

# Manual for B57 Glide computer

[Introduction](#)

[Installation](#)

[Configuration](#)

[Operation](#)

[Maintenance](#)

[Specifications](#)

[Warranty](#)

[Index](#)

Introduction: (Software Version 2)

**BORGELT INSTRUMENTS** are proud to present the **B57 Glide Computer**. We have been manufacturing instruments for the soaring community since 1978 and we have continued to incorporate improved methods and technology whenever appropriate.

The B57 Glide Computer is designed for use with any GPS which outputs NMEA RMB and RMC messages and the **B50 Super Vario system**.

The B50 Super Vario provides all variometer, netto(or relative), speed command, audio and averager functions while the commercial GPS (Garmin 89,90,12XL,55 or Magellan 3000,4000 etc) provides all navigation and flight planning functions.

The system is completed by the B57 which does the things the GPS doesn't do, like altitude required for final glide, wind speed and direction calculation, real time wind component display and task statistics in flight(average speed, climb rate etc).

If GPS information is not available the B57 can be placed in Dead Reckoning mode (DR) where it counts down distance using True Air Speed and Wind component entered by the pilot. Altitude required for final glide is still displayed and actual wind component is calculated when the pilot corrects the distance to run at a checkpoint. Some statistical functions are not available as are the wind speed and direction calculations as these depend on the GPS information.

## **B57 Glide Computer** Installation Guidelines:

To get the most out of your **B57 Glide Computer** some straight forward installation guidelines should be followed. Please take the time to read these guidelines in full BEFORE commencing installation.

**AT ALL TIMES EXTREME CARE SHOULD BE USED TO PREVENT ANY INTERFERENCE WITH FULL CONTROL MOVEMENT OF THE SAILPLANE.**

**WE STRONGLY SUGGEST THAT YOU HAVE A QUALIFIED PERSON INSTALL OR**

## **CHECK YOUR INSTALLATION BEFORE FLIGHT.**

### Mechanical:

1. Install the B57 into a standard 57mm panel hole using the M3 bolts provided.
2. Mount the remote control switches supplied in a convenient location. e.g. on control column, flap handle, on the left hand armrest etc.

### Electrical:

Follow the wiring diagram for the REMOTE in the manual.

The **LCD contrast** may be adjusted after power up by using the trimpot accessible through a hole in about the middle left hand side of the B57 rear cover.(Looking at the rear cover of the instrument) It should not be necessary to do this as the contrast has been factory set and is temperature compensated so as not to require adjustment over the normal operating range.

**DIGITAL DATA MODULE (DDM):** In order to work with the B57 your B50 must have a DDM. If bought at the same time as your B57 this will already be fitted. B50 units in the field may be retrofitted easily.(B50 units with serial numbers before #056 except for #014

will need one resistor change. Contact Borgelt Instruments or your dealer.)

Remove the cover of the B50, plug in the **DDM** and secure with 3 M3 x 6 machine screws provided. Replace cover.

Connect the data out line from the GPS unit (if fitted) to the SDI connection on the B50 using shielded cable.

Connect the shield at one end(GPS or the B50 but not both) only.

Both the GPS and B50 power supply Ground lines must be connected at a common point.

## **Good Practice**

### Mechanical

Plan your instrument panel layout for optimum scan. The LCD on the B57 will be most easily visible if the instrument is placed relatively high in the panel. Just above the altimeter will be optimum as you will refer to both instruments when on final glide.

### B57 Specifications:

Weight: 200g 0.45lb

Power Consumption approx: 25 milliAmps at 10 to 16 volts DC

### General:

All aircraft instruments contain glues, paints and plastics. Their life may be extended by not subjecting them to extreme heat. It is good practice to use a canopy cover if the sailplane sits in the sun before and after flying and also to insulate under the black antireflection cover. 'Space blanket material' works well. Make sure the material does not short any electrical connections.

### **B57 configuration**

If your B50 Supervario does not use an accurate pitot/static source then for best results you should correct the Calibrated Airspeed/Indicated Airspeed relationship in the configuration process. See Version 2 changes on page 7. The aircraft Flight Manual will normally have a graph or table giving this relationship for the certified pitot/static locations for the Airspeed Indicator. Use these unless you have a known error free pitot/static source such as a Prandtl probe.

If not supplied already configured for your glider and choice of units, before use, the B57 should be configured by selecting your desired units, and entering the polar coefficients for your particular glider into the B57. Once this is done the configuration is stored even when power is removed.

Polar coefficient entry instructions follow.

The glider polar coefficients can be derived using the polar program B50polar.exe supplied by Borgelt Instruments either from a good test flown polar or we can supply the numbers to you from our polar library.

Polar entry is accomplished as follows:

Remove right side cover from B57 (as seen from front)

At the top edge of the center circuit board you will see an 8 way dip switch module.

With B57 plugged into cable from B50XCB and RS/OP in RS, power up both instruments, wait for start up cycle to finish, and set the dip switches as shown below.

### **DIP switch positions**

DIP 1	DIP 2	DIP 3	
on	off	off	Sets "a" polar coeff.
off	on	off	Sets "b" polar coeff.
on	on	off	Sets "c" polar coeff.
off	off	on	Sets TAS zero offset

on	off	on	Sets TAS scale coeff.
off	on	on	Sets Ground speed and TAS averaging number, higher = slower
on	on	on	Sets GPS and Compass direction averaging, higher = slower

Return all DIPs 1, 2, 3 to off when finished.

With the DIP switches in the following positions the rotary encoder allows you to set the units.

DIP 4	DIP 5	DIP 6	
on	off	off	sets Altitude (ft, M)
off	on	off	sets Wind (kts,kph,mph)
on	on	off	sets Lift (kts, M/S)
off	off	on	sets Distance(nm,sm,km)
on	off	on	sets Speed(kts,kph,mph)
off	on	on	sets Av Speed(kts, kph, mph)
on	on	on	sets Pressure units(hPa,mmHg,in Hg)

DIP 7 on Sets Wind Alarm Threshold(see compass appendix)

Set to off for normal operation.

DIP 8 Not Used(leave OFF)

Switch RS/OP to OP(screen will prompt)and wait for saving Page 0, saving Page 1 messages to finish. Switch to RS

RETURN ALL DIPS TO OFF

Power off

At this time, if it is more convenient that the DB9 connector on the B57 exits near the bottom of the rear cover instead of the top, the rear cover may be rotated 180 degrees by removing the remaining screws, rotating the backplate with attached circuit boards and reassembling.

Replace cover of B57

**B57 OPERATION - Explanation of Display Pages:**

The 10 position rotary switch controls the pages on the 8 x 2 line LCD.

Switch	Description	Display

S1	Time on task average speed	tt03:41 av109.7
S2	Distance flown Distance to go(dtg set by rotary encoder)	dfl 1004 dtg 3
S3	Circling % flight time	circ 33% ft08:42
RCU	Remote toggle switch controls display pages	remote
TAS	True Airspeed from B50 serial message Groundspeed	TAS 107 GS 95
ARR	Arrival altitude(value changed by rotary encoder)	Arr Alt 3500ft
WIND	<u>DR mode</u> Displays final glide height required, distance, head/tailwind component. Wind component set by pilot.	fg 12390 d112hw14
WIND	<u>GPS mode</u> Distance display is replaced by current GPS groundspeed and TAS derived wind component.  hg(GPS/TAS headwind), tg(GPS/TAS tailwind). Wind component still set by pilot if in MANUAL. In AUTO displays wind component being used by B57 from last wind speed and direction computation and bearing to turnpoint.	fg 12390 hg15hw14
NAV/ DIST	<u>DR mode</u> Displays final glide height required, distance to go on leg, head/tailwind component. Distance is set by pilot using rotary encoder.	fg12390 d124hw11
NAV/ DIST	<u>GPS mode</u> Head/tail wind is replaced by two arrows with 2 digit number between them representing difference in degrees between current track and track to next turnpoint and direction to turn. When greater than 99 four arrows appear	fg12390 d124>13>

## Explanation of Controls:

- **10 way** BCD rotary switch for page display selection above display.
- **Rotary encoder** for changing values of variables set by pilot located under display.
- **Toggle switches**
  - **RS/OP** Reset/Operate
  - **AUTO/MAN** Automatic/manual wind calculation
  - **DR/GPS** Dead Reckoning/GPS mode selection
  - **START/FIN** Start/Finish
- **REMOTE CONTROL** (optional)

When the 10 position rotary encoder is placed in the RCU position the optional Remote Control Unit controls the display pages. This is a 10 way push button encoder allowing easy page selection without reaching the instrument panel. The small size of the RCU allows it to be mounted (for example) at the top rear edge of the control column or on the front of the flap handle.

## **FLYING WITH THE B57**

The B57 has been designed to be extremely easy to use.

Pre-flight, to avoid the requirement to tediously enter the Arrival altitude each time and to minimise the amount of turning of the rotary encoder to set dtg(distance to go on the S2 page) power up the B57 with the **RS/OP** switch in RS. After the title and units pages have been displayed go to the **ARR** page and set the normally used arrival altitude at your site and go to the S2 page and set dtg to the average size task you fly. Then switch to **OP**.(screen will prompt) This stores these values as defaults to be used automatically every time the instrument is powered up.

**WARNING** - The FLASH memory used to store these default values has a limited number of write cycles(about 1000), so do not change these default values unnecessarily. Once powered up these values may be changed at will but will revert to the default values on next power up.

In normal operation (with GPS) with the **AUTO/MANUAL** switch in AUTO and the **GPS/DR** switch in GPS, the Reset/Operate(RS/OP) switch has no function other than to store default values as above. The pilot simply **STARTS** the flight statistics using the **ST/FIN** switch when crossing the start line and freezes the flight statistics when crossing the finish line by switching to FIN.

In every thermal the wind speed and direction is automatically calculated and updated every circle using the GPS derived drift and the wind component on the leg is automatically calculated and used in the final glide altitude required computation along with the Macready (STF) setting, bugs and ballast state from the B50. The pilot is free to call up on the display any information available by using the 10 position rotary switch above the display. Arrival altitude in the altitude required calculation (or any other pilot enterable variable) is changed using the rotary encoder under the display.

If desired the wind calculation may be started and stopped manually by placing the **AUTO/MANUAL** switch in MANUAL and using the **RS/OP** switch to start and stop. This

allows the pilot to calculate the wind in any chosen height band not just over the whole thermal climb.

The manual mode also allows final glide calculations using any desired headwind or tail wind component entered by the pilot on the WIND page which is useful if you suspect the wind will be different at lower altitudes on final glide (for example when penetrating a sea breeze front).

"What if" calculations (glides to alternative landing points) can be run by switching destinations on the GPS temporarily.

If the desired task is entered into the GPS (usually called a ROUTE on most GPS units) the GPS will normally switch legs as each turnpoint (WAYPOINT) is made which means that the pilot does not need to operate the GPS in flight.

Turnpoints may be changed in flight using the GPS GOTO function and the B57 will then provide calculations on the new leg.

In **DR mode** (used if GPS is unavailable) simply go to the **NAV/DIST** page, put the **RS/OP** switch in RS, set the distance to run on the leg, estimate the wind component and set this on the WIND page. When ready place the **RS/OP** switch in OP and the distance will count down as you fly the leg. When thermalling the distance will increase or decrease with the wind drift that has been set. When a visual checkpoint of known distance to go on the leg is reached select WIND and set the wind component so that the distance is correct. The wind component displayed is then the correct average for the leg so far flown.

If deviations from track are flown which increased the distance the distance at a checkpoint may be in error because of this not because of the incorrect wind component. In this case select **NAV/DIST** and correct the distance on this page.

**IMPORTANT:** For the B57 to work correctly in **DR mode** the **ST/FIN** switch must be in ST position.

### **Wind Computation (GPS only)**

MANUAL MAN/AUTO to MAN, use RS/OP switch when in CLIMB mode. Going to OP starts GPS wind calculation.

Every completed circle the result of the wind calculation is displayed. Going to CRUISE or RS finishes the calculation.

If AUTO/MAN subsequently set to AUTO, this wind is used for final glide height required until superseded by new AUTO wind calculation.

AUTO In auto the GPS detects circling flight in climb mode and displays the results of the wind calculation after every completed circle. When circling is started two circles are required before a new wind calculation is displayed.

The display shows the most recent wind calculation on the top line and the previous one on the bottom line with an "a" or "m" suffix to denote automatic or manual results.

Version 2 Software( Version 2 software requires Version 3.06 or later firmware in B50 DDM)

In Version 2 the following changes have been made from Version 1.

The Altitude Required in the Final Glide calculation is Total Energy compensated for airspeeds above 60 kts. That is the Altitude Required shows a decrease at high speeds. This prevents apparent falling below glidepath as soon as you accelerate on leaving a thermal.

If GPS is working but no GOTO is entered in the GPS the B57 now displays a NO GOTO message. The NO GPS only occurs if no GPS messages are present.

There is a way of setting position error corrections if an accurate pitot/static system is not available for the B50.

These work on TAS not IAS on the B57 display but are reasonably accurate. Draw a graph of CAS (Calibrated airspeed) vs IAS (Indicated Airspeed) (See aircraft Flight Manual), preferably draw a straight line through zero CAS/IAS and work out the CAS divided by IAS factor. Draw the line for best fit at speeds above best L/D. If necessary a zero offset may be used (IAS and CAS zero do not co-incide). Enter these during the configuration process using DIPs 1,2,3.

The software is ready for the magnetic heading sensor module which is in development. This will provide near real time windvector (speed and direction) information in straight flight which is very useful when ridge soaring and in wave as well as in inter thermal glides.

Processing for an altimeter and glide slope deviation is present. This will require a future instrument development.

## **MAINTENANCE OF THE B57**

### Cleaning:

LCD - if required use only a soft cloth and gently wipe the display, taking care not to scratch the surface. Caution: the LCD is easily damaged. Solvents MUST NOT BE USED on LCD or labels.

## **WARRANTY**

If, under normal operating use, any part of the B57 hardware proves to be defective in material and/or workmanship within the warranty period of twenty-four months from date of purchase such defective parts and/or workmanship will be repaired by Borgelt Instruments or their approved agent. All freight charges are to be borne by the owner. This warranty is not transferrable.

This warranty does not cover damage caused by misuse, neglect, accident, reversal of polarity or repair or attempts to repair by unauthorized personnel.

Disclaimer: The B57 is designed to be used as a guide only.

Remember your final glide result is up to you, the weather and your inputs. Use your instruments as just another factor in final decisions. At all times the aircraft must be flown within its safe flight envelope.

## INDEX

[Arrival altitude](#)

[cleaning](#)

[Configuration](#)

[controls](#)

[DR mode](#)

[GPS mode](#)

[Installation](#)

[Introduction](#)

[Operation](#)

[polar entry](#)

[wind computation](#)

[Specifications](#)

B57 remote wiring diagram

March 1998

Switch	1	2	4	8	C
Cable	Red	Green	Yellow	Blue	Shield

Connector from B50	Shield	Green	Red	Blue	Yellow
--------------------	--------	-------	-----	------	--------