

MST 67A

Pilot's Guide

Honeywell
Mode S Transponder



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Manual MST 67A Pilot's Guide

Revision 0, July 2004

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MODE S CONTROL PANELS



CTA 81A



PS 550



CD 671C



KFS 578A



PS 578A

REMOTE-MOUNTED HARDWARE



**DUAL L-BAND OMNI
DIRECTIONAL
ANTENNAS**



**MST 67A
MODE S
TRANSPONDER**

INTRODUCTION

Your Honeywell transponder is a radio transmitter and receiver which operates on radar frequencies. It receives interrogations from ground radar, airborne radar or TCAS, then returns a coded response of pulses to the interrogating system. The reply can be any one of 4,096 codes, which differ in the position and number of pulses transmitted. By replying to ground transmissions, your MST 67A enables Air Traffic Control (ATC) computers to display aircraft identification, altitude and ground speed on Enroute, Approach or Departure Control radar screens. When IDENT is selected, your aircraft is positively identified to the Air Traffic Controller. The MST 67A also works as part of a TCAS II system.

The MST 67A provides you with optimal Mode S transponder performance and offers all the capabilities needed to operate in the evolving world airspace. The MST 67A incorporates the latest technology, including the Elementary and Enhanced Surveillance functionality and data link capability with full Level 3 compliance.

The MST 67A features a unique Flight ID function that converts the transponder Mode S address (for US registered aircraft only) into the tail number of your aircraft. For most Part 91 operators, this is also your Flight ID, so it's automatically stored in the transponder register, eliminating the need to install and use an additional control head or FMS. This makes compliance with Elementary Surveillance simple and convenient.

The MST 67A provides flexibility by allowing you to choose either diversity or non-diversity installation or to upgrade from non-diversity to diversity to keep up with changing regulations.

The MST 67A can be controlled by a choice of control heads, and the operation of the transponder using each is detailed in Section I.

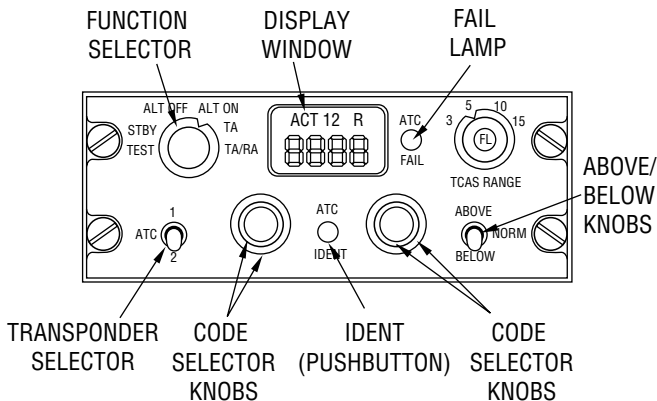
SECTION I: CONTROLS AND DISPLAYS



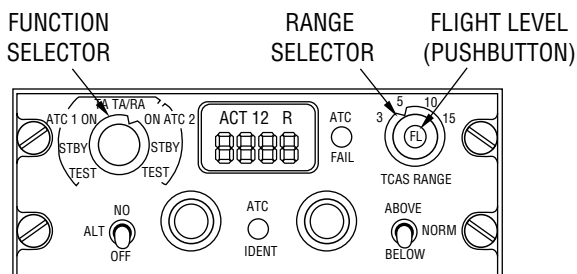
SECTION I DESCRIBES CONTROLS AND DISPLAYS OF THE MST 67A.

Note: If power is removed from the MST 67A, it will reset in the last used condition.

TRANSPONDER CONTROL UNIT; CTA 81A, CTA 81B, CTA 81C, CTA 81D



CTA 81A & D Dual Mode S Control Unit, CTA 81C Single Mode

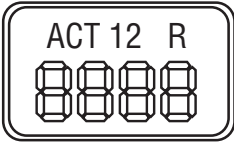


Mode S Control Unit (CTA 81A shown)
CTA 81B Mode S/ATCRBS Control Unit

CTA 81A, CTA 81B CTA 81C AND CTA 81D CONTROLS AND DISPLAYS

The CTA 81 () Control Unit is the control for the transponder. The CTA 81A/D controls two Mode S transponder. The CTA 81B controls one Mode S transponder and one ATCRBS ARINC 572 transponder. The CTA-81C controls one Mode S transponder.

Note: Controls vary depending on CTA 81 () configuration installed. Control functions same as typical unit shown.



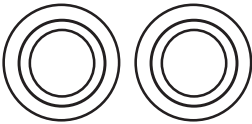
The **Display Window** displays the 4096 ATC code selection and whether transponder No. 1 or No. 2 is active. The letter R blinks on the CTA 81B when indicating the interrogation reply of ATCRBS transponder only.



ATC 1-2 selects the active transponder. The other unit is placed in standby.



ALT ON/OFF turns altitude source ON or OFF.



Concentric knobs select the 4096 ATC code in the display window.

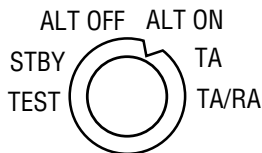


The **ATC FAIL** Lamp indicates failure of the selected transponder.



The **ATC IDENT** pushbutton is used to initiate the IDENT feature for ATC. The IDENT function is used at the request of an Air Traffic Controller, and holds the Ident reply for 18 ± 1 seconds.

(Pushbutton)

**FUNCTION SELECTOR CTA 81A/C/D CONTROL UNIT ONLY
(SELECTS OPERATING MODE)**

Moving the spring loaded knob to TEST position for one second initiates a comprehensive self test lasting approximately eight seconds. Refer to the Test section in the Appendix for a detailed description of test functions.

STBY places Mode S transponder and TCAS system in standby. Use this position during ground operations.

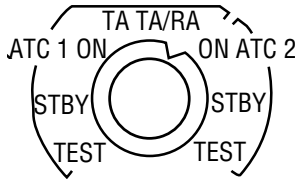
ALT OFF activates Mode S transponder without altitude reporting, TCAS system in standby.

ALT ON activates Mode S transponder with altitude reporting, TCAS system in standby.

TA (Traffic Advisory) mode. N/A

TA/RA (Traffic Advisory and Resolution Advisory) mode. N/A

**FUNCTION SELECTOR CTA 81 B CONTROL UNIT ONLY
(SELECTS OPERATING MODE)**



The left ATC 1 TEST position (CCW) tests the Mode S Transponder. The right ATC 2 TEST position (CW) tests the ATCRBS transponder only.

Moving the spring loaded knob to either TEST position initiates a self test in the respective unit. Refer to the Test section in the Appendix for a detailed description of test function.

Selection of either STBY position places both transponder in standby. Use standby during ground operations.

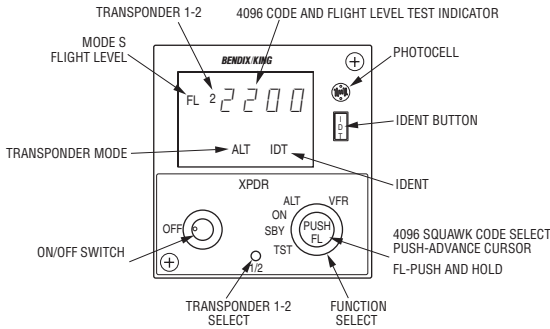
ATC 1 ON activates the Mode S transponder.

ON ATC 2 activates the ATCRBS transponder.

TA (Traffic Advisory) mode. N/A

TA/RA (Traffic Advisory and Resolution Advisory) mode. N/A

KFS 578A TRANSPONDER CONTROL UNIT

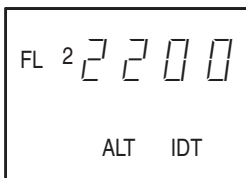


KFS 578A Single or Dual Mode S Control Unit (Dual Unit shown).


KFS 578A CONTROLS AND DISPLAYS

The KFS 578A Control Unit is the master control for the transponder. The KFS 578A will also display the selected 4096 ATC code and current mode of operation in the display window. Versions are available to control one or two transponder. A “Fail” annunciation indicates failure of the selected transponder, antenna or control data.

Note: If the KFS 578A is interfaced to a MST 67A Mode S transponder and the MST 67A senses a failure, a failure annunciation will be shown. A maintenance check should be performed.



The **Display Window** Displays ATC code selection, whether transponder #1 or #2 is active, transponder mode, transponder ident and own aircraft flight level (in TEST).

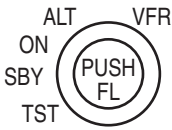

(Pushbutton)

1/2 selects the active transponder. The other unit is placed in standby.


(Pushbutton)

IDT initiates IDENT feature for ATC. The IDENT function is used at the request of an Air Traffic Controller, and holds the Ident reply for 18 ± 1 seconds.

KFS 578A FUNCTION SELECTOR & ATC CODE SELECT



The outer concentric knob on the right selects the transponder mode of operation.

Rotating the function knob (CCW) to the TST position initiates a comprehensive self test lasting approximately eight seconds. All segments of the display are illuminated for 2 seconds, then the code window will display the encoded altitude for four seconds, then the control unit will return to the previously selected mode. (Refer to the Test section in the Appendix for a detailed description of test functions.)

SBY places the Mode S Transponde in standby. SBY is annunciated on the display window. Use SBY during ground operations.

ON activates the selected transponder without altitude reporting. ON is annunciated in the display window.

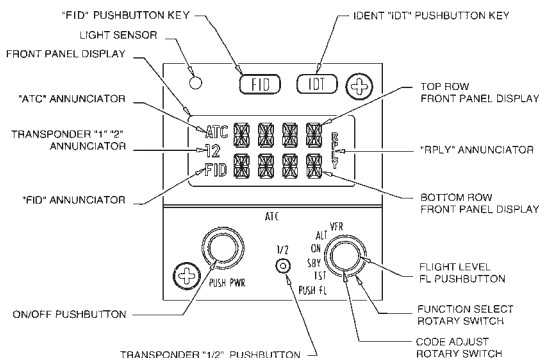
ALT activates Mode S transponder with altitude reporting.

Selecting **VFR** for more than 3 seconds changes the ATC code to the pre-programmed VFR code (Typically 1200). VFR is annunciated in the display window for the 3 seconds prior to switching the programmed code. The control unit will return to the mode selected prior to making the VFR selection.

The VFR code can be programmed to be any code by the following technique:

- a. Place the function selector to VFR.
- b. Select the VFR code as required.
- c. Push the Ident (IDT) button, or wait 3 seconds, or rotate the Function switch to the desired mode.

PS 578A TRANSPONDER CONTROL UNIT

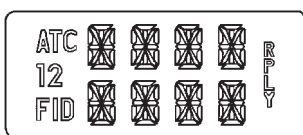


PS 578A Single or Dual Mode S Control Unit (Dual Unit shown).

PS 578A CONTROLS AND DISPLAYS

The PS 578A Control Unit is the master control for the transponder. The PS 578A will also display the selected 4096 ATC code and current mode of operation in the display window. Versions are available to control one or two transponder. A "Fail" annunciation indicates failure of the selected transponder, antenna or control data.

Note: If the PS 578A is interfaced to a MST 67A Mode S transponder and the MST 67A senses a failure, a failure annunciation will be shown. A maintenance check should be performed.



The **Display Window** Displays ATC code selection, Flight ID (FID) selection, whether transponder #1 or #2 is active, transponder mode, transponder ident and own aircraft flight level (in TEST).



(Pushbutton)

1/2 selects the active transponder. The other unit is placed in standby.



(Pushbutton)

IDT initiates IDENT feature for ATC. The IDENT function is used at the request of an Air Traffic Controller, and holds the Ident reply for 18 ± 1 seconds.



(Pushbutton)

FID allows entry of an alphanumeric flight identification. Selecting the right inner pushbutton will cycle through the eight characters to be changed. Rotating the right inner knob will change the contents of the selected (flashing) character.



PUSH PWR

The inner concentric knob on the left includes an on/off switch.

Note: All knobs are continuous rotary and do not roll over or stop.

PS 578A FUNCTION SELECTOR & ATC CODE SELECT



The outer concentric knob on the right selects the transponder mode of operation.

Rotating the function knob (CCW) to the TST position initiates a comprehensive self test lasting approximately eight seconds. All segments of the display are illuminated for 2 seconds, then the code window will display the encoded altitude for four seconds, then the control unit will return to the previously selected mode. (Refer to the Test section in the Appendix for a detailed description of test functions.)

SBY places the Mode S Transponde in standby. SBY is annunciated on the display window. Use SBY during ground operations.

ON activates the selected transponder without altitude reporting. ON is annunciated in the display window.

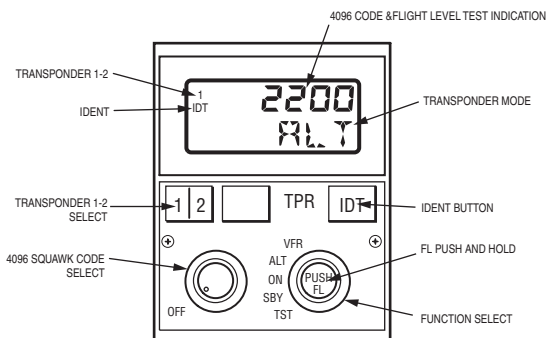
ALT activates Mode S transponder with altitude reporting.

Selecting **VFR** for more than 3 seconds changes the ATC code to the pre-programmed VFR code (Typically 1200). VFR is annunciated in the display window for the 3 seconds prior to switching the programmed code. The control unit will return to the mode selected prior to making the VFR selection.

The VFR code can be programmed to be any code by the following technique:

- Place the function selector to VFR.
- Select the VFR code as required.
- Push the Ident (IDT) button, or wait 3 seconds, or rotate the Function switch to the desired mode.

CD 671C TRANSPONDER CONTROL UNIT



CD 671C Single or Dual Mode S Control Unit (Dual Unit shown).

CD 671C CONTROLS AND DISPLAYS

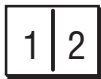
The CD 671C Control Unit is the master control for the transponder. The CD 671C will also display the selected 4096 ATC code and current mode of operation in the display window. Versions are available to control one or two transponder. A "Fail" annunciation indicates failure of the selected transponder, antenna or control data.

Note: If the CD 671A is interfaced to a MST 67A Mode S transponder and the MST 67A senses a failure, a failure annunciation will be shown. A maintenance check should be performed.



The **Display Window** displays the ATC code selection, whether transponder #1 or #2 is active, transponder mode, transponder ident and own aircraft flight level (in TEST)

All display annunciations are seen during the control unit self-test. The "R" annunciation is only seen during self-test. "FL" on the control unit is only displayed during self-test and indicates the transponder's encoded altitude. Continuous FL mode is selected by activating Ext. SBY discrete and turning mode knob to "TST"



The 1/2 push button selects No. 1 or No. 2 as the active transponder. The other unit is placed in standby. The Display Window shows which transponder is the active source.



The IDT push button initiates the IDENT feature for ATC. The IDENT function is used at the request of an Air Traffic Controller, and holds the Ident reply for 18 ± 1 seconds.

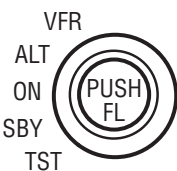


OFF

The inner concentric knob may include an optional ON/OFF switch; clockwise is ON.

CD671A FUNCTION SELECTOR & ATC CODE SELECT

The dual concentric knobs on the right side of the unit are used to select the ATC code and Transponder mode. The outer concentric knob selects the transponder mode of operation. The mode is annunciated in the display window.



TST Rotating the outer function knob (CCW) to the TST position initiates a comprehensive self-test lasting approximately eight seconds. All segments of the display are illuminated for 2 seconds, then the code window will display the encoded altitude for four seconds, then the control unit will return to the previously selected mode.

SBY places the Mode S Transponder in standby. SBY is annunciated in the display window. Use standby during ground operations.

ON activates the selected transponder without altitude reporting. ON is annunciated in the display window.

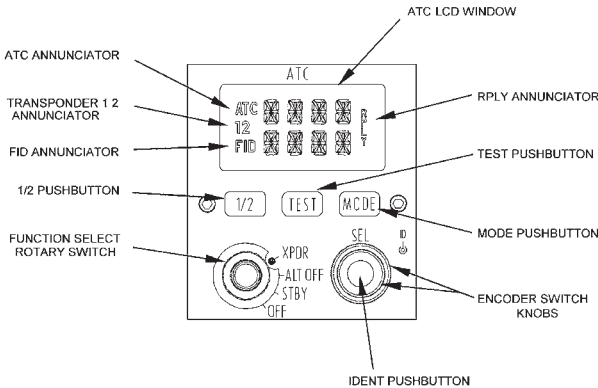
ALT Activates Mode S transponder with altitude reporting.

VFR Selecting VFR for more than 3 seconds changes the ATC code to the pre-programmed VFR code (typically 1200). VFR is annunciated in the display window for the 3 seconds before switching to the programmed code. The control unit will return to the mode selected prior to making the VFR selection. The VFR code can be programmed to any code by the following technique:

1. Place the function selector to VFR.
2. Select the VFR code as required.
3. Push the Ident (IDT) button, or wait 3 seconds, or rotate the Function switch to the desired mode.

The inner concentric knob on the right selects the 4096 ATC code . To select an ATC code, momentarily push this knob to start the left hand digit in the ATC code flashing, twist the knob to change the number. Momentarily push the knob again to move the flashing digit one space to the right and twist the knob to change the digit. Repeat for the third and fourth digit of the ATC code. The flashing digit will stop flashing 3 seconds after the last change.

PS 550 TRANSPONDER CONTROL UNIT

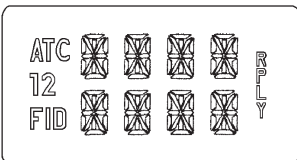


PS 550 Single or Dual Mode S Control Unit (Dual Unit shown).

PS 550 CONTROLS AND DISPLAYS

The PS 550 Control Unit is the master control for the transponder. The PS 550 will also display the selected 4096 ATC code and current mode of operation in the display window. Versions are available to control one or two transponder. A “Fail” annunciation indicates failure of the selected transponder, antenna or control data.

Note: If the PS 550 is interfaced to a MST 67A Mode S transponder and the MST 67A senses a failure, a failure annunciation will be shown. A maintenance check should be performed.



The **Display Window** displays the ATC code selection, whether transponder #1 or #2 is active, transponder mode, transponder ident and own aircraft flight level (in TEST).

All display annunciations are seen during the control unit self-test.



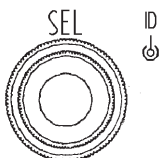
The 1/2 push button selects No. 1 or No. 2 as the active transponder. The other unit is placed in standby. The Display Window shows which transponder is the active source.



The TST push button initiates a comprehensive self-test lasting approximately eight seconds. All segments of the display are illuminated for 2 seconds, then the code window will display the encoded altitude for four seconds.



The MODE push button sequentially selects the ATC, FL mode, FID and ADC.



ATC Mode - Allows entry of the four digit ATC code.

Honeywell MST 67A configuration: The right outer knob selects each of the four positions for entry, and the right inner knob selects the content.

Collins TDR-94D configuration: The right outer knob enters the first two digits and the right inner knob enters the last two digits.

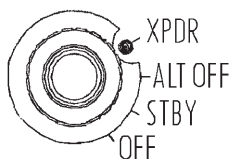
FID Mode - Allows entry of the eight digit alphanumeric flight ID code. The right outer knob selects each of the eight positions for entry, and the right inner knob selects the alphanumeric character.

ADC Mode - Allows selection of the air data computer used.



The ID push button in the center of the Code Selector knob initiates the IDENT feature for ATC. The IDENT function is used at the request of an Air Traffic Controller, and holds the Ident reply for 18 ± 1 seconds.

PS 550 FUNCTION SELECTOR



The dual concentric knobs on the left side of the unit are used to select the Transponder mode. The outer concentric knob selects the transponder mode of operation. The mode is annunciated in the display window.

STBY places the Mode S Transponder in standby. SBY is annunciated in the display window. Use standby during ground operations.

Controls and Displays

ALT OFF activates the selected transponder without altitude reporting. ON is annunciated in the display window.

XPDR Activates Mode S transponder with altitude reporting.

SECTION II: SYSTEM CONSIDERATIONS

SECTION II EXPLAINS CONSIDERATIONS OF THE SYSTEM; WARNINGS AND LIMITATION, CAUTIONS AND NOTES.

WARNINGS AND LIMITATIONS

Refer to the Aircraft Flight Manual for the specific operational features of the transponder installation.

CAUTIONS

None

NOTES

The MST 67A requires the availability of a suitable encoding altimeter providing altitude input in order to report altitude.

Some enhanced functionality of the MST 67A is configured at the airplane level and is not configurable by the pilot. Refer to the MST 67A Installation Manual and the Aircraft Flight Manual for details.

SECTION III: APPENDIX

THE APPENDIX INCLUDES THE TEST FUNCTION, A GLOSSARY OF TERMS AND RECOMMENDATIONS FOR POST FLIGHT REPORTS.

FUNCTIONAL AND AUTOMATIC SELF TEST

The Mode S transponder Functional Test determines the operational status of the entire system. The test is initiated by rotating the function selector knob on the Transponder Control Panel to the TEST position.

Thereafter, the test continues automatically for a period of approximately eight seconds. During the test the transponder function is inhibited. When the knob is held for longer than eight seconds the system remains in test until it is released.

CTA 81B CLOCKWISE TEST POSITION

The CTA 81B function selector is moved to the right hand test position (switch fully clockwise) to test the ATRBS transponder. During the test, segments of the Transponder Control Unit display window and the ATC Fail lamp illuminate.

POST FLIGHT REPORTS

If a failure of the system has occurred, give Maintenance as much specific information about the problem as possible. Avoid phrases such as "Transponder Inop."

Provide information in terms of fault lights lit, audio announcements, test pattern discrepancies and screen annunciations that indicate which unit was observed to have failed.

GLOSSARY OF TERMS***ABBREVIATIONS AND DEFINITIONS***

AFMS	Airplane Flight Manual Supplement
AGL	Above Ground Level
ATC	Air Traffic Control. A federally operated ground based system that manages aircraft traffic flow.
ATCRBS	ATC Radar Beacon System. A ground based secondary radar and airborne transponder system used to monitor traffic.
Absolute Altitude	Altitude above Mean Sea Level (MSL). See Pressure Altitude.
BITE	Built-In Test Equipment. A feature that continuously monitors itself for operational errors.
FID	Flight Identification
IDENT	SPI pulse added to Mode A replies as method for ground to identify transponder. SPI info bit is set in Mode S and reported in the Mode S replies.
Indicated Altitude	Altitude shown on the altimeter with barometric correction setting set to local sea level pressure. Used by the crew below 18,000 feet.
LRU	Line Replaceable Unit. A self-contained avionics component that can be replaced in the field.

ABBREVIATIONS AND DEFINITIONS (CONT'D)

Mode A Transponder	ATCRBS transponder that replies to ATC interrogations sending identification code but without giving altitude data.
Mode C Transponder	ATCRBS transponder that replies to ATC interrogations giving identification code or encoded altitude data.
Mode S Transponder	Transponder that replies to ATC interrogations giving an ATCRBS identification code, encoded altitude and other data fields including aircraft discrete address.
Pressure Altitude	Indicated altitude when barometric pressure is set to 29.92" Hg. (1013mb).
Rad Alt	Radio Altitude.
Self Test	A functional test that determines equipment status. Self test differs from BITE performance monitoring because it is initiated by the crew and is not performed continually or automatically.

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