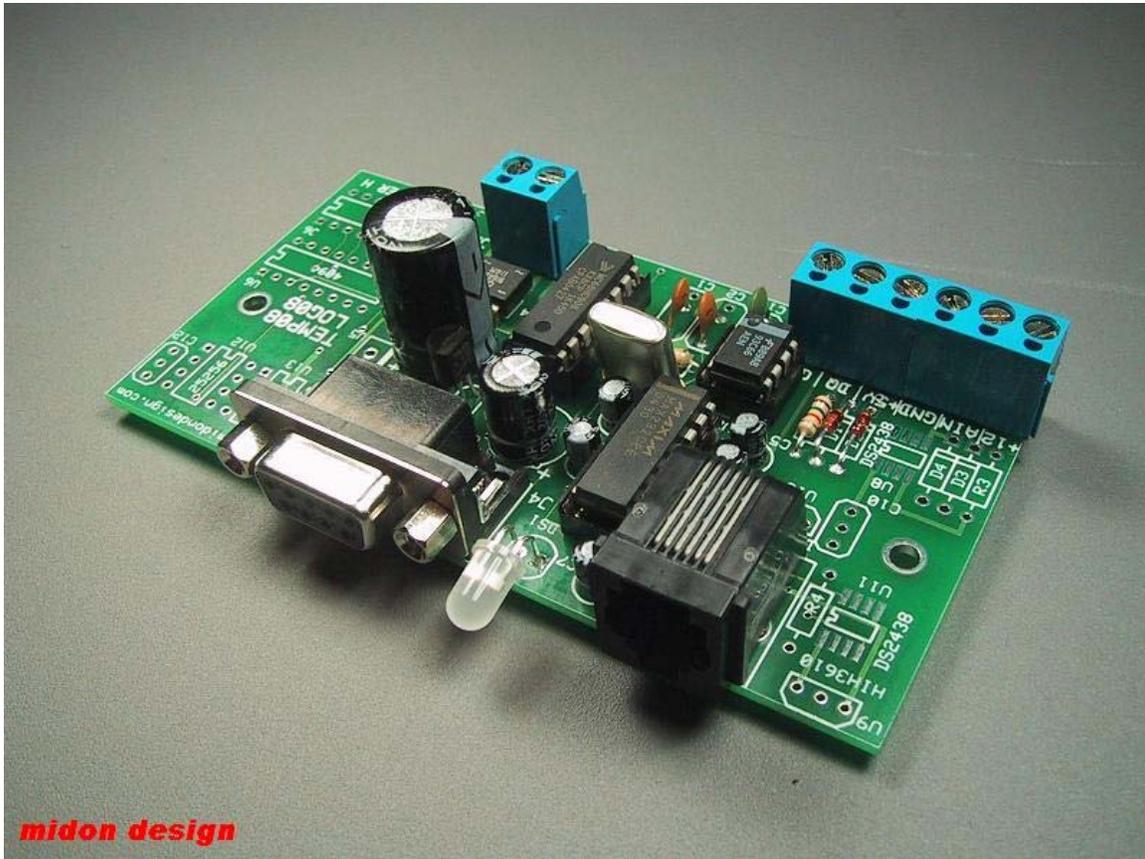


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## **A 1-Wire Serial Interface**

### **1WSwitch**



**Figure 1 1WSwitch**

1WSwitch User Guide Version 1.02  
November 18, 2008

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## 2. Introduction

Thank you for your purchase of the 1WSwitch 1-Wire Serial Interface. The following instructions will assist you in configuring and operating the product.

1WSwitch is a stand-alone 1-Wire™ interface providing standard serial commands to control the Dallas/Maxim 1-Wire bus and some specific devices used on it. Sensors can be polled on a regular basis (from 1 to 99 minutes), or manually interrogated.

In a typical application, 1WSwitch is connected to a serial port on a PC. Serial interface software is then used to gather the data received from 1WSwitch and process it. Users have interfaced 1WSwitch into the [HomeSeer](#) product, which can be used to automate lights, HVAC, sprinklers, and other devices, based on the sensor readings from 1WSwitch.

The 1WSwitch provides a serial interface for the following 1-Wire devices:

- Multiple DS2438-based Voltage Sensors
- Multiple DS2405 input/output sensors
- Multiple DS2406 (or DS2407) input/output sensors
- Up to 20 1WIO relay interface modules (or equivalent DS2408 based relay module) available from Midon Design
- Up to 10 1WIO LED modules (available from Midon Design)
- One 1WIO Input module (available from Midon Design)

1WSwitch has the following features:

- Real-time display of state changes for DS2405, DS2406 or DS2407 sensors
- On-board voltage sensor.
- Jumper-less provisioning - all configuration settings are stored in non-volatile memory
- Up to 60 1-Wire are sensors supported
- Simple instruction set with a Help prompt for recalling command names
- Easy to delete sensors, if they are no longer required, using the DEL command
- 1-Wire bus errors are flagged when they occur
- Continuous poll for ALL sensors - 1WSwitch will notify you when any switch sensor has changed state or is connected or disconnected, providing that they have been previously registered by 1WSwitch via the **INI** command. Very useful for locating intermittent 1-Wire bus problems or for real-time polling of contact sensors.

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- Manual Poll of sensor readings. While 1WSwitch is normally used for continuous (from 1 to 99 minute intervals) polling of sensor readings, it can also be used manually to take sensor readings on command from the serial interface.

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## 3. Installation

To complete this project, you will need to connect a 12 to 16 Volt (AC or DC) transformer to the terminal J1 (see Figure 2 for the location of J1). If you intend to power 1WIO relay units from the 12V output of 1WSwitch, the transformer needs to supply at least 350mA (250mA for 1WIO and 100mA for 1WSwitch) per 1WIO relay unit, up to a maximum of 800mA, or 2 1WIO relay units. Beyond that, supplemental powering will need to be provided for the off-board units. Otherwise, any 12 to 16 Volt adapter capable of at least 100mA will do.

If you are using a sensor network of 1-Wire devices, connect them now to either connector J3 or J5.

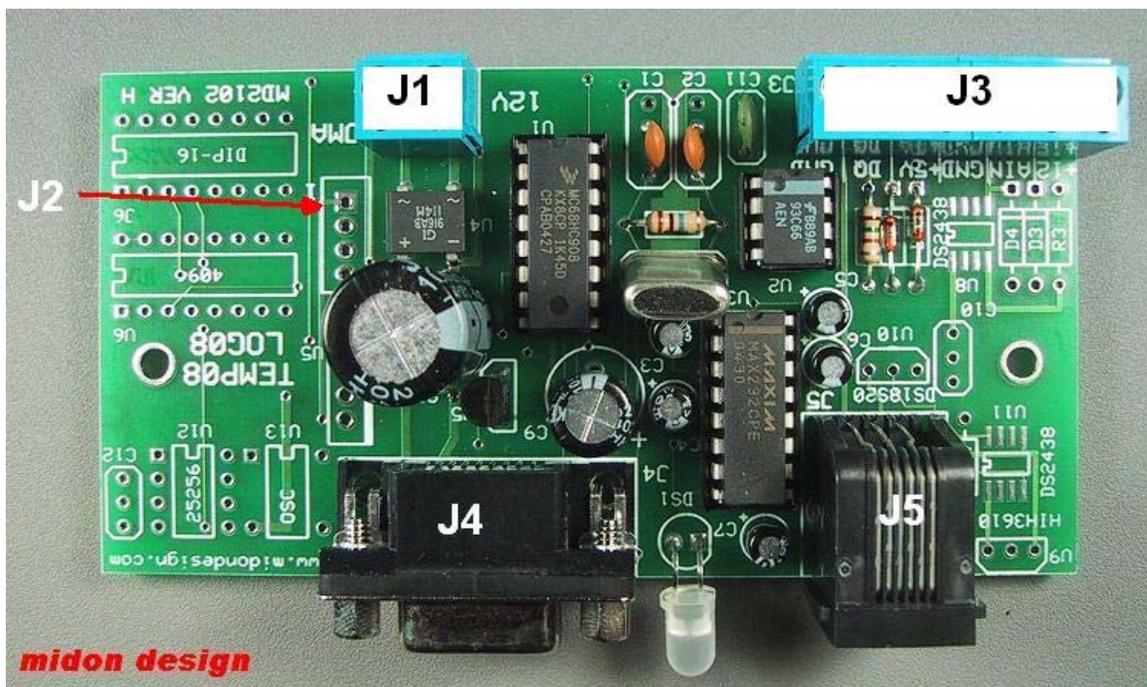


Figure 2 Location of Connectors

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## 4. Using 1WSwitch

Connect up a straight-through serial cable between 1WSwitch's J4 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 1WSwitch and configure the unit for the devices that you have connected.

The start-up sequence will look like this:

```
1WSwitch v1.01 2008-10-12
MidonDesign.com 2245
Reset type: C2

Poll interval = 255 minutes
Serial # Display = On
Time Display = On
OnBoard ADC Display = On
Enable INP = On
Debug = On
SUN 00:00:00
>
```

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

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

If you believe that 1WSwitch has not found all 1-Wire devices, re-issue the INI command.

Now program the configuration by using the **SET** command. Just type **SET** and the program will prompt you for the required settings; polling interval, display settings, and finally the real time clock setting.

```
>set
Poll interval = 01
Serial # Display = on
Time Display = off
OnBoard ADC Display = on
```

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```
Enable INP = off  
Debug = off  
Set Clock (d,h,m,s): 01,14,30,00
```

The options are further defined later in this manual. All are independently adjustable without using the **SET** command.

To verify that your setup is working properly, you could 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).

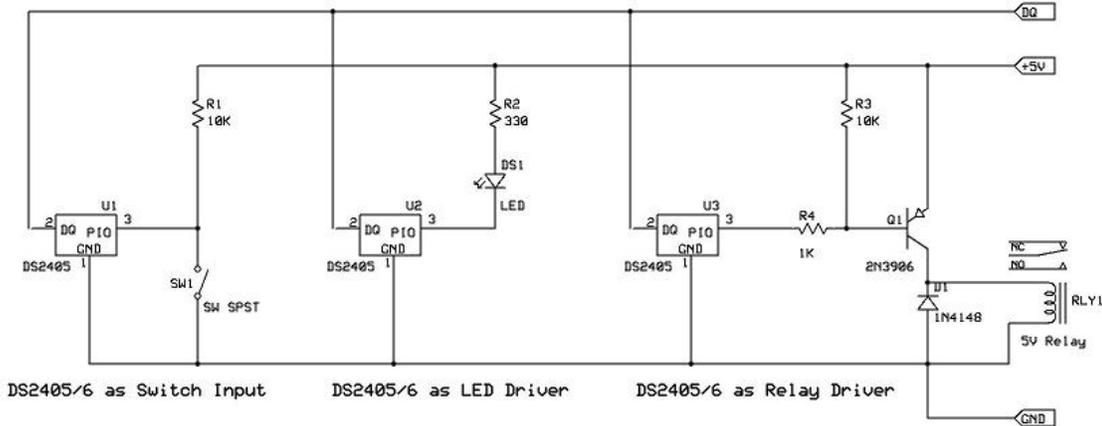
```
SUN 14:30:44  
Reading Sensors...  
Switch #01[C90000005F31C412]=On  
Switch #02[4A0000005F3A1512]=On  
Switch #05[170000002A345005]=On  
Switch #06[4F0000002A15C405]=On  
Switch #07[A60000002A30A405]=On  
Switch #08[620000002A1B9C05]=Off  
Switch #09[410000002A1A3A05]=On  
Switch #10[CC0000001FBD2605]=Off  
Switch #11[8F0000001FB60105]=Off  
Switch #12[E60000001FB82D05]=Off  
Switch #13[A20000001FB6C705]=Off  
Switch #14[290000005F365412]=Off  
J2 Pin 3 Voltage = 00.40V  
>
```

It is highly recommended that you next turn off (or on) all the connected switches. This will reset the saved state in the EEPROM, which may not match the physical configuration – the state of all switch sensors is normally preserved through a power cycle. Use the **ONA** or **OFA** command for all DS2406's (or DS2407) and the **TOG** command for DS2405's.

If there are no apparent errors, you are ready to use 1WSwitch. Enjoy!

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## 5. Using 1-Wire Switch Sensors



**Figure 3 DS2405 or DS2406 Applications**

Figure 3 shows some of the ways in which DS2405 or DS2406 1-Wire sensors can be connected to external devices. The PIO pin on the 1-Wire device can be used as either an input or as an output. When used as an input, make sure that you set the 1-Wire sensor to the off state, otherwise the PIO input changes will not be visible to the device.

When properly connected as a switch input, 1WSwitch will show state changes whenever they occur, for example:

```
FRI 08:11:10
Switch #01[C90000005F31C412]=On
>
FRI 08:11:12
Switch #01[C90000005F31C412]=Off
>
FRI 08:11:17
Switch #01[C90000005F31C412]=On
```

Note that “On” means that the DS2405/6/7 PIO output is at ground voltage level. Thus, in the applications shown in Figure 3, “On” would mean that switch SW1 is closed, or LED DS1 is lit, or relay RLY1 is activated.

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## 6. 1WSwitch Commands

**Table 1 1WSwitch Command List**

Command	Description	Syntax
<b>DAD</b>	Display on-board ADC voltage during poll output	DAD<on off> <b>Note 3</b>
<b>DEB</b>	Enable or disable debug outputs Use only when directed to by Midon Design	DEB<on off>
<b>DEL</b>	Delete a sensor that was previously installed via the INI command	DEL<sensorid> <b>Note 1</b>
<b>DIS</b>	Display serial numbers of all registered 1-Wire devices	DIS
<b>DTI</b>	Display Time every minute	DTI<on off>
<b>EEP</b>	Display and change specific EEPROM memory locations	EEP <start location><cr>
<b>EIN</b>	Enable polling of 1WIO sensors for input status	EIN<on off>
<b>ERA</b>	Erase the entire EEPROM	ERA
<b>HLP</b>	Display a list of available commands	HLP
<b>INI</b>	Register all connected 1-Wire sensors	INI
<b>INP</b>	Display the status of bits 4-7 of the first connected DS2408	INP
<b>LED</b>	Actuate a specific LED on a 1WIO LED unit or an equivalent DS2408 LED interface	LED <LED number> <on off>  Where <LED number> = 01 to 80 or A for All (the leading zero is required for LED numbers less than 10)

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Command	Description	Syntax
<b>MEM</b>	Display and change specific memory locations	MEM <start location><cr>
<b>ONA</b>	Turn ON a DS2406 or DS2407 (channel A only)	ONA <sensorid> Where xx is a decimal number corresponding to the DS2406/7 sensor number as shown in the DIS display
<b>OFA</b>	Turn OFF a DS2406 or DS2407 (channel A only)	OFA <sensorid> Where <sensorid> is a decimal number corresponding to the DS2406/7 sensor number as shown in the DIS display
<b>RLY</b>	Actuate a specific 1WIO relay	RLY <relay number> <on off> Where <relay number> = 01 to 80 or A for All (the leading zero is required for relay numbers less than 10)
<b>SCK</b>	Set Clock	SCK dd, hh, mm, ss<cr> dd = 01 to 07 (Sunday = 01) hh = 00 to 23 mm = 00 to 59 ss = 00 to 59 <b>Note 2</b>
<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 in minutes	SPT <xx> Where <xx> is a decimal number from 00 to 99. 00 will disable polling.
<b>TIM</b>	Display Time from the 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 mode	TMP
<b>TOG</b>	TOGgle a DS2405 sensor output from	TOG <sensorid> Where <sensorid> is a decimal

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Command	Description	Syntax
	on to off or from off to on	number corresponding to the DS2405 sensor number as shown in the DIS display
<b>VER</b>	Displays the current version of the software loaded	VER
<b>ZZZ</b>	Performs a soft reset of 1WSwitch	ZZZ

## Notes

1. *The <sensorid> parameter in the commands above refers to the sensor number as shown via the DIS command. Leading zeros are required. 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.*
3. *Command parameters are shown in angled brackets "<>". Where only certain options are permitted, they are indicated with a vertical pipe character "|".*

## 6.1. Using the SET Command

The SET command has multiple parameters. All option parameters are also adjustable via discrete commands.

```
>set
Poll interval = 01
Serial # Display = on
Time Display = off
OnBoard ADC Display = on
Enable INP = off
Debug = off
Set Clock (d,h,m,s): 01,14,30,00
```

### Poll Interval

This parameter determines the time between sensor readings. Set to 00 to stop polling. Enter the time in decimal minutes. Use the **SPT** command to adjust only this parameter.

### Serial # Display

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

### Time Display

Set this to On if you want 1WSwitch to display the voltage as measured at connector J2 pin 3. Use the **DAD** command to adjust only this parameter.

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## OnBoard ADC Display

Set this to On if you want 1WSwitch to display the output from the on-board Analog to Digital Converter connected to pin 3 of J2 and referenced to ground on pin 4 of J2. Use the **DAD** command to adjust only this parameter.

## Debug

Set this to On only if requested to by Midon Design in case troubleshooting details are required. Otherwise, your display will be corrupted with outputs that are meaningless. Use the **DEB** command to adjust only this parameter.

## Set Clock

Enter the current time here as Day of week (01 = Sunday) followed by Hour, Minutes, and lastly, Seconds. Use the **SCK** command to adjust the clock at any time. Time is entered and displayed in 24 hour (military) format.

## 6.2. The DIS Display Output

### Sample DIS Output

```
>dis
01 C900000005F31C412 DS2406 OK P
02 4A00000005F3A1512 DS2406 OK P
03 A4000000001042829 DS2408 OK P
04 74000000001044629 DS2408 OK P
05 1700000002A345005 DS2405 OK P
06 4F00000002A15C405 DS2405 OK P
07 A600000002A30A405 DS2405 OK P
08 6200000002A1B9C05 DS2405 OK P
09 4100000002A1A3A05 DS2405 OK P
10 CC00000001FBD2605 DS2405 OK P
11 8F00000001FB60105 DS2405 OK P
12 E600000001FB82D05 DS2405 OK P
13 A200000001FB6C705 DS2405 OK P
14 2900000005F365412 DS2406 OK P
15 A0000800E93A8F10 DS1820 OK P
16 3D00000004CC69826 DS2438 OK P
```

```
Poll interval = 01 minutes
Serial # Display = On
Time Display = Off
OnBoard ADC Display = On
Enable INP = Off
Debug = Off
FRI 20:11:12
```

### 6.2.1. DIS output explanations

The DIS commands shows all sensors registered by 1WSwitch. The output shows the memory locator for the sensor, known as the sensor ID, the sensor

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serial number, which is programmed into the sensor at the factory, followed by the CRC check status and presence status.

An OK will be displayed following the Sensor ID 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.

Following the CRC status, a **P** or **M** will be displayed to show the connectivity of the sensor. A **P** is displayed if the sensor is present, and an **M** when it is missing from the 1-Wire bus.

Following a display of the sensors installed, the output of the **DIS** display then shows the 1WSwitch settings that you entered via the **SET** command.

## 6.3. Using the EEP and MEM Commands

These two commands provide direct access to the memory of 1WSwitch and, as such, should be used with extreme caution. After entering the command, 1WSwitch 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.

To change a memory location using the EEP command, enter a double hexadecimal value after the memory contents are displayed. Valid inputs are from "0000" to "FFFF".

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

Obviously, these commands can be potentially harmful to the operation of 1Wswitch if not used properly. Midon Design recommends that the **EEP** and **MEM** commands only be used under guidance from our support staff.

## 6.4. TMP Output Display

The **TMP** output and polled output displays are identical. An example is shown below.

# midon design

```
FRI 08:10:41
Reading Sensors...
Switch #01[C90000005F31C412]=Off
Switch #02[4A0000005F3A1512]=On
Switch #05[170000002A345005]=Off
Switch #06[4F0000002A15C405]=On
Switch #07[A60000002A30A405]=Off
Switch #08[620000002A1B9C05]=Off
Switch #09[410000002A1A3A05]=On
Switch #10[CC0000001FBD2605]=Off
Switch #11[8F0000001FB60105]=Off
Switch #12[E60000001FB82D05]=Off
Switch #13[A20000001FB6C705]=On
Switch #14[290000005F365412]=On
J2 Pin 3 Voltage = 00.42V
Voltage #16[3D0000004CC69826]=01.89V 05.22V 01mV
>
```

The output starts with a time reading, followed by switch status, 1WIO input status (if enabled by the EIN command), DS2438 voltage sensor status and on-board ADC voltage (if enabled by the DAD command).

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 lastly by the DS2438 “current” sensor voltage, which corresponds to current depending on what value of resistor is connected across the current terminals of a DS2438.

**Note: the time is always displayed once per minute, on the minute, except during a polling interval or TMP display, or if disabled by the DTI Off command. See the explanation of the DTI command.**

## 6.5. Missing Sensor Display

1WSwitch continuously polls for the presence of all sensors that have been registered via the INI command, in other words, for sensors that are known to 1WSwitch. If any of the sensors are detected as missing, the following display will result:

```
>MON 09:52:34
Missing Sensor #06 [4F0000002A15C405]
```

When the sensor is re-connected, the display will look like this:

```
>MON 09:57:01
Restored Sensor #06 [4F0000002A15C405]
```

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Polling of sensors is done sequentially and very fast (milliseconds per sensor). The more sensors that are equipped, however, the more time it will take for 1WSwitch to recognize a missing or re-added sensor.

## 6.6. Options

### 6.6.1. On Board ADC Display (DAD)

The DAD (Display A to D) option is to enable or disable the on-chip voltage sensor (Analog to Digital Converter, or ADC). The command **DAD on** enables the display and **DAD off** disables the display.

The on-board ADC is available on pin 3 of J2 and referenced to the ground pin available as pin 4 of J2. Be careful with connections to this ADC input. **Note: you are connecting directly to the processor, and input voltages greater than 5 volts, or less than -0.6 volts, will damage the processor pin and possibly the processor itself.**

Activating the display results in the following kind of display during a Polling interval:

```
>
FRI 08:10:41
Reading Sensors...
Switch #01[C90000005F31C412]=Off
Switch #02[4A0000005F3A1512]=On
Switch #05[170000002A345005]=Off
Switch #06[4F0000002A15C405]=On
Switch #07[A60000002A30A405]=Off
Switch #08[620000002A1B9C05]=Off
Switch #09[410000002A1A3A05]=On
Switch #10[CC0000001FBD2605]=Off
Switch #11[8F0000001FB60105]=Off
Switch #12[E60000001FB82D05]=Off
Switch #13[A20000001FB6C705]=On
Switch #14[290000005F365412]=On
J2 Pin 3 Voltage = 00.42V
Voltage #16[3D0000004CC69826]=01.89V 05.22V 01mV
>
```

### 6.6.2. Once Per Minute Time Display (DTI)

The DTI (Display Time) option is used to enable or disable the once-per-minute time display. The command **DTI on** enables the regular time display.

### 6.6.3. Enable DS2408 Input Poll (EIN)

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The EIN (Enable INput) option enables or disables a regular poll of one DS2408 connected on the 1-Wire bus, the one with the lowest sensorid. Setting EIN off is generally only required for users of MD2088 LED displays, which uses a DS2408 to drive the LED's, since the normal poll of a DS2408 will set the high order bits (4 to 7) of the DS2408 and corrupt the LED display for those bits. Setting EIN Off is done to permit reading of the input ports (4 to 7) of the 1WIO sensor since clearing those bits would normally result in false readings. This option has no affect on the **INP** command and as a result, user's with MD2088 displays will experience corruption of their LED displays if the **INP** command is used. The command **EIN on** will enable regular polling of the 1WIO inputs during a poll cycle.

**Table 2 EIN Settings Recommended**

<b>1WIO Used</b>	<b>Recommended EIN Setting</b>
MD2083 4 Relay Output	Not important
MD2084 4 Input	On
MD2088 8 LED Ouput	Off

## 6.7. DS2408 Based Relay and LED Usage

1WSwitch software has the ability to actuate relay modules based on the DS2408 port expander chip from Dallas/Maxim. One such module is the Midon Design 1WIO.

The 1WSwitch supports up to 40 1WIO relay modules (MD2083) and the **RLY** command input then actuates those relays (numbered from 01 to 80). Relay numbers 01 to 04 are for the first connected 1WIO module, relay numbers 05 to 08 are for the second, and so on. Note that the leading zero for the relay number is required.

The **LED** command works the same way as the **RLY** command except that there are 8 LED's per 1WIO acted on instead of 4 relays per 1WIO. Up to 10 1WIO LED units are supported for a total of 80 LED's. Remember to set EIN OFF when using a 1WIO LED Module.

The **RLYA<on|off>** command will affect all connected 1WIO relays, and/or all connected LED modules.

```
>rly01on  
Relay Group #01=On,Off,Off,Off
```

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## 7. J5 Usage

J5 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 J5 connector is shown in Figure 4.

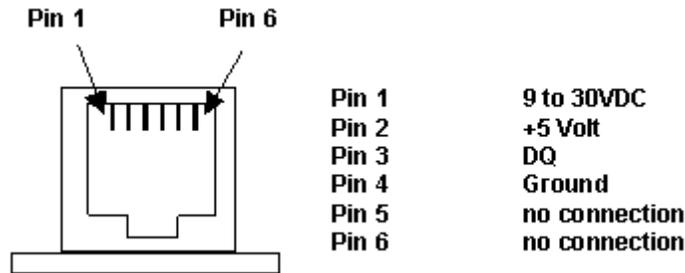


Figure 4 Connector J5 RJ-12 Pin-out

Pin 1 is derived from the power supply feeding 1WSwitch. 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.** At one time, 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 1WSwitch to avoid damaging the sensor.**

Table 3 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 1WSwitch	DC Supply	+5VDC	DQ	GND	N/C	N/C
Midon Design MD2204 LOG08	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 MD3020x 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 (1WIO)	DC Supply	+5VDC	DQ	GND	N/C	N/C
Simon Atkins' Hub (shown for reference only. 1WSwitch does not 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

The table entries shown in red above indicate pin configurations that may damage 1WSwitch or the connected sensor.

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## 8. Software Change History

Table 4 1WSwitch Software History

Version	Date	Major Changes from Previous Loads
1.02	11/17/2008	<ul style="list-style-type: none"><li>• Minor glitch in INI command</li><li>• Added “Found...” message to INI output</li></ul>
1.01	10/12/2008	<ul style="list-style-type: none"><li>• Final production version of software</li></ul>

### 8.1. Upgrading 1WSwitch Software

Midon Design strives to continue to add value to the 1WSwitch product and, as a result, we release new features to the 1WSwitch software from time to time. Upgrading 1WSwitch is easy. Software updates can be ordered from our web pages. Upon receipt of your new chip containing the upgraded software, return the original chip to Midon Design and cite the order number. If we receive the device back within 30 days of the upgrade order, we will credit your PayPal account with half the price of the upgrade, less shipping costs. Alternatively, you can apply that credit towards a future purchase from Midon Design.

### 8.2. Upgrade Instructions

- 1. Remove power from the 1WSwitch!**
2. Using a small screw-driver, or similar tool, gently remove U1, the 68HC908KX8 micro-controller, by inserting the screw-driver between the micro-controller and the DIP socket that it is inserted to. The location of U1 is shown in Figure 5.
3. Make sure that you are grounded, or adequately static free, and then insert the new micro-controller into the socket. Care should be taken to observe the correct polarity. The end of the micro-controller with a small notch, or a dot in the left corner, should be positioned to be close to the J1 connector as per the diagram below.
4. Make sure that all micro-controller pins are seated in the socket. Check for pins that may have bent inwards.
5. Restore power to 1WSwitch.
6. Enjoy your new features.

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The following figure shows the location for installing the new processor, U1.

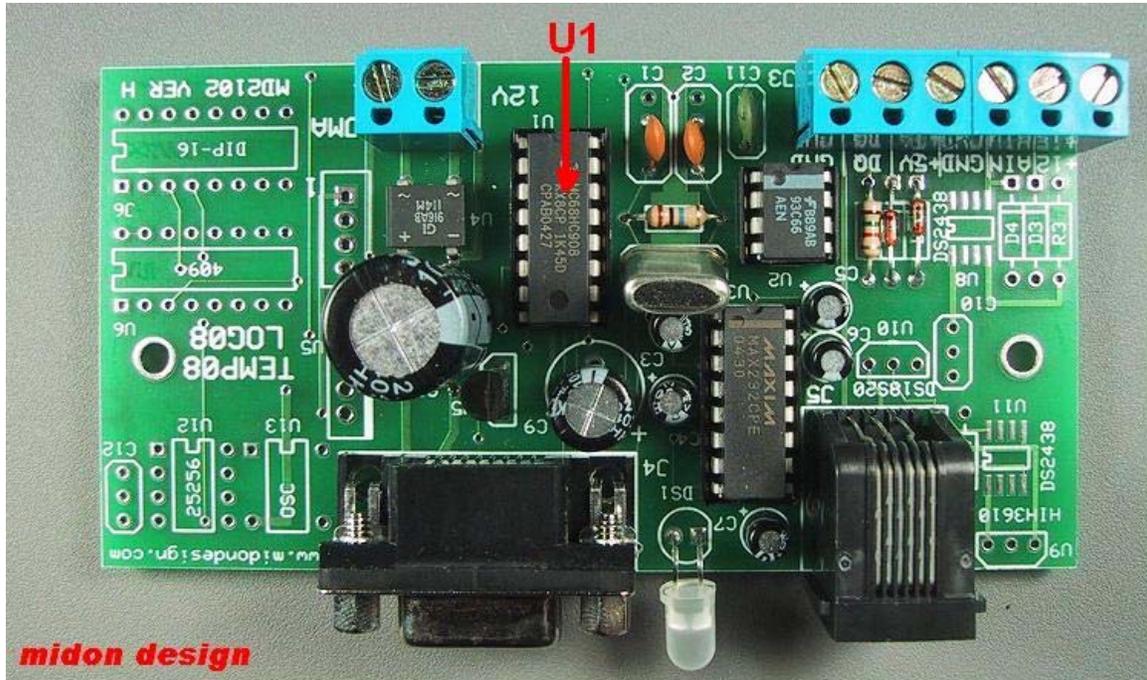


Figure 5 1WSwitch Top View

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## 9. Trouble-Shooting Problems with 1WSwitch

The most common problems associated with using 1WSwitch are listed in the following table. If these instructions do not result in better results with your 1WSwitch, 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 5 Common 1WSwitch Problems and Resolutions**

<b>Problem</b>	<b>Possible Causes</b>
I cannot display 1WSwitch 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 Hyperterm versions that come pre-packaged with some versions of 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 need to add a 100 ohm 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) to eliminate the ??? readings.
I have a MD2088 LED display and LED's 5 to 8 turn on by themselves and will not turn off	Disable DS2408 input polling via the EIN OFF command

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## 10. Error Messages

**Table 6 1WSwitch 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. 1WSwitch has sufficient memory for only 60 unique 1-Wire device ID's.
Not installed	1WSwitch could not communicate to the device that you were trying to access. Check your 1-Wire bus wiring, or make sure that you are specifying the correct sensor number.
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.
? Input Timeout	A parameter was not received in response to a command within 1 minute.
? Device Write Error	Only issued when communication with a DS2408 fails. Try the command again. If it persists, you may have a 1-Wire bus wiring problem.

**Table 7 Reset Type Messages**

Reset Type (hex)	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 happened. 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 types above are possible and normal. For example, a power up reset will usually result in a type 82 message (Power on reset plus low voltage reset) and a ZZZ reset will result in a type 50 message.

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## 11. 1WSwitch Schematic

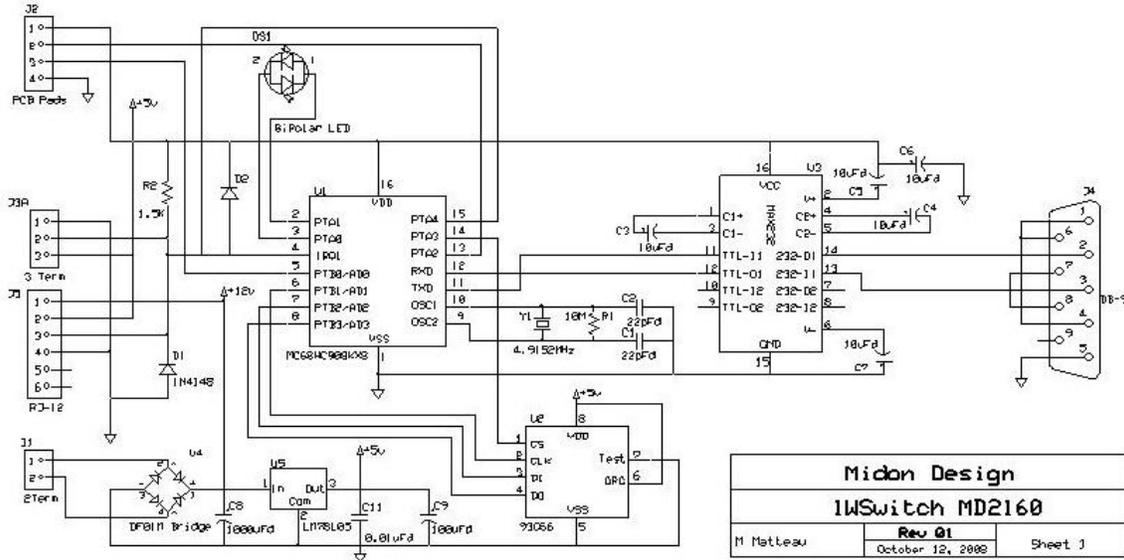


Figure 6 1WSwitch Schematic

Figure 6 shows all components as equipped on a 1WSwitch. The PCB also has mounting connections for an optional DS2438 that can be used as a voltage sensor for external voltages (from zero to 5Volts) through the AIN connection on J3.

## 12. 1-Wire Sensors

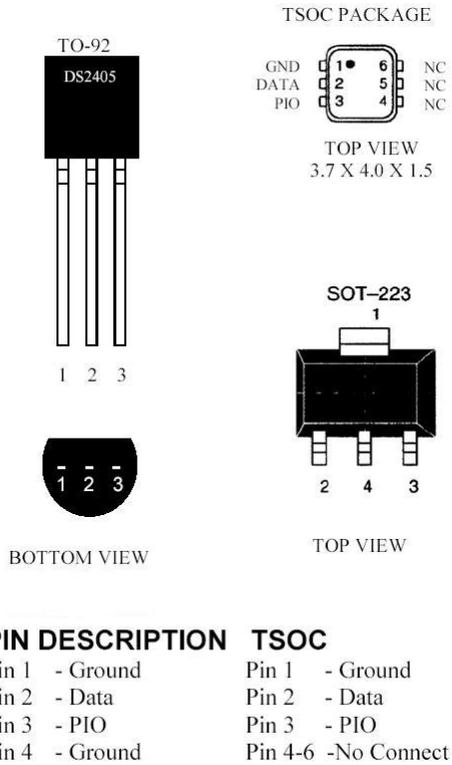


Figure 7 DS2405 Pinout

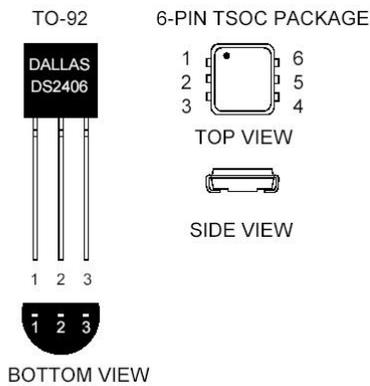
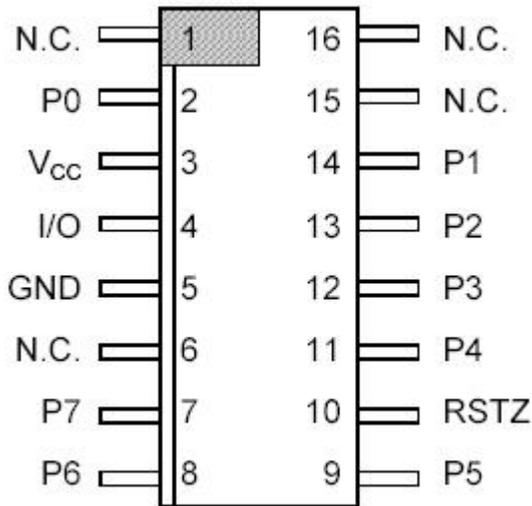
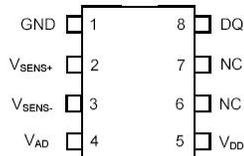


Figure 8 DS2406 & DS2407 Pinout

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**Figure 9 DS2408 Pinout**



DS2438Z, DS2438AZ  
8-Pin SOIC (150-mil)

**PIN DESCRIPTION**

- DQ - Data In/Out
- VAD - General A/D input
- VSENS+ - Battery current monitor input (+)
- VSENS- - Battery current monitor input (-)
- VDD - Power Supply (2.4V to 10.0V)
- GND - Ground
- NC - No connect

**Figure 10 DS2438 Pinout**

**Table 8 Midon Design – Available/Compatible Sensors**

Midon Part Number	Description
MD3014	DS2405 Switch Sensor
MD3023	DS2406 Switch Sensor
MD2083	1WIO 4 Relay Output
MD2084	1WIO 4 Input
MD2088	1WIO 8 LED Output
MD3020E	Humidity Sensor (humidity will display as voltages only)

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MD3020G	1 Relay Output
MD3020H	1 LED output

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## 13. Legal Disclaimer

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## Thank you!

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

[support@midondesign.com](mailto:support@midondesign.com)

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