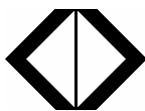# NARCO AVIONICS

# AT165 TSO
# Transponder

Operation Manual
03609-0621

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NOTICE

While every effort has been made by Narco Avionics
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## PRODUCT DESCRIPTION

The AT165 TSO is a panel-mounted transponder with additional altitude and timing functions. The AT165 consists of a receiver tuned to the frequency of a ground interrogation station (1030 MHz), logic circuitry to check the validity of the received interrogation and encode a reply containing pertinent identification information, and a transmitter, which sends the coded reply to the ground station.  When connected to an optional Altitude Digitizer (AR850) coded altitude information will be transmitted to the ground station.

The AT165 utilizes a single knob for error free code entry even in turbulence. Push button controls are used to access and manipulate the added features. The front panel display has two distinct areas, one for the primary transponder functions and the second for the altitude and timing functions.

The AT165 has been designed for 14V or 28V operation. If the AT165 is replacing an existing AT50TSO, AT50A, AT150, or AT155 that uses an MP10 or a passive voltage converter, these do not need to be removed.

## OPERATION



**FIGURE 1-1 AT 165 FRONT PANEL**

### Function Selector Switch

The function selector is a four position rotary switch. The four positions are:

**OFF**- Turns off all power to the transponder.
**SBY**- Turns the transponder power supply on. When in **SBY**, the transponder will not reply to any interrogation. **SBY** is used at the request of the air traffic controller to selectivity clear his scope of traffic. When in this mode SBY will be shown on the Code display window.
**ON**- Places the transponder in Mode A, the aircraft identification mode. In addition to the aircraft's identification code, the transponder will also reply to altitude interrogations (Mode C) with discrete signals that do not contain altitude information. When in this mode ON will be shown on the Code display window.
**ALT**- The **ALT** position activates all the necessary circuitry (transponder to optional altitude digitizer and return) to respond to ATC (Air Traffic Control) altitude interrogations and aircraft identification interrogations with standard pressure altitude (29.92 inches Hg). The **ALT** position may be used in aircraft that are not equipped with the optional altitude digitizer, however, the only response will be discrete signals that do not contain altitude information. When in this mode ALT will be shown on the Code display window.

**SETUP**

Start with the AT165 Function Selector Switch in the **OFF** position. Hold in the **FUNC** button while turning the Function Selector Switch to the **SBY** position. Release the **FUNC** button. The AT165 will now be at the *Contrast Adjust* screen. Rotating the Code Selector/Data Entry Switch CW or CCW will adjust the display's contrast. Once the desired contrast is achieved pressing the **FUNC** button will save this setting and continue to the *Display Mode* screen.

The *Display Mode* screen allows three choices for the display: AUTO, POS or NEG. While in this mode, turning the Data Entry Switch will scroll through these settings.

> AUTO – Black letters on a light background switching to light letters on a black background as the ambient light is reduced.
> POS- Black letters on a light background.
> NEG – Light letters on a black background.

Once the desired *Display Mode* setting is achieved pressing the **FUNC** button will save this setting and continue to the *Gray Code Input* screen.

The *Gray Code Input* screen shows the current altitude and the status of each of the Gray code altitude inputs. A filled box indicates a ground on the altitude input. This screen is used as an aid in installation troubleshooting.

Pressing the **FUNC** button exits the setup procedure.


**CODE SELECTION**

Pressing the Code Selector/Data Entry Switch once enables Transponder Code entry. The left most code digit will begin flashing. Turning the switch selects the code and pushing the switch again moves to the next digit from left to right. Once code selection has started, all four digits must be set before the code entry is completed. A total of 5 pushes completes the code entry process. If the switch is inadvertently pressed, it will stop the code entry process automatically in 10 seconds. The VFR code can subsequently be recalled automatically by pressing the VFR button. Code entry can not be started if the AT165 is in setup, Count Down Timer set, or Altitude Buffer set modes.

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## BUTTONS FOR ALTERNATE FEATURES

IDENT
Pressing the **IDENT** button will activate the SPIP (Special Position Identification Pulse) signal for approximately 20 seconds. This signal will "paint" an instantly identifiable image on the controller's scope. This signal must only be used upon request of a "Squawk IDENT" from the controller. Use at any other time could interfere with another aircraft sending a SPIP. The IDENT legend will appear in the Code window while the Ident signal is being sent.

VFR
Pressing the **VFR** button will cause the squawk code to either change from the user entered code to a VFR code or change back to the user entered code from the currently displayed VFR code. The last used squawk code is automatically recalled when the unit is cycled off and on.

HOLD
Pressing the **HOLD** button will enter the *Altitude Hold* mode and lock the current altitude as the HOLD altitude. The Altitude display area will now show the altitude difference relative to the HOLD altitude in 100ft increments. The altitude display area will flash if the *Altitude Buffer* value is exceeded. Additionally if the audio alert function has been installed, a warning will be heard. The audio warning will be present only while the unit is in the *Altitude Hold* mode. This is a warning only and is not tied to any navigation systems.

Depressing the **HOLD** button for two seconds or longer will allow the setting of the *Altitude Buffer*. The available range is 200ft to 2500ft. Once set, momentarily pressing **HOLD** again will save this buffer value. The buffer value will be retained when the unit is powered off. This mode must be exited before other functions can be accessed. Once started this mode will be exited when it has been inactive for 10 seconds.

FUNC
Pressing the **FUNC** button cycles the timer display between *Flight Timer*, *Count Up Timer*, and *Count Down Timer*.

Holding the **FUNC** button in for 5 seconds or longer will Flip/Flop the left and right display areas. This function is extremely useful in the unlikely event of an unreadable LCD display. When the unit is turned off it will always restart with the displays in their default locations.

START/STOP
Pressing the **START/STOP** button will independently start or stop the *Count Up* and *Count Down* timers depending on which is currently displayed.

CRSR/CLR
When in *Flight Timer*, depressing the **CRSR/CLR** button for two seconds will reset the *Flight Timer*.
When in *Count Up Timer*, depressing the **CRSR/CLR** button for two seconds will reset the *Count Up Timer*.

When in *Count Down Timer*, with the timer stopped, momentarily pressing the **CRSR/CLR** button once will recall the preset count down time. Momentarily pressing this button again will activate the cursor in the timer window. At this point, changes to the *Count Down Timer* value can be made by using the Code Selector/Data Entry knob.

**TIMER OPERATION**

FLIGHT TIME (Press FUNC until **FLIGHT TIME** is displayed)

```
XXXXXXXXXXXXXX
FLIGHT TIME  00:00:00
```

The Flight Timer starts automatically when the AT165 is powered on. Pressing and holding **CRSR/CLR** for two seconds will reset the Flight Timer to zero.

COUNT UP TIMER (Press FUNC until **COUNT UP** is displayed)

```
XXXXXXXXXXXXXX
COUNT UP      00:00:00
```

If necessary, press and hold **CRSR/CLR** for two seconds to reset the *Count Up Timer* to zero.
Press **START/STOP** to begin counting up.
Press **START/STOP** to pause the *Count Up Timer*.

COUNT DOWN TIMER (Press FUNC until **COUNT DOWN** is displayed)

```
XXXXXXXXXXXXXX
COUNT DOWN  00:00:00
```

Press **CRSR/CLR** once to reload the previous Count Down Time.
Press **CRSR/CLR** a second time to activate the cursor.

Use the Code Selector/Data Entry switch to set the desired Count Down Time pressing the Code Selector/Data Entry switch to complete each digit.
Press **START/STOP** to start the *Count Down Timer*.
Press **START/STOP** to pause the *Count Down Timer*.
When the *Count Down Timer* reaches zero and starts counting up, the *Count Down Timer* display will flash. Additionally if the audio alert function has been installed a warning will be heard. The audio warning will be present after the *Count Down Timer* has reached 00:00:00 and will continue until **START/STOP** and then **CRSR/CLR** have been pressed.

NOTE: The *Count Down Timer* must be stopped before using **CRSR/CLR** to reset or change.

## ALTITUDE DISPLAY

```
┌─────────────────────────┐
│ PRESSURE ALT  08500ft   │
│ XXXXXXXXXXXXXX          │
└─────────────────────────┘
```
Displays the altitude data supplied to the AT165 from the blind altitude encoder.

## ALTITUDE HOLD

### HOLD MODE

```
┌─────────────────────────┐
│ +0100ft  HLD-> 01000ft  │
│  XXXXXXXXXXXXXX         │
└─────────────────────────┘
```
Pressing **HOLD** will capture the Aircraft's current altitude and use it as the reference for the hold function. The altitude display will now show the reference altitude and the deviation from that altitude in 100ft increments. If the deviation exceeds the BUFFER limit, the altitude display will flash.

### BUFFER SETTING

```
┌─────────────────────────┐
│ LIMIT          +-0000ft │
│  XXXXXXXXXXXXXX         │
└─────────────────────────┘
```
Pressing **HOLD** for greater than 2 seconds will allow setting of the *HOLD BUFFER* value. Use the Data Entry switch to set the desired *HOLD BUFFER* value. The *HOLD BUFFER* can be set from 200ft to 2500ft in 100ft steps. When finished, press **HOLD** to save the *HOLD BUFFER* value.