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## A 1-Wire Sensor Logging Device LOG08-II



Figure 1 LOG08-II MD2134

July 30, 2011  
LOG08-II User Guide Version 2.08

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## 2. Revision History

**Table 1 Document Revision History**

<b>Revision #</b>	<b>Date</b>	<b>Changes to User Manual</b>
2.00	July 10, 2005	Original Issue of document
2.02	August 14, 2005	Updated to add ERF command
2.03	September 19, 2005	Added details of voltage logging and introduced new option – DUN
2.04	January 10, 2006	Added capability of logging DS2450's
2.05	April 26, 2006	Added VDD logging for DS2438 sensors.
2.06	August 5, 2007	Added Vsense logging for DS2438 sensors. Added continuous logging capability.
2.06	February 11, 2008	Updated the manual to provide clarity on usage of DS2438 sensors.
2.06d	May 13, 2008	Corrected error in schematic

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## 3. Introduction

LOG08-II is a stand-alone 1-Wire™ interface that provides the ability to record up to 3 years of readings from a variety of 1-Wire temperature sensors. The records are stored on LOG08-II until you require access to them. At any time in the recording process, you can download the records to your PC, via a standard RS232 serial interface. The records are conveniently output as comma separated entries and can easily be imported into Excel or other standard PC programs.

### 3.1. 1-Wire Sensors Supported

- Multiple DS2438-based sensors, including, of course, the Midon Design MD3020E sensor.
- Multiple DS18S20, DS18S20-PAR, DS18B20, DS1822, DS1920 temperature sensors as well as temperature reading from any DS2438
- 
- Multiple DS2423 general purpose counters (for use with Lightning sensors and other types of counter inputs)
- Multiple DS2450 voltage sensors

### 3.2. LOG08-II Features

- On-board voltage sensor with an option for an on-board humidity and/or temperature sensor.
  - The on-board voltage sensor is used to monitor the input voltage and the battery voltage.
  - Input voltage and battery voltage are automatically stored in the logging database
- Jumper-less provisioning - all configuration settings stored in non-volatile memory
- Up to 60 sensors supported for on-demand or timed polling
- Up to 24 DS18S20, DS18B20, DS2438, or DS1822 temperature sensor results can be logged to non-volatile memory
- Simple instruction set with a Help prompt for recalling command names

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- Easy to delete sensors, if they are no longer required, using the DEL command
- 1-Wire bus errors are flagged when they occur
- Support for software serial flow control (Control-S, Control-Q) to permit inspection of long lists without scrolling beyond your terminal's page length. Control-X can be used with the **DLO** and **DLR** commands to abort the display at any time.
- Manual Poll of sensor readings. While LOG08-II is normally used for continuous (from 1 to 99 minute intervals) logging of sensor readings, it may also be used manually to take sensor readings on command from the serial interface.

## 3.3. Differences between LOG08-II and TEMP08/LOG08

LOG08-II is designed with many of the same principles as TEMP08 and LOG08 and uses similar hardware. Some new commands have been added to handle the logging functionality and some commands removed. LOG08-II also allows for logging of multiple sensors, unlike LOG08 which only logs 1 sensor at a time.

***UPGRADE NOTICE: Existing LOG08 devices cannot be upgraded via firmware change to LOG08-II.***

1-Wire Wind Speed and Wind Direction sensors are not supported, although raw data from the DS2423 and the DS2450 devices used in such sensors is still available.

1-Wire rain bucket sensors are not supported, although raw data from the DS2423 devices used in such sensors is still available.

Humidity sensors based on DS2438 devices are supported, however the output is "raw" and user calculations will be required to convert the voltage outputs provided to humidity levels using the following calculation:

$$RH = ((V_{AD}/V_{supply}) - 0.16) / 0.0062$$

A hardware Real Time Clock (RTC) has been added to LOG08-II, along with an on-board battery to ensure clock continuity over a power failure.

An on-board voltage monitor has been added to provide voltage readings for the input voltage and the battery for the RTC.

A major difference between LOG08 and LOG08-II is the amount of memory space available. LOG08-II uses 128Kbytes of EEPROM memory, whereas LOG08 only has 32K bytes of EEPROM memory. This provides for a significant

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amount of additional storage capacity and LOG08-II, as a result, can store up to 3 months of log samples in its non-volatile memory for the maximum of 24 sensors.

Here's the math:

2 bytes per sensor sample required (note, DS2438's require 2 samples and DS2450's require 4 samples)

7 bytes of time stamp and on-board voltages per logging interval (poll)

24 sensors maximum polled per poll

Total bytes per poll = 7 bytes/poll + 24 sensors/poll \* 2 bytes/sensor = 55 bytes/poll

3 months at 1 poll per 60 minutes = 24 polls/day \* 3 months \* 30 days/month = 2,160 polls/3 months

Total bytes used over 3 months = 55 bytes/poll \* 2,160 polls/3 months = 118,800 bytes/3 months

Of course, if fewer than 24 sensors are monitored, then the total logging time will be correspondingly higher. If only one sensor is logged, then the logs can be captured for up to 3 years.

One sensor position of the sensor log database is always used for logging the on-board battery voltage and the power input voltage.

### 3.3.1. New LOG08-II commands

**DLR** Display recent log samples

**SER** Display serial number of LOG08-II

**SPR** Enable or disable logging continuation following power-up

### 3.3.2. LOG08-II Commands not available with TEMP08

**DLO** Display Log samples

**DLR** Display recent log samples

**LOG** Enable or disable logging

**SER** Display serial number of LOG08-II

**SPR** Enable or disable logging continuation following power-up

### 3.3.3. TEMP08 Commands not implemented in LOG08-II

**RLT** Set Relay Timer

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- RLY** Actuate Relay
- RLB** Actuate set of Relays
- ONA** Set switch Sensor on
- OFA** Set switch Sensor off
- WND** Continuously Display wind direction
- WDR** Wind Direction Reverse
- DEB** Debug on/off

The Relay commands, and related functions, were deleted since they did not make sense to be included with a logging device. Similarly, the switch sensor actuate commands were removed for the same reason. Wind direction, wind speed and rain counter functionality has been removed from LOG08-II to conserve program memory space. The **DEB** command has also been removed for the same reasons.

**Table 2 Midon 1-Wire Controller Properties**

Feature	TEMP08	LOG08	LOG08-II
Up to 60 devices supported	Y	Y	Y
DS18S20, DS1822, DS18B20 Temperature sensors supported	Y	Y	Y
DS2423 counters supported	Y	Y	Y
DS2450 Voltage sensors supported	Y	Y	Y
DS2438 Voltage sensors supported	Y	Y	Y
DS2405 switch/input sensors supported	Y	N	N
DS2408 input/.output sensors supported	Y	N	N
1-Wire Weather Station supported	Y	N	Y(note)
1-Wire Rain gauge supported	Y	N	Y(note)
1-Wire Humidity Sensor supported	Y	N	Y(note)
1-Wire Relay sensor (Midon Design version) supported	Y	N	N
1-Wire Barometric Pressure sensor (Bray/Jennings version) supported	Y	N	Y(note)
RELAY05 supported	Y	N	N
Log to memory supported	N	Y	Y
Log multiple sensors to memory	N	N	Y
Logging memory available	0	32K	128K
Real Time Clock	Y	Y	Y
Battery back up for Clock	N	N	Y
On board option for temperature sensor	Y	Y	Y
On board option for humidity sensor	Y	Y	Y(note)
On board battery and supply voltage monitoring	N	N	Y

Note: DS2450 and DS2438 sensors noted above are logged or displayed only if the sensor type is set to "V". It is the user's responsibility to convert the raw sensor readings into the appropriate parameter required. DS2423 sensors noted



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above are logged or displayed only if the sensor type is set to "C". It is the user's responsibility to convert the raw sensor readings into the appropriate parameter required.

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## 4. Installation

Prior to use, insert the CR2032 battery into connector B1. It is shipped separately to avoid accidental discharge.

To use this product, you will also need to connect a 12 to 20 Volt (AC or DC) transformer to the terminal J1 (see Figure 2 for location of J1). Any 12 to 20 Volt adapters capable of at least 100mA will do. Steady-state current consumption for LOG08-II is approximately 12mA.

*Note: Do NOT connect power to J3! Doing so will damage LOG08-II.*

If you are using a sensor network of 1-Wire devices, connect them now to connector J3 or J4.

If you are using DS18S20, DS1822 or DS18B20, temperature sensors, only 2 pins of each device need to be connected, however a connection is required between the VDD and GND pins of the device if you are using parasitic power. If +5VDC local power is being used to power the sensor, connect the VDD terminal to it. See Figure 2 for device connections.

***Midon Design recommends that sensors are used in local powering mode to ensure the most reliable communication.***

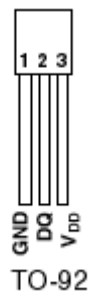


Figure 2 DS18S20/DS18B20/DS1822 Pin-out

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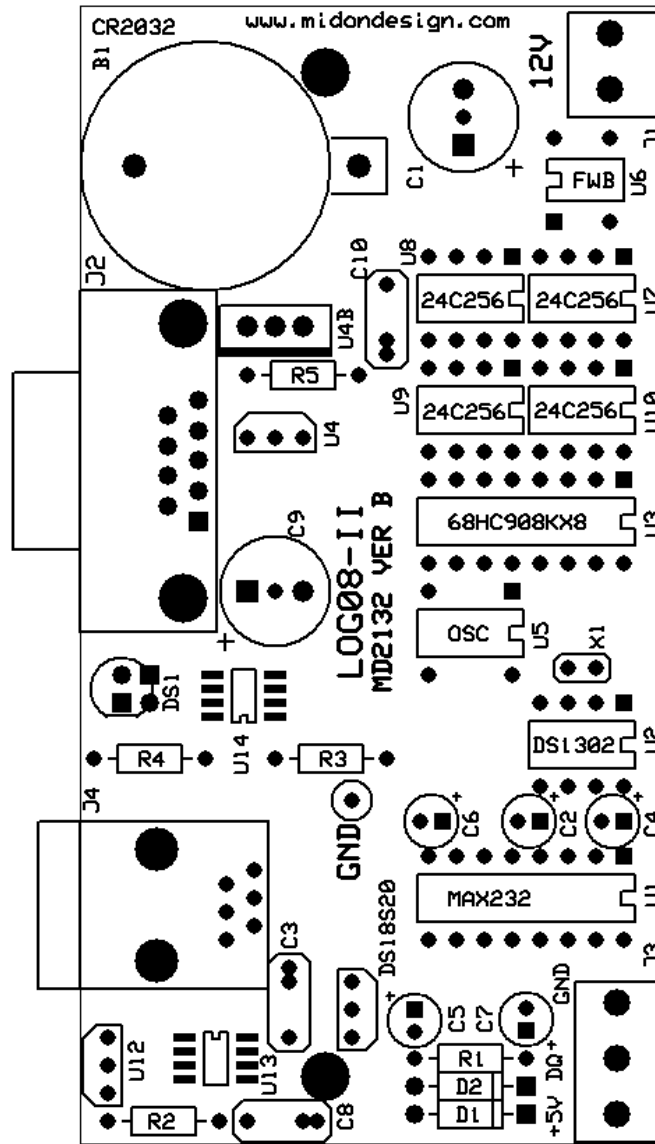


Figure 3 LOG08-II Parts Placement

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## 5. Using the LOG08-II

Connect up a straight-through serial cable between LOG08-II's J2 connector and your PC. Open up HyperTerminal (or equivalent terminal emulator program) on your PC. Configure it to 9600 BPS, No parity, 8 bits, 1 start bit and NO hardware handshaking (very important!). Power up the LOG08-II and configure the unit for the devices that you have connected.

The LED will initially flash red and then should change to a flashing green state. This is normal. The LED will change to flashing red whenever a 1-Wire sample is being taken.

We recommend that you use the **ERF** command for first time use, to erase the EEPROM. This will remove any previous information that may have been stored in the EEPROM.

*Note: an ERF command will take considerable time (about 40 minutes) to execute due to the size of the memory being addressed.*

Next use the **INI** command to search for any 1-Wire devices connected to the 1-Wire bus. If you get any error messages, it is most likely a result of a bad connection to the devices. Verify them. Typically, a "OW bus error" message indicates that a sensor has been installed in reverse, or that there is a short on the bus.

Due to limited RAM space within LOG08-II, trying to **INI** more than 8 1-Wire sensors at a time may not always be possible. Should that cause problems, remove some sensors and re-do the **INI** function. Once all sensors have been identified on the 1-Wire bus, re-connect them and LOG08-II will establish communication to them without problem.

*Note: an ERA or ERF command is not required every time that an INI command is issued. It should only be required for first time use.*

Now program the configuration by using the **SET** command. Just type **SET** and the program will prompt you for the required settings; Polling interval, F/C display, serial ID display, power restore setting, and finally the real time clock setting.

To verify that your setup is working properly, you should next use the **TMP** command to perform an immediate sensor reading. The output of the **TMP** command should look like the sample below (the exact output will depend on what type of sensors and how many you have installed).

>

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12/18 20:24:12  
Reading Sensors...

```
Battery Voltage = 2.95V
Input Voltage = 12.6V
Humidity #01[CB0000003770C926]=52%
Counter #01[BF00000004F3631D]=00256
Temp #01[060000003770D026]=75.22F
Temp #02[440000001EC34228]=76.00F
Temp #03[600008001E316D10]=77.67F
Temp #04[F5000000375E9426]=74.77F
Temp #05[CB0000003770C926]=74.77F
Temp #06[91000800135B9B10]=75.35F
Temp #07[21000000032E4E22]=75.45F
>
```

If there are no apparent errors, you are ready to use LOG08-II. Enjoy!

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## 6. LOG08-II Commands

These commands are valid for all versions of LOG08-II software

**Table 3 LOG08-II Command List**

Command	Description	Syntax
<b>DEL</b>	Delete a sensor that was previously installed via the INI command	DEL<sensorid> <b>See Note 1</b>
<b>DIS</b>	Display serial numbers of all configured 1-Wire devices	DIS
<b>DLO</b>	Display the log records. Output will be time-stamped and the entries separated by commas.	DLO
<b>DLR</b>	Displays log records that are new since the last DLR or DLO command. The output is identical to the DLO command but records already displayed are suppressed.	DLR
<b>DUN</b>	An option to enable (on) or disable (off) the display of units with the log file and poll output.	DUN <on off>
<b>EEP</b>	Display and change specific EEPROM memory locations	EEP <start location><cr>
<b>ERA</b>	Erases just the serial numbers of sensors in the EEPROM. See also the ERF command.	ERA
<b>ERF</b>	Erase the EEPROM (Note: due to the size of memory used, this will take considerable time – use with discretion)	ERF
<b>HLP</b>	Display a list of available commands	HLP
<b>INI</b>	Search for a list of available 1-Wire sensors.	INI
<b>LOG</b>	Start or stop the logging process	LOG <on off>
<b>MEM</b>	Display and change specific memory locations	MEM <start location><cr>
<b>RST</b>	Reset any DS2423 counter	RST<sensorid>

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Command	Description	Syntax
<b>SCK</b>	Set Clock	SCK <b>See Note 4</b>
<b>SER</b>	Display the serial number of the LOG08-II	SER
<b>SET</b>	Configure all system parameters	SET
<b>SID</b>	Show the Serial Number ID for the 1-Wire Devices	SID <on off>
<b>SPT</b>	Set the polling interval	SPT xx Where xx is a decimal number from 00 to 99. 00 will disable polling <b>and logging</b> . Enter "R" instead of a number to enable repetitive polling (V2.06 and later)
<b>SPR</b>	Set power restore logging. If set to on, logging will resume after a power failure, if set to off, logging will not resume after a power failure.	SPR <on off>
<b>STD</b>	Set Temperature Display	STD <F C>
<b>TIM</b>	Display Time from Real Time Clock	TIM
<b>TMP</b>	Display sensor readings of all connected 1-Wire Devices in either verbose (includes serial numbers) or non-verbose manner	TMP
<b>TYP</b>	Select the type of DS2438 or DS2423 device. See Table 3 for valid types.	TYP<sensorid>
<b>VER</b>	Displays the current version of the software loaded	VER
<b>VIE</b>	A debug command that permits viewing the entire EEPROM log memory as Hexadecimal.	VIE
<b>ZZZ</b>	Performs a reset of LOG08-II	ZZZ

## Notes

1. The <sensorid> parameter in some commands above refers to the sensor number as shown via the DIS command. See the DIS command explanation below.
2. Most commands do not require a Carriage Return (enter) following the parameter or command input. One exception is the SCK command. Commands requiring a sensor number input will require a CR if the sensor number is only a single digit.

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3. *Command parameters are shown in angled brackets "< >". Where only certain options are permitted, they are indicated with a vertical pipe character "|".*
4. *The SCK command will prompt the user for the time and date input.*

## 6.1. Using the SET Command

The **SET** command has multiple parameters. All parameters are also adjustable via discrete commands. All parameters established via the **SET** or discrete commands are retained in non-volatile memory.

### Update Interval

This parameter determines the time between sensor readings, which is the same interval used to log samples. Set to 00 to stop polling and logging. Enter the time in decimal minutes or enter the letter R to enable Repetitive (continuous) polling. Use the **SPT** command to adjust only this parameter.

### F or C Display

This parameter determines how temperature readings are displayed. Enter F for Fahrenheit or C for Celsius. Use the **STD** command to adjust only this parameter.

### Serial # Display

Set this to On if you want LOG08-II to display the 1-wire ID of all sensors. Use the **SID** command to adjust only this parameter.

### Power Restore

Set this to "on" if you want logging to continue following a power failure. Set to "off" if logging should stop following a power failure. Use the **SPR** command to adjust only this parameter.

### Set Clock

Enter the current time here as Year, Day of week (01 = Sunday, 07 = Saturday), Month, Date, followed by Hour, Minutes, and lastly, Seconds. Use the **SCK** command to adjust the clock at any time, except when logging is set to On.

## 6.2. The DIS Display Output

### Sample DIS Output

```
>dis
```



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Serial # 0023

```
01 3000000002202920 DS2450 OK
03 440000001EC34228 DS18B2 OK
04 600008001E316D10 DS1820 OK
05 F5000000375E9426 DS2438 OK T
06 CB0000003770C926 DS2438 OK H
07 91000800135B9B10 DS1820 OK
08 21000000032E4E22 DS1822 OK
09 590000000007B014 DS2430 OK
10 BF00000004F3631D DS2423 OK C
```

```
Update interval = 01 minutes [R]
Temp display = F
Serial # display = On
Power Restore = On
Logging = Off
Samples = 00024
12/18 08:23:30 PM
>
```

## 6.2.1. DIS output explanations

The serial number displayed (in the example above: 0023) is set at the factory.

Time is displayed as Month/Date Hours:Minutes:Seconds.

Sensor numbers do not necessarily match up with the output from the regular sensor output readings. ***This is intentional.*** The sensor numbers in the **DIS** output are the memory locator and are used by the **DEL**, **RST** and **TYP** commands. The sensor numbers in the **TMP** output and regular polled output are sequential numbers for each type of sensor.

An **OK** will be displayed following the sensor type to indicate that the Cyclic Redundancy Counter (CRC) checksum of the sensor's serial number is good. If the serial number has a bad CRC, an **NG** will be displayed. The checksum is validated during the output of the sensor display.

Letters following the DS2423 and DS2438 indicate the TYPE of sensor equipped. This is a manual input and will be set following first discovery of the sensor via the INI command. The letters designate the sensor type per the following table. Use the **TYP** command to change a device type for DS2438's. DS2423 sensors always default to type "C". Note that the sensor type input for DS2438's becomes irrelevant during a logging or polling cycle. All DS2438's will default to type "V" during a logging session.

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**Table 4 Sensor Type Descriptions**

Designation	Description	OW Device
C	General Purpose Counter	DS2423
H	Humidity Sensor	DS2438
T	Temperature only from DS2438	DS2438
V	Voltage Sensor	DS2438

Following a display of the sensors installed, the output of the **DIS** display then shows the LOG08-II settings that you entered via the **SET** command.

The Logging mode is then shown. Use the **LOG** command to enable or disable the logging mode.

The quantity of stored samples is then displayed.

*Note: this capability is not present in software versions after 2.06.*

Following that display the **DIS** output proceeds to show how many temperature sensors are installed, by type. The DS18B2 type indicates a DS18B20 sensor. The DS1820 type is valid for DS1820, DS18S20 and DS1920 sensors.

## 6.3. Using the LOG command

The **LOG ON** command will start recording of the samples from all connected temperature sensors, counts from DS2423's, and also voltage readings from DS2438's that may be connected. The clock cannot be changed following the issuance of the **LOG ON** command. The following commands are inhibited once logging is in process: **DEL**, **EEP**, **ERA**, **ERF**, **INI**, **MEM**, **RST**, **SCK**, **SET**, **SID**, **SPT**, **STD**, **TYP**.

If LOG08-II is reset, via power failure or other means, the logging will be disabled if the Power Restore option is set to off. If the Power Restore option is set to on, then logging will resume after a power failure or other reset. The **SPR** command will change the Power Restore option.

Use the **LOG OFF** command when finished logging.

When the samples taken exceed available memory, the logging is automatically disabled and a "! Memory is full" message will be displayed.

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The **DLO** command may be used at any time during the logging process to observe the entire contents of the log file.

The **DLR** command may be used at any time to display logs received since the last **DLR** or **DLO** command.

Logging will be done on the following 1-Wire sensors:

**Table 5 Sensors Supported by the LOG command**

Sensor	What is Logged
DS1820	Temperature
DS18S20	Temperature
DS18B20	Temperature
DS1822	Temperature
DS2438	Voltage from VAD and VDD and VSense
DS2423	Counter B – first 2 bytes only
DS2450	Voltages from A, B, C and D inputs

## 6.4. DLO Output

The **DLO** command is used to display the contents of the log records. A sample appears below.

### 6.4.1. DLO Display with DUN ON

```
>DLO
LOG08-II v2.06 2007-08-04
MidonDesign.com
Serial # 0023
05 F5000000375E9426 DS2438 OK
01 3000000002202920 DS2450 OK
03 440000001EC34228 DS18B2 OK
04 600008001E316D10 DS1820 OK
07 91000800135B9B10 DS1820 OK
08 21000000032E4E22 DS1822 OK

12/18,08:46:12 PM,2.96V,13.6V,05,2.09V,05,4.99V,05,0.31V,_
01,2.38V,01,1.22V,01,4.75V,01,3.65V,_
03,78.13F,04,82.30F,07,57.96F,08,78.11F
12/18,09:46:12 PM,2.96V,13.6V,05,2.09V,05,4.99V,05,0.31V,_
01,2.38V,01,1.22V,01,4.75V,01,3.65V,_
03,78.13F,04,82.30F,07,57.96F,08,78.11F
12/18,10:46:12 PM,2.96V,13.6V,05,2.09V,05,4.99V,05,0.31V,_
01,2.38V,01,1.22V,01,4.75V,01,3.65V,_
03,-127.99F,04,82.30F,07,57.96F,08,78.11F

End of Log
>
```

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## 6.4.2. DLO Display with DUN OFF

```
>DLO
LOG08-II v2.06 2007-08-04
MidonDesign.com
Serial # 0023
05 F5000000375E9426 DS2438 OK
01 3000000002202920 DS2450 OK
03 440000001EC34228 DS18B2 OK
04 600008001E316D10 DS1820 OK
07 91000800135B9B10 DS1820 OK
08 21000000032E4E22 DS1822 OK

12/18,08:46:12 PM,2.96,13.6,05,2.09,05,4.99,05,0.31,_,_
01,2.38,01,1.22,01,4.75,01,3.65,_,_
03,78.13,04,82.30,07,57.96,08,78.11
12/18,09:46:12 PM,2.96,13.6,05,2.09,05,4.99,05,0.31,_,_
01,2.38,01,1.22,01,4.75,01,3.65,_,_
03,78.13,04,82.30,07,57.96,08,78.11
12/18,10:46:12 PM,2.96,13.6,05,2.09,05,4.99,05,0.31,_,_
01,2.38,01,1.22,01,4.75,01,3.65,_,_
03,-127.99,04,82.30,07,57.96,08,78.11

End of Log
>
```

The output is straightforward. The display starts with the serial number of the LOG08-II device and then a list of all sensors being recorded. The sensor order may be different than the DIS display since the **DLO** display will display in the order that logging is done (DS2438's first, DS2423's next, DS2450's next, all temperature sensors last).

Each line starts with the date and time of the sample recorded. This is followed by a comma, then the on-board battery voltage, and then the power input voltage.

Note: The Power Input voltage is calculated to approximate the actual input voltage. The presumed diode drop of the Full Wave Bridge U6 is added to the actual reading to provide the displayed voltage. This may lead to inaccuracies of the voltage reading and as a result the input voltage may vary by as much as  $\pm 1$  volt from the actual input voltage.

The voltage readings are followed by a comma, then the sensor number (from the DIS display) and then the actual sampled data for each sensor, separated by commas. The log record concludes with an End of Log indicator.

Occasionally, errors will occur on the 1-Wire bus and temperature readings from one or more sensors will be invalid. These invalid readings will be displayed as -127.99F, or -127.99C, which is a reading that can never normally occur with any 1-Wire temperature sensor.

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In the example shown, the Logging interval was set to 60 minutes. This can be set to any amount of time from 1 to 99 minutes.

Some things to note:

1. If you have a DS2438 connected to your 1-Wire network and it is not set to **TYPE V** (voltage), this will be changed when you issue a **LOG ON** command to a V type. You can change this back after you have finished logging to another type if so desired, however, any other type set is really irrelevant.
2. If you have a DS2423 connected to your 1-Wire network and it is not set to **TYPE C** (counter), this will be changed when you issue a **LOG ON** command to a C type.
3. Temperature readings are not taken from DS2438 sensors at any time and will not appear in the logs as well.

## 6.5. DLR Output

The **DLR** command output is identical to that of the **DLO** command with the sole difference being the amount of data shown. If the **DLR** is used for the first time following a **LOG ON** command, the display will be identical to the **DLO** output. Subsequent uses of the **DLR** command will display only information that is new since the last **DLR** or **DLO** command. If there is no new logged information, the End of Log message only will be displayed.

## 6.6. Using the EEP, MEM and VIE Commands

These two commands provide direct access to the memory of LOG08-II and, as such, should be used with extreme caution. After entering the command, LOG08-II will display the contents of memory. Use the “;” key to advance to the next memory location, and use the “/” key to go to the previous memory location. Both commands will wrap around at the appropriate memory boundaries.

To change a memory location using the **MEM** command, enter a hexadecimal value after the memory contents are displayed. Valid inputs are from “00” to “FF”. If the memory location is read-only, an “? Entry Error” error message will be displayed when you try to change the contents.

To change a memory location using the **EEP** command, enter a hexadecimal value after the memory contents are displayed. Valid inputs are from “00” to “FF”.

In both commands, a carriage return (enter) following display of the memory contents will terminate the command.

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For a quick view of the entire EEPROM log memory, use the **VIE** command. It will output the contents in hexadecimal rows of 8 bytes each. To cancel the display at any time, use the Control-X key. To pause the output, use the Control-S key. To resume the display, use the Control-Q key.

The commands noted in this section are not recommended for use without specific input from the manufacturer.

## 6.7. TMP Output Display

The **TMP** output and polled output displays are identical. The **TMP** command simply triggers a poll that would normally occur at the next polling interval. An example is shown below.

### 6.7.1. TMP Output Display with DUN ON

```
>
12/18 08:24:12 PM
Reading Sensors...

Battery Voltage = 2.95V
Input Voltage = 12.6V
Humidity #01[CB0000003770C926]=52%
Voltage #01 [F5000000375E9426] = 1.24V 4.96V 0.31mV
Counter #01[BF00000004F3631D]=00256
Temp #01[440000001EC34228]=76.00F
Temp #02[600008001E316D10]=77.67F
Temp #03[91000800135B9B10]=75.35F
Temp #04[21000000032E4E22]=75.45F
>
```

### 6.7.2. TMP Output Display with DUN OFF

```
>
12/18 08:24:12 PM
Reading Sensors...

Battery Voltage = 2.95
Input Voltage = 12.6
Humidity #01[CB0000003770C926]=52
Voltage #01 [F5000000375E9426] = 1.24 4.96 0.31
Counter #01[BF00000004F3631D]=00256
Temp #01[440000001EC34228]=76.00
Temp #02[600008001E316D10]=77.67
Temp #03[91000800135B9B10]=75.35
Temp #04[21000000032E4E22]=75.45
>
```

The output starts with a time reading. Next the battery and input voltages are displayed. These displays are followed by any humidity, voltage, counter, or

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temperature readings depending on what 1-Wire sensors are connected to LOG08-II.

The first voltage reading displayed for a DS2438 voltage sensor is always the external voltage from the DS2438 input. This is followed by the VDD voltage and then the Vsense input voltage. Changing a humidity type to a voltage type may be useful for trouble-shooting problems with a sensor.

LOG08-II will communicate with each sensor during a TMP poll and will display the results as shown above. In the case of communication errors with any sensor, LOG08-II will re-try the communication up to 10 times. In the event that the communication still fails, then LOG08-II will display “???” instead of a valid sensor reading.

The **TMP** command is disabled when logging is set to On.

## 6.8. Setting the Clock

The SCK command is probably a bit too cryptic, so here is the meaning of the abbreviations used:

```
>sck
YR=07      (the Year)
DY=04      (Day of the week – Sunday = 01, Monday = 02, etc.)
MO=11      (Month)
DT=21      (Date – the day of the month)
HR=06      (Hour in 12 hour format)
MI=36      (Minutes)
SE=43      (Seconds)
AM/PM= a   (AM or PM – enter a or p only)
>tim
11/21 06:36:45 AM
>
```

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## 7. Software Change History

**Table 6 LOG08-II Software History**

<b>Version</b>	<b>Date</b>	<b>Major Changes from Previous Loads</b>
2.02	August 1, 2005	Final production version of software
2.03	September 19, 2005	Added the DUN option
2.04	January 10, 2006	Added ability to log DS2450 sensors
2.05	April 26, 2006	Added VDD logging for DS2438's and fixed missing DS2423 sensor log issue.
2.06	August 4, 2007	Added Vsense logging for DS2438 sensors. Added continuous logging capability.
2.07	August 6, 2009	Added display for Humidity sensors during poll (this will not be logged however)
2.08	February 12, 2010	Added more error checking for temperature sensors.



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## 8. Trouble-Shooting Problems with LOG08-II

The most common problems associated with using LOG08-II are listed in the following table. If these instructions do not result in better results with your LOG08-II, please feel free to contact Midon Design at [support@midondesign.com](mailto:support@midondesign.com). We would be more than happy to assist you.

**Table 7 Common LOG08-II Problems and Resolutions**

Problem	Possible Causes
I cannot display LOG08-II output on my PC	Ensure that you are connected with the proper settings (9600 bps, no parity) and that you are using a straight-through, not a null-modem, serial cable.
I cannot see what I type on Hyperterm	This is normal for some Hyperterm versions that come pre-packaged with Windows. Upgrade to a commercial version of Hyperterm or use different terminal emulator software.
I added a new sensor and now all I get is "OW Bus Error" messages	Your sensor is probable reversed on the 1-Wire bus, OR, there is a short on the bus. Check your wiring.
I was able to add a new sensor but all I get is "???" readings from it.	Check your 1-Wire bus wiring. You may also need to add a 100 $\Omega$ resistor in series with a new leg of bus that you added.
I removed a sensor from my wiring and now all I get is "???" readings from it.	Delete the sensor (use the DEL command).
I added a DS2405 (or 2406 or 2407) sensor and I cannot see the state change when I change the input to it.	LOG08-II, unlike TEMP08, does not display state changes for these sensors.
I tried to add a bunch of sensors via the INI command and only some of them showed up.	The algorithm used in the INI routine is limited in the number of new sensors that can be added due to small amount of RAM available to the LOG08-II. We recommend that you INI less than 8 sensors at a time. In rare cases, this number may need to be lower.
The LED is not flashing	Power to the LOG08-II may not be applied. Check your power supply.
The <b>DIS</b> display shows a blank for "Temp display = "	The <b>DUN</b> option is set to Off. Set it to On.
Humidity sensor output is not displayed	Change the sensor type to "V". DS2438

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Problem	Possible Causes
	sensors will only display output if set to type "V". Note: humidity display is available with versions 2.07 and greater.
DS2438 temperature is not shown.	This is not supported on LOG08-II.

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## 9. Error Messages

**Table 8 LOG08-II Error Messages**

Message	Description
? Entry error	You have made a syntax error in entering a command or a parameter
! Memory is full	You tried to add more than 60 1-wire devices via the INI command. LOG08-II has sufficient memory for only 60 unique 1-Wire device ID's.  Additionally, this error message will be issued when LOG08-II's sample memory is full. There is sufficient memory for about 2,500 samples of up to 24 sensors per sample.
Not installed	LOG08-II could not communicate to the device that you were trying to access. Check your 1-Wire bus wiring.
OW bus error	Common to any 1-wire bus read operation. This error indicates that something is preventing the bus from changing state. Typical causes include shorts on the bus, or a reversed sensor. Disconnect all sensors from J3 and J4 and try adding them one at a time to determine where the wiring error is.
Not Allowed - Logging = On	You are trying to use a command that is not permitted when logging is enabled. Disable logging first via the <b>LOG OFF</b> command.

**Table 9 Reset Type Messages**

Reset Type	Cause of Reset
02	Low voltage – the power supply fell below spec
04	Monitor Mode reset entry – should never be seen
08	Illegal Address – something in the software caused access to an illegal address. Contact Midon Design
10	Illegal Op Code reset – something in the code caused access to an invalid instruction. If this was not the result of a ZZZ command, contact Midon Design
20	Watchdog timeout. The software was busied out with something. If this occurs too frequently, contact Midon Design
40	User reset – you issued a ZZZ command
80	Power on reset – a normal entry

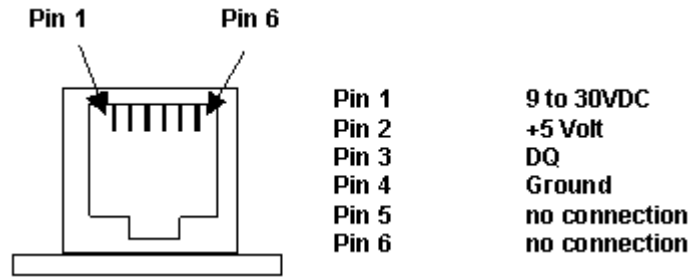
Binary combinations of the above reset types are also possible (the reset type number is in hexadecimal). For instance, a reset type of “50” is normal since the User Reset (40) is accomplished via the intentional use of an illegal op code (10). A power failure reset is usually also indicated via a type “82” reset.

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## 10. J4 Usage

J4 is an RJ-12 connector, which is equivalent to a phone connector, except that it has 6 pins instead of just 4 (or 2). J5 is connected to the One Wire bus and can be used for adding connectivity to One Wire busses configured for RJ-11/12 connection.

The pin-out of the J4 connector is shown in Figure 3.



**Figure 4 Connector J4 RJ-12 Pin-out**

Pin 1 is derived from the power supply feeding LOG08. It is DC rectified, so it will not matter if your power supply is AC only.

**Please note that this pin-out may be different than that of your 1-Wire sensors.** Up until recently, there was no established standard pin-out for the RJ-12 wiring and, as a result, different manufacturers have chosen to use the pins in various ways. The common pins (DQ and Ground) have remained the same for all manufacturers, however, as of the time of writing this manual. These pins are shown **in color** in the table below. Some of the published pin-outs available today are shown in the table below. **Please take caution in connecting up your 1-Wire sensor to LOG08 to avoid damaging the sensor.**

**Table 10 RJ-12 Pin-outs in use**

Device	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
Dallas/Maxim wiring standard (published Oct 2001)	+5VDC	GND	DQ	GND	N/C	DC Supply
Midon Design MD2004 TEMP05	N/C	+5VDC	DQ	GND	N/C	N/C
Midon Design MD2104 TEMP08	DC Supply	+5VDC	DQ	GND	N/C	N/C
Midon Design MD2124 LOG08	DC Supply	+5VDC	DQ	GND	N/C	N/C
Midon Design MD2135 LOG08-II	DC Supply	+5VDC	DQ	GND	N/C	N/C
Midon Design MD3009 Temp Sensor	N/C	+5VDC	DQ	GND	N/C	N/C
Midon Design MD3020 Temp and Humidity Sensor	DC Supply	+5VDC	DQ	GND	N/C	N/C

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Device	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
Midon Design MD208x Relay and LED Sensor	DC Supply	+5VDC	DQ	GND	N/C	N/C
Simon Atkins' Hub (shown for reference only. LOG08 does not currently support this device)	+5VDC	DC Supply	DQ	GND	DC Supply	GND
AAG TAI8550 Combo Switch	+5VDC	GND	DQ	GND	N/C	N/C
AAG TAI8520 Temp Sensor	+5VDC	GND	DQ	GND	N/C	N/C
AAG V3 1-Wire Weather Station	N/C	+5VDC	DQ	GND	GND	N/C
AAG TAI8540A Humidity Sensor	N/C	N/C (GND?)	DQ	GND	N/C (+5VDC?)	N/C
AAG TAI8555 Latch Relay	N/C	GND	DQ	GND	N/C	N/C
AAG TAI8585 Counter Kit	N/C	N/C	DQ	GND	N/C	N/C
AAG DS9097U-S09-X	N/C	GND	DQ	GND	+5V	N/C

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## 11. About the Battery

The CR2032 Lithium battery included with your LOG08-II should last a long time, due to the low current consumption of the circuit that it powers. The “Battery Voltage” readings delivered by LOG08-II should show about 3.0 volts for this lifetime. As the voltage drifts down to 2.0 volts, consider changing the battery, which is a standard “watch” battery available nearly everywhere. Proper disposal of Lithium batteries should be observed.

Please note that the battery supplies power to the real-time clock only. The rest of the LOG08-II circuit requires a power supply to function.

If you are not using LOG08-II for any length of time, remove the battery to prevent it draining.

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## 12. LOG08-II Parts List

**Table 11 MD2135 Parts List**

Part ID	Quantity	Description
B1	1	Coin Battery 3V CR2032 type
C1	1	Capacitor Electrolytic axial 25V 1000uFd
C2, 4-7	5	Capacitor electrolytic axial 10uFd
C3, 10	2	Capacitor ceramic 0.1uFd
C9	1	Capacitor electrolytic axial 16V 100 uFd
D1, 2	2	1N4148 Signal diode
DS1	1	Bipolar LED
J1	1	Terminal Block, 5.08MM, 2 position, PCB Mount
J2	1	Connector, PCB Mount, DB-9
J3	1	Terminal Block, 5.08MM, 3 position, PCB Mount
J4	1	Connector RJ-12 (6 wire)
PCB	1	PCB
R1	1	Resistor 1/4W 5% 1.5K
R3, 5	2	Resistor 1/4W 5% 10K
R4	1	Resistor 1/4W 5% 33K
U1	1	MAX232 RS232 Interface
U2	1	DS1302 Real Time Clock
U3	1	Motorola 68HC908KX8 Flash Microcontroller
U4	1	LM78L05 Voltage Regulator 5V
U5	1	Crystal Oscillator 9.8304 MHz
U6	1	Full Wave Bridge 1A 100PIV 4 pin DIP
U7-10	4	24C256 256Kx8 Serial EEPROM 8DIP
X1	1	Crystal 32.768KHz

**Table 12 Additional Components for MD2136**

Part ID	Quantity	Description
C8	1	Capacitor ceramic 0.1uFd
R2	1	Resistor 1/4W 5% 100K
U12	1	HIH-3610 Humidity Sensor
U13	1	Maxim DS2438 Voltage Monitor

### 12.1.

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## 13. LOG08-II Schematic

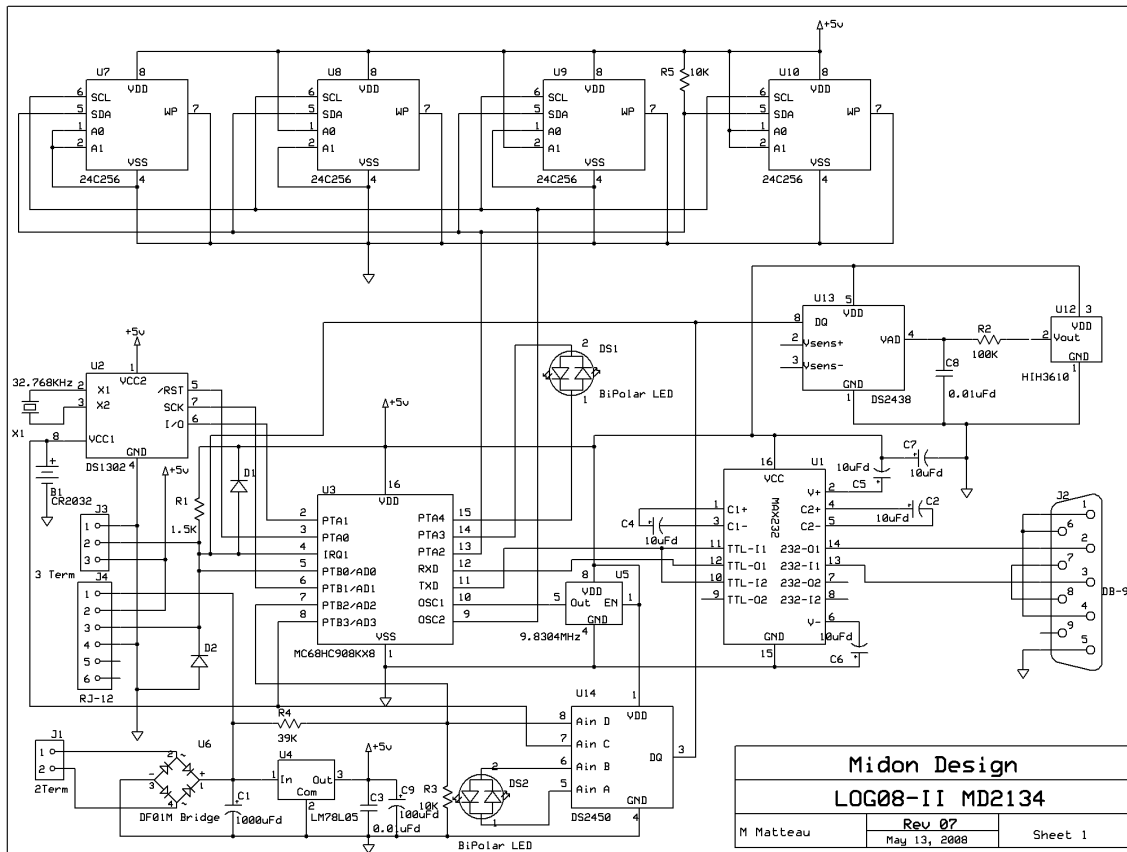


Figure 5 LOG08-II Schematic

a.



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## 14. Conclusion

Your comments are appreciated. If you would like to submit feature requests or product recommendations, please e-mail us for a quote.

### 14.1. Legal Disclaimer

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