S-TEC

Autopilot Selection Guide

COBHAM

TABLE OF CONTENTS

How To Use This Selection Guide

1. The information which follows will introduce you to the S-TEC autopilot product line allowing you to choose the autopilot system which is best for you and your aircraft.
2. Review the S-TEC autopilot systems Meggitt / S-TEC offers for the features and functions you want. We have also included *non-installed* Manufacturer's Suggested Retail Prices so you can make the value judgements required in deciding which system to install. *(Note: Unless otherwise noted, prices do not include installation kits.)*
3. Review the specific differences between the autopilots which fit your functional requirements, including the packaging variations which impact your instrument panel requirements.
4. Once you have selected an autopilot, the next step is to contact a Meggitt / S-TEC dealer to get a quotation for an installed price which will include the installation kit.

Rate Based vs. Attitude Based Autopilots

In General Aviation singles, light twins, and turboprops, rate systems have a number of significant advantages over attitude systems that rely on artificial horizons for roll and pitch reference.

Safety – The electric turn coordinator rate gyro does not depend upon the aircraft vacuum system or attitude gyro. If either the vacuum system or attitude gyro fails, or its performance is degraded, the turn coordinator and the autopilot are completely unaffected. A Rate Gyro will not tumble due to unusual attitudes. For this reason, pilots are instructed to *use the Turn & Bank or Turn Coordinator* instrument to level the wings during recoveries from an unusual attitude.

Reliability - Rate gyros are inherently very reliable. An S-TEC autopilot turn coordinator rotor spins at about 1/3rd the speed of the rotor in an attitude gyro and therefore has a much longer MTBF, over 8000 hrs. Reliability is not always measured by total failure. Gyros often suffer performance degradation over a period of time due to bearing wear. Bearing wear in an attitude gyro causes precession which is reflected in the performance of the autopilot. Rate gyros continue to function with worn bearings to a high level of performance until the spin motor fails. The S-TEC pitch axis rate sensor, an accelerometer, has an MTBF of greater than 20,000 hrs.

Performance - Because they do not tumble, rate gyros will function in any attitude and are not damaged or worn excessively by unusual attitudes. In addition, since a consistent turn rate requires a lower bank angle at lower airspeeds, rate autopilots often provide better aircraft turn control at low airspeed.

The S-TEC Autopilot *Building Block* Design Philosophy

All S-TEC autopilot systems use hardware, servos, and sensors common throughout the product line. This commonality gives the aircraft owner significant advantages in serviceability, reliability, and overall cost. It is also the foundation of the S-TEC Upgrade/Trade-In program that gives an autopilot buyer the option of buying a system today and upgrading it to a system with more features and functions later.

The S-TEC Autopilot Packaging Philosophy **(how they fit in the instrument panel)**

Meggitt / S-TEC is the industry leader in General Aviation autopilots. We have become the leader because we work very hard responding to the needs of the aircraft owner. In all aircraft, old or new, the panel space required for the autopilot is a consideration in an avionics upgrade. That's precisely the reason we offer systems with similar features and functionality in more than one configuration. As you study this Selection Guide you'll be able to choose the autopilot features and functions you want in the configuration that best meets your panel layout requirements.

Installation of S-TEC Autopilots

Autopilots are unique in aviation electronics since proper installation requires the expertise of both an electronics technician and an airframe mechanic. The systems must be integrated into the avionics package as well as with the primary flight controls of the airplane.

For these reasons, trained Meggitt / S-TEC Authorized Dealers must install S-TEC autopilots. The Meggitt / S-TEC Warranty is valid only if this policy is followed. The only exception to this is installation in an experimental airplane.

Glossary of Terms

3-Axis Autopilot - this phrase is often misused in talking about autopilot capabilities. Some use it to mean "roll, heading hold and altitude hold." Since the first two functions are both roll axis functions and altitude hold is a pitch function, most autopilots are 2 axis systems. An S-TEC 3-axis autopilot will control the flight of the aircraft in roll, pitch and yaw. *(This definition is not intended to address the autopilot requirements in FAR 135.105(c)1)*

Control Wheel Steering – a feature found only on the System Fifty Five X. This feature allows the pilot to interrupt the autopilot flight by pressing and holding a CWS switch on the control wheel and then manually placing the aircraft in a specific rate of turn and vertical speed. Release of the button reengages the autopilot to the rate of turn and vertical speed set by the pilot.

Course Deviation Warning – an annunciation given to alert the pilot that there is significant deviation in the course tracking. This is especially valuable during approach tracking.

Dual Mode Intercept – this function allows the pilot to follow the ATC controller's instruction "fly heading 060° until intercepting the localizer, then cleared for the approach." By simultaneously pressing both the "HDG" and the "NAV" buttons with both lighting up, the autopilot will fly the "HDG" bug until the "NAV" needle begins to center. At that time the "HDG" Annunciator will extinguish and the autopilot will complete the intercept and track. Intercept angles other than the standard 45° are selectable. Dual mode intercept is also available in "REV" navigation mode.

Gain – the variable signal strength from the autopilot computer to the servos for different autopilot functions. We use a higher gain, and therefore more authority over the servos, during the more aggressive localizer tracking than the gain used when flying "NAV" enroute.

GPSS by S-TEC **–** The GPS Steering function is optional for all S-TEC autopilots and dramatically improves enroute and approach GPS navigation tracking. Normal NAV tracking uses heading data and course deviation shown as CDI or HSI needle deflection. GPSS by S-TEC flies the roll steering commands output by many of the newer GPS Navigators. Theoretically, the GPS computer always knows where it is located and, based on the flight plan programmed by the pilot, where it is going. The GPS computer processes this information into right and left steering commands. These are then sent to the autopilot that flies the airplane in response to these commands navigating the GPS course very accurately. Currently, some GPS navigators have roll steering capability for enroute flight and limited approach transition procedures. As GPS database inventories grow to include full approach procedures, the GPSS by S-TEC will be ready to fly them.

Tracker vs. Coupler - S-TEC autopilots have **trackers** or **couplers**. The essential difference is the ability to calculate and fly the intercept of an enroute or approach navigation signal. A tracker does not have the ability to fly an intercept. In order to operate a tracker the pilot must hand fly the airplane, or use the heading bug on the DG, to a point on the navigation course where the CDI indication is centered and the aircraft is flying in the direction of the navigation course. At that point the tracker can be engaged to track the course. In the systems equipped with couplers which require a heading system, the autopilot will calculate the intercept angle, then fly the aircraft to execute the intercept turn, couple and fly the navigation course.

Features & Functions Spreadsheet	System Twenty	System Thirty	System Thirty ALT	System Forty	System Fifty	System Fifty Five X	System Sixty - one	System Sixty - two	System Sixty Five	System Sixty PSS
ROLL FEATURES AND FUNCTIONS										
Turn Coordinator				s	s	s	s	s	s	
Turn Coordinator/Roll Computer	s	s								
Turn Command Knob	s	s		s	s					
Heading Select & Hold (requires heading system)	s	s		s	s	s	s	s	s	
Navigation / Approach Tracker (track only)	s	s		s	s					
Navigation / Approach Tracker (intercept and track)						s	s	s	s	
Backcourse Mode				s	s	s	s	s	s	
Dual Mode Interecept HDG / NAV						s	s	s	s	
Course Deviation / NAV Flag Warning						s	s	s	s	
Navigation / Approach Gain Select	s	s		s	s					
Navigation / Approach Gain Automatic						s	s	s	s	
GPSS						s				
PITCH FEATURES AND FUNCTIONS										
Altitude Hold		s	s		s	s		s	s	s
Altitude Trim						s		s	s	s
Trim Annunciation		s	s		s	s		s	s	s
Vertical Speed Command						s		s	s	s
Digital Vertical Speed Select						s				
Glideslope Coupler						s		s	s	s
Automatic Electric Trim (where STC'd)									s	
OTHER FEATURES AND FUNCTIONS										
Turn Coordinator / Mode Selector	s	s								
3 ATI Panel Mounted Mode Selector				s	s		s	s		
Radio Stack Mounted Mode Selector / Computer						s				
Pedestal Mount Mode Selector									s	
Control Whell Steering						s				
Remote Computer		s	s				s	s	s	s
Remote Annunciator									s	
OPTIONS										
ST-360 Altitude Selector / Alerter						o		o	o	o
SA-200 Altitude Pre-Selector						o*				
Control Wheel Mode Select	o	o	o		o					
Remote Annunciator						o			s	
Automatic Electric Trim (where STC'd)						o		o	s	o
Manual Electric Trim (where STC'd)	o	o	o	o	o	o	o	o		o
Yaw Damper (where STC'd)	o	o	o	o	o	o	o	o	o	o
GPSS Converter	o	o		o	o		o	o	o	

s = standard *o = optional*

**S/N Limitations. Contact Product Support for Effectivity.*

SINGLE AXIS AUTOPILOTS - Roll

UNIT	FEATURES AND FUNCTIONS	WEIGHT* (lbs)	(kg)

SYSTEM 20

5.1 2.3

Lighted 3” Turn Coordinator / Roll Axis Computer
Turn Command in "ST" Stabilizer Mode
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
Low and High Gain VOR/LOC/GPS Tracking

AVAILABLE OPTIONS

- Control Wheel Mode Selection
- Manual Electric Trim
- GPSS Roll Steering Converter

SYSTEM 40

7.1 3.2

Lighted 3” Turn Coordinator
3 ATI Panel Mounted
Turn Command in "STB" Stabilizer Mode
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
VOR/LOC/REV/GPS Tracking

AVAILABLE OPTIONS

- Manual Electric Trim
- GPSS Roll Steering Converter

SYSTEM 60-1

13.2 6.0

Lighted 3” Turn Coordinator
3 ATI Panel Mounted Programmer - Remote Computer
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
Course Intercept Capability
- NAV Mode
- Dual Mode - Heading/NAV

VOR/LOC/REV/GPS Coupling with 3 Gain Levels
VOR/LOC/REV/GPS Course Deviation and
- NAV Flag Warning

AVAILABLE OPTIONS

- Manual Electric Trim
- GPSS Roll Steering Converter

*Notes: * Weight shown is the total of system major components. The weight of installation hardware and wiring harness are not included. System images not to scale.*

SINGLE AXIS AUTOPILOTS - Pitch

UNIT	FEATURES AND FUNCTIONS	WEIGHT* (lbs)	WEIGHT* (kg)
	**SYSTEM 30 ALT** Stand Alone or Add On to Existing Roll Axis Autopilot Panel Mounted Selector Switch - Remote Computer Altitude Hold Only Pitch Trim Annunciation **AVAILABLE OPTIONS** Control Wheel Engage / Disengage Manual Electric Trim	4.0	1.8
	**SYSTEM 60 PSS** Pitch Stabilization System Stand Alone or Add On to Existing Roll Axis Autopilot Panel Mounted Programmer - Remote Computer Altitude Hold GS Coupling Vertical Speed Command Pitch Trim Annunciation **AVAILABLE OPTIONS** Automatic Electric Pitch Trim Altitude Selector/Alerter	7.3	3.3

YAW DAMPER

UNIT	FEATURES AND FUNCTIONS	WEIGHT* (lbs)	WEIGHT* (kg)
	**YAW DAMPER** Panel Mounted ON / OFF Switch Rudder Trim Control Remote Mounted Sensor / Amplifier Automatic ON / OFF Mode Integrated with Roll & Pitch Autopilot	3.8	1.7

*Notes: * Weight shown is the total of system major components. The weight of installation hardware and wiring harness are not included. System images not to scale.*

PRIMARY TWO AXIS AUTOPILOTS - Roll & Pitch

UNIT	FEATURES AND FUNCTIONS	WEIGHT* (lbs)	(kg)

SYSTEM 30

9.1 4.1

Lighted 3” Turn Coordinator / Roll Axis Computer
Remote Pitch Axis Computer
Turn Command in "ST" Stabilizer Mode
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
Altitude Hold with Remote Engage / Disengage
Low and High Gain VOR/LOC/GPS Tracking
Pitch Trim Annunciation

AVAILABLE OPTIONS

- Control Wheel Mode Selection
- Manual Electric Trim
- GPSS Roll Steering Converter

SYSTEM 50

10.0 4.5

Lighted 3” Turn Coordinator
3 ATI Panel Mounted
Turn Command in "STB" Stabilizer Mode
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
Altitude Hold
VOR/LOC/REV/GPS Tracking
Pitch Trim Annunciation
Automatic Self Test

AVAILABLE OPTIONS

- Control Wheel Altitude Engage / Disengage
- Manual Electric Trim
- GPSS Roll Steering Converter

*Notes: * Weight shown is the total of system major components. The weight of installation hardware and wiring harness are not included. System images not to scale.*

FULL FUNCTION TWO AXIS AUTOPILOTS - Roll & Pitch

UNIT	FEATURES AND FUNCTIONS	WEIGHT* (lbs)	(kg)

SYSTEM 55X

14.2 6.5

Lighted 3” Turn Coordinator
Avionics Stack Mounted
Control Wheel Steering
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
Altitude Hold with Altitude Trim
Course Intercept Capability
- NAV Mode
- Dual Mode - HDG/NAV or HDG/APR

VOR/LOC/GS/REV/GPS Coupling with 3 Gain Levels
VOR/LOC/GS/REV/GPS Course Deviation and
- NAV Flag Warning

Digital Vertical Speed Command
Pitch Trim Annunciation
GPSS Roll Steering Mode
Flight Director Compatible

AVAILABLE OPTIONS
- Remote Mode Annunciator
- Automatic Electric Pitch Trim
- Altitude Selector/Alerter

SYSTEM 60-2

19.5 8.9

Lighted 3” Turn Coordinator
3 ATI Panel Mounted Programmer
Remote Roll and Pitch Computers
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
Altitude Hold with Altitude Trim
Course Intercept Capability
- NAV Mode
- Dual Mode - HDG/NAV or HDG/APR

VOR/LOC/GS/REV/GPS Coupling with 3 Gain Levels
VOR/LOC/GS/REV/GPS Course Deviation and
- NAV Flag Warning

Vertical Speed Command
Pitch Trim Annunciation
Flight Director Compatible

AVAILABLE OPTIONS
- Automatic Electric Pitch Trim
- Altitude Selector/Alerter
- GPSS Roll Steering Converter

*Notes: * Weight shown is the total of system major components. The weight of installation hardware and wiring harness are not included. System images not to scale.*

FULL FUNCTION TWO AXIS AUTOPILOTS - Roll & Pitch

UNIT	FEATURES AND FUNCTIONS	WEIGHT* (lbs)	(kg)

SYSTEM 65

15.8 7.2

Lighted 3" Turn Coordinator
Pedestal or Panel Mounted Programmer
Remote Roll and Pitch Computers
Panel Mounted Remote Annunciator
HDG Preselect & Hold **(HDG SYSTEM NOT INCLUDED)**
Altitude Hold with Altitude Trim
Course Intercept Capability
- NAV Mode
- Dual Mode - HDG/NAV or HDG/APR

VOR/LOC/GS/REV/GPS Coupling with 3 Gain Levels
VOR/LOC/GS/REV/GPS Course Deviation and
- NAV Flag Warning

Vertical Speed Command
Pitch Trim Annunciation
Automatic Pitch Trim
Flight Director Compatible

AVAILABLE OPTIONS
- Altitude Selector/Alerter
- GPSS Roll Steering Converter

*Notes: * Weight shown is the total of system major components. The weight of installation hardware and wiring harness are not included. System images not to scale.*

GPSS ROLL STEERING CONVERTER

UNIT	FEATURES AND FUNCTIONS	WEIGHT* (lbs)	(kg)
	**GPSS CONVERTER** **ST-901 GPSS ROLL STEERING CONVERTER** Available to convert all S-TEC autopilots without integral ***GPSS*** to ***GPSS*** Steering. Converts the heading channel of the autopilot to the ***GPSS*** Channel for roll steering capability. **(REQUIRES A GPS NAVIGATOR WITH COMPATIBLE ROLL STEERING SIGNALS)**	0.3	0.14

UPGRADE KITS

UNIT	FEATURES AND FUNCTIONS
Mod Kit Thirty	Contains all necessary components, hardware, and cables to upgrade a single axis System Twenty to a two-axis System Thirty.
Mod Kit 50	Contains all necessary components, hardware, and cables to upgrade a single axis System 40 to a two-axis System 50. Includes factory upgrade of System 40 programmer.
Mod Kit 60-1	Contains all necessary components, hardware, and cables to upgrade a System 60 PSS to a two-axis System 60-2. Includes factory exchange of programmer at no charge.
Mod Kit 60-2	Contains all necessary components, hardware, and cables to upgrade a single axis System 60-1 to a two-axis System 60-2. Includes factory upgrade of System 60-1 programmer.
Mod Kit Autotrim	Contains all necessary components, hardware, and cables to upgrade an S-TEC Manual Electric Trim System to Autotrim. Autotrim upgrades are only available for System 55/FiftyFiveX, 60-2, and 60PSS autopilots. Note: Autotrim is not STC'd on all aircraft models.

*Notes: * Weight shown is the total of system major components. The weight of installation hardware and wiring harness are not included. System images not to scale.*

OPTIONAL EQUIPMENT

UNIT	DESCRIPTION	WEIGHT* (lbs)	(kg)
	ST-670 SINGLE CUE FD INTERFACE For use with the System 60-2 & System 65 when interfaced with one of the following FD: P/N 01180 - King KI 256 or EFIS 40/50 P/N 01180-1 - Collins 329B-7R	1.3	0.6
	**SA-200 ALTITUDE PRE-SELECTOR (LCD) SYSTEM** Available on select models of System Fifty Five X autopilots. Contact Customer or Product Support for compatibility information. Includes Altitude Pre-Selector and encoding altimeter indicator.	3.2	1.5
	**ST-360 ALTITUDE SELECTOR/ALERTER (LCD) SYSTEM** ** Available on System Fifty Five X, 60-2, 60 PSS, and 65.		
	**AUTOMATIC ELECTRIC TRIM** Available where approved for System Fifty Five X, 60-2 and 60 PSS. (Check STC listings). **MANUAL ELECTRIC TRIM** Available where approved for System Twenty, Thirty, 40, 50, 60-1, 60-2, and 60 PSS, Also available without autopilot. (Check STC listings).		
	ST-500 HDG/CRS AC to DC CONVERTER		
	**ST-645 REMOTE LCD ANNUNCIATOR for SYSTEM FIFTY FIVE X** P/N 01188 Non FD (Optional) P/N 01188-1 Required with ST-361 S-TEC FD P/N 01188-2 Required with King KI 256 FD		

*Notes: * Weight shown is the total of system major components. The weight of installation hardware and wiring harness are not included.*
*** This system requires an operating transponder & encoding altimeter or blind encoder.*
System images not to scale.

A guide to purchasing your S-TEC autopilot.

Our STC Directory and Dealer List is on our website: www.s-tec.com

STEP ONE: ***Identifying installer, defining need and making a selection.***

Yes	No	
☐	☐	Have you identified an authorized S-TEC dealer for purchase and installation of your autopilot?
☐	☐	Have you requested references of recent installations by this dealer?
☐	☐	Have you visited with recent customers about their experience with the dealer?
☐	☐	Has your selected dealer inspected your aircraft?
☐	☐	Have you and the dealer discussed your ***normal*** flight profile?
☐	☐	Have you defined what functions you expect from your autopilot?
☐	☐	Have you and the dealer determined which products are FAA / STC approved for your aircraft?
☐	☐	Have you and the dealer discussed the functionality of each S-TEC autopilot system?
☐	☐	Have you and the dealer discussed the functionality of available options for each system?
☐	☐	Have you and the dealer considered your panel layout and space constraints?
☐	☐	Have you and the dealer discussed the interface requirements of the autopilot and options to your current or proposed avionics and flight instruments?
☐	☐	Have you made a selection from the STC approved S-TEC autopilots and options?

STEP TWO: ***Preparing for the installation.***

Yes	No	
☐	☐	Have you received a quote for the purchase and installation?
☐	☐	Have you discussed any scheduling issues and notified the dealer of any potential schedule issues? i.e. Business trips which much be completed.
☐	☐	Have you planned / budgeted for installation delays or equipment interface issues?
☐	☐	If the dealer identified any previous STC modifications which might affect the autopilot installation or autopilot performance, has it been resolved?
☐	☐	Has your aircraft been mechanically inspected to verify control system rigging, cable tensions, control system friction, static system integrity, etc?

When all the answers are Yes, you're ready, congratulations!

STEP THREE: ***Placing your order with your selected dealer***

Yes	No	
☐	☐	Have you called your dealer and placed an order for your new S-TEC autopilot?

If you need assistance with answers to any of these questions feel free to contact us at:
S-TEC Customer Support *@ 1-800-USA-STEC (872-7832)*

Contact your nearest dealer for STC approvals

In order to satisfy S-TEC's policy of continual product improvement, specifications and design may be changed without notice.

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