

# PILOT'S GUIDE



## Meet **SAM**<sup>®</sup>

MD302 Standby Attitude Module



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Congratulations on selecting one of the newest and most advanced aviation products. The design team at Mid-Continent Instruments and Avionics has incorporated over five decades of experience to bring you unparalleled reliability and value in aviation. We are proud to offer you the finest standby indicator in its class — SAM® — the MD302 Standby Attitude Module.

SAM is the industry's first digital standby instrument to provide attitude, altitude, airspeed, slip, vertical trend, and heading information in an advanced, 2-inch format. The compact design and selectable orientation (horizontal and vertical) ensures a perfect fit within any panel. The self-contained, rechargeable, emergency battery offers pilots an increased level of safety. All backed by Mid-Continent's world-class reputation for high quality and responsive service.

**J. Todd Winter**

*President and CEO*

Mid-Continent Instruments and Avionics

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# FORWARD

This manual contains information regarding the use and interpretation of information presented to the pilot and crew during normal and emergency operation of SAM — the MD302 Standby Attitude Module. Operational instructions are intended for persons who operate aircraft in accordance with applicable Federal Aviation Regulations (Title 14 CFR).

We welcome your comments concerning our product and this manual. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph or image number and page number.

Please e-mail or send comments and technical questions to:

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## **IMPORTANT:**

Read this entire guide prior to operating SAM – the MD302 Standby Attitude Module – in flight.

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SAM is designed for simple and intuitive operation. The User Interface provides quick interpretation of the flight information displayed.

The central Control Knob can be located at the bottom-center, middle-left or middle-right of the unit bezel depending on the installation orientation. This is the only user interface device on the unit.

### **The Control Knob has two functions: Push and Turn.**

The Control Knob provides 16-detents per revolution and typically changes the information it is controlling on the display one unit per detent or click.

The Push function is used to select the highlighted option in a menu or to enter and exit menus and control functions. The Push function can also perform certain operations with a push-and-hold action.

## PRE-FLIGHT MODE

In Pre-flight Mode, power is applied to the unit and the Introduction Screen appears during startup (Image 1).

During Pre-flight Mode, the Introduction Screen will be displayed while the unit conducts an initial Power-up Built-in Test (PBIT) of the system to validate operational readiness. This includes, among others, a battery capacity measurement, an internal test to verify software and memory, and confirmation that the internal settings and identification of the unit match the Configuration Module installed in the aircraft cable harness.

The Introduction Screen will be displayed for approximately five seconds and will transition to Flight Mode when complete.

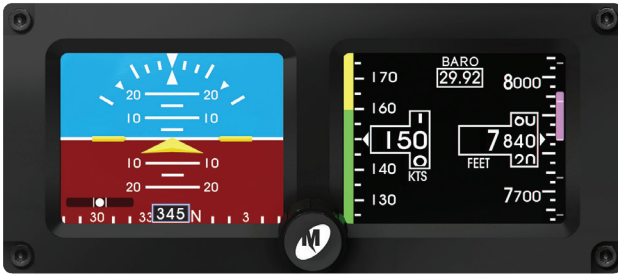
Image 1



**PRE-FLIGHT MODE  
INTRODUCTION SCREEN**

# FLIGHT MODE

Image 2



**FLIGHT MODE  
HORIZONTAL ORIENTATION**

Image 3



**FLIGHT MODE  
VERTICAL ORIENTATION**

In Flight Mode, the unit operates normally by displaying six functions:

Attitude, Altitude, Airspeed, Slip, Vertical Trend, and Heading Information (Images 2, 3).

The Attitude Indicator portion of the display (Image 4) will always appear on the top display when oriented vertically and can be configured to appear on the right or left display when oriented horizontally.

**The Attitude Indicator consists of seven parts: Horizon Line, Sky (blue), Ground (brown), Symbolic Airplane, Roll Scale, Pitch Scale and Slip Indicator.**

The Symbolic Airplane will always remain in the center of the display, with the background elements moving behind it to represent the aircraft's position relative to the horizon. The symbol that represents the airplane can be selected during Flight Mode using the Options Menu (see Options Menu, page 21).

The Roll Scale is depicted as an arc of graduations representing bank angles of 0° (triangle), 10°, 20°, 30°, 45° (small triangle) and 60°. The Roll Scale can be configured during installation to be fixed to the sky/horizon or fixed to the top of the display. The unit is operable and usable in a continuous and unlimited roll range of 360°+.

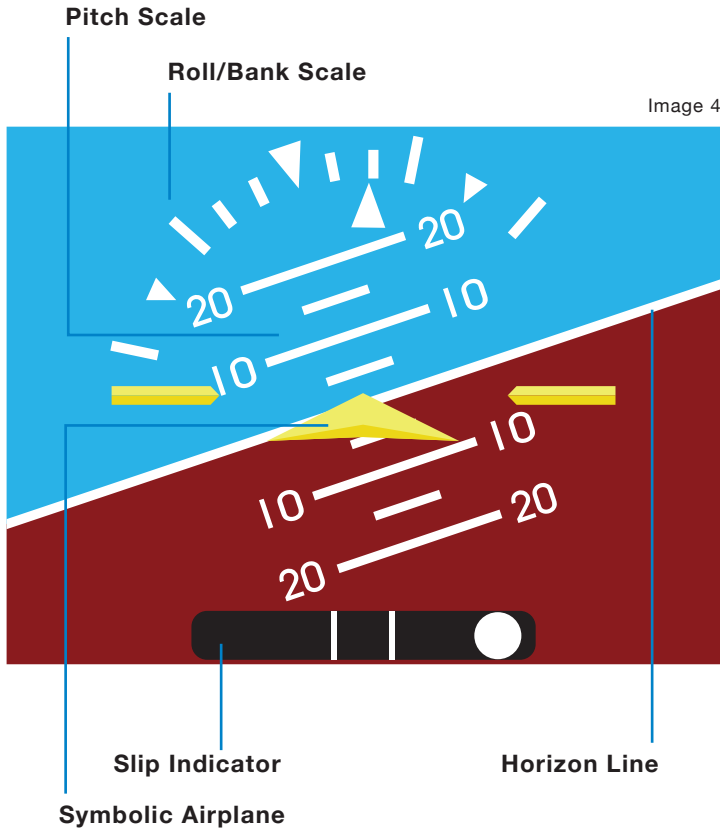
**CAUTION: The roll configuration must be set to match other attitude indicators in your panel.**

The Roll Pointer is the triangle just below the Roll Scale and represents the aircraft in relation to its bank angle. It is configured, by definition, to operate conversely to the Roll Scale behavior. That is, a rotating Roll Scale produces a fixed Roll Pointer and a fixed Roll Scale produces a rotating Roll Pointer.



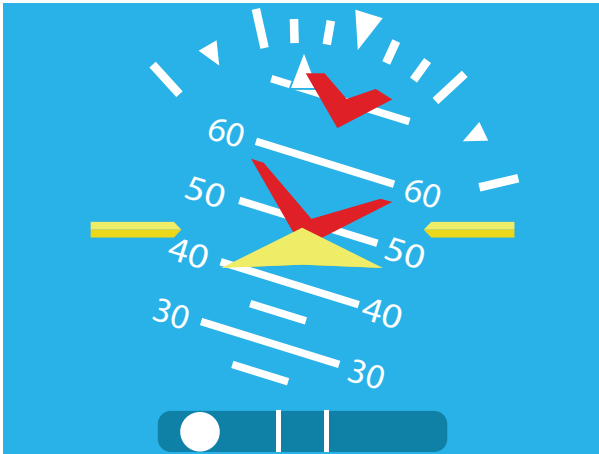
The Pitch Scale is depicted as a series of graduations representing pitch angles every 5°, with every 10° graduation being wider and numbered. The unit is operable and usable in a continuous and unlimited pitch range of 360°+.

**ATTITUDE OPERATION**



A series of chevrons (^) will appear overlaid on the Pitch Scale at attitudes greater than  $\pm 45^\circ$ . This is to indicate to the pilot the direction of the horizon for quick reference when in an unusual pitch attitude (Image 5). The chevrons always point toward the horizon line.

Image 5



### ATTITUDE OPERATION

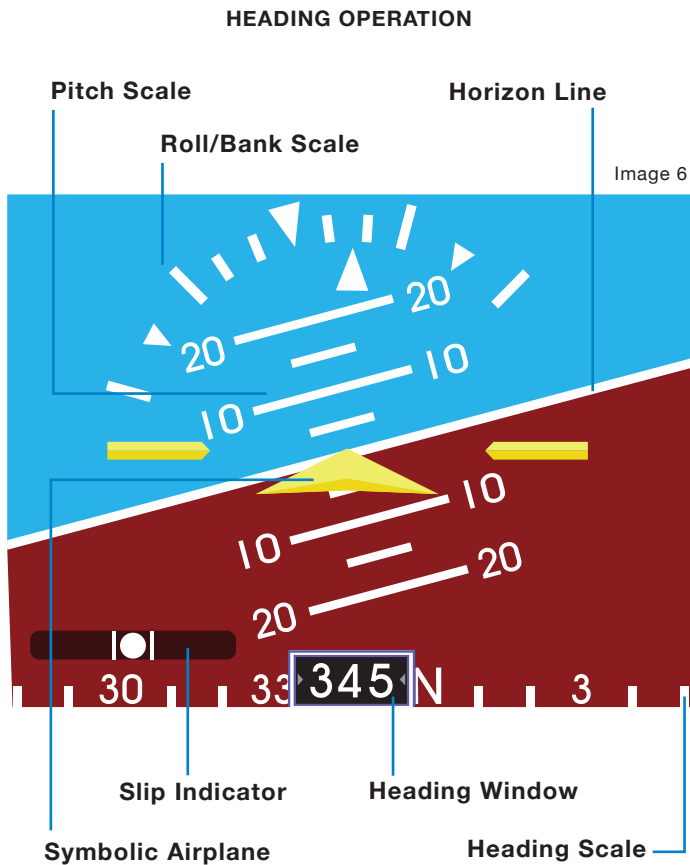
**This image demonstrates 50° pitch up and 18° left turn. Red chevrons point to the horizon line.**

The Slip Indicator portion of the display will appear at the bottom of the Attitude Display (Image 5). If Heading Operation is enabled, the Slip Indicator will appear to the left and above the Heading Window in horizontal orientation, and directly above the Heading Window in vertical orientation (Image 6).

The Slip Indicator is represented by a shaded translucent background with two white lines around center and a white ball. When the ball is maintained between the vertical lines during banking maneuvers, the turn is considered “coordinated” without slip.

The Slip Indicator’s background becomes semi-transparent if the Roll Scale or Roll Pointer pass behind the indicator. All other elements remain visible.

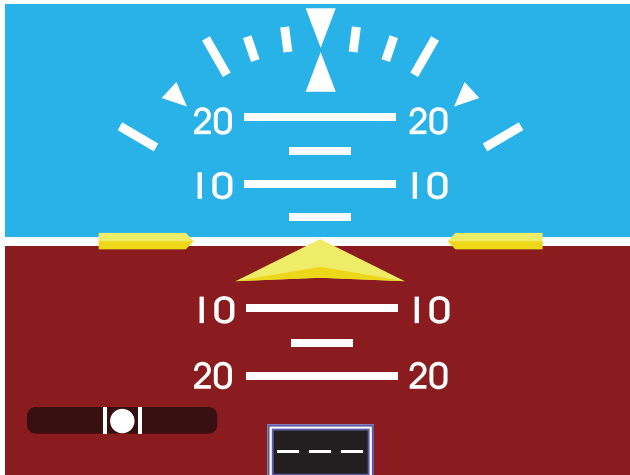
Heading Operation can be configured during installation. The heading information is comprised of a window showing the current heading and a moving scale located along the bottom of the display (Image 6). The Heading Scale is depicted as a series of graduations every 10° with numbers every 30°, and letters for each cardinal heading.



Heading data source can be supplied in one of two ways: an external source via ARINC 429 input (indicated by small gray arrows pointing inward per Image 6) or from the MD32 Remote Magnetometer (indicated by small gray arrows pointing outward). If ARINC input data is lost, the display will read “---” (Image 7).

**HEADING OPERATION**  
**ARINC data loss shown below.**

Image 7



The Altimeter Indicator portion of the display will always appear on the bottom display when oriented vertically and can be configured to appear on the right or left display when oriented horizontally (Image 8).

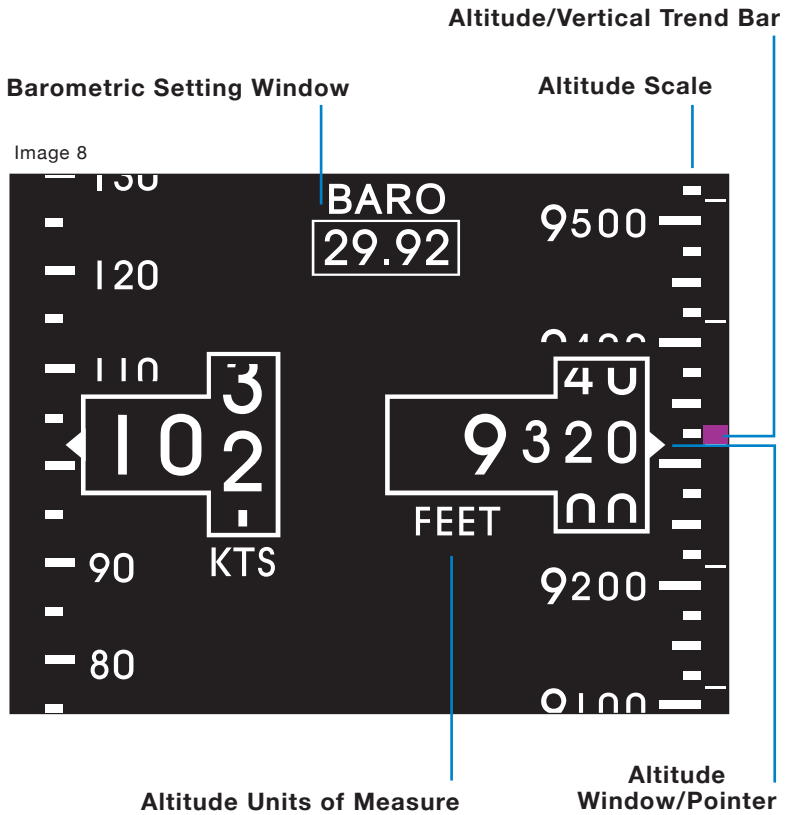
**The Altimeter consists of four parts: Altitude Window, Altitude Scale, Barometric Setting Window and optional Altitude/Vertical Trend Bar.**

The Altitude Window displays the current, barometric corrected altitude. The digits of the display are in increments of twenty and the window is expanded over this portion of the number to display a minimum spread of forty units. The numbers will 'roll' or scroll to assist in quick reference to the increasing or decreasing nature of the aircraft's altitude. The hundreds, thousands and ten-thousands digits appear to the left of the tens digits with the thousands and ten-thousand digits slightly larger than the others. The Altitude Pointer (triangle) to the right of the window points to the associated position on the Altitude Scale of the current altitude. Altitude units of measure appear below the Altitude Window and can be changed during Flight Mode using the Options Menu (see Options Menu, page 19). The pilot may select feet or meters.

The Altitude Scale is positioned vertically along the right margin of the display. The current altitude is always in the middle of the scale and indicated by the Altitude Pointer on the right side of the Altitude Window. The scale has numeric indications every one-hundred units with minor graduations every fifty units and sub-graduations every twenty-five units. In horizontal installations, the scale spans approximately 400 units from top to bottom. In vertical installations, the scale spans approximately 500 units from top to bottom. The scale will 'roll' or scroll to assist in quick reference to the increasing

ALTITUDE OPERATION

Altitude display shown below.



or decreasing nature of the aircraft's altitude. The Barometric Window shows the currently set barometric pressure. It is identified by the abbreviation BARO and is located at the top center of the Airspeed/Altitude Display. Setting the current barometric pressure compensates the altitude for the appropriate environmental conditions.

**The barometric setting can be adjusted by turning the Control Knob while in Flight Mode.** When adjusting the barometric pressure the digits will turn green (Image 9). When finished setting the pressure the digits will return to their original color. Barometric pressure units can be selected during Flight Mode using the Options Menu (see Options Menu, page 20). **Note: If the unit is installed to receive ARINC data from the Primary Flight Display (PFD), the BARO value will automatically synchronize.** When the two are synchronized two arrows will appear on either side of BARO (Image 10). Manually changing the MD302 barometric setting will override the external source.

The Altitude Trend Bar is located along the right margin of the Altitude Display. This feature can be turned ON or OFF using the Options Menu (see Options Menu, page 23). The Altitude Trend Bar is magenta in color and originates at the current altitude on the Altitude Scale — always from the middle of the display, directly across from the Altitude Pointer. The height of the Trend Bar, above or below the current altitude, indicates the altitude of the aircraft on the Altitude Scale if the current vertical speed or 'altitude trend' is maintained over a period of six seconds. For example, as seen in Image 9, the current altitude is approximately 2,420 feet. The Trend Bar is at approximately 2,470 feet, indicating that the aircraft's altitude will be 2,470 feet in six seconds if the current vertical speed or climb is maintained constant. The length of the Trend Bar will increase with increased dive or climb rates and approach zero or disappear entirely as the vertical speed reaches zero in level flight.

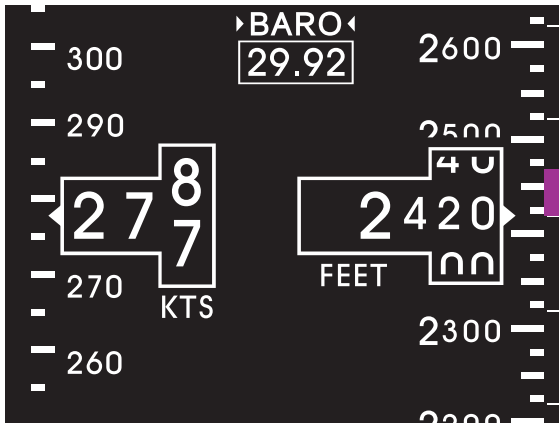


Image 9



The Barometric Setting will turn green during adjustment.

Image 10



Two arrows appear on either side of BARO when synchronized.

The Airspeed Indicator portion of the display will always appear on the bottom display when oriented vertically and can be configured to appear on the right or left display when oriented horizontally (Image 11).

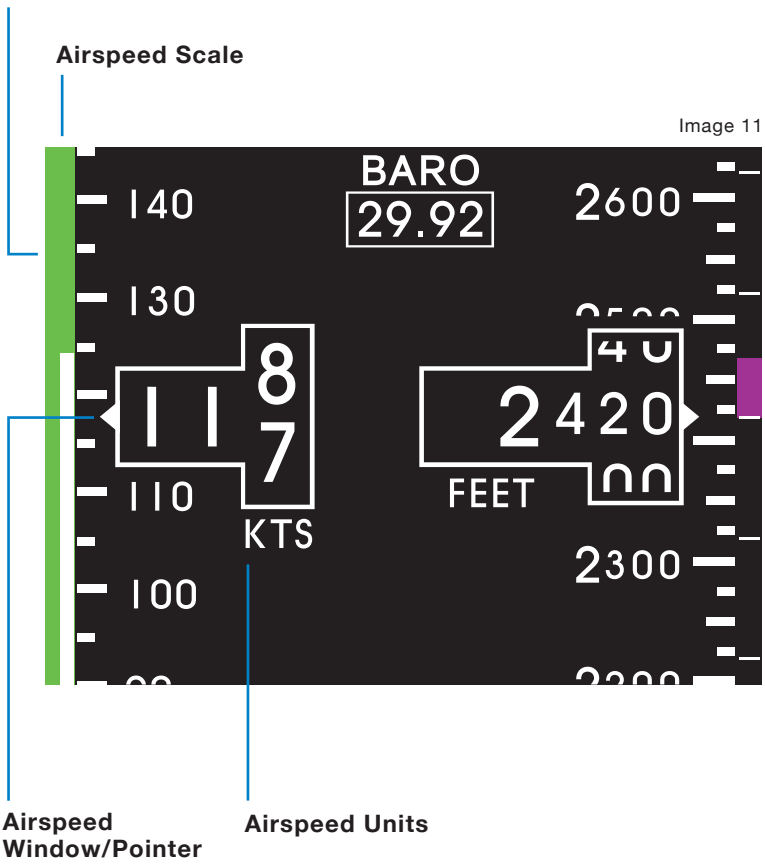
**The Airspeed Indicator Display consists of three parts: Airspeed Window, Airspeed Scale and Airspeed Limitations or Range Markings.**

The Airspeed Window displays the current Indicated Airspeed (IAS). The digits of the display are enlarged for visibility and increment by one unit. The units will 'roll' or scroll to assist in quick reference as to the increasing or decreasing nature of the aircraft's airspeed. The Airspeed Pointer (triangle) to the left of the window points to the associated position on the Airspeed Scale of the current airspeed. Airspeed units are available in Knots, KPH (kilometers per hour) or MPH (miles per hour). The unit of measure appears below the airspeed window and can be selected during installation in the Configuration Mode only. This selection is not available in Flight Mode.

The Airspeed Scale is positioned vertically along the left margin of the display. The current airspeed is always in the middle of the scale and indicated by the Airspeed Pointer on the left side of the Airspeed Window. The Airspeed Scale has numeric indications every ten or twenty units depending on the unit of measure selected. Minor graduations appear every five or ten units, respectively. In horizontal installations, the scale spans approximately 50 or 100 units from top to bottom, depending on the unit of measure. In vertical installations, the scale spans approximately 80 or 160 units from top to bottom, depending on the unit of measure. The Airspeed Scale will 'roll' or scroll to assist in quick reference as to the increasing or decreasing nature of the aircraft's airspeed.

**AIRSPEED OPERATION**  
Airspeed display shown below.

**Range Markings**



The Airspeed Limitations, also known as “V-speeds” or Range Marks, are indicated with colored range marking bands placed vertically along the left margin next to the Airspeed Scale. The colors and values of each bar can be set during installation in Configuration Mode by the installer only. This setting is not available in Flight Mode. **Colors must be selected based on industry-defined colors and V-speed limits as defined by the aircraft’s specific Pilot’s Operating Handbook (POH).** Range markings are represented by full-width bars, half-width bars and/or radial marks. A traditional ‘barber pole’ or ‘barber pole’ radial may also be displayed if the aircraft requires and provides the appropriate  $V_{NE}$ ,  $V_{MO}$  and/or  $M_{MO}$  values.

### **Menu operation is simple and intuitive.**

<b>Menu Title</b>	White text on a blue background at the top of each menu and sub-menu
<b>Current Item Selected</b>	Highlighted by a white box and green background
<b>Selectable Items</b>	Any selectable item on the menu is indicated in white text
<b>Submenu Items</b>	A > symbol indicates submenu information is available upon selection
<b>Unavailable Items</b>	Information only — options that are unavailable are indicated in gray text

Turning the Control Knob will scroll the green cursor highlight over the available options within the current menu. By default, the currently set value of each menu option is displayed in gray directly to the right of each setting. Pressing the Control Knob for any highlighted item will activate the selection, allowing adjustment to the right. Scroll to the desired option and press the Control Knob to select it. The green highlight will return to the menu options on the left and the new value will be displayed in gray to the right.

**After confirming any setting by selecting it, that setting will immediately become active and be saved in memory, regardless of whether the Exit Menu command is selected or if it times out and automatically reverts to the Attitude Display.**

**Note: Unit will not time out and return to Attitude Display when in Battery INFO or Review CFG screen.**

## OPTIONS MENU

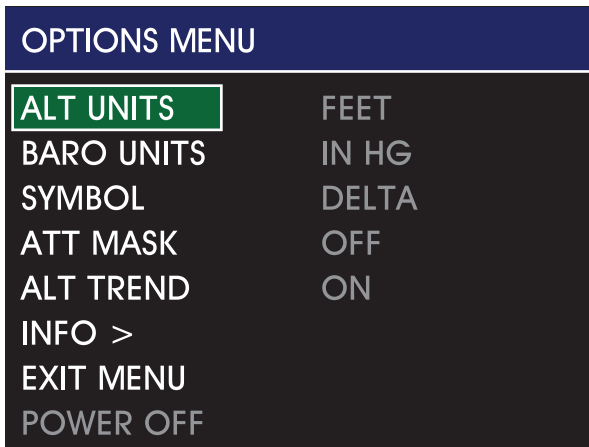
While in Flight Mode, the Options Menu is available to the pilot or cockpit crew members. It offers multiple selections that are available during flight and do not affect the aircraft-specific configuration of the unit. Options are provided for convenience, preference, or potentially necessary in-flight adjustments (Image 12).

**The Options Menu can be accessed by pushing and holding the Control Knob for approximately two seconds.**

The brightness adjustment bar will appear briefly before the menu is visible. The menu will appear in place of the Attitude Display and will revert to the active Attitude Display if no activity occurs for ten seconds.

**The Options Menu root menu includes: ALT Units, BARO Units, Symbol, ATT Mask, ALT Trend, INFO, Exit Menu and Power OFF.**

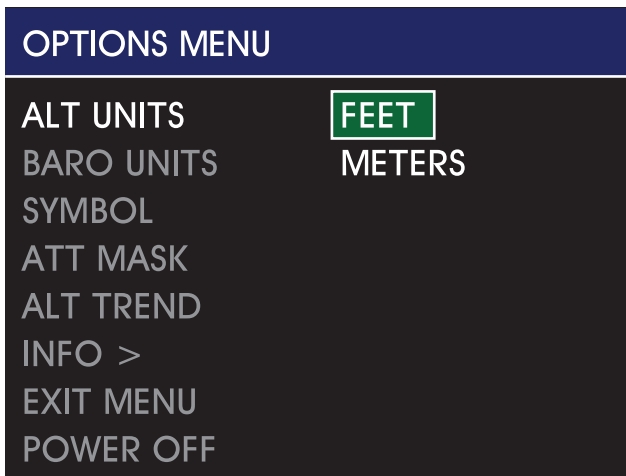
Image 12



OPTIONS MENU

The ALT Units setting allows the user to select the altitude unit of measure to either feet or meters. This feature is available during flight in the event that the aircraft crosses territorial airspace that requires or reports different altitude units (Image 13).

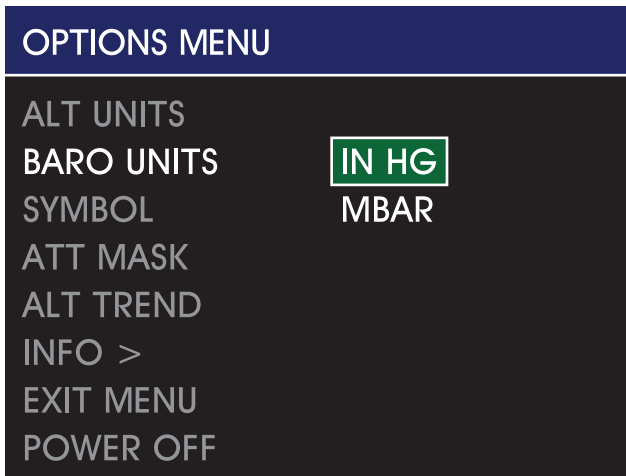
Image 13



**ALT UNITS**

The BARO Units setting allows the user to select the altitude barometric adjustment unit of measure to either IN HG (inches of mercury) or MBAR (millibars). This feature is available during flight in the event that the aircraft crosses territorial airspace that requires or reports different barometric pressure units (Image 14).

Image 14



### BARO UNITS



The Symbol setting allows the user to select the type of symbolic airplane on the Attitude Display to either delta-wing, split delta or traditional. This feature is provided for pilot preference and to match other instruments in the panel (Images 15, 16, 17, 18).

Image 15

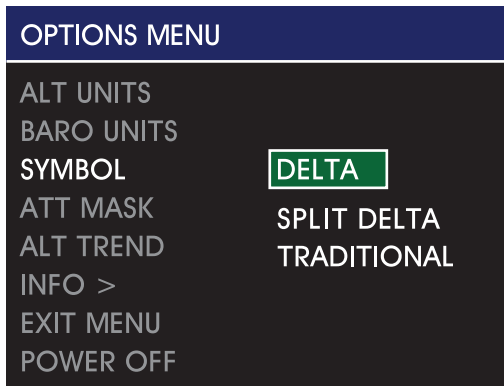
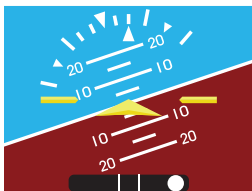
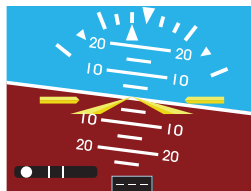


Image 16



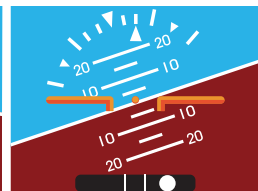
DELTA-WING SYMBOL

Image 17



SPLIT DELTA SYMBOL

Image 18



TRADITIONAL SYMBOL

## Options Menu / ATT MASK

The ATT Mask setting allows the user to turn the Attitude Mask ON or OFF. The Attitude Mask provides gradient dimming of the corners of the Attitude Display to give the aesthetic look of a round instrument (Images 19, 20, 21).

Image 19

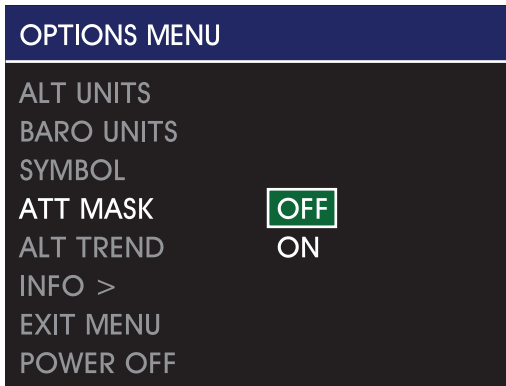
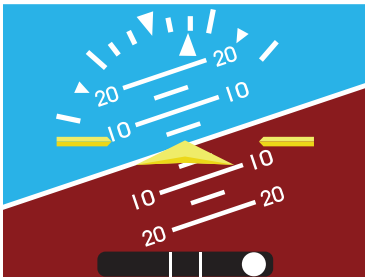
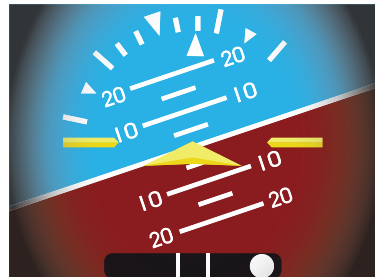


Image 20



ATT MASK OFF

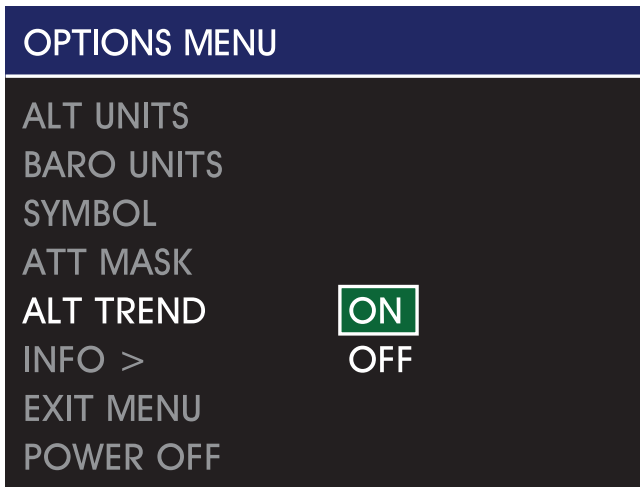
Image 21



ATT MASK ON

The ALT Trend setting allows the user to turn the Altitude Trend Bar ON or OFF. The Altitude Trend Bar provides a graphical representation of vertical speed near the Altitude Scale (see Altitude Operation, page 10). This feature is provided for pilot preference and convenience (Image 22).

Image 22



ALT TREND

The INFO submenu is found within the Options Menu (Image 23). It offers multiple selections that are available during Flight Mode that do not affect the aircraft-specific configuration of the unit. The options available allow the user to access the Review Configuration (Review CONFIG), Software INFO, and Battery INFO screens (Image 24).

Image 23

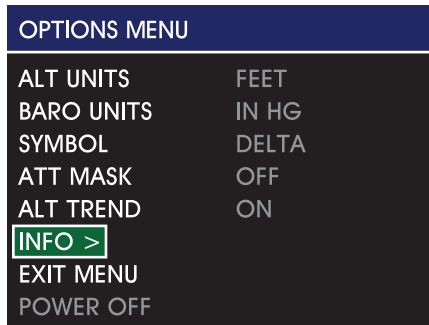
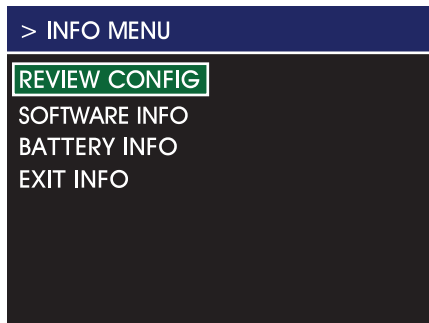


Image 24



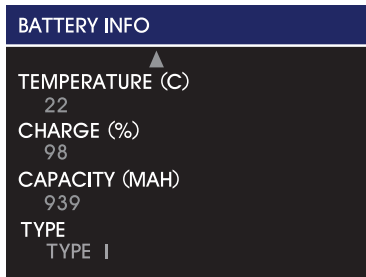
The Review CONFIG selection (Image 24) allows the user to review all of the values saved in unit memory previously set in Configuration Mode during installation or maintenance. There are no selectable options and this feature provides a view-only verification of information. When selected, the Review CFG screen will appear and allow the user to scroll through all of the configuration values (Image 25). Push the Control Knob to return to the INFO submenu.

Image 25



## Options Menu / Info / BATTERY INFO

Image 26

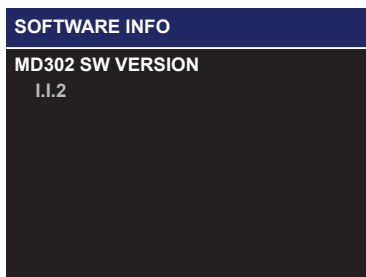


**BATTERY INFO**

The Battery INFO selection allows the user to view the real-time status of the internal battery. The information available includes the Estimated Run Time in minutes, the Temperature in Celsius, the current battery State of Charge percentage, the Battery Capacity in milliamp-hours and battery Type (Type 1 = Lithium-ion, Type 2 = Nickel metal hydride (NiMH)) (Image 26).

## Options Menu / Info / SOFTWARE INFO

Image 27



**MD302 SOFTWARE INFO**

Image 28

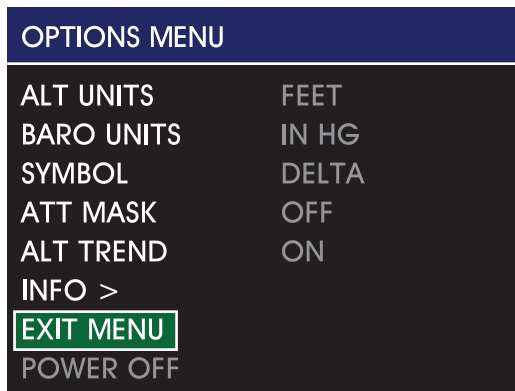


**MD32 SOFTWARE INFO**

The Software INFO selection allows the user to view the version of software currently installed on the MD302 (Image 27). If an MD32 Remote Magnetometer is installed (Image 28), its software version will be displayed as well.

The Exit Menu action allows the user to manually exit the Options Menu and return to the active Attitude Display. There are no selectable options. After confirming any setting by selecting it, that setting will become active and it will be saved in memory. This will occur regardless of whether the Exit Menu command is selected or should it time out after approximately ten seconds of inactivity and automatically revert to the Attitude Display (Image 29).

Image 29

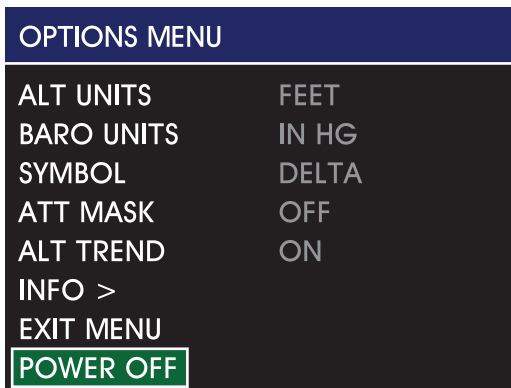


**EXIT MENU**

The **Power OFF** action allows the user to immediately turn the unit **OFF** when it is operating on its internal battery. This item is typically grayed out and unavailable in Flight Mode. This feature is only provided to manually turn the unit OFF when the unit is on internal battery power (Image 30).

See Emergency Operation for more information on Emergency Operation when operating on battery power (page 32).

Image 30



**POWER OFF**



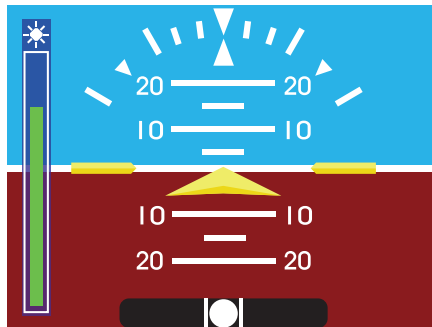
SAM can be configured to adjust its brightness based on the aircraft's manual lighting bus control or automatically, based on the ambient lighting conditions using the photocell sensor on the unit. For either option, **the pilot or crew member can temporarily override the current brightness and manually increase or decrease brightness.**

**To adjust brightness, briefly press the Control Knob. The brightness bar will appear overlaid on the Attitude Display and turning the Control Knob will increase or decrease the current setting (Image 31). A second push will remove the brightness adjust bar before it times out.**

While the unit remains powered, the manual adjustment will remain saved and any change in the lighting bus or photocell sensor will increase or decrease the brightness from the newly set manual adjustment point.

**When the unit is powered OFF, the manual adjustment will be reset and default to the lighting response curve programmed into memory per the settings in the Configuration Mode setup by the installer.**

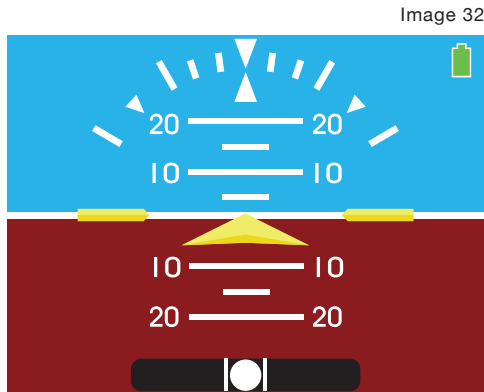
Image 31



SAM is designed to operate reliably and provide the critical situational awareness needed, even if the aircraft power systems fail. Should this occur, the unit provides emergency operation by continuing to perform seamlessly and uninterrupted in the Flight Mode.

SAM is available with an internal and field-replaceable battery, which recharges during normal flight, contains a heater for low temperature conditions and provides a minimum of one hour of operation — 2.5 hours when new.

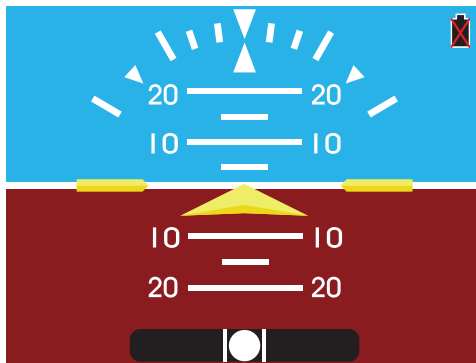
**If aircraft power to the unit is lost in flight, the unit will immediately begin operating on internal battery power. This is indicated by a green battery icon displayed in the top right of the Attitude Display (Image 32).**



**Fully charged battery.  
Approximately one hour of operation remaining.**

Should the battery power become low while in operation, the battery icon will be displayed. This is identified by a black battery icon with a red X on it. **This indicates that there is less than 20% of battery capacity left and may represent as little as ten minutes of backup power available (Image 33).**

Image 33



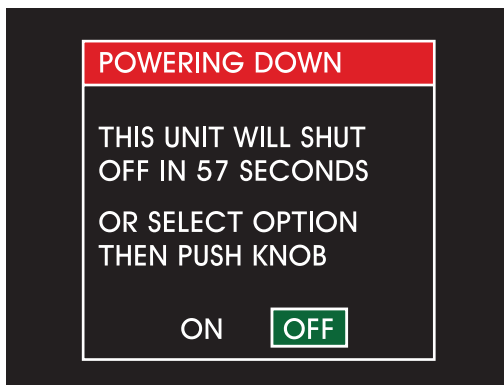
**Battery almost depleted.  
10 minutes or less of operation remaining.**

**If primary aircraft power to the unit is lost, the unit will immediately begin operating on internal battery power.** When this occurs, as a result of normal landing and shut-down procedure, the unit will recognize that there is minimal airspeed and determine that the aircraft is on the ground. **At the end of each flight, the unit will display a warning message (Image 34).**

**The unit will begin counting down for 60 seconds and turn OFF automatically.**

If continued operation is desired, turn the Control Knob to highlight ON and press to select. Select and press the OFF option to turn the unit OFF immediately. If you would like to turn the unit OFF after acknowledging the 'Remain On' option, enter the Options Menu and select the Power OFF action (see Power OFF, page 28).

Image 34



### POWERING DOWN OPERATION

**Loss of power and no airspeed is sensed.  
Shut-down in progress.**

# ALERTS AND ANNUNCIATIONS

A brief summary of the unit's dynamic limits are presented within this section. If these limits are exceeded in flight, or should an error occur that produces misleading information, the data in question will be replaced with a red X (Images 35, 36, 37). A more complete list of limitations can be found in the Specifications section of this Guide (see Product Specifications, page 39).

## Attitude

Pitch Angle	No limits (360°+)
Pitch Rate	300° per second max
Roll Angle	No limits (360°+)
Roll Rate	300° per second max

---

## Altitude

Range	-1,500 to +55,000 feet (available in meters)
Barometer	28.00 to 31.00 inches of mercury (available millibars)

---

## Airspeed

Range	Certified from 20 to 500 knots (available in mph or kph)
-------	--

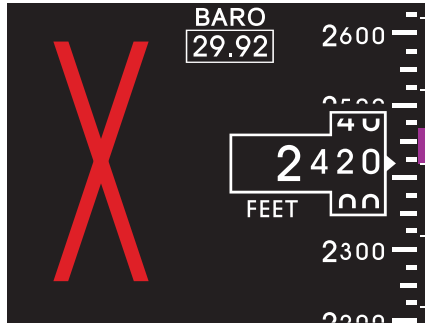
Image 35



**The attitude display is absent due to exceedance of internal rate sensors, loss of airspeed or other various reasons. This may self-correct, but if the red X persists, the unit should be serviced immediately.**

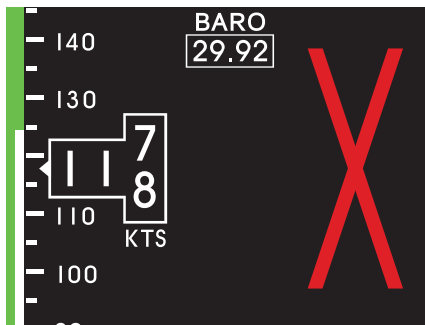
## ALERTS AND ANNUNCIATIONS

Image 36



The airspeed instrument is absent, possibly due to exceedance of the pressure sensor range. This may self-correct, but if the red X persists, the unit should be serviced immediately.

Image 37



The altimeter instrument is absent, possibly due to exceedance of the pressure sensor range. This may self-correct, but if the red X persists, the unit should be serviced immediately.

## SERVICE REMINDER

The service actions listed in this section represent partial Instructions for Continued Airworthiness (ICA) which are recommended or required by the FAA and/or the manufacturer.

### **Pressure System and Altimeter Verification**

Per Federal Regulation 14 CFR 91.411, it is required that each static pressure system and each altimeter have been tested and inspected within the last twenty-four (24) months.

### **Field Calibration**

The MD302 provides a Calibrate Pressure feature in Configuration Mode, which allows field calibration of the MD302 pressure instruments to offset any errors such that the displayed values are within required tolerances for a given installation. An external pitot/static tester must be connected to the MD302 with the pressures stabilized to 5,000 ft. and 120 knots. **See Installation Manual for additional details regarding field calibration.**

**After Calibrating pressure, the airspeed and altitude functions must be tested for the required tolerances across the operating range of the aircraft.**

### Software Updates

Mid-Continent will have, on occasion, the need to update software versions on SAM for maintenance, improvements or the addition of functionality. With the unit's easy, field-upgrade option, it does not have to be returned to the factory for software updates. In some cases, the unit may not have to be removed from the panel.

Prepare the new software by loading it onto a USB memory device. It is recommended, but not necessary, that the USB device have no additional files on it. Loosen the screw and USB port cover on the back of the unit and insert the USB device.

Load the factory-approved software onto the unit by following the procedure in the Installation Manual. Note the software version before and after this procedure, which is displayed on the initial pre-flight screen to verify proper installation. For more information visit [flySAM.com](http://flySAM.com).



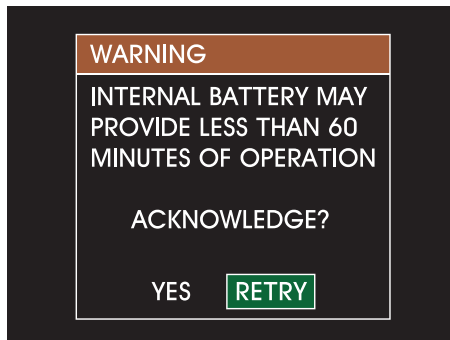
## Battery Replacement

Regularly scheduled maintenance of the battery is not required. The battery module is rated for an estimated life of six (6) years. Extreme temperature, repeated full-depth discharges or other abuse may reduce battery life.

A battery capacity check occurs each time the unit is powered on. If the battery capacity is determined to provide at least 60 minutes of operation, no message is displayed and the battery is good. If the battery capacity warning appears, the battery pack may need to be recharged (Image 38). The user may acknowledge the warning and continue on to Flight Mode. However, emergency backup power may be less than the required minimum capacity.

The battery will recharge itself when external power is applied to the unit. If the battery capacity warning persists after recharging, the battery pack may need to be replaced. Battery replacement can be conducted without returning the unit to the factory by following the procedure provided in the Installation Manual.

Image 38



**Initial battery capacity check is less than 60 minutes.**

### Disposal

Dispose of batteries in accordance with local, state and federal laws and regulations. Batteries do contain recyclable material. For recycle information, call (877) 273-2925 or visit [www.call2recycle.org](http://www.call2recycle.org).

### Care and Cleaning

The bezel of the unit is made of black anodized aircraft-grade aluminum. This provides a durable, chip-proof and corrosion-resistant finish. Each LCD display has a polymer polarizer on top of the glass. Both the bezel and the displays should be cleaned with a clean, lint-free cloth. Slightly dampen the cloth with water, if needed. Be cautious to avoid scratching or otherwise damaging the bezel and displays by applying excessive pressure.

**Do not use solvents, glass cleaners or other chemicals to clean SAM.** Incidental contact with these or other fluids are unlikely to damage the unit, but should be avoided for cleaning or extended exposure.

# PRODUCT SPECIFICATIONS

<b>Power Input</b>	10-32 VDC; 6W nominal, 40W max
<b>Output</b>	ARINC 429 (high or low speed, see manual for specific labels)
<b>Operating Range</b>	
Attitude	300° per second pitch, roll and yaw (max)
Altitude	-1,500 to +55,000 ft (-457 m to 16,764 m)
Airspeed	20 to 500 knots (23 to 575 mph) (37 to 926 kph)
<b>Heading</b>	Displayed via ARINC 429 input (external interface dependant) or optional MD32 Remote Magnetometer
<b>Units of Measure</b>	
Altitude	Feet or meters
Barometric Setting	Inches of mercury, millibars
Airspeed	Knots, miles per hour or kilometers per hour
<b>Panel Tilt</b>	Configurable    -90° to +90° pitch
<b>Panel Roll</b>	Configurable    ±5° roll
<b>Lighting</b>	5, 14 and 28 VDC external input or internal photocell Programmable dimming curve
<b>Pilot Interface</b>	16-detent, push and turn knob
<b>Weight</b>	1.6 lbs (0.73 kg)
<b>Battery</b>	
Technology	Rechargeable, field-replaceable, internal battery Lithium iron phosphate (Type 1) or nickel metal hydride (Type 2)
Run time	60 minutes minimum when fully charged and properly maintained
<b>Mounting</b>	Front panel mounted
<b>Mating Connectors</b>	Mid-Continent P/N 9017646 kit contains custom DB15 connector with configuration module, pitot and static connectors

## Certification

FAA / EASA / ANAC TSO certified to C2d, C3e, C4c, C6e, C10b, C106, C113a, C179a  
RTCA DO-178B and DO-254 Design Assurance Level (DAL) A  
RTCA DO-160G and RTCA DO-311 qualified

## LIMITED WARRANTY

Mid-Continent Instruments and Avionics understands customer satisfaction is the cornerstone of our business. If you are dissatisfied for any reason, let us know. For assistance, contact a customer service representative at either of our two locations.

We provide a limited warranty for all new SAM — MD302 Standby Attitude Modules for **two (2) years** after date of original sale. We will repair or replace a unit under warranty once the unit is returned and we verify the malfunction. After repair or replacement, items under warranty retain the unused portion of the original limited warranty period.

Mid-Continent Instruments and Avionics warrants that all articles we furnish will conform to applicable specifications at time of shipment and be free from defects in workmanship and in materials. Our obligation will be limited to replacement or repair. Except for a warranty of title and the limited warranty set forth above, no other warranties, expressed or implied, or other obligations or liabilities shall apply. In no event will seller be liable for any incidental damages, consequential damages, special damages, indirect damages, loss of profits, loss of revenues or loss of use, even if informed of the possibility of such damages. Seller's liability for damages arising out of, or relating to a product or order, is limited to the lower of catalog or contract price for the specific product that gives rise to the claim. To the extent permitted by applicable law, these limitations and exclusions will apply regardless of whether liability arises from breach of contract, warranty, tort (including but not limited to negligence), by operation or law, or otherwise.

For complete warranty details, contact a Mid-Continent Instruments and Avionics customer service representative.

# PRODUCT REGISTRATION

To register your unit, return the enclosed product registration card to:

**Mid-Continent Instruments and Avionics**

**Attn: Product Support**

9400 East 34th Street North

Wichita, Kansas 67226 USA

You may also visit **flySAM.com/registration** to enter the requested information online.

# NOTES

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# SAM<sup>®</sup>

Compact. Flexible. Advanced.  
2-inch attitude, altitude, airspeed,  
slip, vertical trend and heading.



Selectable  
Orientation



Field-upgradeable  
Software



Emergency  
Battery

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