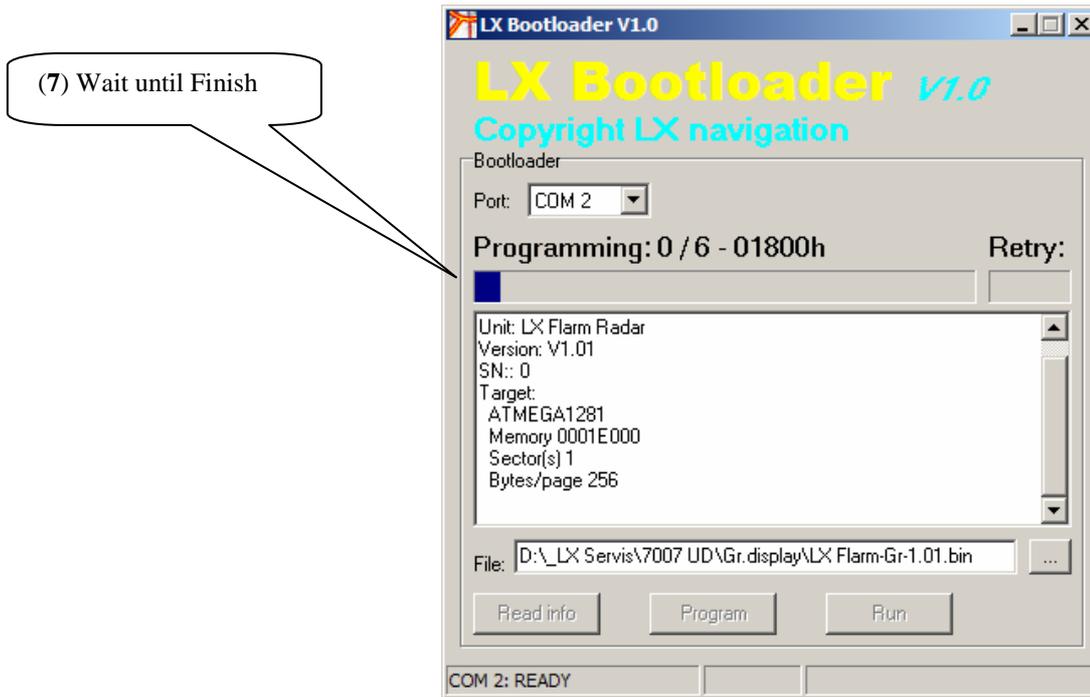
9.1 The procedure

Connect interface to the PC com port and run LXBootloader (1).



(4) Connect LX graphic Display





(8) Close Bootloader

(9) Disconnect LX Flarm Graphic Display

(10) Connect to power, check program version and execute INIT MEMORY (see capture 5).