

# STX 165



Mode A/C Transponder

*Pilot's Guide*

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## ***STX 165 Panel Mounted Mode A/C Transponder***

The STX 165 and STX 165R (remote) are Mode A/C Air Traffic Control Beacon System (ATCRBS) transponders that receive ground radar interrogations on a frequency of 1030 MHz and transmit replies on a frequency of 1090 MHz. The STX165 is capable of transmitting one of 4,096 pilot entered codes which differ in both the position and number of pulses that are transmitted. These coded reply's allow ATC to display your aircraft's position, selected identifier, groundspeed and altitude on their radar screens. This information aids controllers in maintain aircraft separation and proper approach and departure sequencing.

The STX 165R is a remote unit that can be interfaced to and controlled by other manufactures navigations systems. For operation of the STX165R refer to the manufactures Pilot Guide of the unit controlling the STX 165R This manual will only address the operation of the panel mounted STX 165.

The STX 165 is a panel mounted transponder and uses a bright OLED display that is viewable in virtually all lighting conditions. The STX 165 detects ambient lighting conditions and automatically dims or brightens depending on the conditions. The minimum display intensity can be set by the pilot in the user set up mode.

The controls have been arranged to simplify data entry and retrieval while conserving valuable aircraft panel space.



***Caution: Prior to starting or turning off the aircraft engine, the avioncs master should be turned off to prevent possible damage to your avionics.***

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***Note: Mimimum dispay intensity is preset by the pilot in the user configuration mode.***

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## STX 165 Features

In addition to displaying the transponder code, the STX 165 has the following features that provide the pilot with valuable information

	<b>Pressure Altitude.</b>	The STX 165 has a built-in encoder that is certified to 35,000 feet. The Unit will display the Pressure altitude in the lower left hand quadrant
	<b>OAT</b>	When Sandia's optional ST 78 OAT probe is installed the STX 165 will display Outside Air Temperature (OAT) in either F° or C°.
	<b>Density Altitude</b>	When Sandia's optional ST 78 OAT probe is installed the STX 165 will display Density Altitude in feet.
	<b>Icing Alert</b>	When Sandia's optional ST 78 OAT probe is installed the STX 165 will display a Snow Flake in the upper right corner of the display at a preset temperature to indicate freezing and possible icing conditions.
	<b>Elapsed Flight Timer</b>	An elapsed flight timer is initiated at system start up or after take off at a predetermined pilot entered altitude. Non resettable in flight
	<b>Count Up Timer</b>	A resettable count up timer is controlled by the pilot.
	<b>Count Down Timer</b>	A preset time is entered and started by the pilot.



**Note: Temperature scale and flight timer initiation altitudes are preset by the pilot in the user configuration page.**

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**Note: Pressure altitude is derived from the STX 165's built-in encoder and is not baro corrected. It is the sea altitude as that being transmitted to ATC**

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## STX 165 Display and Controls



The STX 165 uses a bright sunlight readable OLED display that automatically dims to adjust to ambient light conditions. There can be times however when some pilots may have a hard time reading the display, especially in bubble canopies when the STX 165's display is pointed directly at the sun. In this case, the pilot can press and hold the VFR pushbutton for three seconds and the code will be displayed in large numbers. In this condition, the Mode will continue to be displayed and both the mode and code can be changed. To exit this mode press and hold the VFR pushbutton for three seconds again.



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**Caution: Pressing and holding the VFR pushbutton for less than three seconds will cause the VFR code to be displayed and become the active code.**

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The STX 165 display can be thought of as being divided into four quadrants.

Upper Left Hand Quadrant is the Mode in which the STX 165 is operating.

SBY: or standby the display is on and the unit fully functional, except it is not replying to transponder interrogations.

ON: The STX 165 is on and responding to interrogations but not send out the aircraft altitude information also call Mode A

ALT: The STX 165 is on and responding to transponder interrogation with altitude data, also called Mode C.

Reply Light This is a bar that will blink at a 1 Hz rate whenever the STX 165 is replying to transponder interrogation It is directly under the Mode.

Upper Right Hand Quadrant: This displays the transponder code currently being transmitted by the STX 165

Lower Left Hand Quadrant: This show the pressure altitude (PALT) being sensed by the built-in encoder and transmitted by the STX 165. If the Sandia ST 78 OAT probe is installed the quadrant will also display Density Altitude (DALT) and Outside Air Temperature (OAT)

Lower Right Hand Quadrant: This area shows the three timer functions, Elapsed Flight Time (EFT), Timer Up, and Timer Down (Timer DN).



**POWER** The STX 165 is designed to come on automatically when the avionics master switches is turned on. The STX 165 can be turned OFF by pressing and holding the power/mode pushbutton for three seconds. If the pushbutton is disengaged prior to the three second time out, the unit will remain in the ON mode. The STX 165 always comes on the last active code.



**MODE** Turning the MODE control selects one of three MODES of operation, **Standby** (SBY) in which all functions are operational except that the unit is not transmitting reply. **ON**, the STX 165 is replying to interrogations but not reporting altitude (Mode A). **ALT**, the STX 1656 is replying to radar interrogation and reporting altitude (Mode C). The STX 165 always turns on in the Standby mode. The STX 165's Mode is shown in the upper left quadrant of the OLED display



**SELECT** The SELECT knob is the large outer knob of the stacked pair on the lower right of the STX 165. This is a momentary knob that can be turned clockwise or counter clockwise and will move the 'cursor' one position. When released, it will return to the neutral position. The SELECT knob is used to move the cursor over the code digits so that a different code can be entered by the pilot.



**DATA** The DATA knob is the smaller, outer knob of the stacked pair in the lower right hand corner of the STX 165. It can be turned either clockwise or counter clockwise to enter data.



**ENTER** The ENTER pushbutton is the smaller, outer knob in the lower right corner of the STX 165. Pressing the ENTER pushbutton stores pilot entered data in the STX 165. It is represented by the international enter symbol



**VFR** The VFR pushbutton is used to toggle between the units programmed VFR code and the last pilot entered code.



**IDT** The IDT pushbutton is pressed to squawk Ident when requested by ATC. When IDT is pressed the unit will stay in the IDENT mode for 22 seconds and the IDENT annunciator will be illuminated.

## STX 165 Operation

### Mode Selection

The STX 165 automatically turns on in the SBY (standby) mode when external power is applied, normally via the avionics master switch. The pilot can use the MODE control to select On (mode A ) or ALT (Mode C) if desired. The STX 165 also has the ability to automatically select ALT mode once the aircraft has taken off and reached at a predetermined altitude AGL. Once this altitude is sensed by the built-in encoder the STX 165 will automatically turn on to the ALT mode. This altitude is preselected by the pilot in the User Set up page.



**Note: Since the STX 165 uses pressure altitude to determine when to turn on, it will automatically turn off. The pilot should ensure that the unit is turned to the SBY Mode after landing.**

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When power is applied the STX 165 will tun on with the last active squawk code. The pilot can then change it to the code requested by the controller. The active code is shown in the upper right quadrant of the display.



*A 1200 squak code is displayed in the upper right quadrant of the units display.*

To change the squawk code, rotate the SELECT know once clockwise to place the cursor over the first digit in the squawk code. Consecutive turns of the SELECT knob will move the cursor progressively over each digit. Turning the SELECT knob counter clockwise will reverse the travel of the cursor. Once the cursor is over the digit to be changed, rotate the DATA knob either direct to select the desired number. Continue this until all the digits have been changed to the new squawk code. Then simply press enter to activate the new code.

To squawk VFR, simply press the VFR pushbutton. The programmed VFR code will be displayed. If you push the VFR pushbutton inadvertently and want to return to the previous code, simply press the VFR code again.



**Note: Pressing the VFR pushbutton cycles between the VFR code and the last pilot programmed code.**

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**Pressing and holding the VFR pushbutton for three seconds causes the display to go to a large font on only the mode and squawk code are displayed. Pressing the VFR pushbutton again for three second restores to display to normal.**

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A flashing bar under the mode in the upper right hand corner of the display is the STX 165's reply annunciator. It will blink at a 1 Hz rate whenever the STX 165 is replying to interrogations ground or TCAS interrogations.

### Pressure Altitude, Density Altitude, Outside Air Temperature

The STX 165 will display PALT in the lower right quadrant of the display. This quadrant can also display Density Altitude (DALT) and Outside Air Temperature (OAT) if the optional SANDIA aerospace STP 78 OAT probe is installed. Upon initial turn on the PALT display will be blanked until the transducer heater has come up to temperature. Depending upon the ambient air temperature, this can take up to a minimum one minute.



**Caution: If the computed altitude is out of range the PALT display will show -9982 feet. If there is an altitude failure the PALT display will show -9981. Note that neither of these are valid altitudes in the normal mode.**

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**Note: If the optional STP 78 OAT probe is not installed only Pressure Altitude (PALT) will be displayed in the lower right quadrant.**

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To display the alternate functions in the lower right quadrant, turn the SELECT knob once in the clockwise direction. The displayed data in the lower right quadrant will blink. Turn the DATA knob until the data you want displayed is visible. Then press the ENTER pushbutton. If the ENTER pushbutton is not pressed within 15 seconds the display will revert to the previous information.

### Timer Functions

The STX 165 has three timer functions that are displayed in the lower left display quadrant. To select the desired timer, rotate the SELECT knob twice clockwise or once counterclockwise. Then turn the DATA knob to select the desired Timer function.

**Elapsed Flight Time (EFT)** begins counting when the unit is powered up or reaches a preset AGL altitude that is programmed by the pilot in the user set up mode. The EFT is not resettable after power up. The EFT counts in minutes and seconds up to 59 minutes and 59 seconds and then begins counting in hours and minutes.



**Note: The TIMER UP counts in Minutes and Seconds for 59 minutes and 59 seconds and then displays time in hours and minutes.**

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**Timer Up** is a resettable timer that allows the pilot to time various task, such as holding pattern legs. To begin the Timer Up function, rotate the SELECT knob to the lower right quadrant, and then rotate the DATA knob until the TIMER UP is shown. Press the ENTER pushbutton and the TIMER UP begins to blink. Press the ENTER again and the timer begins to count up. To reset the TIMER UP, press and hold the ENTER pushbutton for three seconds. The TIMER UP will reset to 00:00. Press the ENTER pushbutton while the time is blinking and the timer up will begin counting. If the ENTER pushbutton is not pressed within 15 seconds, the timer is stop blink and the counter will stay at 00:00. In this case, to begin the counter, rotate the SELECT knob over the TIMER UP display and push the ENTER pushbutton . The TIMER UP will begin counting up. The TIMER UP counts in minutes and seconds up to 59 minutes and 59 seconds and then rolls over to zero and begins to count up again in minutes and seconds.



**Timer Down** (TIMER DN) is a resettable timer to allows the pilot to preset a time into the display and will then count down. When the count down timer reaches zero, the timer display will be gin to blink to alert the pilot that the preset time has expired. The timer will then begin to count up with a plus sign (+) in front of the time. This enables the pilot to how far he is past his preset time. To set the time in the TIMER DN rotate the SELECT knob to the lower right display quadrant, this area will begin to blink. Rotate the DATA knob until the TIMER DN function is displayed. Press the ENTER pushbutton and the seconds digits begin to blink. Turn the DATA knob until the desired time is in the display. When entering time into the seconds, the time will roll over to the minutes. Rotating the SELECT knob counterclockwise will place the cursor over the minutes. Entering minutes separately may be the fastest way to get to a longer time.



User Configurations allow pilots to set the STX 165 to display certain items to their preference. To set the user configurations press and hold the IDT pushbutton while turning the SELECT knob counter clockwise. Then press ENTER. The first configuration screen will appear. Rotating the DATA knob counter clockwise will scroll the various user set up items.

**TEMP UNIT:** use the SELECT knob for temperatures to be displayed in either Celsius or Fahrenheit.

**ALT UNIT:** Rotate the SELECT knob for altitudes to be displayed in either Meters or Feet.

**AUTO MODE ALT:** This determines what altitude AGL the STX 165 will automatically transition from Standby to ALT after initial turn on. It can be set in 25' increments up to 900 feet. If 0 feet is selected, the STX165 will turn on the ALT mode. To select an altitude Press the ENTER pushbutton. The currently set altitude will blink. Use the DATA knob to select the desired altitude, and press ENTER.

**ICING ALERT:** If the optional SANDIA ST 78 OAT probe is installed, the pilot can select a temperature at which an icing alert will be displayed. To program an icing alert temperature, Press the ENTER pushbutton. The Temperature will begin to blink. Use the DATA knob to select a desired icing alert temperature. Icing Alert temperatures can be set from -5 to +5 degrees C or 23 to 41 degrees F.

**EFT START ALT:** This determines what altitude AGL the STX 165 will automatically start the EFT timer. If the Altitude is set to 0, the EFT will begin counting at unit start up. To select an altitude Press the ENTER pushbutton. The currently set altitude will blink. Use the DATA knob to select the desired altitude, and press ENTER.

**BRIGHTNESS:** The STX 165 automatically dims the display for the ambient lighting conditions. This feature allows the pilot to set the minimum intensity to which the STX165 will dim. To set a minimum intensity, Press ENTER and turn the DATA knob until the minimum desired intensity is displayed.

**DEFAULT VFR:** This display allows the pilot to set the squawk code that will be active whenever the VFR pushbutton is pressed. This is factory set at 1200 which is the VFR squawk code for the US. To change the VFR code, Press the ENTER pushbutton. The first digit in the code will blink, indicating it can be changed. Rotate the DATA knob to select a new value. Rotate the SELECT knob to select the second digit. Continue this until all digits have been changed to the new VFR code and then press ENTER.

**SET DEFAULTS:** This will return all setting to the factory default setting. To reset all the user setting, Rotate the SELECT knob counter clockwise, [YES] will be displayed. Press the ENTER pushbutton. The setting have now been reset.

To exit the user set up mode, momentarily press the POWER pushbutton.