

LX 1600

Variometer / speedcommand system controlled by PDA

Pilot`s Manual



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1 Overview

The LX 1600 has been designed from the outset as a variometer/ speedcommand system designed to operate with and be controlled by a PDA (iPAQ, for example). When connected to such equipment and when loaded with compatible operating program, and connected to a suitable GPS source, the pilot has at his command a full competition-capable flight management system that needs only one standard 57mm hole in the instrument panel!

In addition to its operation by a PDA, the LX 1600 also has four push buttons fitted coincident with the 4 mounting screws that allow the pilot to operate the vario independently of the iPAQ. These controls comprise:

- Audio Volume adjustment
- Ballast input
- MacCready input
- Altitude
- Vario Response input

The unit is available without PDA software or can be ordered as a package including software (SW).

Note!

SW packages currently available: SeeYou Mobile, FlyWithCE Navigator

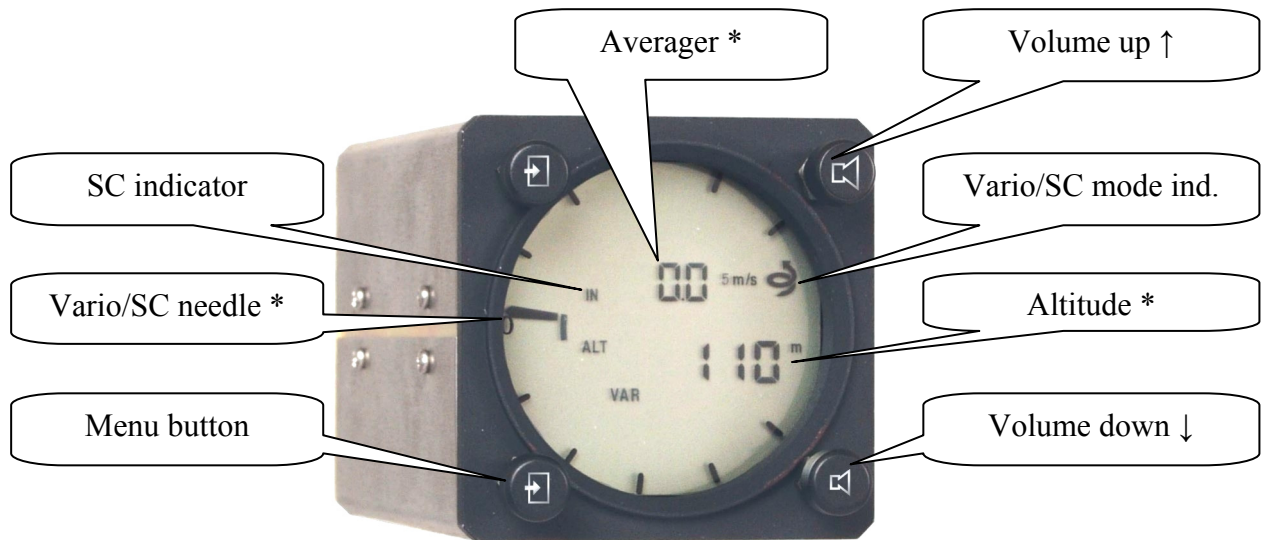
The LX 1600 cannot operate a second cockpit repeater. If you need this we recommend either the LX 160S or the LX 7000 series.

2 Functions

Because the LX 1600 is principally designed for operation with a PDA the really important Pilots' Manual is that provided by the designer of the operating software. This manual for just the LX 1600 will help you to operate the unit as a stand alone unit, or to install the unit and connect it to a PDA.

However, it will be helpful to note the controls that are provided on the LX 1600 permit its operation without PDA. These controls are mounted concentric with the mounting screws and enable to following functions to be controlled:

2.1 Controls

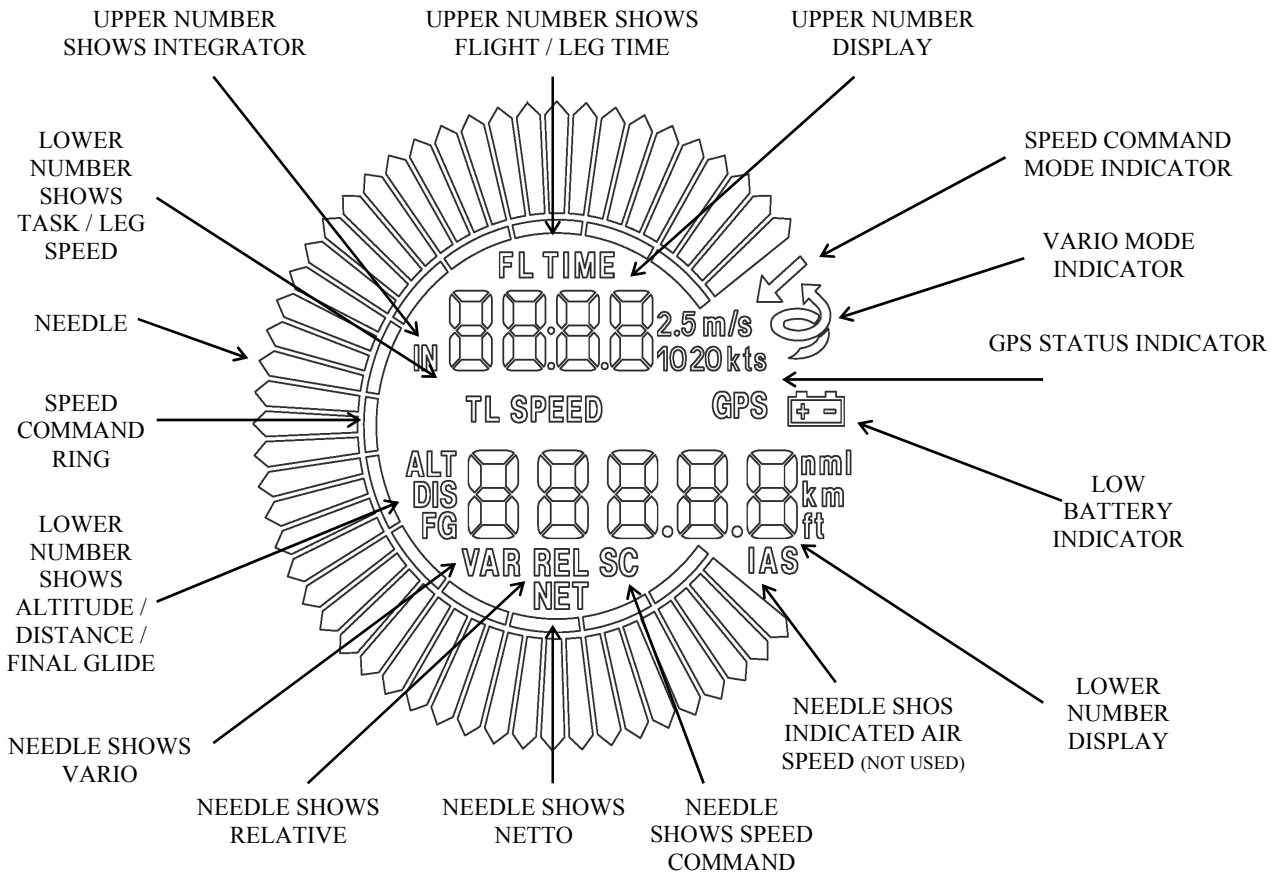


The function of the four push buttons is as follows:

- Speaker knob up to increase audio volume
- Speaker knob down to reduce audio volume
- Menu buttons (doesn't matter which is activated) will allow MacCready (MC), Ballast, vario filter (response) and altitude.

Press Menu button as required to find appropriate function and change the value using volume up or down. There is no confirmation procedure after input, if no change on up/down buttons is detected the unit will change over into main mode automatically.

The diagram below shows in detail the function capability of the LX 1600 display. Many of these can be re-programmed by the user through the PDA and can be personalised. Use PDA program manual (SeeYou Mobile and Navigator) for details.



Note!
 The GPS status indicator has the following meanings:

<i>GPS symbol not present</i>	=	<i>no GPS data received</i>
<i>GPS symbol blinking</i>	=	<i>GPS Bad</i>
<i>GPS symbol present all the time</i>	=	<i>GPS OK</i>

2.2 Stand alone operation

The unit can be used as a stand alone electronic variometer and speed command instrument at any time. In this case only limited functions will be available and no system setting changes possible. All adjustments have to be made using the push buttons on the unit.

3 Installation

Installation is straightforward and well within the capability of most glider pilots. The following advice may, however, be helpful.

3.1 Mechanical Installation

One 57 mm diameter circular cut out is required but you need to allow for the overall dimensions of the unit which are as follows:

60mm width
60mm height
140 mm length with connectors

The unit is attached by 4 hollow bolts at its 4 corners and the positioning of these holes is the same as any other instrument of this size. The control knobs are mounted concentrically around the hollow bolts and are fixed using the internal screw.

Installation procedure

- Extend instrument fixing holes to 6.5 mm
- Remove four buttons from axis, use special tool delivered with the unit
- Remove four bolts, use 8mm tool
- Insert LX 1600 into the cut out and fix it using four bolts provided
- Check functioning of push buttons, if they are blocked or your instrument panel is too thin, place a ring (included) between the instrument and the panel to achieve the correct functioning.
- Fix all four push buttons

3.2 Pneumatic Connection

There are three (3) pressure connections on the rear of the instrument and all are clearly labelled. It is fundamental that these connections are made correctly. They are labelled as follows:

- TE (Pst)
- PSt
- Ptot

The PSt and Ptot are used by the instrument for airspeed measurement whereas TE(Pst) provides the input for the variometer.

There are 2 ways of connecting the instrument depending upon the type of installation required. One provides probe compensation and the other gives electronic TE compensation. The latter can only be achieved by the use of a PDA and SW. The factory setting is TE probe.

TE Probe Compensation

- TE(Pst) connect to the glider TE probe
- Pst connect to the glider static
- Ptot connect to the glider pitot (total pressure)

Electronic TE Compensation

- TE(Pst) connect to the glider static
- Pst connect to the glider static
- Ptot connect to the glider pitot (total pressure)

If you select the electronic TE compensation system then you must carry out a test flight in smooth air to set it up properly. There are 2 parameters that will need to be checked and adjusted; the TE percentage setting and the vario damping (vario filter). The suggested procedure is as follows:

- Take a tow high enough to find smooth air and release
- Then accelerate up to about 100 knots and stabilise the airspeed
- Pull up at about 1.5g (no more) and observe the vario indication

If the vario indicates up during the ascent after the pull up then the compensation is insufficient. If it indicates sink then the compensation is too high. You adjust as follows:

- Increase compensation by increasing the percentage compensation (the norm is 100% but you can go above or below this)
- Decrease the percentage if the compensation needs reducing

The adjustment is carried out by using the PDA and you will need to cross refer to the PDA Manual to see how this should be done.

The vario damping (vario filter) is set to ensure that the needle response is suitable for your requirements; you may need to adjust this from time to time if you fly in different conditions where turbulence may be a factor. The damping can be adjusted by the knob on the dial of the vario or by using the PDA in which case you will need to refer to the PDA Manual to find out how this can be done.

Note!

A very clear indication of electronic TE compensation mode, is a blinking T symbol in the middle of the vario display.

3.3 Electrical connections

The electrical connections are clearly marked and the pre-assembled cables make it very easy to connect all the components. The unit has no **ON/OFF** switch, use avionic master switch or install a separate switch.

Note!

There is no internal fuse in the LX 1600 and you must install an external fuse with a rating of 1 amp (quick blow).

In the LX 1600 delivery box you will find the following cables and accessories:

- Main power supply cable with speaker output and input for an external Speed to Fly/Vario changeover switch (15 P Sub D)
- Power and data cable to connect LX 1600 to the PDA (cables available for iPAQ 36,38,39,19, 22, 38, 41, 43, 51, 54 and 55.)

Note!

*LX 1600 powers your PDA with excellent 5V DC supply without any special installation works (plug and play).
The type of PDA should be declared when ordering*

- NMEA input cable, open wire to connect to a suitable GPS source

Note!

If you use any other GPS data source then the NMEA connection must be made correctly; you will need to configure the system to produce data sentences in GGA and RMC format.

- Interface cable LX 1600 to LX 20 / Colibri

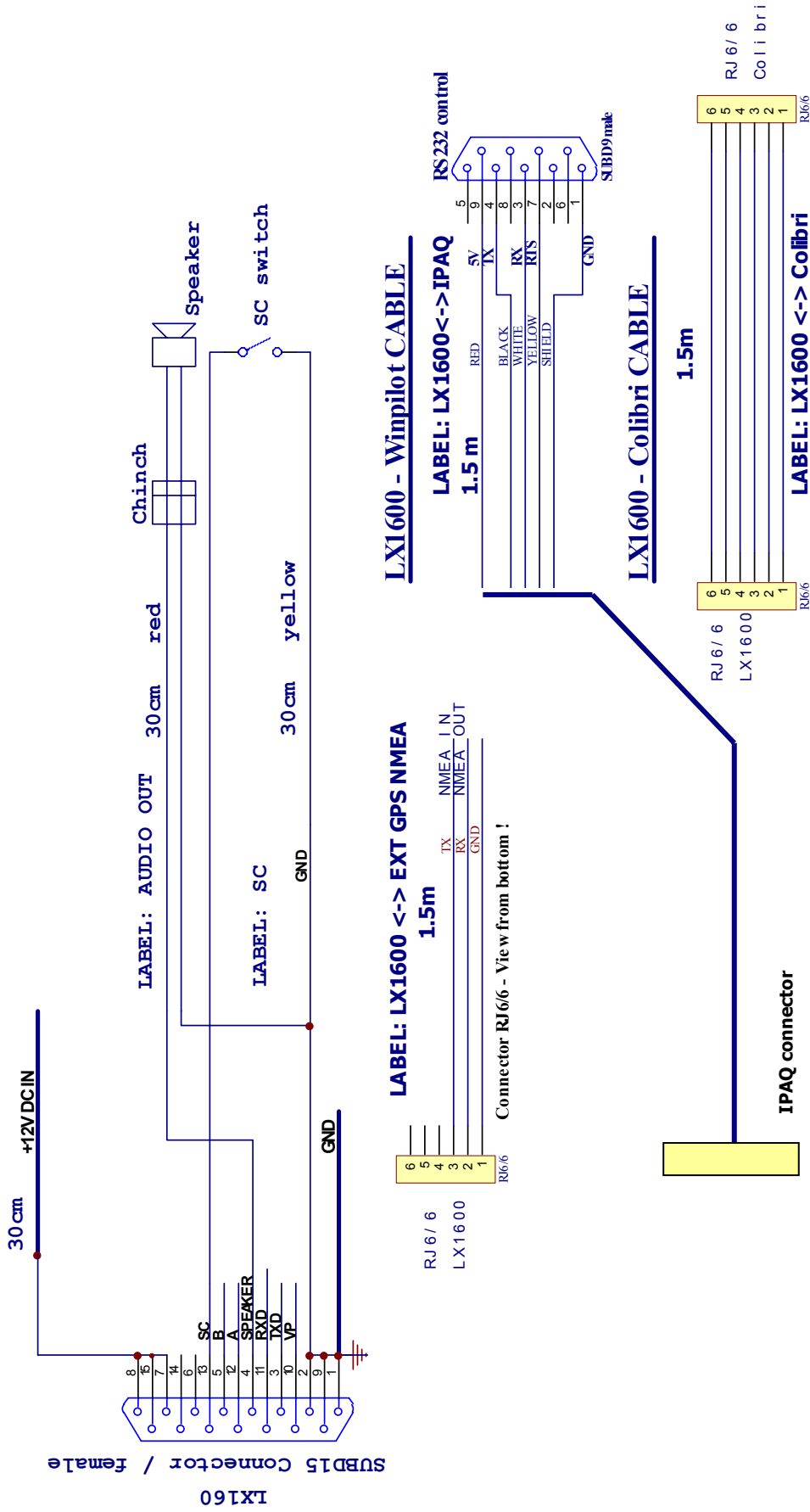
Note!

If you are going to use a LX 20 or Colibri as your GPS source then they can be connected very easily by using the cable supplied that is "plug and play" ready, for power and data.

- Loudspeaker
- Tool for push button removal and refastening

3.4 Connection Diagram





4 Technical Data

The principal features of the LX 1600 are as follows:

- Microprocessor used to compute and display vario and speed command information
- Power supply 8 – 16 V DC
- Power consumption approx 30mA without audio, PDA and Colibri or LX 20
- Dimensions: 57 mm diameter, box is 60 x 60 x 140 mm with connector
- Weight approx 450 g
- Power output for the PDA 5V/3A (DC/DC converter is integral with the LX 1600), powers Colibri or LX 20
- NMEA input

5 First initialisation

To input the system parameters, such as polar, units, electronic TE compensation, it will be necessary to use a PDA. After the data has been entered into the LX 1600, it will remain after power off. See PDA manual for details.

5.1 Function test after installation

Connect GPS source to the LX 1600 without connected PDA. Switch LX 1600 on and check GPS status indicator, which is on the right side of the vario indicator.

- **No GPS** symbol present, means no GPS data received.
Possible reasons: GPS source doesn't send NMEA data sentences, check settings and wires.
- **Blinking GPS** symbol means, GPS data present, but GPS is BAD
- **Stable GPS** symbol declares GPS OK

Connect PDA (original cables hardly requested) and check communication between both units. For instance:

- Adjust audio volume using commands on PDA

If the communication doesn't work check PDA settings and specially pay attention on com port which could be occupied by another application. Use PDA program manual.

Note!

*Never enable more than two NMEA data sentences on GPS source. The necessary sentences are; **GGA and RMC**. Additionally enabled sentences will overload the system.*

6 Special functions

To download flights from a Colibri or LX 20 into a PDA without disconnecting any connectors use FlyWithCE Downloader or SeeYou equivalent SW tools. After receiving a

transfer request the LX 1600 will automatically connect the PDA and LX 20 or Colibri and ensure a direct data transfer. The same is possible when transferring TP and task and flight declaration data.

7 PDA Program Compatibility

FlyWithCE Navigator
SeeYou Mobile

8 Revision History

02.March 2004	New issued
26.Dec. 2004	Added chapter 5.1

**PLEASE READ THE PDA PROGRAM MANUAL BEFORE ATTEMPTING TO
OPERATE THE SYSTEM!**