



## OPERATION

Once the module is powered up it will load its correct configuration from its internal EEPROM and from the dipswitch. It will not automatically start monitoring. To prevent any startup instabilities and timing issues the module will wait 1 minute from startup before it will start monitoring its channels for inactivity.

When a channel's timeout duration has been exceeded due to no activity the module will initiate the reset/power cycle. In reset mode it will toggle the output once for the pulse length duration after which it will again wait 1 minute before monitoring is resumed.

In Power cycle mode the module will toggle the output for the pulse length duration to switch of the monitored device. It will then wait for xx seconds after which it will toggle the output again for 1 second to switch on the monitored device and again wait 1 minute before monitoring is resumed.

In both power and reset modes the delay before monitoring resumes will be canceled if the module detects input activity, since it will assume the monitored device is active again.

## CONFIGURATION

The operation of the module can be manipulated by altering the configuration of the 10way dip switch and the 4 onboard 2pin jumpers.

### OPEN THE BACK OF THE ENCLOSURE WITH CARE TO PREVENT DAMAGE

#### Dipswitch Configuration

Dipswitch 1,2,3	Timeout Duration (Minutes)
Dipswitch 4,5,6	Pulse Duration (Milliseconds):
Dipswitch 7,8	Power/Reset Mode (Off = Power, On = Reset )
Dipswitch 9	Pulse Duration Multiplier (Off = x1, On = x10)
Dipswitch 10	Reboot Timeout Mode(Off = Disabled, On = Enabled)

Table 1 – Dipswitch assignment

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10
Power Mode*	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
Reset Mode	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	OFF

Table 2 –Default configuration

\* Ships with these settings: 4 minutes Timeout, 300mS x10 Pulse duration

**Timeout Duration (Dips 1/2/3):** This timeout duration is used to specify the duration of no input activity before a reset/power cycle is initiated. Care must be taken not to set this value to low as it might result in reset/power cycles during period of low disk activity.

**Pulse Duration (Dips 4/5/6):** This is the pulse length of the reset/power cycle pulse to the computer. When set too long it might initiate another reset/power cycle, and when too short it might not be detected. When operating in reset mode it is recommended to use a value between 100-500mS and between 1-2 Seconds for Power mode.

Timeout (Minutes)					Pulse Duration (Milliseconds)					
SW3	SW2	SW1	Value	Duration	SW6	SW5	SW4	Value	Duration	
									Multiplier x1	Multiplier x10
OFF	OFF	OFF	0	2	OFF	OFF	OFF	0	100	1000
OFF	OFF	ON	1	4	OFF	OFF	ON	1	200	2000
OFF	ON	OFF	2	6	OFF	ON	OFF	2	300	3000
OFF	ON	ON	3	8	OFF	ON	ON	3	400	4000
ON	OFF	OFF	4	10	ON	OFF	OFF	4	500	5000
ON	OFF	ON	5	12	ON	OFF	ON	5	600	6000
ON	ON	OFF	6	14	ON	ON	OFF	6	700	7000
ON	ON	ON	7	16	ON	ON	ON	7	800	8000

Table 3 – Dipswitch duration lookup

**Power/reset Mode (Dips 7/8):** These pins are used to allow the user to specify if the module must power cycle the unresponsive computer or simply reset it.

Channel 1: Dip 7, Channel 2: Dip 8.

When set to OFF, the specific channel is in Power mode, and ON it is in Reboot mode. The module must then also be connected to the correct power or reboot pins on the motherboard to operate correctly.

**Multiplier (Dip 9):** The switching pulse duration used to initiate the reset/power cycle is in the range of 100mS to 800mS with the Multiplier set to OFF (x1). When set to ON, x10 multiplication is enabled, increasing the pulse duration to a range of 1-8 seconds which is more appropriate for the power cycle mode.

**Reboot timeout Mode (Dip 10):** To prevent possible reboot/power cycle loops, the user can Enable (ON) / Disable (OFF) monitoring after 5 reboot/power cycle counts if it occurred within a 5xTimeout period. Once the reboot counter reaches 5 and the time between first and last reboot is still less than 5xTimeout then the channel's monitoring will be disabled which will prevent any further attempts to reboot/power cycle it.

The reboot counter will automatically clear if the 5xTimeout duration has lapsed without any reboots but only while monitoring is still enabled. Once monitoring is disabled the user MUST use the push button to re-enable monitoring for the specific channel or cycle the power to the watchdog module.

### Jumper Configuration

The module has 4 jumpers and they are used to enable/disable the input series LEDS, and output series resistors. It is highly recommended that the output resistors remain enabled (Jumper removed) to limit the current flow on the output circuit to minimize the risk of component damage due to incorrect wiring.

J1=Ch1 / J2=Ch2	Removed (Default): Input Series LED enabled Present: Input Series LED Disabled.
J3=Ch1 / J4=Ch2	Removed (Default): Output 390Ω series resistor enabled Present: Output 390Ω series resistor disabled

Table 4 – Jumper assignment

### LEDS

The modules' 2 output LEDS have multiple functions, ranging from showing input signals, heartbeat and error codes.

#### During Start up:

Mode	Flash Sequence
Debug	Both LEDS will flash for 500mS when entering debug mode at startup
System Error	LED1 flash on for 500mS then off for 500mS. LED2 then flash on for 500mS, and off for 500mS, repeat
Demo	LED2 flash on for 200mS then off for 200mS for 2 cycles. LED1 only on if debug mode enabled
Normal	LED1 flash on for 200mS then off for 200mS for 2 cycles. LED2 only on if debug mode enabled

Table 5 – Startup LED sequences

#### During operation (per channel):

Mode	Flash Sequence
Random flash	Represent input signal detected.
Heartbeat	200mS Flash every 10 seconds, 400mS if a restart occurred on the channel in the specified time period.
Permanent Off	Channel factory disabled
Permanent On	Channel disabled due to max restarts in specified time period or manually initiated by user.
Channel Selection	Indicates the selected channel (Ch1, Ch2 or both). The LEDS will automatically clear after 10 seconds and resume normal operation

Table 6 – Operation LED sequences

### PUSHBUTTON

During normal operation the push button can be used to initiate a reset/power cycle of either/both channels and to initiate a module reboot as well by varying the duration the button is pressed.

Button pressed Duration	Action
1-4 Seconds	Channel selection, LEDS will toggle to indicate the selected Channel(s)
5-15 Seconds	Initiate Reset/Power cycle on the selected channel(s) and disabled/enabled monitoring depending on previous state
>20 Seconds	Initiate a Watchdog module reboot.

Table 7 – Pushbutton Functions

## TESTING

The easiest way to test if the module is connected correctly and functioning as expected is to simulate a system crash and then evaluate how the module recovers the system from it.

Windows includes a feature that can be enabled to manually crash the system by holding the right CTRL key and pressing the "Scroll Lock" key twice. To enable follow these steps:

- Open Registry Editor by clicking on the Start Button and typing in Regedit and hitting Enter
- Navigate to: HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\i8042prt\Parameters.
- Create a new DWORD (32-bit) value and name it CrashOnCtrlScroll and set value to 1
- Navigate to: HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\kbhid\Parameters.
- Create a new DWORD (32-bit) value and name it CrashOnCtrlScroll and set value to 1
- Restart Windows to take effect.

You can now blue screen (crash) your system by holding the right CTRL key and pressing "Scroll Lock" twice.

Remember to disable automatic reboot on bluescreen, follow these steps:

- Go to Control Panel > System
- Click on the Advanced tab
- Under Startup and Recovery, click the Settings button.
- Under System failure, uncheck the option *Automatically restart*.

With the module connected and timeouts set (for the test I recommend 2minutes timeout). Initiate the bluescreen and when for 2 minutes for the module to timeout, it should then initiate the reset or power cycle.

If the module does not initiate the reset/power cycle, then the 2pin connector connected to the motherboards reset/power switch pins is probably the wrong way round. Power down, swap the pin around and repeat the test.

## TROUBLESHOOTING

- Device not starting:
  - Verify that the 5pin connector is connected to the correct pins on the motherboard and that its orientation is correct.
  - Some motherboards have a jumper which must be set correctly to enable 5V to be available even if the machine is off. If this is not set the module will lose power when the motherboard is switched off.
  - LED1 and LED2 must flash approximately every 10 seconds to indicate the module is operable, if not, check power to the module
- Input LEDS not flashing:
  - The input LEDS are able to flash even without power to the module.
  - If an input LED is not flashing, first make sure the relevant jumper is not connected which bypasses the LED.
  - With the jumper removed, if the LED is still not flashing, check the connection to the motherboard, it might be connected to the wrong pins or its orientation might be the wrong way round.
  - Once flashing correctly, verify that the relevant output LED 1/2 flashes similar to the input LEDs indicating that the module is detecting the Hard drive activity.
- Switching of machine does not happen after timeout duration exceeded:
  - The module's output connector might be connected to the wrong pins on the motherboard or its orientation is the wrong way round.
  - If the correct pins are used, and both orientations have been tested, bypass the output resistor (setting the relevant jumper) and try both orientations again.