

SECTION 5 CLOCK / CHRONOMETER OPERATION

5.1 DESCRIPTION

The clock/chronometer portion of the MD93 has four modes of operation, including local time, universal time, flight timer, elapsed and countdown timers. Specific operation instructions are covered in Section 5.3 (Operational Modes).

5.2 CONSTRUCTION

The clock has six digits that are 0.360" tall and 0.138" wide. Three user interface buttons (**MODE**, **-**, and **+**) are utilized to switch between modes of operation, set clock time, and manage timer functions for the MD93. Backlit annunciations on the front bezel are included which indicate current mode of operation. When aircraft power is removed, the display clock and all annunciations will be turned off. The MD93 contains a battery that maintains clock functions (local time, universal time, flight timer) when aircraft power is removed for well over ten years.

5.3 OPERATIONAL MODES

The MD93 modes of operation for clock functions are, in order: local time, universal time, flight timer, countdown and elapsed timer. Note: When the clock is in local time function, there are no annunciations to indicate as this is the default mode of operation. The mode button (MODE) is used to alternate between four different operational modes; specifically, local time > universal time > flight timer > timer (elapsed and countdown) > (and back to) local time, etc. This is performed by pressing the MODE button. Refer to Figure 4 - Modes of Operation for changing modes of operation.

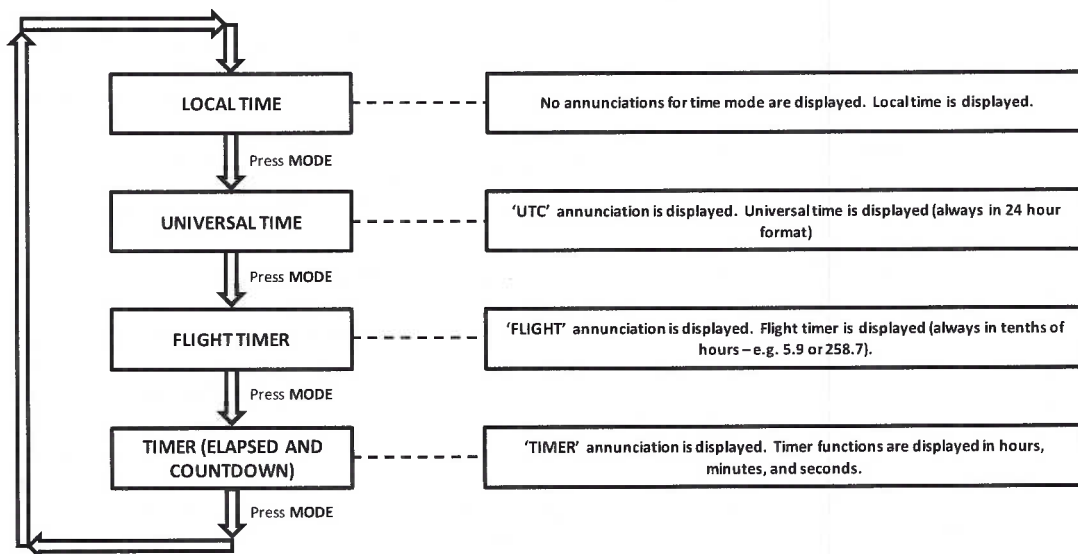


Figure 4
Modes of Operation

5.3.1 Local Time Operation / Setting

When power is applied to the MD93, the system defaults to local time mode (there is no indication or annunciation showing "LOCAL" time). To set time and preferences (e.g. 12/24 hour, display or hide seconds) refer to Figure 6. Note: As minutes and seconds can also be set in universal time mode, it is not necessary to set minutes or seconds when setting local time (refer to universal time operation/setting). However, if minutes and/or seconds are set for local time, the system will update the minutes and seconds in universal time as well.



Figure 5
Local Time Clock Mode

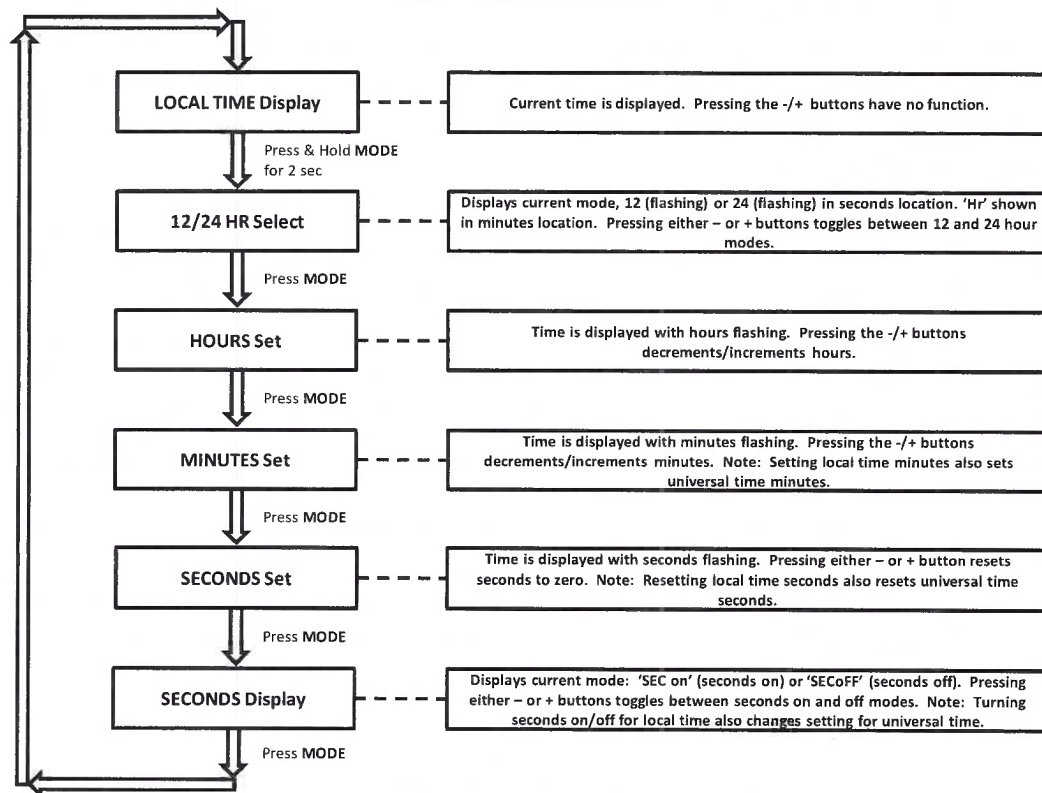


Figure 6
Setting / Configuring Local Time

5.3.2 Universal Time Operation / Setting

When operational mode is changed to universal time, UTC will be backlit (refer to Figure 7). To set UTC time, refer to Figure 8 - Setting Universal Time. Setting minutes and seconds in UTC time also sets minutes and seconds for local time.



Figure 7
Universal Time Clock Mode

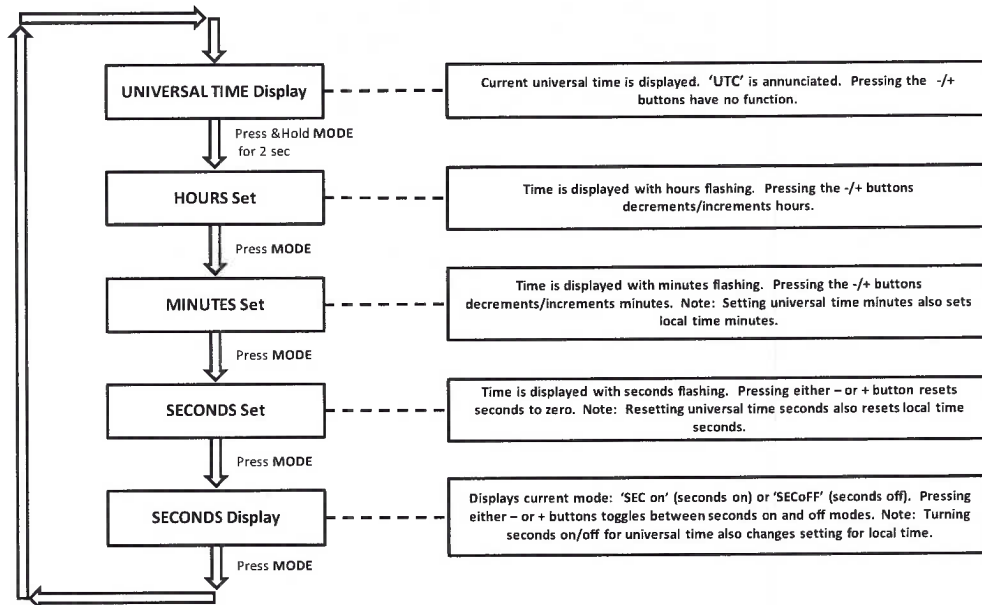


Figure 8
Setting Universal Time

5.3.3 Flight Timer

When operational mode is changed to flight timer, FLIGHT will be backlit (refer to Figure 9). In order for the flight timer to be active, a ground or aircraft power signal must be supplied to pin 4 of the connector. This can be provided from an event-based relay (such as engine start or weight-on-wheels). Or it can simply be connected via jumper to the power or ground pins of the unit to activate on unit power. The decimal point will blink briefly every 2 seconds to indicate that the flight timer is active. Flight time is displayed in hours and tenths of hours up to 99999.9 hours. The flight timer maintains the accumulated time (but does not run) when power is off.

Two flight timers are enabled on the MD93. The default flight timer shown (normally in FLIGHT mode) is a resettable timer. Pressing and holding either – or + button will display the non-resettable flight timer. Upon releasing the – or + button, the resettable flight timer will be displayed. Note: the non-resettable timer value may be initially set in diagnostic mode. Contact Mid-Continent Instruments and Avionics for further details if required. For more detailed operation of flight timer, refer to Figure 10 below.



Figure 9
Flight Timer Mode

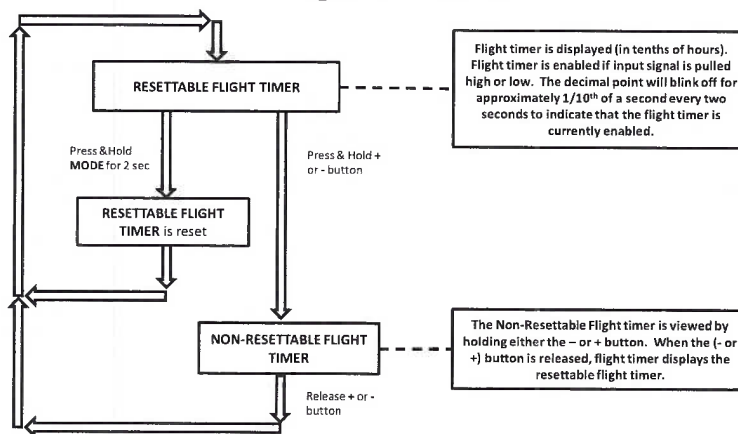


Figure 10
Flight Timer Operation

5.3.4 Timer

When operational mode is changed to the timer function, TIMER will be backlit (refer to Figure 11). The timer function can be operated as either an elapsed timer (stopwatch) or countdown timer, where a specific countdown time can be set. Upon power up, the MD93 remembers countdown timer setting and, when in timer mode, will default to the last mode (elapsed or countdown).

5.3.4.1 Elapsed Timer

The elapsed timer counts up to a maximum of 99 hours, 59 minutes, 59 seconds and then starts again at zero time. Pressing the + button will start and stop the timer. Pressing the – button resets the timer only if the timer is stopped. Note: If the timer is active, the user can change modes (e.g. to local time) and timer will still remain active, but only when power is maintained to the clock. For detailed timer operation, refer to Figure 12.

5.3.4.2 Countdown Timer

The countdown timer can be set to a maximum of 99 hours, 59 minutes, 59 seconds. Pressing the + button will start and stop the timer. Pressing the – button resets the timer only if the timer is stopped. When the countdown timer reaches 00:00:00, it will begin counting up and will flash every second to indicate elapsed time after countdown reached zero. Note: If the timer is active, the user can change modes (e.g. to local time) and timer will still remain active, but only when power is maintained to the clock. Countdown timer setting is maintained when clock is powered off. For detailed timer operation and setting, refer to Figure 12.

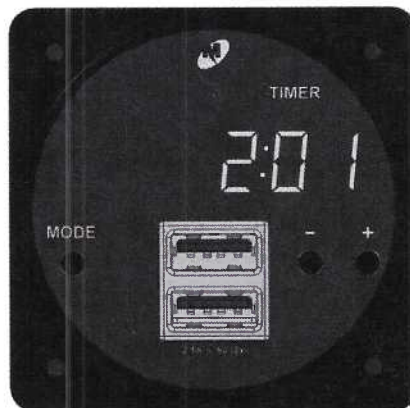


Figure 11
Timer Mode

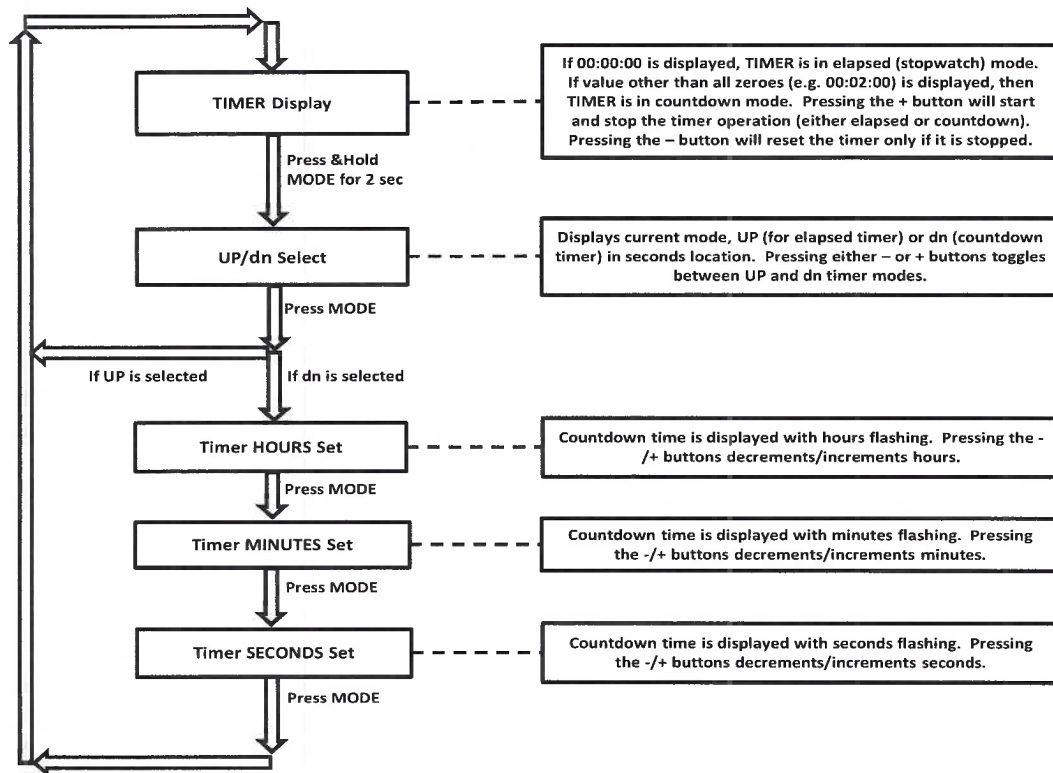


Figure 12
Elapsed Timer Operation

5.3.5 Display Test Mode

To test the MD93 display, press and hold both +/- buttons for 2 seconds. After 2 seconds all clock digits shall display 8's (e.g. 88:88:8.8) and all annunciators shall be activated until the +/- buttons are released. Refer to Figure 13 below.



Figure 13
Display Test Mode

SECTION 6 CONFORMANCE

6.1 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

No periodic scheduled maintenance or calibration is necessary for continued airworthiness of the MD93 Digital Clock / Dual USB Charging Port. If the unit fails to perform to specifications, the unit must be removed and serviced by Mid-Continent Instruments and Avionics or their authorized designee.

6.2 ENVIRONMENTAL QUALIFICATION STATEMENT

MODEL NUMBER: MD93 Series **PART NUMBER:** 6420093-()

NOMENCLATURE: Digital Clock/USB Charging Port

MANUFACTURER: Mid-Continent Instrument Co., Inc.

ADDRESS: 9400 E. 34th St. North, Wichita, KS 67226, USA.

MANUFACTURERS SPECIFICATIONS:

Minimum Performance Specifications: TS509 6430102-(), TDS509 6430102-(), TDS093 6420093-()

Qualification Test Reports: QTR1901-1902, QTR1904-1908-1 & 1908-2, QTR1915-1917

RTCA DO-160: Rev G, dtd 12/08/10

DATES TESTED: 7/2014-9/2014

CONDITIONS	SECTION	DESCRIPTION OF TEST
Temperature and Altitude	4	Category F1
Low Temperature	4.5.1	Short and Normal Operating Low Temp = -40C
High Temperature	4.5.2	Short Time Operating High Temp = +70C
Altitude	4.6.1	Normal Operating High Temp = +55C Altitude = 55,000 ft
Temperature Variation	5	Category S2
Humidity	6	Category B
Operational Shock and Crash Safety	7	Category B
Vibration	8	Category R; Curves C, C1 Category U, Curve G
Explosion	9	Category X
Waterproofness	10	Category X
Fluids	11	Category X
Sand and Dust	12	Category X
Fungus	13	Category X
Salt Spray	14	Category X
Magnetic Effect	15	Category Y
Power Input	16	Category B(XX)
Voltage Spike	17	Category B
Audio Frequency Conducted Susceptibility	18	Category R
Induced Signal Susceptibility	19	Category X
Radio Frequency Susceptibility	20	Category X
Emission of Radio Freq Energy	21	Category M
Lightning Induced Transient Susceptibility	22	Category X
Lightning Direct Effects	23	Category X
Icing	24	Category X
ESD	25	Category A
Fire, Flammability	26	Category X
REMARKS: Section 4: Category F1 Operating Low temperature performed at Short-time Low temperature set point of -40C. Section 8: Vibration was performed per Cat R, Curves C & C1 for fixed-wing aircraft and per Cat U, Curve G for helicopter using the same test article.		

