

Borgelt B2500

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DESCRIPTION

The B2500 is an economically priced full function soaring computer designed to provide information to the pilot as a Situational Awareness/Navigation/Tactical decision making aid.

IT IS NOT INTENDED TO NOR DOES IT SUBSTITUTE FOR GOOD JUDGEMENT ON THE PART OF THE PILOT IN COMMAND.

ANY TECHNICAL EQUIPMENT CAN FAIL OR PROVIDE INAPPROPRIATE INFORMATION AT ANY TIME AND THE PILOT NEEDS TO FACTOR THIS IN TO HIS OR HER DECISION MAKING TO ENSURE A SAFE OUTCOME TO A FLIGHT.

The B2500 uses serial GPS data (stand alone GPS operation) or if used with a Borgelt B500 or B50 variometer system, Air Data and B50/B500 settings in addition to GPS data.

The instrument builds on the experience gained with the B2000 computer and works in similar ways with the addition of a mini SD card slot for loading databases, status LEDs and a voice alert system as well as a dedicated landing gear warning system.

A logger which logs in *.igc file format is included but does not log pressure altitude and is not approved. It may be acceptable to your local contest authorities.

INSTALLATION

THE INSTALLATION SHOULD BE CHECKED BY A QUALIFIED PERSON TO ENSURE THAT THE AIRWORTHINESS OF THE AIRCRAFT IS NOT COMPROMISED IN ANY WAY.

The B2500 fits over the space occupied by a standard 80mm panel hole.

Screw the mounting plate over the selected hole with screws provided, then attach the B2500 to the mounting plate from the rear with the 5mm stainless steel socket head screw provided.

Power and data are supplied by a 9 pin D connector. Power requirements are 10 to 14 V DC at 60 – 70mA. This instrument will NOT cause a problem for the electrical power system in your sailplane, unlike some others on the market.

The recommended configuration is B500 variometer, PDA_PS and B2500. The PDA_PS has a cable with 9 pin D connector to provide power and data to the B2500. Plug this into the mating connector on the back of the mounted B2500. The speaker output and landing gear warning circuit are available on the PDA_PS also.

The landing gear circuit is on the PDA_PS screw terminals marked RAT. Use the ground and middle terminals and arrange the circuit so that with the gear up and brakes open the circuit is closed.

Speaker output terminals for B2500 voice are the ground and middle terminals on the block marked ELVIS. Connect an 8 ohm speaker here.

NOTE: On earlier PDA_PS or B2000/B2500 connection boards the connections for speaker and gear warning may be swapped. The correct connection can be established by doing a continuity check between Pin 8 on the DB9 that plugs in to the B2500 and the centre connection on the ELVIS terminal block and between DB9 Pin 6 and the centre connection on the RAT block. If these aren't as above, relabel the terminal blocks.

The B2500 can be run from a B50/GPS combination or from a GPS alone supplying 4800 baud NMEA RMC and GGA messages. In this case you will need to connect a cruise/climb switch (ON/OFF toggle, circuit closed = Climb mode) to the landing gear warning terminals. The B2500 will automatically detect the absence of B50/B500 air data messages and assign the cruise/climb function to this circuit. In this case the landing gear warning function is unavailable.

GETTING STARTED

IMPORTANT:

You need to set your PC to use American English when running B2500 support programs or the B500/GPS simulator. The B2500 uses commas and decimal points conforming to the NMEA standard so that it can communicate with a GPS, so when connected to a PC the PC must assign the same meanings to these. European usage of commas for decimal points WILL cause problems.

A PC connection cable is supplied with the instrument. This is required for loading new operating software in the B2500 or for running it on the bench for familiarisation purposes.

Alternatively, if installed in the glider or if the B500/PDA_PS combination is available on the bench, PC communication may be done via the PDA_PS PC port with a straight through serial DB9F to DB9M cable and appropriate PDA_PS switch configuration.

Normally the B2500 will be supplied loaded with the latest version of the operating software but if new operating software is required, see the section **Installing new operating software in the B2500 near the end of this manual.**

You will also need a PC with a SD card reader slot or attach a USB card reader to your PC to load information on to the supplied mini SD card (an card adapter for full size SD card slot is supplied also).

In order for any sailplane computer to provide useful information you must tell it the performance polar of your sailplane and pilot preferences such as units, task types, default arrival heights etc. Some of these can be changed on the instrument itself while others must be done via the card.

A set of files is supplied on the card.

A turn point and airfield database is also required and if you wish to use the B2500 for airspace awareness purposes an airspace database must be loaded.

There is also a set of files for the voice alerts.

Once all four (or any one, two or three if making changes on only some files) are loaded on the card, insert the card in the slot in the side of the B2500 and power up. Any file changes will be loaded into the instrument automatically and the instrument will then go through its normal power up cycle. You **MUST** always have a properly formatted mini SD card in the B2500, otherwise the instrument will not complete its boot up cycle.

The B2500 is supplied with a default set of the required files on the card.

CONTROLS AND DISPLAY



There is a main 128 x 64 pixel LCD. This displays dark blue on a yellow-gold background and is a high contrast, wide temperature range type and little difficulty will be experienced in viewing it under all lighting conditions likely to occur in a sailplane cockpit.

Just to the right of the LEDs is a rotary encoder knob, which also has a push button function and to the right of this are two rows of buttons under the decal.

In the top row from the left the buttons are : CHANGE value of variable under cursor, move CURSOR and PAGE. Pressing one of these changes the function of the rotary encoder to the selected function.

The CURSOR can be moved on each page but only to variables which the pilot can CHANGE or select. Results of calculations are displayed "as is" (there is no ENTER button) and you cannot be misled into trying to change these as the cursor cannot be moved over these display fields.

Pressing the rotary encoder always displays the main flying page on the B2500, called the Situational Awareness or SA page. It also cancels any previous button push of the top row buttons so if you want to change to other pages you must push PAGE again before it is possible to do so.

When the PAGE function is selected the rotary encoder lets you select the appropriate page on the display. Mostly this will be the SA page or the Moving Map (Map) page with other selections as appropriate.

Note that the page function does not "wrap". Turning the encoder anticlockwise always results in the First Configuration (FC) page being displayed and clockwise goes to the NEAREST Emergency Airfields/Landing Places page. This means that to get to either of these you do not need to count pages or look at the display. Just rotate the encoder in PAGE mode in the desired direction, then look at the display.

In the lower row the buttons are from left to right: UNDO (X) or Delete, MARK POSITION(Target symbol) and GO TO selected point (Right Arrow).

Note there is no ENTER button. We say again: **Note there is no ENTER button.**

The B2500 does NOT work like a PC in this regard. Once a variable is changed it is automatically active on that selection. Mark Position has a dual function on the Task Planning page as it toggles the display between leg distance and track and AAT area/shape selection.

This interface has been found to minimise wrong function selection as you think about what you want to do next * before* turning the knob on the encoder. It quickly becomes very familiar.

The B2500 has a voice system to provide voice alerts at significant times. The voice alerts are entered into the B2500 as .wav files on the mini SD card.

A dedicated circuit is provided in the B2500 for a landing gear warning. When the circuit is closed the landing gear warning voice message is triggered. You can arrange microswitches or magnetic reed switches or similar on the landing gear and dive brake actuating mechanisms to close this circuit when the gear is up and the brakes are open.

In the lower left corner are 4 indicator LEDs, red, green, amber and blue. These identify various stages of a flight by illuminating and/or flashing.

Condition	Light status
Power Up	lights test, lights ON then turn off one by one
On Ground <30 kts	Amber ON
>30 knots	Blue ON permanently while flying
Pre Start	Amber flashing 2Hz (short On duty cycle)
Approaching start area	Amber ON
In Start Sector	Green flashing 2 HZ
Good Start (clock running)	Green ON
Restart	Amber flashing
Approaching TP Sector	Amber ON

In Sector	Green flashing 2 Hz
Made Good Turn (On next leg)	Green ON - after log timeout or GO TO next TP
On Last Leg	Flash red 2hz
In Sector	Green flashing 2 HZ
Made Good Turn	Green ON
Approaching Last TP	Flash Amber 2 HZ at 5km
Good Finish (task clock stopped)	Red ON

See **Voice Files** under **Installing Support Software in PC** for a complete listing of voice messages.

OPERATION and FLYING with the B2500

When connected to a B500/PDA_PS combination the B2500 will power up when power is supplied to the B500.

The B2500 will always power up on the First Configuration (FC) page (this also applies to power interruptions in flight) and as previously noted you can return to the SA page by pushing the encoder knob.

Detailed explanations of the Pages and what is shown on them is the PAGE section. You will need to refer to that for what follows.

If you have changed any wiring or instruments in the glider or changed the glider polar/pilot preference database it is best to check that the correct data has been seen by the instrument and that the correct data is still being seen by the B2500. Also check that the software load switch on the back of the B2500 is still in the “flight” position.

There are several “diagnostics” pages accessible by moving the cursor on the First Setup page to the “configuration” slot (top of page) and changing the “zero” to a “one”. Rotating the encoder clockwise will then show you the diagnostics pages in turn where you can check the units selected, the glider polar coefficients, the status of the GPS and air data messages and in the event of an outlanding you can read the GPS derived latitude, longitude, altitude and time.

Rotating back to the FC page and then pressing PAGE will return the instrument to normal operation.

There is a logical sequence to what follows next. Any instrument of this nature must be told the type of task, any pilot optional selections and a task must be entered for the instrument to be of any use.

Here’s how to work through the sequence: (note that details of what appears on each page and what you can change are in the PAGE section – refer to that for more information)

Normal operation only requires you to power up the system, check that after one minute or so that the GPS is navigating (GPS OK will appear – you will get a voice message “no GPS” first) and make any selection or setting that you desire on the FC Page (mostly self explanatory – note the B2500 does not use Magnetic Variation and all bearings are TRUE – EXCEPT for the radial and distance in nautical miles on the Information pages which is useful for Air Traffic control purposes where magnetic variation is used in order to conform to normal aeronautical practice – so set the Magnetic variation on the FC Page.), then switch to the Second Configuration (SC) Page and select the Task type and whether you want AUTO or MANUAL turn point rounding.

AUTO turn point rounding will advance the instrument to the next leg as soon as you are in the sector.

MANUAL requires you to press GO TO while on the MAP or SA pages. A message will appear saying "Confirm GOTO (name of next TP) which gives you a chance to change your mind. This function resets after a few seconds so if you don't press GO TO right away for a second time it will work properly again when you do intend to turn.

For FAI or fixed tasks Auto is recommended. For AAT, use AUTO for start and finish and MANUAL for turn points although you may use MANUAL for all (Don't forget to do the required action, though).

For AAT tasks, then switch to the STATISTICS page where you can set the Minimum time for the AAT task – TTF. This counts down once you have made a start and resets on a restart. The difference between the minimum time remaining and predicted time to finish is continuously updated on the SA page, in flight, on task.

Next, select a task to fly on the PLAN page. (This can of course be changed while airborne but you should minimise time spent configuring instruments while airborne and do as much of this as possible before takeoff.)

This page is two to the right of the SA page, which may be simply accessed by pushing the ENCODER knob and pressing PAGE again, then two ENCODER clicks right.

Hit "CURSOR", place the CURSOR in the first position (if not already there) and hit "CHANGE" and then scroll through the list until the desired point is displayed. The top slot is the desired Start Point, followed by the turn points in turn and the finish point.

Repeat for each turn point.

NOTE: DO NOT PRESS GO TO. The points are automatically active when selected.

If too many points are displayed then just place the CURSOR on the unwanted point and hit UNDO to delete it.

If flying an AAT task then hit "MARK" and the AAT area sizes and shapes can be edited.

Once done switch to the SA page.

Now the amber LED will be flashing signifying that you have not yet started and the arrow on the SA page will be pointing toward the start point. If within 2Km of the start point the Amber LED will be ON.

Once airborne the Blue LED will illuminate indicating that you are flying (30 knots is the trigger).

Note that in flight you can always switch back to the SA page by pushing the encoder knob momentarily.

To change to another page requires you to then press PAGE.

Local Soaring

If local soaring or when you just want to fly to a place without altering the entered task (it may be more convenient to do this later) you can use the "DIRECT TO" mode accessible on the INFORMATION page. [See page appendix] You will not get valid flight statistics in this mode.

We envisage DIRECT TO mode to be used when you have a set task but wish to fly via places which have known good landing areas (not necessarily airports) on any leg. It is NOT intended to use this mode instead of the PLAN page but it lets you keep your set task and get valid statistics but temporarily go "off task" using the DIRECT TO mode.

An alternative if just local soaring is to simply have only the home field on the PLAN page as the start point and no other points. The instrument will give you a final glide to the home field at all times with wind being supplied automatically after you have been circling for a while.

Use "MANUAL" turn point rounding otherwise if/when you fly through the start zone the B2500 will think you have started, rounded all turn points and finished and refuse to do any more on that flight.

BE CAREFUL about this feature. It is designed to prevent loss of flight statistics or the record of turn points rounded which can be important in some contest task types. Once you have made a Finish the B2500 needs to stop flying to let you clear the task and enter a new one.

SO DON'T FLY THROUGH THE SECTOR (OR DO A MANUAL FINISH) OF THE LAST LOCATION ON THE PLAN PAGE UNLESS IT REALLY IS THE FINISH POINT.

If in doubt about wanting to finish just place another turn point after the previously entered last point. It can be deleted later.

Cross Country Soaring

Making a start

When you decide to start, fly towards the Start point or area. When 2 km short you will get an "approaching start" voice message and the Amber Flashing LED will stop flashing and turn ON. You can check on the MOVING MAP (Map) page (between the SA and PLAN pages - see appendix for page details)

When in the zone the green LED will flash.

When a successful start has been made (AUTO or MANUAL) you will get "good start" voice message and a "On Task" voice message and the green LED will be steady ON to signify that you are on a leg. On the PLAN page this is signified by a # (AUTO) or & (MANUAL) replacing the last letter of the name of the start point. (The same symbols are used for checking off turn points that have been successfully rounded.)

IF AN ALTITUDE LIMIT HAS BEEN SET THIS WILL NOT BE TAKEN IN TO ACCOUNT AS TO WHETHER THE START HAS BEEN "GOOD", ONLY THAT THE START ZONE HAS BEEN FLOWN THROUGH.

Restarts are handled by going to the PLAN page, putting the cursor on the start point (it will have a # or & at the end of the name, depending whether the start was manual or auto, showing you started), changing to another name and back again. The # or & will disappear.

For AAT tasks you must use MANUAL mode for turn point rounding. You can use AUTO mode for start and finish though and this is recommended, although you may prefer to use MANUAL for everything and this will work also.

Flying fixed speed tasks – FAI or "beer can" turn points

This is very easy, particularly if AUTO start/turn/finish is selected.

Once a start has been made and you are on the way to the first turn, the large arrow on the SA page will show you the direction to the turn point. The wind is automatically updated and a wind arrow will appear (feather on tail) which lets you easily envisage the relationship between the direction in which you are currently tracking, the direction to the turn and the wind direction relative to both. This makes it very easy to leave thermals upwind, crosswind or downwind as desired.

The dotted glide slope bar will appear when within 1500 feet of the glide slope and you can then reach the turn at the altitude set by you on the FC page.

When within 2km of the turn point zone you will hear “approaching turn point” and once in the zone the Green LED will flash continuously and you will hear “In Sector”. If set to AUTO rounding the large arrow will swing around and point to the next turn point and the green LED will be ON.

If on MANUAL rounding select the SA or MAP pages and press GO TO. A message will appear saying “Confirm GOTO (name of next TP) which gives you a chance to change your mind. This function resets after a few seconds so if you don’t press GO TO right away for a second time it will work properly again when you do intend to turn.

In both cases you then get a “Good Turn” voice message.

If the next turn point is the last before the finish you will hear “fly to final turn”

This process is repeated at the next turn point and after the last turn point has been rounded a square will appear around the glider symbol on the SA page and the red LED will flash. If you haven’t selected AUTO for the finish, now is a good time to do so unless you are busy.

As the instrument has a “final glide around turn points” capability you may see the solid final glide slope bar appear at the top of the screen even before rounding the last turn point. When the glider symbol gets above the solid bar you have enough height to get home at the finish height you selected on the FC page. Number in lower left of SA page is height excess or deficit above or below glide slope. It is a total energy final glide to arrive at the chosen finish height at 60 knots so the number doesn’t fluctuate wildly when pulling up in lift or pushing to speed through sink. The scale on the glideslope bars is 1500 feet plus and minus from the glideslope. This may be changed in the defaults.

Once you have made a good finish (voice message “Good Finish” and Red LED ON) the task timer will stop and about ten seconds after landing and rolling to a stop the flight timer will stop and transfer the flight log to the mini SD card. There is an on screen warning not to power down until this transfer is finished.

You may then look at the STATS page to see how the flight went and remove the card for transfer of the flight log to a PDA or PC. Note that this log file is in *.igc format but does not have a pressure altitude record so is not acceptable for badges and records but may be acceptable to your local contest organisers.

DO NOT forget to put the card back in the B2500.

Flying AAT tasks

The start procedure is the same as for the FAI or beer can fixed task.

Once started you should, on the first leg, select MANUAL turns if you haven’t already done that for the start (start can be AUTO) otherwise the instrument will assume you turned as soon as you enter the first and subsequent AAT zones.

Once on track to the first turn point and a reasonable distance has been flown and a thermal or two worked, the B2500 will estimate the time required to finish from your present position and altitude (average rate of climb in thermals since the start is used – until this number is available the MacCready setting is used). Final glide is accounted for in the time calculation. The difference between this time and the remaining minimum time for the task is displayed in minutes above the glide slope number in the lower left area of the SA page. If the time is greater than minimum there is an OK after the number, if less there is an X. Voice messages inform you if you are going under or over minimum time.

While still outside the first AAT area the task is assumed to be to the centres of the AAT areas. Right away this will give you an idea whether you need think about to shortening or lengthening the task and flying

towards an appropriate part of the turn area. When approaching the first area, you hear “approaching turn” when 2km from the boundary and when inside an @ symbol appears and the green LED flashes and you hear “in sector”. You may now make a valid turn (MANUAL) at any time and you will notice a discontinuity in the over/under time prediction as it calculates the time based on turning now and flying to the centres of the remaining AAT areas. While in a turn area this is continuously updated based on present position so look at the time prediction number and decide whether to fly further into this area or to turn now and fly to the next area. You are free to choose the highest energy path you can find to further penetrate the area at the highest possible speed as you are not flying to a specific point. You may use the MOVING MAP page to help orient yourself in the zone or when approaching it. When comfortable with your margin over (or under) the minimum task time select the PLAN page and press GOTO. A message will appear saying “Confirm GOTO (name of next TP) which gives you a chance to change your mind. This function resets after a few seconds so if you don’t press GO TO right away for a second time it will work properly again when you do intend to turn. Do so immediately if you really want to turn.

You will get a “Good Turn “ voice message. There is no lockout of the MANUAL turn function as you may wish to force a turn at any time during practice even outside a turn area though this would result in a penalty during a contest.

You are now on the next leg and the above procedure is repeated at the next AAT area.

Once in the last turn area the time to finish and final glide are based on “if you turned now” so you can immediately see what the options are.

Once established on last leg, at an opportune moment, select AUTO for the finish.

The remainder is the same as for fixed tasks.

GENERAL CONSIDERATIONS

FLIGHT STATISTICS

If you want valid flight statistics you will need to enter a task on the PLAN page and fly it. Even AAT tasks will give you good statistics if you do this.

MARK POSITION

If running into a turn point and a thermal is encountered you can MARK it, turn the point, press GO TO and you will get guidance back to it. Turning downwind at that point will probably get you to the thermal. This is made easy by the SA page wind arrow.

Landing fields that you notice can be marked and saved for addition to your database after landing or use on the current flight. Note that the height above sea level of the field will not be available so treat any glide to this point with extreme caution. You can get this from a topo map or Google Earth after the flight.

A circle appears around the glider symbol when navigating to a marked point. If at any time you want to revert to task just press X (UNDO). The circle disappears. Pressing X again restores the selection, pressing again restores the task. You can do this as many times as you like.

This same function applies to the DIRECT TO and NEAREST mode. Selecting any of NEAREST , DIRECT TO and MARKED will cancel the previous selection of any of the others.

NEAREST

The B2500 tracks the direction and distance to the nearest airfields or landing places identified as such in your database.

They are tagged if they are reachable from your present altitude (at selected FINISH height).

Use caution as meteorological conditions (sink) or terrain (intervening high ground) which the instrument cannot take into account may make them out of range.

If you wish to fly to one of these, place the cursor on its name and press GO TO and the SA page will be displayed with steering and glide information to the place.

DIRECT TO

At any time you may select the INFORMATION page, scroll through the points in the database and read detailed information about that point including the current distance from that point and the radial you are on from that point. This may be useful for talking to Air Traffic Control or other aircraft. This is the only place in the B2500 where the Magnetic Variation is used in order to conform to normal aeronautical practice.

If you wish to fly direct to that point, press GO TO and the SA page is displayed with steering and glide information to the place.

MISCELLANEOUS

Final glides around any number of turn points are also simple. The final glide to arrive at the next turn point allows you to optimise arrival altitude at upwind turn points resulting in large time savings. It is far better to take a weak thermal drifting along track after going around a turn than to climb while drifting backwards before a turn point. Use caution here though, as you must turn high enough to actually find a thermal on the next leg.

If you are unhappy with the wind direction and speed displayed on the SA page, press the CURSOR button and the wind component in the lower right of the SA page will be displayed in reverse video. Then just turn the encoder knob to make it a number more to your liking. Press CURSOR again to revert. The headwind tailwind "bug" moves as you change the numbers so you can line the bug up with the actual head/tail wind bug.

The arrival altitude at turn points (FC page) is about the only B2500 setting you will need to change in the air much of the time, if desired. Variables like MacCready setting, bugs degradation and ballast are taken from the B50 or B500. If operating with only a GPS these are set on the FC page.

You can gauge your in flight progress by looking at the STATISTICS page occasionally but otherwise direct your attention to the wonderful view outside the cockpit.

B2500 WIND CALCULATIONS

There are several ways the B2500 calculates the wind.

- The first is just wind component in the current direction of flight.

This is done by subtracting the GPS ground speed from the True Air Speed (TAS). And displaying this with a pointer on the GRAPHICS page. There is a "bug" you can match to this pointer to see the numerical value or you can see the actual True Air Speed (TR) and Ground speed (GS) as well as the indicated air speed (IN) on the STATISTICS page. (see SA page explanation)

- The second is the DRIFT wind.

When thermalling in climb mode on the B500 the B2500 will determine the centre of the first complete circle then calculate the wind from how successive completed circles shift. Obviously it

takes two completed circles to get a new wind.

It is assumed that the circle shifts with the wind so if the pilot shifts the circle an incorrect wind will be calculated. To minimise this possibility the calculation is blocked if the turn rate varies by more than 20% or the circle takes more than 45 seconds.

The wind is averaged by looking at how each last circle has shifted relative to the first so you get an average wind over the altitude layer you climb through, not just the last one or two circles. You can finish and restart a new calculation at any time by switching to cruise mode on the B500 for a second or two, then back to climb.

On the FLY TO page the results of the last 3 drift wind calculations and the altitude at which they finished are displayed. This lets you see if there is significant wind shear with altitude.

- The third is the ZIG-ZAG wind.

The zig-zag wind is done by "simultaneously" solving two wind triangles when two sufficiently different ground tracks and speeds are known (from the GPS) and the TAS (from the B500) is known). It assumes the wind doesn't change during the track change which may or may not be a good assumption. It can give a wind from normal zig-zagging between thermals or "figure eighting" on a ridge as well as giving a quicker wind update while thermalling which doesn't depend on flying accurate, circular, circles.

You can select zig-zag or drift wind as a default on the PC setup and you can select either at any time on the B2500. The two calculation methods run simultaneously so if changing from one to the other there is no delay in seeing the results as they are already stored in the B2500.

The zig zag wind calculation parameters (averaging etc) are adjustable in the B2500User program.

For the headwind/tailwind component display and for the zig – zag wind to work, an accurate airspeed system or one that has been properly corrected is required. (see Airspeed System Position Error Correction)

PAGE DESCRIPTION

This section describes the pages available and the operating features and pilot actions required in more detail. Refer to this section when unsure of a particular feature on any page.

- **FIRST [CONFIGURATION](#) (FC)**
- **SECOND CONFIGURATION (SC)**
- **[RANGE](#)**
- **[MARK POSITION](#)**
- **[STATISTICS](#)**
- **[FLY TO](#)**
- **SITUATIONAL AWARENESS (SA)**
- **[MOVING MAP](#)**
- **[PLAN](#)**
- **[INFORMATION](#)**
- **[USER TP](#)**

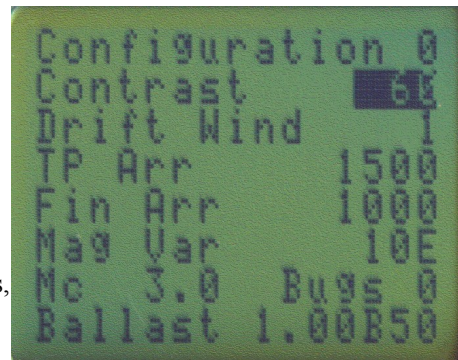
- [NEAREST](#)

The page system does not "wrap around". The end pages are the FIRST CONFIGURATION page and the NEAREST page.

The images in this section are of B2000 screen shots but the B2500 is similar. Significant differences are noted in the text.

Beginning with the **FIRST CONFIGURATION** (FC) page

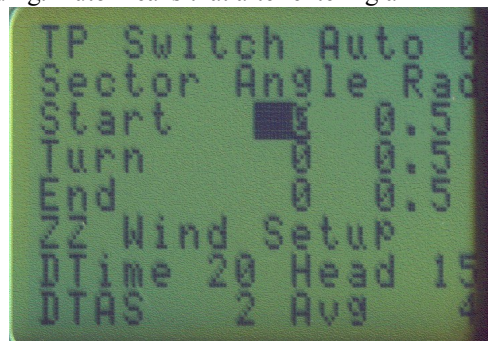
This page appears every time the B2500 is powered up, with the cursor on the screen contrast value. Pressing the +/- button and rotating the encoder allows you to change the screen contrast immediately. The screen drive is temperature compensated so this value should not need adjusting in flight.



Voice volume, magnetic variation, finish line and turn point arrival altitude can also be set on this page and the polar values, units, start, turn point and finish types and radius and GPS and B50 status can be read by moving the cursor to the top of the page and changing CONFIGURATION 0 to CONFIGURATION 1 which then accesses the DIAGNOSTICS pages. Pressing the PAGE button returns to the normal screens. The page selection in diagnostics mode may be a little slow so be patient but this mode is not usually used in flight. The MacCready, Bugs and Ballast settings are shown at the bottom of this page. The lower right corner shows either "B50" or "loc" which indicates the source of this data, either the B50(or B500) or by changing "B50" to "loc" these values may be changed at will by the pilot independent of the B50 data. This is useful for doing "what if" calculations in the back seat of two seaters. There is also the drift/zig-zag wind calculation selection.

The next page is **SECOND CONFIGURATION** (SC) page which lets you set up the automatic or manual turnpoint rounding. Auto means that after entering an observation zone the B2500 automatically switches to the next leg. Manual means that you must go to the PLAN page and with the cursor on the next turnpoint press ENTER to switch to the next leg.

The next selection is the Cruise/Climb switch mode. "Auto" uses the GPS data to decide whether you are climbing or cruising. The alternate is "Switch", meaning you use the B50 Cruise/climb switch to tell the B2500 what mode you are flying in. WE STRONGLY RECOMMEND THE USE OF "Switch" MODE.



Note that this page has been substantially changed from that shown. This image will be updated soon.

The next selection is the task type. Up to 10 different named task types can be uploaded from the B2500User program. These fall into three classes.

- FAI type tasks - these are not editable on the B2500 at all. Sectors and radii are defined using the B2500User program, and used as default. The main use for this is for just the FAI type task for badges and records.
- Fixed type tasks - these are tasks where the start, turnpoint and end points are defined for a contest, but not necessarily the standard FAI task. Editing is possible on the B2500 on this page, in

case of a rule change during the contest. Typical would be the 'Beercan' type sector for a TP, where all TPs in the task have the same radius. The start and end points are editable too, to allow for straight lines, and other variations.

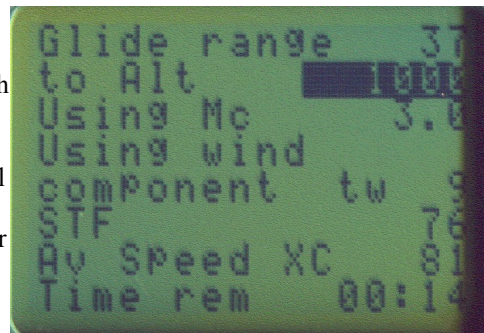
- AAT type tasks, where each TP may have a different radius, and possibly not even circular. Then the user must edit each TP individually on the PLAN page while setting up the task. The default values for each entry on the plan page are taken from the values on this page, and these are editable here.

YOU MUST SET THE TASK TYPE before going to the PLAN page to enter the actual task. If you plan a task, then go back to the TASK TYPE page and change the type, the task you just set will be cleared. This is to prevent confusion over what settings are being used for each task type.

If your current task type is now an AAT type, make sure you edit the radii and arcs on the PLAN page.

The next page is the **RANGE** page.

On this page you can see how far you can fly from your present altitude in your present direction to a preselected finish altitude (above sea level) at any selected MacCready setting using the wind component measured in the last thermal climb. The time for this glide is also shown so you can tell if you will get there before last light. Also shown is the correct speed to fly and the Average Cross Country speed achievable in still air at that MacCready setting. This is an aid to flight planning. While this page uses information from other pages in the B2500, the user settings on this page apply to this page only. This page is for the end of the day on distance flights.



Glide range	37
to Alt	1000
Using Mc	3.0
Using wind	
component	tw
STF	76
Avg Speed XC	81
Time rem	00:14

The **MARK POSITION** page is next.

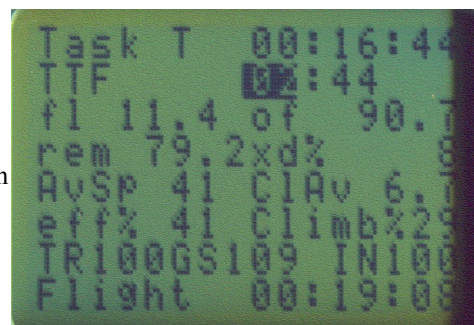
When a position is marked, the local time, latitude and longitude are displayed. If the CURSOR button is pressed a list of marked positions is displayed with the most recent at the top and distances and degrees to turn left or right to the points are displayed. Placing the cursor on a point and pressing GO TO will switch to the SA page and show navigation to that point. As the default cursor position is the most recent marked position, to go to that point it is only necessary to press GO TO regardless of whether the MARK POSITION or any other page is selected. On the SA and MOVING MAP pages a circle appears around the glider symbol when navigating to a marked point. To return to task just press UNDO, to then navigate back to the marked point press UNDO again. You can alternate between task and a marked point such as a previously unknown landing field. NOTE: You won't get a sensible final glide as the altitude of the surface is unknown.



Marked Position	
Mark	M002
UTC	16:24:56
Lat	27:39.18S
Lon	151:48.08E

On the **STATISTICS** page

The current time on task, total task distance, distance flown, distance remaining, average speed, average rates of climb for the current thermal and the whole flight, % time spent circling and total flight time are shown. The total flight time starts when the airspeed exceeds 30 knots and the task time is reset to zero with every new start. No pilot intervention is required and the



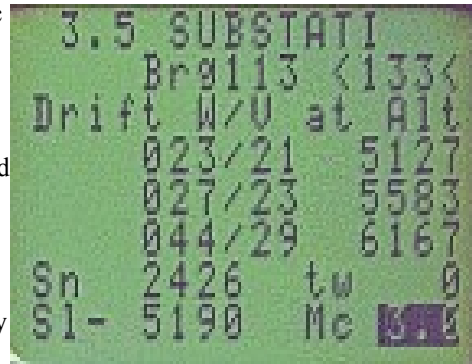
Task T	00:16:44
TTF	00:44
fl	11.4 of 90.7
rem	79.2xd%
AvSp	41 ClAv 6.7
eff%	41 Climb%29
TR100GS	109 IN100
Flight	00:19:08

task statistics are frozen when a valid finish is made, again with no pilot intervention. The remaining information on this page is the extra distance flown as a result of significant deviations from track.(xd%) and an efficiency number which is the achieved speed/theoretical achieved speed for rate of climb achieved. True Air Speed (TS), Indicated Air Speed (IS) and Ground Speed(GS) displays are also shown which may be a diagnostic aid under some fault conditions in the glider installation. The Time to Finish counts down on the this page. It is displayed under the Task Time and you can set it for time limited AAT tasks.

The **FLY TO** page

gives the same information as the SA page but in alphanumeric format and with greater resolution. The name of the turn point you are flying towards is shown along with left/right steering information to arrive there. The final leg is warned by a FIN LEG appearing next to the wind component information. Most of the time the SA page will be sufficient to make decisions and get a snapshot of the navigational and final glide situation to without spending excessive time looking in the cockpit.

The FLY TO page also shows the results of the last three drift wind calculations with the GPS altitude at which the calculation was finished. In a thermal, you can, by momentarily switching from climb to cruise on the B50/B500, stop and restart a wind calculation. You can then see wind versus altitude history on this page. The Sn and Sl numbers in the bottom left are the glide slope altitude to the Next turn and Finish points respectively.



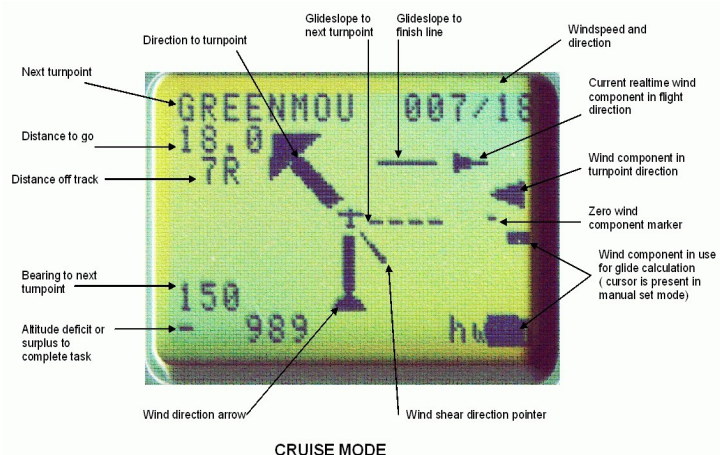
The **SITUATIONAL AWARENESS** page is the heart of the B2500, displaying the name of current turn point and distance to go in the top left corner, the vector wind (direction and speed) in the top right and altitude above or below glide slope for the finish line in the lower right, no matter how many turn points still remain to go around. Immediately above the altitude slope is the number of minutes 'in hand', calculated from the estimated finish time and the time to run on the STATISTICS page. Useful to decide when to switch to the next leg on an AAT type task. There is a number with an R or L under the distance to next turn point which is the cross track error. If pair flying this makes it easy to report your position relative to the track line and next turn point to your colleague. Below this is the true bearing to the next turn.

The large arrow points to the next turn point, the arrow with the feather is the current wind direction and the short line is the wind shear direction (difference between last two wind calculations, if significant). The two short horizontal lines (one solid, one broken) to the right of the glider symbol in the centre of the screen represent the glide slope to the next turn point and the finish. When they move below the symbol you are above glide slope. The vertical scale is set in the PC SETUP procedure. We recommend you leave it at the factory default.

In **CRUISE** mode:

To the right side of the screen are three pointers.

The left one is the real time wind component as measured from the difference between ground speed (as measured by the GPS) and True Air Speed in the direction you are tracking(that is, the wind component you are actually experiencing in the direction you are going), the right most, rectangular bar type, is the wind



CRUISE MODE

component in the direction of the next turn point or finish line being used by the B2500 in its glide calculation. This can be manually set by pressing the CURSOR then CHANGE VALUE button and changing the hw/tw number. The pointer moves as well. The value is set automatically by the B2500 from the last vector wind calculation unless you change it and toggles using the CURSOR button between automatic and pilot set value.

The remaining right most pointer, a triangular type, is the wind component in the direction you are tracking calculated from the last valid vector wind (speed and direction). That is, the wind component you should be seeing in the direction you are going - this should be close to the wind component shown by the first pointer - unless the wind has changed.

In flight, this gives you immediate warning that the wind has changed as the first and last mentioned pointers will split. When tracking for the next turn point the three pointers should all be aligned if the wind hasn't changed.

The current image does not show the task "time in hand". This will be updated soon.

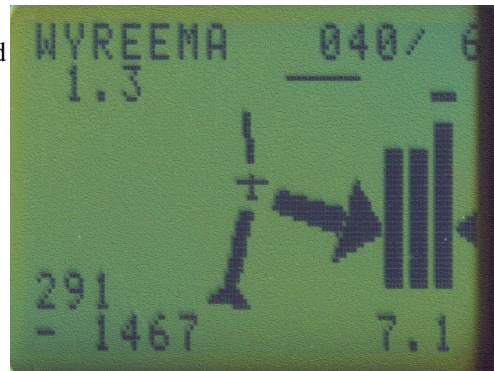
In **CLIMB** mode:

the wind component pointers disappear, to be replaced by 3 vertical bars representing Flight average, thermal average and 20 second running average rates of climb with the average rate of climb for the whole thermal under the bars.

Superimposed on the 20 second running average is a marker representing the current variometer reading. It is in reverse video when the vario is less than the running average.

To the right is a triangular pointer representing the current MacCready setting.

It's easy to see if the thermal is any good, getting stronger or weaker at a glance and the number and MacCready pointer provide scale as well as simple comparison of rates of climb to the MacCready setting.



If the thermal is at least as good as the flight average so far and getting better, the tops of the bars will slope up to the right. This is obviously desirable. If the right bar goes down below the middle bar the thermal is getting weaker as the current running average rate of climb is below the total rate of climb in the thermal so far. It is time to consider leaving. If neither the centre bar nor the right bar get above the left (flight average) bar you should have a good reason for staying in the thermal - like you suspect it may be the last one or you need the altitude to cross a dead area.

When on the final leg the glider symbol is enclosed in a square. This is important on POST and similar tasks as once you fly through a finish sector for the last place currently selected on the PLAN page the B2500 is FINISHED as far as statistics are concerned. When you see the square make sure you REALLY want to finish at the next place. If you do not want to finish just select any other place in the next slot on the PLAN page. You can change it later, even after rounding the now next-to-last turn point.

Alternatively set the B2500 to use MANUAL turn point rounding to avoid this problem (SC page).

If on MANUAL rounding, advance to the next turn point, select the SA or MAP pages and press GO TO. A message will appear saying "Confirm GOTO (name of next TP) which gives you a chance to change your mind. This function resets after a few seconds so if you don't press GO TO right away for a second time it will work properly again when you do intend to turn.

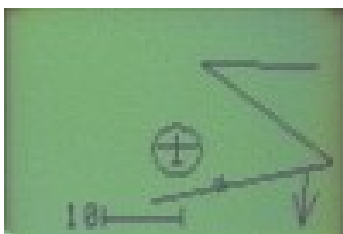
Graphics symbols around the glider :-

These are used on both the SA page and the MAP page.

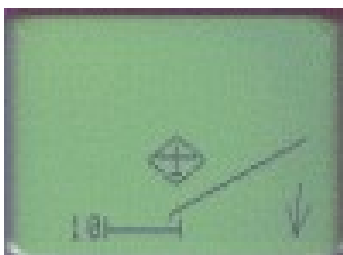
A **square** when you are on the last leg.



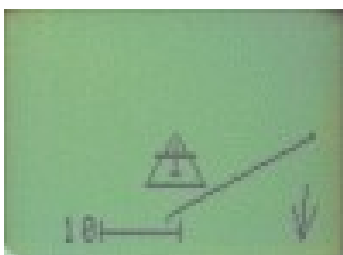
A **circle** when navigating to a marked point.



A **diamond** when navigating to an emergency airfield or landing point.



A **triangle** when navigating to a point in the "DIRECT TO" mode.
See INFORMATION PAGE for more details of this.



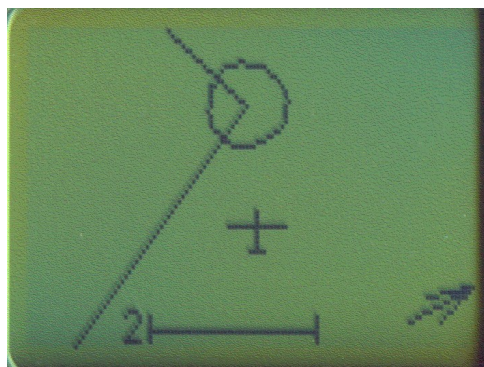
The **MOVING MAP** page which displays the current task, can be zoomed to show the sector/radius/line at start, turnpoints and finish is next.

The MAP page is displayed TRACK UP, NORTH UP or DESIRED TRACK UP.

Pressing the CHANGE VALUE button repeatedly will toggle through these selections or pressing it once and using the rotary encoder will change these selections.

In NORTH UP and DESIRED TRACK UP modes airspace boundaries are shown if an airspace file has been loaded.

There is a scale at the bottom and a north pointing arrow in the lower right corner. The map scale is normally set by the pilot, but when within 2.5 nautical miles of the next turnpoint, the map scale will be automatically set to an appropriate size to show the TP. Pressing the



CURSOR button activates the ZOOM function. The rotary encoder then changes the zoom level. There is a scale on the screen. If the track line disappears you have reached the zoom limit. Back up one zoom step. Nearest airfields are also shown on the map, ones you have enough height to reach are shown as a cross, others are shown as a dot. No account is taken of intervening terrain !

At turn points the sector or circle is shown and the B2500 may be configured to have a time delay to make sure the Flight Recorder records a valid fix in the sector or circle. The delay is whatever is set in the user file you loaded and after this time the sector or circle disappears and re- appears at the next turn point.

There is a marker for the projected position of the glider in 2 minutes. This is also used for projecting crossing of airspace boundaries horizontally and will trigger an “airspace” voice message.

If you have loaded an airspace file then airspace boundaries will be shown when this page is in north up mode or desired track up mode. No vertical limits are shown.

The B2500 is not designed as a complete substitute for your official airspace maps or approved GPS device with approved database updates.

The same symbols around the glider are used as on the SA page.

If on MANUAL rounding select the SA or MAP pages and press GO TO. A message will appear saying “Confirm GOTO (name of next TP) which gives you a chance to change your mind. This function resets after a few seconds so if you don’t press GO TO right away for a second time it will work properly again when you do intend to turn.

The **PLAN** page is next.

At the top is the STARTPOINT. This can be any place in the database. The turn points follow in order and there is no effective limit as the list scrolls when you get to the bottom. The distance and bearing of each turn point from the last is shown as is total task distance and estimated time to finish. On the ground the estimated time is taken from the current B500 MacCready setting. Once started, the flight average rate of climb is used.

You must select a finish point. There is no default finish. The B2500 will take the last selected place from the turn point list as the finish point. (note the above discussion on the SA and FLY TO pages)

Move the CURSOR to a slot, press CHANGE and rotate the knob to view the points in the database IN THE ORDER IN WHICH YOU PUT THEM IN THE DATABASE.(Not alphanumeric order unless you make them that way. This gives you flexibility to store START points together at the beginning of the list for example.) No ENTER is required to select, just move to the next slot if desired. DO NOT PRESS GO TO after making a selection.

To delete a turn point place the cursor on it and press X. When a START or TURNPOINT has been achieved a hash mark will appear next to the name (#) if in AUTOMATIC mode(see TASK TYPE page)or an & in MANUAL turn point mode.

If the task type is selected as an AAT type, then it is necessary to edit the radius and arc of each turn point after creating it. Press the MARK button to toggle between normal mode and editing mode. The display changes to show the RAD / ARC selections. Editing these is by the CHANGE and VALUE buttons as normal. Most AAT tasks use circular areas. Setting the ARC to zero defines this automatically. For non-AAT type tasks this editing mode is not available. Settings are taken from the TASK TYPE page.

It is required to set all the turn points first, then edit the arc and radius as necessary when the task is fully entered. Because defaults are set as new points are entered, they may overwrite earlier settings.

Point Name	Leg	Brg
WYREEMA#	15	250
SOUTH BRO	28	039
NECHILL	31	174
GREENMOU	15	334
WYREEMA		
Task 90.7 00:50		

To restart a task, put the cursor on the first slot, change to another point, change back to the original point and the # or & mark will disappear. A restart can then be done by simply flying back through the start sector. The statistics task time clock will start again from zero. If there is a time limit before you can return to the same start point you can see the time since start on the STATISTICS page.

The next turn point is automatically selected when you achieve a start or turn point in AUTOMATIC mode.

If in MANUAL turn point mode, select the SA or MAP pages and press GO TO. A message will appear saying "Confirm GOTO (name of next TP) which gives you a chance to change your mind. This function resets after a few seconds so if you don't press GO TO right away for a second time it will work properly again when you do intend to turn.

When a turn point is rounded in MANUAL mode an ampersand (&) appears instead of a hash (#) mark which indicates the turn point was rounded.

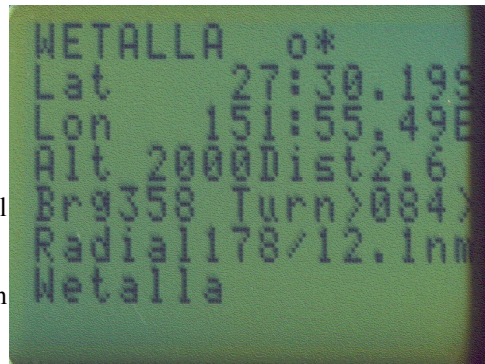
The cursor automatically moves to this next turn point after this one that is now selected. The theory is that before rounding a turn you should know what the next one will be and the turn you are likely to change is the one after that. You can now simply change that turn point as the cursor is already in the right place.

To look at information on other turn points on the PLAN page just put the cursor on the point and switch to the INFORMATION page or go to the information page and scroll until you select the one you want.

With the cursor on any name on the PLAN page you can go to the next page,

The **INFORMATION** page

and see details of the place, whether it is an airport, landing field or turn point and what radial and distance in nautical miles you are on from the place. This is useful if reporting your position to Air Traffic Control or to the tow pilot if aero retrieving. This radial is the only place where the B2500 uses the magnetic variation so as to conform to normal aeronautical practice.



There are some symbols next to the place name - + and - mean airport and landing field respectively. o means an ordinary turn/start/finish point. This allows you to distinguish between airports that are allowable turn points in a contest and emergency airports and landing fields which may not be allowable turn points.

There is also a * symbol which means that that turn point is active and can be selected on the PLAN page. This allows you to deactivate turn points on a particular day without reloading the database from your PC. It also allows the loaded database to be much larger than you can conveniently scroll through on the PLAN page in flight by inactivating rare or unlikely turn points on a given day. They can be reselected as active in flight as they are always visible in the INFORMATION page.

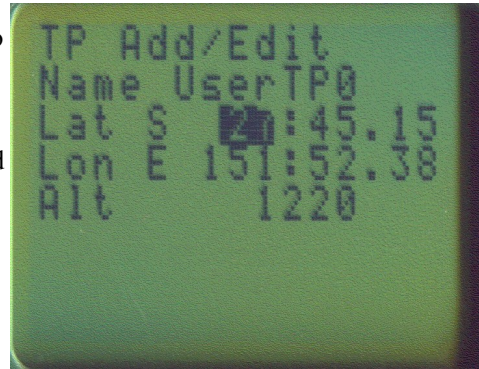
All turn points in the loaded database may be examined by pressing CURSOR while on the INFORMATION page and scrolling through. The turn point may be activated/deactivated by pressing CHANGE and using the rotary knob.

Regardless of whether the turn point is active or inactive you can decide to navigate "DIRECT TO" the point currently shown on the INFORMATION page by pressing the GO TO Button. The display will switch to the SA page and you will have navigation and final glide information (both graphical and the numerical final glide data in the lower left) to that point. The point is a finish point for final glide purposes so the final glide margin used is as for the finish arrival. You can revert to task by pushing the UNDO(X) button at any time.

When navigating to a point in "DIRECT TO" mode the glider symbol has a triangle around it on the SA page.

Next is the **USER TP** page

You can enter up to 9 **USER turn points**, using this page (1 to 9). This allows correction of an incorrect turn point in the database by replacement by a user point or quick addition of a turn point temporarily. These points are NOT added to the permanently stored database but are in Super Capacitor backed RAM where they will stay for a week or two. This prevents corruption of the database by casual use.



Note: You cannot do this in flight.

To use:

Press the CURSOR button. The User Turn point number will be highlighted. Pressing GO TO, then the change button will add a new TP and copy the lat/long and altitude from the current turn point on the INFORMATION page to the data fields (this prevents lots of encoder knob turning as you are likely close in global terms to the desired custom point). Move the cursor to the fields you want to change in this information and use the CHANGE button and the rotary encoder to change the values. Then press GO TO to advance to the next turn point. When done, put the cursor on the turn point number and then press the change button and check the points.

If the user turn points have already been assigned, simply edit them by moving the cursor to the fields you want to change and use the CHANGE button and the rotary encoder to change the values. When finished with one turn point press GO TO to edit the next.

You can also delete an unwanted TP from this list with the DELETE (X) key. This does not affect the permanent database.

The User turn points are placed in reverse numerical order at the beginning of your turn point database. If replacing an incorrect turn point it is suggested to make the incorrect turn point inactive in the main database so as to prevent inadvertent selection on the PLAN page.

At the earliest opportunity it is suggested to edit your master turn point file and put the new one on the card.

The last page is the **NEAREST** page.

As many as seven closest airports or landing fields are displayed and updated as you fly along with the distance and bearing to each one.

Places you have enough altitude to reach with the selected FINISH ARRIVAL margin are marked to the left of the place name with the airport + or landing field - symbol.

If you wish to go to any one place, put the cursor on the name and press GO TO. The B2500 will switch to the SA page and provide guidance for navigation and final glide.

On the SA page the glider symbol will appear with a diamond around it when you are in "glide to an emergency airfield" mode.

If you wish to discard this choice and return to the task just press the X button.

Pressing the exit button again will again navigate you to the emergency airfield. This makes it easy to keep track of your glide to this.



INSTALLING SUPPORT SOFTWARE IN PC

Please note that Borgelt Instruments supports the PC software we provide and the software in our instruments.

We are however not a Windows PC support service and we assume you are capable of using a modern Windows PC to download files from the internet, unzip compressed files and run install programs. You also need to know how to edit files using a text editor like Notepad or Wordpad and move files around in your PC's file system. Windows Help is a great source if you need help or do not know how to do a particular operation.

From the Borgelt Instruments website www.borgeltinstruments.com download the B2500install.zip file, unzip it to a temporary folder and run setup.exe and follow the on screen instructions.

File formats for Mini SD Card

The Mini SD card is formatted with a folder called B2500. All active files go in that folder.

The card must be in the B2500 for the B2500 to work.

Glider setup/Pilot preference

Run the program B2500user.exe. Then from the file menu select load and select the example file factory.usr and then drop down the edit menu and edit to your choices of units, defaults, glider polar, pilot name etc. When done use "save as" and name the file for your glider or yourself. Then use the "to card" function and a new file with default name user.cfg will be made. Place this file on the card in the B2500 folder. To be active the file MUST be named user.cgf. You can save alternative files with the name for example 15mTips.cfg and rename it user.cgf when flying with 15m tips. Any PC, notebook or PDA with a slot for an SD card can do this. (don't forget to bring your Mini SD card adapter)

Turn point and airfield database

The program B2500user may be used to process turn point files in WinPilot *.dat format. From the drop down menus select Conversion and open the file in WinPilot *.dat format that you wish to convert and the program will convert it to B2000/B2500 *.tpb format. While this format is human readable we do not recommend any editing be done here. If you want to edit the file do so in the *.dat format and then convert.

Note that the B2500 and support program do not place the file in alphanumeric order.

You are free to put turn points in this file in any order and that is the order they will appear on both the Plan and Information pages. This lets you put Start zones at the front for example.

When done rename this file tpdata.tpb and place the turn point file on the card in the B2500 folder. It MUST be named tpdata.tpb to be active in the B2500. You may have other turn point files in *.tpb format on the card, just name them anything other than tpdata.tpb. The name of the place in the centre of the area or soaring site name would be good as you can keep track of them easily.

Airspace database A complete explanation of the airspace file system is given in B2500airspace.txt.

In the B2500 any airspace file must be named asdata.asb to be active in the B2500 folder.

Otherwise use the Conversion facility the same way as for turn points. Open a WinPilot format airspace file in OpenAir format and it will be converted to the B2500 *.asb format and can be named asdata.asb and placed in the B2500 folder on the card. Many different *.asb files can be put on the card, only the one called asdata.asb will be active. Manage them as you would the turn point files.

If the voice system is active and a correct airspace file is loaded you should get a 2 minute voice warning of approaching a horizontal airspace boundary.(Vertical boundaries are not warned against)

NOTE THAT THE B2500 AIRSPACE SYSTEM HAS NO CERTIFICATION FROM ANY AUTHORITY AND DOES NOT SUBSTITUTE FOR ANY LEGAL REQUIREMENT TO CARRY CURRENT CHARTS.

Voice files

Voice files are stored in the B2500 as *.wav files. There is a 4 second limit on the length of any one message.

A default set of wav files is supplied. You may record your own using any sound recording /editing software. Save as PCM Uncompressed 8000Hz 8 bit mono.

This is the list of voice messages and when they occur. For the voice messages to occur at the right times the file names must be adhered to but the messages may be by any voice, any message and any language.

Filename	Default Message
"appstart.wav"	0 Approaching start
"instart.wav"	1 In start sector
"gdstart.wav"	2 Good start
"restart.wav"	3 New Start
"apptp.wav"	4 Near Turn Sector
"insector.wav"	5 In Turn sector
"GdTurn.wav "	6 Good turn (<i>after log timeout or go to next TP</i> <i>-On next leg</i>)
"lastnext.wav"	7 Fly to Final Turn
"lastleg.wav"	8 Final Leg
"appLast.wav"	9 Approaching Final Turn
"gdfinish.wav"	10 Good Finish
"nogps.wav"	11 GPS Bad
"nonav.wav"	12 No Navigation
"nob50.wav"	13 No B500
"noroute.wav"	14 No Task
"directTo.wav"	15 Direct To
"mark.wav"	16 Mark
"tomark.wav"	17 Fly To Mark
"ontask.wav"	18 Revert To Task
"airfield.wav"	19 Fly To Airfield (<i>flying to emergency field</i>)
"offtrack.wav"	20 Off Track (<i>only when first going more than 30deg off, then resets if you get back on track</i>)
"Lowtime.wav"	21 Under Time (<i>AATs</i>)
"Overtime.wav"	22 Over Time (<i>AATs</i>)
"LowSITP.wav"	23 Below Glide To Turn
"HiSITP.wav"	24 Above Glide To Turn
"LowSIFin.wav"	25 Below Final Glide
"HiSIFin.wav"	26 Above Final Glide

"ChkWind.wav"	27 Check Wind (<i>real time and calculated wind significantly different</i>)
"ChkClimb.wav"	28 Check Climb (<i>20 sec average drops below total for thermal</i>)
"ChkGear.wav"	29 Landing Gear! Landing Gear!
"ChkAirSP.wav"	30 Airspace!

Installing new operating software in the B2500

Currently this must be done by PC connection. Use the supplied load cable or do this via the PDA_PS PC data port with the switches correctly set for PC – B2500 data transfer.

Place the switch on the rear of the B2500 in the “software load” position and power up the B2500.

The screen will be blank.

From the B2500user.exe program drop down menus select “program”, “update B2500software” and the Tiger Downloader box will appear with a warning “cannot open serial port”. From the Options drop down menu select the correct com port. Note that only com ports 1 through 4 are supported so when you install your USB to serial hardware device make sure you make a serial port numbered 1 through 4. Then select “download module”, select the new software file B2500*.tgu and after a few seconds the load will start. A progress bar will show progress. When done, disconnect the B2500 from the PC, reconnect to the sailplane and set the switch on the rear back to the flight position. Then power up again. The files on the card will reload. Then cycle power and normal operation is restored. After you have done this once on your PC the serial port selection will remain correct unless you change it.

POSITION ERROR CORRECTION OF THE AIRSPEED MEASUREMENT SYSTEM

A PRANDTL probe usually provides good airspeed information to air data computer variometers like the B500 without further correction. If you are unable to use one of these and your sailplane pitot/static system has large errors (greater than 1 - 2 knots) use the following procedure:

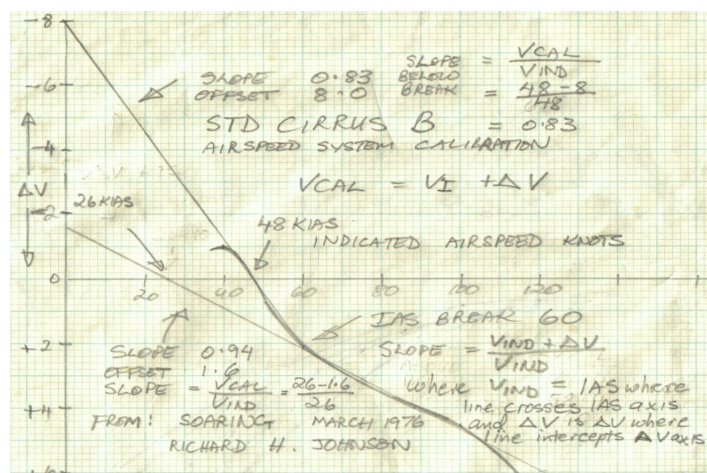
Most Sailplane flight manuals have a Position Error curve, table or graph. Draw a best straight line through zero and the points in the useful speed range (best L/D to about 110 knots usually) and derive the ratio Calibrated Air Speed / Indicated Airspeed.

In extreme cases (Standard Cirrus) the straight line may need two segments. With zero point offsets on both segments. The B500 lets you apply correction even in this case.

Even if you don't use a B2500 your B500 should have this correction applied as it will make the headwind/tailwind component more accurate.

Using the Dick Johnson position error for the Standard Cirrus the position error curve can be well approximated by a two segment straight line covering the speeds below and above 60 knots.

You must of course then use the same Pitot/Static locations for the B500 as this Flight Manual information applies to.



If you aren't using the Flight Manual pitot/static or the position error is unknown the following flight test method will give good results:

Flight Testing the Pitot/Static system.

In flight, after thermalling when the wind speed and direction have been established, fly upwind at a constant airspeed and note the TAS and GS readings on the STATISTICS page. Repeat by flying downwind. This should be done at about 50 knots, 75 knots and about 100knots IAS preferably at about the same altitude. The difference between the TAS and GS is the wind component which should of course be the same value when going up or down wind. If it isn't the pitot/static system has an error at that speed of half the difference between the two numbers (ignore the sign). If the apparent headwind component is smaller when flying upwind than the tailwind when flying downwind then the Indicated Air Speed is less than the Calibrated Air Speed. The reverse situation means that the Indicated Air Speed is greater than the Calibrated Air Speed.

This procedure will give you three points in the useful speed range. Reduce these errors by 8% if this was flown at 5000 feet AMSL, 17% if done at 10000 feet AMSL. As the errors will usually be only of the order of 5 knots or less (hopefully) the altitude will only make a small difference. Continue by using the same procedure as if you had a Flight Manual position error graph or table.

Retest to confirm that you have made the proper corrections.
