PowerFLARM® Displays

Manual
Software-Version 3.0

www.PowerFLARM.us

A. Document status und revision history

Revision	Datum	Status	Autor	Kommentare
2.2	March 30th, 2012	translation from German manual	Butterfly	document created
2.4 to 2.98	March to July 2012	several additions	Butterfly	content added
3.0	July 31st 2012	added information	Butterfly	Stealth mode added
3.01	August 6th 2012	added information	Butterfly	B102 HW Version 2.1 added
3.02	August 7th 2012	added information	Butterfly	More extensive hardware version information + information about operation added
3.03	September 6th 2012	added information	Butterfly	More information about hardware, connections, operation and updates.

General Information

Legal Notices

Safety

 The pilot is ultimately responsible for all flight decisions and for operating the aircraft safely at all times. This instrument does not eliminate the need for an effective lookout. Continue to observe the airspace and do not rely on Displays (or FLARM®) to announce all objects in the airspace!

For Situational awareness only. Never rely on the Displays. Never make safety critical decisions based on displayed information.

Liability

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Trademarks and intellectual property

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Technical Notices

 PowerFLARM® Displays do not have a JTSO or FAA-TSO airworthiness certification for equipment. Make sure that it is legal to install PowerFLARM® Displays in your aircraft.

Installation and operation must be on the basis of non-interference with and no hazard to the existing suite of other certified equipment necessary for safe flying operation, or installed to comply with official requirements. Installation and operation must comply with official regulations and requirements.

Support

United States

To get support, please contact your local authorized PowerFLARM® dealer.

Introduction

PowerFLARM® Displays display traffic data from FLARM, PowerFLARM® or ADS-B traffic receivers. Comprehensive position and danger-level information on dangerous traffic is given. Additionally soaring-tactical informations are given. PowerFLARM® Displays feature a sunlight readable transflective TFT display with 2" screen size.
Two housing versions, 57mm panelmount or external display are available. PowerFLARM® Displays interface to all FLARM compatible devices as well as Garrecht ADS-B receivers. PowerFLARM® Displays feature audible alerts through integrated warning sounders.

Installation

General Notices

- This documentation is to be stored with the aircraft log
- Addition or removal of connected devices may require reconfiguration of your host device
- Furthermore, after installation, it is recommended where possible to check the correct operation of the device prior to flight.
- In all cases the installation is to be performed only with expert advice in accordance with this guidance.

Hardware Versions

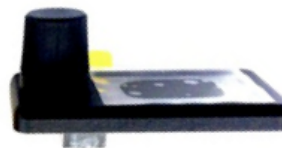The following table gives an overview of different circulating hardware versions.

Hardware Type	PartNr. / Version	Sold From Date	Rotary Knobs	Enclosure
57mm Panelmount	B102 / 2	March 2010	2 concentric	Aluminium
57mm Panelmount	B102 / 2.1	August 2012	One	Aluminium
External Version	B101 / 3	April 2011	One	Aluminium
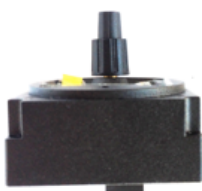
57mm Version 2   57mm Version 2.1   External Version 3

The following hardware versions have been sold in Europe since 2007 and have reached their end of life more than 18 months ago. No such devices have been sold in north-America.

Hardware Type	PartNr. / Version	Sold From Date	Rotary Knobs	Enclosure
57mm Panelmount	B102 / 1	November 2007	2 concentric	Plastic
57mm Panelmount	B102 / 1.1	June 2008	2 concentric	Plastic
External Version	B101 / 1	November 2007	2 concentric	Plastic
External Version	B101 / 2	June 2008	2 concentric	Plastic

Mechanical Installation

Installing the 57mm panelmount version

The display is installed in a standard 57mm (2.25") panel-cutout and fixed with the supplied M3 DIN7985 screws.
If installing hardware version 2 (with 2 concentric rotary knobs), after installation of the display unit the supplied rotary knobs have to be installed. In this case a metrical wrench is needed for installation.
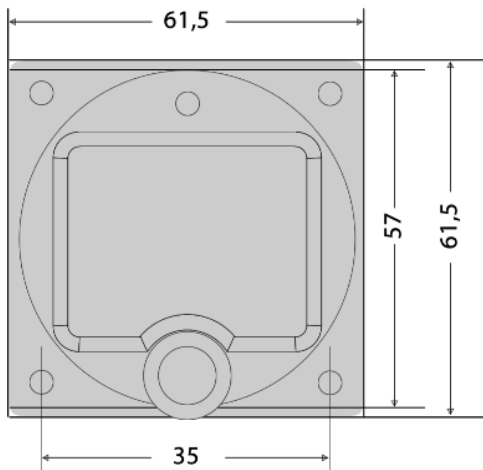
Dimensions in [mm]

Installing the external version

The external display can be mounted via 4 M2 screws (supplied) or with DualLock® velcro tape. The mounting direction can be chosen freely. Specialized mounting systems are available from all authorized PowerFLARM® dealers.
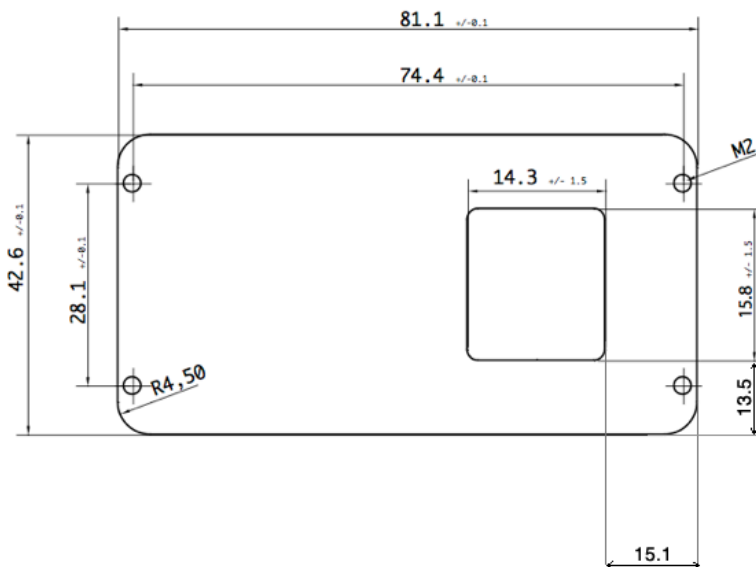
Dimensions in [mm], M2 thread depth: 5mm.

⚠️ *PowerFLARM® Displays do not have a protectionall glass front. Mechanical stress applied directly to the display will destroy the display.*

Viewing Angle

When installing your display make sure that the viewing angle is as straight as possible. Readability largely depends on the viewing angle. Polaroid sunglasses may reduce display luminance depending on polarization and screen direction.

PowerFLARM® Display external: The display screen direction can be rotated 90°-wise for optimal installation. Not only "landscape" but also "portait-mode" is possible.

Connection to host device

Cables and Connectors

PowerFLARM® Displays feature an RJ12 6p6c connector with standard FLARM-pinout. An interface cable is supplied. The display is supplied with 3VDC. Also 6p4c cables (e.g. RJ11) may be used. Take care that the cable is not bent or crushed during installation. It is very important that the cable is fixed closely to the display so that no force or vibration can be applied to the display connector. The cable can be shortened.

Cables may only be shortened by experts

PowerFLARM® Displays are compatible to all FLARM®/PowerFLARM®® compatible devices with data-rates equal or above 19200Bd.

If using an original FLARM device, make sure that the output of navigational data is activated.

Data connection to classic FLARM® devices

When connecting PowerFLARM® Displays to classic FLARM® devices two connection options are available.
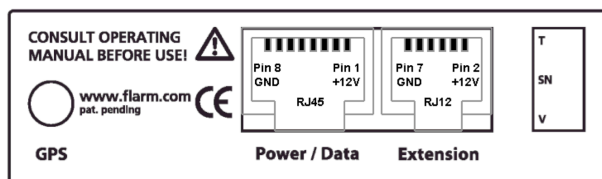
No other display/third party device installed

Connect your PowerFLARM® Display to the „Extension" port of the classic FLARM® device

Other displays/third party devices connected

Connect the PowerFLARM® Display to the „Power/Data" port of the classic FLARM® device using a Y-connector.
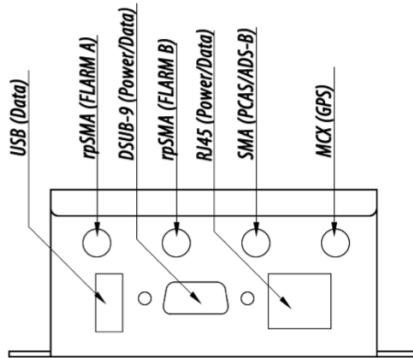
Data connection to PowerFLARM® devices

8pin to 6pin cables (RJ45 <> RJ12) are available (in the US included in delivery). PowerFLARM® Displays can be directly connected to the PowerFLARM® RJ45 data connector.

Data Connection to PowerFLARM® Brick
Butterfly Displays are connected through the RJ45 connector of the PowerFLARM® Brick.

Installations with two Displays: Do not use RJ45 Y-Connectors to connect two displays e.g. in two-seater aircraft. Use two different ports, one display on D-SUB, one on RJ45.

Data Connection to PowerFLARM® PORTABLE
Butterfly Displays are connected through the RJ45 connector. If PowerFLARM® PORTABLE is to be supplied with external power, use an RJ45-Y-Connector.
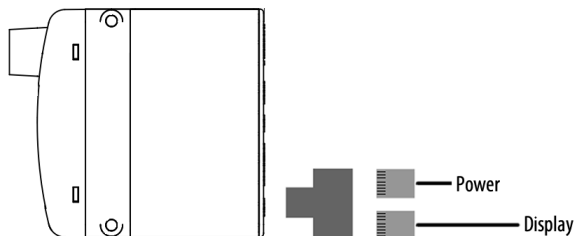
Data connection to other devices

Data Connections to other FLARM® compatible devices can be made through any available FLARM-standard connector. Various adapter-cables are available through Butterfly Store or authorized resellers.

Using PowerFLARM® Displays

Boot-Process

PowerFLARM® Displays are powered on as soon as the host-device is switched on. When Booting up PowerFLARM® Displays show a dedicated boot-screen with software version informations.

Controls

Control elements

PowerFLARM® Displays are controlled via rotary knobs and an integrated push-button.
Displays have one rotary knob and one integrated push-button.
Older hardware versions of the panelmount version (57mm) have two concentric rotary knobs and one integrated push-button.
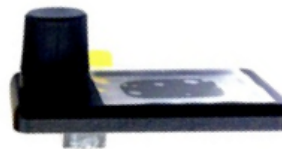
Hardware Type	PartNr. / Version	Sold From Date	Controls
57mm Panelmount	B102 / 2	March 2010	2 concentric rotary knobs with pushbutton
57mm Panelmount	B102 / 2.1	August 2012	Single rotary knob with pushbutton
External Version	B101 / 3	April 2011	Single rotary knob with pushbutton
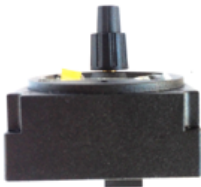
57mm Version 2   *57mm Version 2.1*   *External Version 3*

Control element functions

The table below gives an overview of possible interactions with the control elements.

Single knob hardware versions:

| Element	Action
Rotary Knob	turn
Rotary Knob and Pushbutton	Push Button, hold Button and simultaneously turn
Pushbutton	Short push (> 1 second)
Pushbutton	Long Push (equal or more than 2 seconds)

Dual knob hardware versions:

Element	Action
Foremost Rotary Knob	turn
Backmost Rotary Knob	turn
Pushbutton (on foremost knob)	Short push (> 1 second)
Pushbutton (on foremost knob)	Long Push (equal or more than 2 seconds)

Traffic Depiction

PowerFLARM® Displays feature different screens in different traffic situations.

No traffic received

When there is no traffic in range, PowerFLARM® Displays show a dedicated screen giving the current time as well as system information. GPS and TX indicators show the FLARM GPS and RF status. If a status indicator turns red there is problem with the host device.
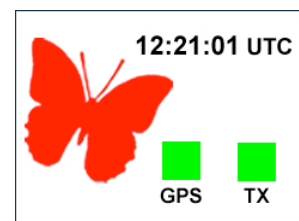
No dangerous traffic received

If non-dangerous traffic is received, the pilot can freely chose one of four different pages, three radar screens (with different zoom factor) and one list view.
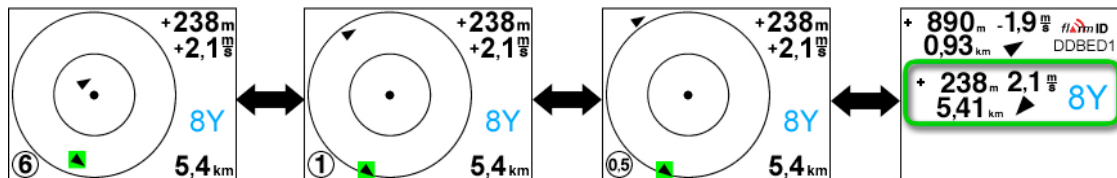

Radar View
In the radar view traffic is shown in a radar-style fashion.
Circling aircraft are depicted as blue circles, non-circling aircraft are depicted as arrows pointing into the flying direction.

 If your aircraft is on ground the radar-display direction points north up. North up mode is indicated with a little symbol in the upper left corner. When flying the displays always shows track-up.
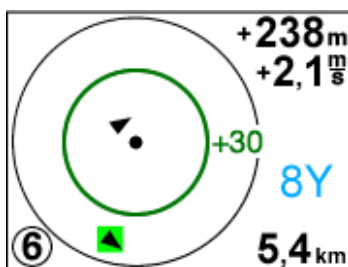
Ranging and altitude separation of aircraft with transponders (Mode-S/C) are shown as a ring around the current position. The current altitude separation is depicted on the right side of the ring.
If units are set to feet, the altitude separation is given in flightlevels. „+30" means 3000ft above.
If metric units are set, altitude separation is given in meters.

Circling Detection
If a received target circles with an adequate turnrate and climbs, this is depicted with a special symbol on the radar screen. The target is depicted as a blue circle instead of a normal arrow. Additionally if you select a circling aircraft, the circling direction is displayed.

List view
The list view shows traffic sorted by range together with additional Information. The list view is only available if in SELECTION-Mode (see modes below)

Modes
There are two different operation modes available. The mode can be set in the settings menu (see below).

NEAREST mode
The nearest received aircraft is automatically selected. No other aircraft, except for the nearest can be selected. You can use the rotary knob to adjust the displayed range.

	Adjust Range	Enter Menu	Select Menu Item	Execute Menu Item	Exit Menu
Dual concentric Rotary Knobs (57mm Version 2)	Turn one of both rotary knobs	Long push on pushbutton	Turn foremost rotary knob	Short push on pushbutton	Long push on pushbutton
Single Rotary Knob (External Version + 57mm Version 2.1)	Turn rotary knob	Long push on pushbutton	Turn rotary knob	Short push on pushbutton	Long push on pushbutton

SELECTION mode
By turning the rotary knob aircraft can be selected (green marker). For marked aircraft additional information is shown on the right of the display in radar view.
You can use a push and turn gesture on the rotary knob to switch between different display pages (three range settings + list page).
Older 57mm panel-mount hardware with two rotary knobs, the foremost rotary knob is used to select an aircraft, the backmost to adjust the displayed range.

	Adjust Range	Enter Menu	Select Menu Item or aircraft	Execute Menu Item or view FlarmNet info of aircraft	Exit Menu
Dual concentric Rotary Knobs (57mm Version 2)	Turn backmost rotary knob	Long push on pushbutton	Turn foremost rotary knob	Short push on pushbutton	Long push on pushbutton
Single Rotary Knob (External Version + 57mm Version 2.1)	Push, hold and simultaneously turn rotary knob	Long push on pushbutton	Turn rotary knob	Short push on pushbutton	Long push on pushbutton

FLARMNet view and Team function

By pushing the button after you have selected an aircraft you can see the aircraft's FlarmNet information. Register your aircraft at FlarmNet.org to be shown the same way.

FlarmNet is a community of FLARM® users. In FlarmNet you can enter certain information about you and your aircraft. FlarmNet capable devices can use the FlarmNet database to identify FLARM®-users in the air. FlarmNet registration is free and takes only some minutes. You can access FlarmNet and finde more information on http://www.flarmnet.org

You can mark aircraft in an orange color, e.g. to easily distinguish team-partners from other traffic. Enter the FLARMNet view of a certain aircraft (with a short push of the button) and then push the button long to mark it in orange. Repeat the process to unmark it again.

Stealth

Aircraft with active stealth mode are only shown on the radar-screen when they are safety relevant. Furthermore no tactical information such as altitude difference and climbrates are given.
Butterfly displays allow the activation of stealth mode inside FLARM®/PowerFLARM® devices. To activate stealth mode, go into the menu (long pushbutton push) > FLARM > Stealth Mode.

Please note. If Stealth mode is active in your device, all other traffic is depicted in the same way as if they have stealth mode active as well.

For the first few minutes after startup, FLARM®/PowerFLARM® devices usually are in Stealth mode.

De-activating stealth mode in-flight is possible, however stealth mode remains active for some minutes after deactivation.

Dangerous traffic received

When dangerous traffic is detected, a dedicated warning screens is shown. Warning screens are shown automatically and con not be closed by the user. Additionally an audible warning tone is given.
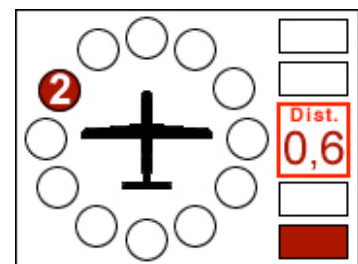
Warning Situation 1:
Dangerous traffic is on the left (10 O'Clock) and below, distance 0.6 km (depending on units-settings also miles can be displayed).
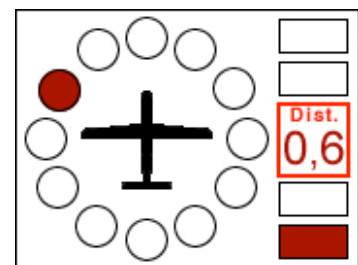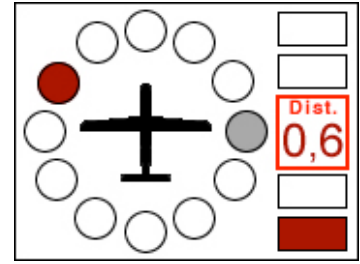

Warning Situation 2:
Dangerous traffic with more than one aircraft. The number of targets is indicated (here two targets).

Warning Situation 3:

Dangerous traffic is detected. A non-dangerous aircraft is flying close on the right and is indicated in grey (typical team-flying situation)

Settings

PowerFLARM® Displays feature a setup page for the most important settings. Push the push-button long to enter the settings menu. Push it long again to leave. You can navigate the settings screen by turning the knob. You can enter a menu item with short push of the push-button.

Menu (Enter/Exit with long button push)
        Volume Adjust the volume of the integrated alarm sounder
        System
                Units: Change the units from imperial to metric
                Display mode: Change from NEAREST to Selection-Mode
                XPDR Alarm: Activate/deactivate XPDR audio alarm
                Orientation: Change the screen orientation (external version)
        FLARM
                Stealth-Mode: Toggle FLARM Stealth mode
                FLARM UI: Activate/Deactivate FLARM UI (normal FLARM only)

Updates

Update through PowerFLARM®

After Q4/2012 it will be possible to update the displays through any PowerFLARM® unit directly without the need for a special cable.

Available Software Versions

Different Software version with slight modifcations are available. Updating Butterfly Display may only be done by experts. Enduser software updating is not recommended before updating through PowerFLARM® becomes available.
Changes made from 2.9.4 to 3.0 only target settings/configuration and do not affect operation.

| Software Version	Changes	Comments
2.9.4	-	-
2.9.5	Minor corrections	Minor typographical corrections
2.9.8	Information Screen added to boot-screen	Informations about connected devices are shown on bootscreen
3.0	Boot-screen Information slightly modified	Boot-screen informations are now only displayed when pushing the pushbutton during the boot-process.

Update with special cable

PowerFLARM® Displays feature field-upgradeable firmware. You can update your display by using an original Butterfly Update Cable which is available at Butterfly Store or authorized resellers.
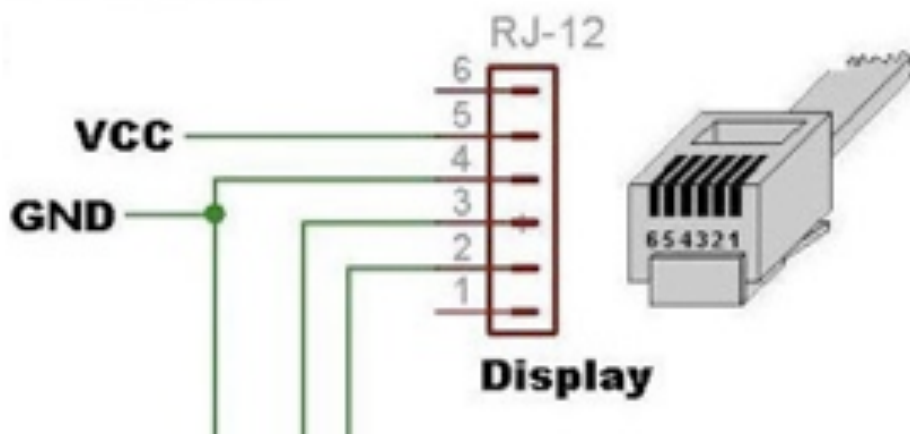
Update process
- don't connect your display. start the software, choose com-port, follow instructions
- push the display-pushbutton and hold it
- connect the display
- release the pushbutton
- wait until the update is finished

Connector Pinout
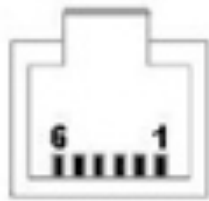

```
6:   -         Not used
5:   3.3 V     Connect to +3.3 V
4:   GND       Connect to PC Pin 5 & GND
3:   RX        Connect to PC Pin 3
2:   TX        Connect to PC Pin 2
1:   -         Not used
```

Notes: