Operating Handbook

For

SORCERER, AP 100 AUTOPILOT

TRUTRAK FLIGHT SYSTEMS

1500 S. Old Missouri Road
Springdale, AR 72764
Ph. 479-751-0250 Fax 479-751-3397
www.TruTrakap.com

Table of Contents

General Introduction

The TruTrak autopilot can be defined as being an orthogonal rate system. This means that gyroscopic rate sensors are installed so as to sense motion about each of the major axes (roll, pitch and yaw). These sensors generate the fast signal responses necessary to create an autopilot with the best possible dynamic performance.

To fly an aircraft well about the axis controlled by the ailerons, velocity of aileron movement must be directly proportional to the rate of roll for small movement. This means that aileron position corrections do not lag behind motion of the craft about the roll axis. Aileron control systems that use a turn coordinator, which senses twice as much azimuth as roll rate, cannot do this. Instead, in turbulence, yaw disturbances cause undesired aileron movement. In some aircraft this effect is so severe that the controls may even move momentarily in the wrong direction.

The challenge at TruTrak is to create, beyond question, systems with the very best dynamic performance available—systems that need not be disengaged in turbulence, but instead provide function when needed most.

The complete TruTrak flight control system combines within a single panel-mounted programmer/computer package which includes all the electronic and sensing elements needed for the roll and pitch functions as well as a rate-gyro-controlled yaw damper.

Basic directional control is provided by digital selection of a GPS track to be flown. This replaces heading selection on the DG, and eliminates drift as well as crosswind correction. In the GPS steering mode of operation, the system responds to digital guidance information so as to fly a complex navigation program.

The vertical portion of the system contains a digital altimeter and associated altitude selector capable of selection in increments as small as fifty feet. Altitude transitions can be made by airspeed, vertical speed, or horizontal distance (VNAV) selection. If an upward vertical speed is selected which is beyond the capability of the aircraft, there will be no stall. Instead, the autopilot will cause the aircraft to climb at a pre-set minimum safe airspeed. This is the only known system to provide this safety feature.

For any set of features all TruTrak computers are identical. Servos likewise are identical in velocity response. Servos do differ according to total torque required. By providing setup functions in the programmer for system activity and torque, one TruTrak programmer-servo combination can fly any aircraft.

As a starting point in understanding how to operate the TruTrak system, the following describes the presentation of data, the operating controls, and the procedures for selecting modes of operation.

POWER UP—AIRCRAFT STATIONARY

SEE INITIALIZING THE AUTOPILOT PAGE 11

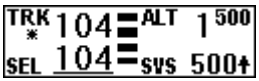
Mode and Data Display

This display normally shows operating modes and associated numerical data. It is also used to display setup mode screens and the setting of associated numerical data. When displaying operating modes, the left side shows lateral data and the right side shows vertical data. (See figure below) The upper left display labeled **TRK** shows the electronic DG slaved to GPS track. When the GPS track is not available **TRK** will be replaced by **BANK**, which means the autopilot now uses its internal gyros for bank angle control. The lower left display labeled **SEL** shows the selected direction of flight when in the standard track mode. When in the gyro mode, the lower left shows the current selected bank angle. The upper right display shows altitude or selected altitude, and the lower right display shows either selected vertical speed or selected airspeed.

The vertical space between the left and right hand display area is used to show pitch trim. This display consists of four horizontal bars spaced vertically as the rungs on a ladder, and are made to move up or down when the aircraft is in need of being trimmed.

In the upper left where direction is shown, a flashing indicator is present in the center left of the display. When there is no GPS signal present the display will show **NO GPS**. When there is no GPS position information the indicator will be a flashing period, and the display will show **NO FIX**. Once GPS position data becomes valid the indicator will be a flashing asterisk, and the display will show **GPS OK**. If GPS flight plan information is being received over the serial channel or if GPS steering information is being received, a flashing plus sign will indicate the presence of a useable steering (**GPSS** mode) or waypoint to waypoint (**GPS NAV** mode) signal.

A cursor in the form of an underline is shown beneath the **SEL** numerals. This is used to indicate that an underlined number will be set by rotation of the encoder knob.



Controls

Switches labeled **[NAV] [REV] [SEL] [VNAV]** when depressed enter the respective lateral and vertical mode setup screens. When the desired setup screen is displayed, the numerical data to be entered will be underlined. The data is then set by rotating the encoder knob and entered by depressing and then quickly releasing the knob. This will be referred to hereafter as "enter". The **[TRK] [ALT] [AP] [GPSS] [GPSV]** buttons do not have setup screens; they enter directly into the respective modes.

Another means of entering numerical data is the sequential pressing of the vertical speed rocker. Each time the rocker is pressed, the vertical speed will be changed in increments of 100 feet per minute. If the vertical speed rocker is pushed and held, the vertical speed will slowly scroll up or down in the desired direction. Still another means of altering the display presentation is engaging or disengaging the autopilot. This is accomplished by using the **[AP]** switch on the programmer. If GPS Steering or Vertical GPS Steering is available, the **[GPSS] [GPSV]** switches will also engage the autopilot. The control stick switch located on the control wheel or stick is yet another means of engaging the autopilot. The control stick switch serves a dual purpose. Momentary closure will disengage the autopilot. If the switch is held closed more than two seconds, the autopilot will engage upon release. This means that in addition to disengaging the autopilot, this switch also provides the function referred to as Control Wheel Steering in that the autopilot synchronizes to both direction and vertical speed upon being engaged.

Lateral Modes

Upon being engaged, the autopilot will be in the basic lateral mode, and it will be synchronized to the track being flown at the time. (See figure on page 3.) Note: The number following **SEL** (Selected direction) is underlined, meaning that rotation of the encoder will select a new ground track. Rotation of the knob when it is not depressed will cause 5° steps of **SEL** and when it is depressed the steps will be 1°.

If the autopilot is in another lateral mode, pushing the **[TRK]** button will enter the basic track mode.

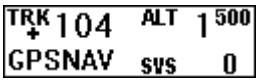
When an external heading source (DG or HSI) is present, pressing **[TRK]** will toggle between the **EXT DG** and the track mode. When in the **EXT DG** mode the heading "bug" within the external DG or HSI

will be used to control direction.

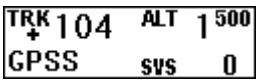
GPS Steering/GPS Nav Mode

Pressing the **[GPSS]** button will enter either **GPS NAV** or **GPSS** mode depending on which, if either, steering signal is available to the autopilot.

In **GPS NAV** mode the autopilot follows a flight plan programmed into the GPS. The autopilot will however overfly each waypoint prior to turning and intercepting the course line to the next waypoint.



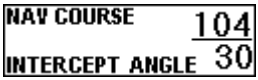
In the **GPSS** mode the autopilot follows lateral steering or bank commands generated by a navigation system (EFIS or GPS). If there is a **GPSS** signal present, the autopilot can also be engaged with **[GPSS]** button, and it will engage in the **GPSS** mode.



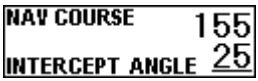
NOTE: If there is not a GPS NAV or GPSS signal present the [GPSS] button will not function.

NAV/LOC Course Mode

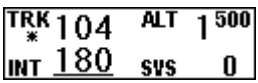
Pressing the **[NAV]** button will bring up the **NAV COURSE** or **LOC COURSE** setup screen depending on which is selected by the navigation receiver. The setup screen for this mode is shown below.



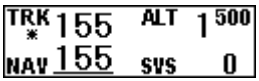
The course numerals are underlined. This means that the VOR/LOC course is to be set by rotating the encoder. As the encoder is rotated, knob out equals 5° steps while knob in equals 1° steps. When course has been set press enter. The cursor (underline) will now move to intercept angle. The default value will be 30°. The intercept angle can be set from 15° to 45° by rotation of the encoder knob. When the desired intercept angle is set, press enter.



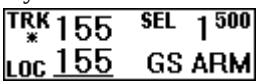
The selected intercept angle is now converted to an intercept direction according to which side of the course the aircraft is on.



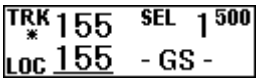
Also, intercept direction is underlined which means it can be adjusted. With this feature the system is in a selected direction mode until the on course turn (tracking phase) is initiated. During the intercept phase of the approach, the lower left display will alternate between **INT** and **NAV** or **LOC** depending on which mode has been selected. When the aircraft is established on the inbound portion of the approach, the lower left display will indicate the selected course.



If the above is **LOC COURSE** and glide slope is present (ILS), flying below the glide slope in **ALT HOLD** mode will arm the glide slope coupler. When this occurs, the display will be as shown below:



When the Glide slope is intercepted, the display will be as shown below:



When glide slope coupling is terminated, by entering either the **ALT HOLD** or **SVS** (selected vertical speed) mode, the lateral mode will switch from **LOC COURSE** to **TRK** mode. The selected track will be the same as the inbound course.

NOTE: When coupled to the glide slope, one push of the VS rocker in either direction will command a 500 fpm climb.

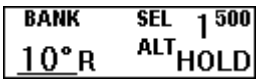
REV Course Mode

Click the **[REV]** button to enter the **REV COURSE** setup screen. This refers to flying the localizer or VOR in the reverse direction. Operation of this mode is the same as **NAV COURSE** or **LOC COURSE** except that there will be no glideslope coupling.

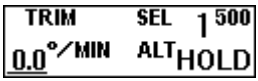
Gyro Back-Up Mode

The lateral modes previously described are based on GPS track being present. When GPS is lost, the autopilot uses its internal gyros for bank control, and **TRK** is replaced with **BANK**. This mode is only a backup and would seldom be needed; however, it does provide a means of selecting a desired bank angle, and a means of adjustment if the aircraft turns when zero bank is selected. If an external heading source (HSI or DG) is present, the **EXT DG** mode remains functional, and if the GPSS or GPSV signal source is functional, the **GPSS** and **GPSV** modes will also be functional. The remaining modes, **NAV COURSE** and **LOC**

COURSE navigation should not be used when GPS track is absent. The **VNAV** mode will also not be functional without a GPS signal. When in the gyro backup mode the number displayed below **BANK** is the selected bank angle. Rotating the encoder knob will move the selected bank angle one degree at a time up to five degrees, the bank angle is then selectable in five degree steps up to 30 degrees.

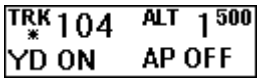


If the aircraft continues to turn when a bank angle of zero degrees has been selected, push in on the encoder and the display changes to show a **TRIM** adjustment. This adjustment is selectable in increments of 0.2 degrees per minute up to ten degrees per minute in either direction. Every time the trim is adjusted it will add the displayed number to the current trim adjustment.



Yaw Damper

The Yaw Damper can be used whether or not the autopilot is engaged. It automatically comes on when the autopilot is engaged. When the autopilot is not engaged the Yaw Damper can be toggled on or off by pressing the **[TRK]** button. If the autopilot is not engaged, the yaw damper will automatically disengage at the user selectable minimum airspeed. When the autopilot is not engaged, and the yaw damper is engaged the display will be as shown below.



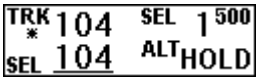
Vertical Modes

When the autopilot is engaged, it will synchronize to the vertical speed being flown at the time, and thus will be in the basic vertical speed-operating mode (see figure on page 3). While in this basic vertical speed mode, the upper right section of the display shows altitude and the lower right section shows **SVS** (selected vertical speed). This mode is also entered by pressing either end of the vertical speed rocker. If the system is in transition to a selected altitude pressing the appropriate direction of the vertical speed rocker will switch from airspeed to vertical speed. It will not cancel the selected altitude, unless the selected vertical speed is in the opposite direction.

Altitude Hold Mode

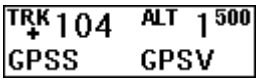
Press **[ALT]** to select **ALT HOLD** mode. The selected altitude will be to the nearest 100 feet as viewed on the

digital altimeter. For example, pressing enter between 4950 and 5050 will select 5000.



Vertical GPS Steering Mode

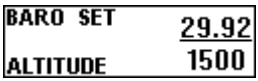
Pressing the **[GPSV]** button will enter vertical GPS steering mode. In the **GPSV** mode the autopilot follows vertical steering commands generated by a navigation system (EFIS or GPS). If there is a vertical steering signal present, the autopilot can also be engaged with **[GPSV]** button, and it will engage in the **GPSS** and **GPSV** mode. When in the GPSV mode, the display will be as shown below.



NOTE: If there is not a vertical GPS steering signal present the [GPSV] button will not function.

Barometer set

NOTE: (SORCERER ONLY)
The barometer must be set prior to using the altitude select feature. To enter the **BARO SET** screen, press and hold **[SEL],** for approximately three seconds. The display will show the following screen.



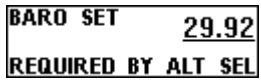
Rotate the encoder to match the displayed number to the current barometer setting; the default will always be **29.92**. When this is done press enter. If the displayed altitude is not correct, adjust it by rotating the encoder knob. Press enter to accept the current altitude and exit the barometer set mode.

When the autopilot is engaged and in altitude hold, upon exit of the barometer set page the autopilot will climb or descend to the current selected altitude.

Altitude Select Mode

NOTE: (SORCERER ONLY)
Pressing **[SEL]** will display the **SEL ALT** set up screen.

The barometer must be set prior to using the altitude select feature. If the barometer is not set prior to attempting to enter the altitude select screen the display will show the following screen. To set the barometer see Barometer set in the previous section.

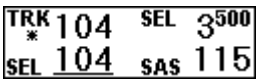


If the barometer set has been done the display will show the following screen.

At this screen the **SEL ALT** numerals are underlined so that rotation of the encoder selects the target altitude. When this is done press enter.

If a higher altitude has been selected, the pre-set (best-cruise climb) air speed is now displayed and underlined.

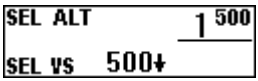
This value can be modified by rotating the encoder knob. When air speed has been set, press enter and the altitude transition will begin. The autopilot will then revert to the normal flight display.



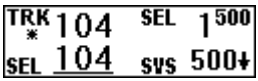
Also, **SEL** direction will again be underlined. Both selected altitude and air speed can be modified while in transition. Press and release the encoder knob once and the underlined cursor moves to selected altitude. Pressing a second time moves it to air speed and a third time returns it to direction, or after a short period of time it will return automatically to direction. If the selected airspeed is adjusted, the airspeed will then change at a constant rate from its initial value to the selected value at which point it will cease moving with no overshoot.

Finally, because the vertical speed rocker is always active, the climb to a new altitude can be changed from airspeed to vertical speed and the rate adjusted, by pressing the appropriate direction on the vertical speed rocker the required number of times.

If a lower altitude is selected, the set-up screen will be as shown below in which a default downward vertical speed of 500 Fpm is shown when the selected altitude differs from the present by more than 500 feet.



When the new altitude has been selected and entered the downward transition will begin at 500 fpm. Pressing the appropriate direction on the vertical speed rocker will modify this value.

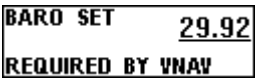


VNAV Mode

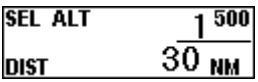
NOTE: (SORCERER ONLY)
Pressing **[VNAV]** will display the **SEL ALT** set up screen.

NOTE: The barometer must be set prior to using the VNAV feature. If the barometer is not set prior to attempting to enter the

altitude select screen the display will show the following screen. To set the barometer see Barometer set on page 8.

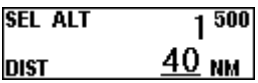


If the barometer set has been done the display will show the following screen.

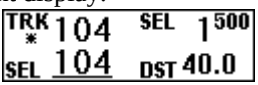


NOTE: If there is not a GPS signal present, the [VNAV] button will not function.

At this screen the **SEL ALT** numerals are under lined so that rotation of the encoder selects the target altitude. When this is done press enter.



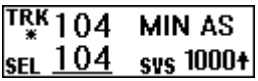
Once the desired altitude has been entered the **DIST** numerals are underlined so that rotation of the encoder now will select the distance, in nautical miles, in which the selected altitude will be reached. Click the knob to enter the distance and begin the transition to the selected altitude. The autopilot will now revert to the normal flight display.



As in the altitude select mode, the selected altitude and selected distance can be adjusted by clicking the knob to move the cursor first to the selected altitude, then to the selected distance. A third click will click will return the cursor to direction, or after a short period of time the cursor will return automatically to direction.

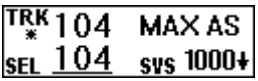
Minimum Airspeed

Any time the autopilot is engaged, and the airspeed falls to the minimum airspeed setting, the autopilot will begin to flash **MIN AS**, as shown below.



Maximum Airspeed

Any time the autopilot is engaged, and the airspeed reaches the maximum airspeed setting, the autopilot will begin to flash **MAX AS**, as shown below.



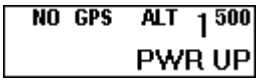
Stopping the Transition to a Selected Altitude

Once the aircraft is in climb or descent to a selected altitude, the process can only be stopped by entering the **ALTHOLD** mode. This is accomplished by arriving at the selected altitude or by selecting the **ALTHOLD** mode by clicking the **[ALT]** button.

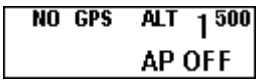
Additional Operating Instructions

Initializing the Autopilot

The autopilot master switch should be in the off position when the engine is started. Aircraft electrical systems can generate voltage transients during an engine start, and like other avionics systems, the autopilot should not be subjected unnecessarily to these conditions. After start up, turn on the autopilot master switch and hold the aircraft stationary as the internal gyros are initialized. This takes approximately ten seconds during which time the display will show the words **PWR UP** in the lower right. **NOTE: The aircraft must be stationary for the first ten seconds after power is applied to the autopilot.**

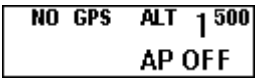


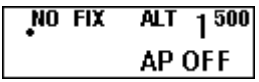
When initializing is complete **PWR UP** will change to **AP OFF**.

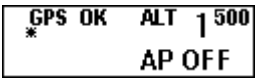


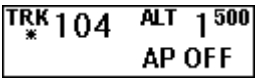
GPS Acquisition

If there is no GPS signal the top left portion of the display will read **NO GPS**. If a GPS signal is present, but satellites have not yet been acquired, the upper left portion of the display will read **NO FIX** with a flashing • below. When the GPS does obtain a fix, the period will be replaced by an asterisk and the display will switch to show **GPS OK** with a flashing * below. This means that when a certain velocity is attained **TRK** will appear followed by the current track. This happens at approximately 10 Knots groundspeed as detected by GPS and will even occur at rapid taxi speeds. The four possible screens are shown below.









Altitude Select with AP Off

NOTE: (SORCERER ONLY)

If a target or assigned altitude is known prior to take-off this altitude can be set while on the ground. As with the AP on, pressing **[SEL]** will display the **SEL ALT** setup screen. The

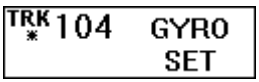
procedure is to select the desired altitude and then press enter.

NOTE: The Barometer must be set prior to attempting to enter the altitude select screen.

The display will show the selected altitude even though the autopilot is still off. This will serve as a reminder that the autopilot will climb to the selected altitude when engaged. It will not climb at a selected airspeed, but will default to a vertical speed of 500 fpm. This can be adjusted with the vertical speed rocker as usual.

Gyro Set

When the initializing has been done correctly, the gyros should already be centered at the time of take off. If confirmation of this is desired, with the aircraft stationary on the runway, pressing and holding the encoder knob will put the gyros in the fast centering mode. The knob should be depressed for approximately 10 seconds during which time the words **GYRO SET** will be displayed.



Engaging the Autopilot

Since the autopilot synchronizes to vertical speed, the vertical speed at the time of engaging should be a value that can be sustained. Otherwise airspeed will diminish as the aircraft attempts to sustain vertical speed. As airspeed then diminishes to the pre-set minimum it will hold this value and thus prevent a stall.

When aircraft vertical speed is less than approximately 450 feet per minute, the autopilot will initially select zero vertical speed. The vertical speed rocker can be used to change the initial value if desired.

Setting Pitch Trim

The pitch servo contains a torque sensor that sends a signal to the computer when the up or down force greater than a threshold value is required to fly a selected flight condition. When this signal indicates an out-of-trim condition that persists in one direction for more than a few seconds, the three moving horizontal bars will come into view and move according to the direction in which trim is required. The pilot is then required to operate the trim control (electric or manual) so as to bring the system to neutral trim. With mechanical trim this is easily done, but with electric systems it may be necessary to develop a technique. If the trim is slow enough, the pilot has plenty of time to react when the bars disappear before the trim condition is reversed. With a fast trim it will be necessary to tap or pulse the trim button so that it will be slow enough to turn it off before going too far. When a reversal takes place, a slight tap in the reverse direction may be required to get the bars to stay

off. Finally, when the bars have been made to disappear and there has been no speed change, the bars can be ignored if they reappear if it is known the aircraft is close to being in trim.

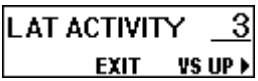
Power Loss

If there is a momentary loss of electrical power, the autopilot will disengage. When this happens it is necessary to do a **GYRO SET** before re-engaging the autopilot. To accomplish this, the aircraft must be held very straight during which time the encoder knob is pressed to do **GYRO SET**. After this, engage the autopilot and note the extent to which **TRK** differs from **SEL**. If this is more than 15° repeat the gyro set procedure. The difference between **TRK** and **SEL** will be reduced at the rate of 8° per minute by the automatic gyro centering system within.

Sorcerer Setup Procedure

Lateral Setup

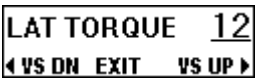
The lateral setup consists of setting activity, torque, serial baud rate, and various configuration parameters. To enter the setup mode, press and hold the **[TRK]** button for two or more seconds, until the first setup screen appears. This screen shows the current value for the activity, with an underline under the present setting of activity. A typical screen might show:



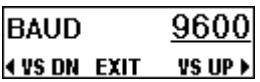
The underlined number is set by rotating the encoder knob. Turn this knob to set the activity level to the desired value for the particular aircraft. Any value between 0 and 24 may be chosen. In this example, the value of 1 will be selected. Activity should be set so as to not be excessive in turbulence and yet sufficient to fly without hunting in still air. (Any lost motion or play between the servo and the control surface can cause hunting in still air).

Once the **LAT ACTIVITY** has been set to the desired value, push the up control on the vertical speed rocker to enter the selected value into storage, and advance to the next setup screen.

In a manner similar to activity, use the encoder knob to select the desired value of roll servo torque. This value should be between 8 and 12. A default value is set at the factory but may need to be modified to suit a particular aircraft. The value chosen should be sufficient to fly the aircraft, but not so much that it is difficult to override the autopilot if necessary.



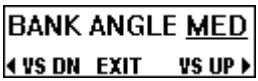
Having selected the desired **LAT TORQUE** level, again push the up control on the vertical speed rocker to enter the selected value into storage, and advance to the next setup screen. If the need arises to move to a previous setup screen pressing the down control on the vertical speed rocker will move to the previous screen. Likewise, clicking the encoder knob in any setup screen will exit the setup mode. The next setup screen is shown below.



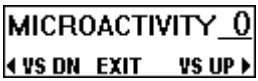
The value shown represents the speed of the primary RS-232 interface to the external GPS unit. By default at the factory the **BAUD** is set to 9600, as that is the most commonly used value.

However, it may be set to any of 600, 1200, 2400, 4800, or 9600 baud. Consult the manual for the GPS unit and follow its setup instructions to determine its setting and set the baud rate of the autopilot to the same value. The autopilot will recognize NMEA-0183 protocol, Garmin protocol, or Apollo GX50/GX60 protocol (moving map output).

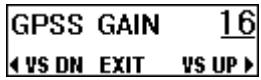
Once the desired baud rate has been selected, again push the up control on the vertical speed rocker to enter the selected value into storage, and advance to the next setup screen, which is shown below.



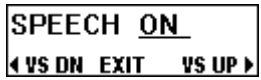
The **BANK ANGLE** setup screen allows a low, medium, or high setting. This will limit the autopilots maximum bank angle to approximately 13 degrees at the low setting, approximately 18 degrees at the medium setting, and approximately 24 degrees at the high setting. Once the desired maximum bank angle has been selected, again press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.



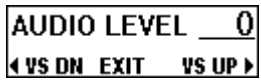
The next setup screen is **MICROACTIVITY**. This setting is to be left at zero unless advised by the factory. Press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.



The next setup screen is **GPSS GAIN**. This setting should be left at 16 unless advised by the factory. Press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.

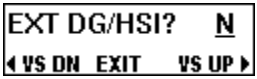


This setup screen is to turn the speech annunciation on and off. If the speech is turned off, the autopilot will give a series of alerter tones for important information. If the speech is turn on, there will be a voice annunciation for important information. Once this has been set, press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.



The next setup screen is for **AUDIO LEVEL**. While this screen is displayed, the autopilot will send an audio

tone to the audio system. Adjust the value between **0** and **16** for the desired volume. Once the audio level has been set, press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.



The next setup screen is the external DG/HSI setup screen. Use the encoder to select either **Y** (yes) or **N** (no) depending on whether an external DG or HSI is connected to the system. Press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.

Answer **Y** (yes) or **N** (no) to indicate whether or not a yaw damper is present. If **N** is selected, this is the final lateral setup mode. Press enter to exit the lateral setup mode. If **Y** is selected push the up control on the vertical speed rocker to advance to the next setup mode, which is shown below.

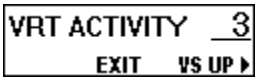
If the **YAW DAMPER?** was answered with **Y**, then the next setup screen will be for **YD LEVELING**. This is the fine adjustment for the leveling of the yaw damper module. The value for leveling is adjustable from -8 to 8 and is used as necessary to have the yaw damper keep the aircraft slip/skid indicator (ball) centered when the yaw damper is engaged and the autopilot is flying the aircraft straight and level. When adjusting this value, allow a few seconds for the yaw damper to respond to each new value setting. Once the yaw damper leveling has been set, push the up control on the vertical speed rocker to advance to the final setup screen, which is shown below.

The final setup screen is for yaw damper activity. The yaw damper activity functions exactly like the lateral and vertical activity settings. This setting is adjustable from **0** to **12**, where zero is the lowest activity and **12** is the highest activity. Once the activity has been set, push enter to exit the lateral setup mode.

Pitch Setup

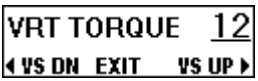
The pitch (vertical) setup consists of setting activity and torque in a manner similar to that done for the aileron servo in the lateral setup. To enter the vertical setup mode, press and hold the **[ALT]** button for two or more seconds, until the first

setup screen appears. This screen shows the current value for the activity with an underline under the present setting of activity. A typical screen might show:



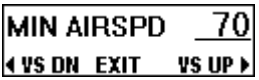
Turn the encoder knob to set the activity level to the desired value for the particular aircraft. Any value between **0** and **24** may be chosen.

Once activity is set to the desired value, press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.



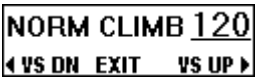
In a manner similar to activity, use the encoder knob to select the desired value of pitch servo torque. This value should be between **8** and **12**. A default value is set at the factory but may need to be modified to suit a particular aircraft. The value chosen should be sufficient to fly the aircraft, but not so much that it is difficult to override the autopilot if necessary.

Having selected the desired torque level, again press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.



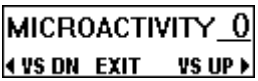
Use the encoder knob to select the minimum airspeed at which the autopilot will fly the aircraft. This speed should be a safe margin above a stall. Press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.

Use the encoder to select the maximum airspeed at which the autopilot will fly the aircraft. This should be safely below red line, but above cruise speed. Once this value has been set, press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.

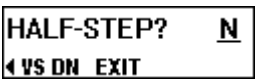


Select, using the encoder knob, the default value most commonly used for a climb to a selected altitude. Press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.

The next screen in the pitch setup sequence allows adjustment to compensate for the lag (delay) in the aircraft's static system. Select the lowest value over the range **0** to **2** which results in the elimination of "hunting" in the altitude hold mode. This adjustment should be done in still air at cruise airspeed. Press the up control on the vertical speed rocker to advance to the next setup screen, which is shown below.



The next setup screen is **MICROACTIVITY**. This setting is to be left at zero unless advised by the factory. Press the up control on the vertical speed rocker to advance to the final setup screen, which is shown below.



This setting in most cases will not need to be adjusted. If this is set to **Y** (yes), then the pitch servo will have a higher resolution and take smaller steps. However, it will also have less available torque. This setting should be left at **N** (no) unless it is observed that the nose moves up and down very slightly in very still air. Once this setting has been completed, push enter, to exit the vertical setup mode and return to the normal flight screen.

This concludes the vertical setup portion of the Sorcerer autopilot.

TruTrak Flight Systems, Inc.

(5-06)
Printed in U.S.A.