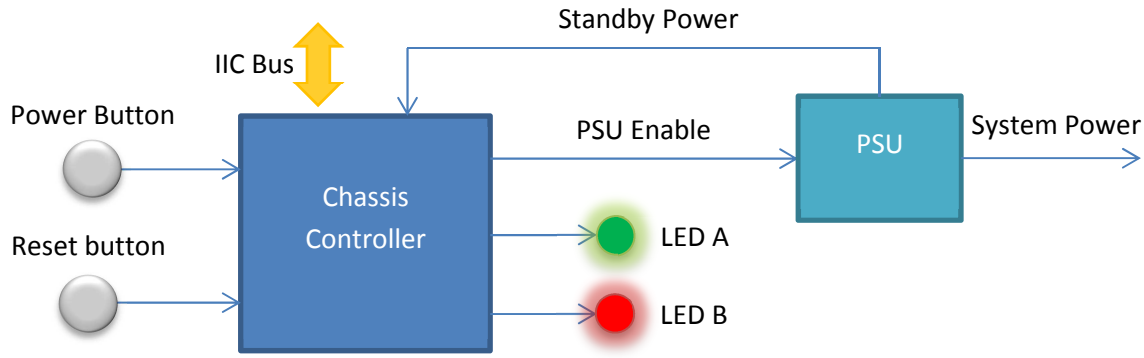
Introduction

The CJE Micros Chassis Controller can be used to manage the On/Off control line of an AT PSU with inputs coming from Power and Rest buttons found in most typical PC Cases. The Chassis Controller also provides software control of the PSU plus two Case-mounted LEDs via connection to a standard IIC bus. The software interface is implemented with a total of 16 registers that can be accessed randomly or sequentially starting from Device Address **0xE8/9** (R/W in LSB).

In addition to the above, 64 Bytes of general purpose EEPROM follow directly after the 16 chassis control registers.



Writing to Registers

Variable length IIC Write Transfers consist of sending the device Bus Address 0xE8 followed by the address of the first register to be written (REG #) then one or more data values to be written. The Register address REG # auto-increments for each additional value sent in the IIC transfer.

[11011000] - [REG #] - [REG Value] - [REG+1 Value] - [REG+2 Value] --- [REG+n Value]

Any writes to invalid register locations will be ignored.

Reading from Registers

Variable length IIC Read Transfers consist of sending the device address 0xE9 followed by the address of the first register to be read (REG #) followed by one or more read operations. The Register # auto-increments for each additional value read in the IIC transfer.

[11011001] - [REG #] - [REG Value] - [REG+1 Value] - [REG+2 Value] --- [REG+n Value]

Any reads from invalid register locations will cause an IIC error.

Chassis Controller Register assignments

REG#	BIT	7	6	5	4	3	2	1	0	Default	R/W
0	ID0	'C'								67	R
1	ID1	'J'								74	R
2	ID3	'E'								69	R
3	ID4	'1'								49	R
4	PSU_Control	Off = '**0**' (48) / On = '**1**' (49) / Reset = '**R**' (82) / Shutdown† = '**S**' (83)								48	R/W
5	Duration_A	Timer A Duration in 100ms increments (0 = max = 25.6s)								0	R/W
6	Mark_A	Flash on period A in 10ms increments (0 = max = 2.56s)								0	R/W
7	Space_A	Flash off period A in 10ms increments (0 = max = 2.56s)								0	R/W
8	LED_A	Fitted	-	-	-	-	Flash	Timer	State	0	R/W
9	Duration_B	Timer B Duration in 100ms increments (0 = max = 25.6s)								0	R/W
10	Mark_B	Flash on period B in 10ms increments (0 = max = 2.56s)								0	R/W
11	Space_B	Flash off period B in 10ms increments (0 = max = 2.56s)								0	R/W
12	LED_B	Fitted	-	-	-	-	Flash	Timer	State	0	R/W
13	Power_Off	Power button hold timer in 100ms increments (0 = max = 25.6s)								40‡	R/W
14	Reset_Time	Reset button PSU cycle time in 100ms increments (0 = max = 25.6s)								10‡	R/W
15	Reserved									0‡	R/W

† Shutdown is "read-only" writing 'S' or any value other than those given in the table above will be ignored.

‡ Defaults read from EEPROM at Microcontroller power-up. All other defaults are as per table above.

ID Registers 0-3

The first four read-only Registers contain the string "CJE1" for positive identification of the IIC device and its firmware revision.

PSU_Control Register 4

This Register provides software control over the Chassis PSU and can be read at any time to discover the current state of the PSU as managed automatically by the Chassis Controller. The Chassis Controller initially powers-up with the PSU disabled and continuously monitors the Case Power and Reset Buttons – setting the PSU enable control line accordingly.

The PSU can also be enabled and disabled under IIC control by writing '1' and '0' respectively to the PSU Control register. Writing 'R' to this register causes the controller to perform a hard reset cycle (Default: power off for 1 second, power back on). The power cycle time can be configured by writing a different value (in 100's of ms) to Register 14.

The PSU Control register can also be polled over IIC to discover if the Case Power Button has been pressed in an attempt to turn off the computer. In this case, the register will contain the character 'S' until such time as the forced shutdown period elapses with the Power Button still held in. The default period of 4 seconds can be changed by writing a different value (100's of ms) to Register 15.

The following tables illustrate the possible conditions with the default Time-out:

Case 1: Button pressed and released before 4s Time-out				
Time	T<0	T=0	T<4s	T>=4s
Power Button		Pressed	Released	
PSU Control Register	'1'	'S'	'S'	'S' *(unless OS has set to '0')*

Case 2: Button pressed and held during 4s Time-out				
Time	T<0	T=0	T<4s	T=4s
Power Button		Pressed	Held	Still held
PSU Control Register	'1'	'S'	'S'	'0' *(PSU disabled)*

As can be seen from the tables above there are two cases: the button is pressed and released before the time-out period expires or it is held throughout the time-out period.

Case 1

If the OS polls the PSU register, it can detect a momentary press of the Power Button and respond by initiating a soft power-off. If the OS does not monitor and respond to the PSU register a momentary press of the power button will not switch off the PSU although the 'S' flag will remain in place until some other operation changes the state of the PSU_Control register.

Case 2

The PSU is disabled unconditionally after the controller has detected a 4-second long press of the power button.

LED Control Registers 1-4 & 5-8

LED_X Behaviour	LED_X (Bits 6-3 reserved – set to 0)					Duration_X	Mark_X	Space_X
	Fitted	-	Flash	Timer	State			
	Bit 7	-	Bit 2	Bit 1	Bit 0			
Unconditionally off	X	-	X	0	0	X	X	X
Unconditionally on	X		0	0	1	X	X	X
On, scheduled to go off after delay	X	-	0	1	0	✓	X	X
Off, scheduled to go on after delay	X	-	0	1	1	✓	X	X
Unconditionally Flashing	X	-	1	0	1	X	✓	✓
Flashing LED to go off after delay	X	-	1	1	0	✓	✓	✓
Flashing LED to go on after delay	X	-	1	1	1	✓	✓	✓

LED_X Register

Both LEDs can be programmed to light in various ways with minimal intervention from the host. Bit 0 determines the basic state of the LED as modified by bits 1 and 2. If both Bits 1 and 2 are clear, bit 0 switches the LED on and off. If bit 1 is set, the LED state programmed in bit 0 is scheduled to occur after a delay of Duration_X. Bit 2 can be set to make the LED flash when showing, with a Mark/Space ratio determined by the values held in Mark_X and Space_X registers. Bit 7 of LED_X is for

information only. Bit 7 is set if the LED on that channel is Fitted. This is determined by the controller at power-up and is a read-only bit. Any value (1 or 0) written to this bit will be ignored.

LED Timing Registers

The timing values for LED Duration, Mark and Space all default to maximum (0) at power-up. Once set with the appropriate values for the application, all timings persist until the removal of power from the Chassis Controller. The OS must explicitly initialise the timing registers before using them.

Power_Off Register 13

The value in this register determines how long the power button must be held in for, in order to force an unconditional power-down of the PSU. The value represents intervals of 100ms. A setting of 0 results in the maximum available period of 25.6 seconds. This value is automatically stored and recalled from EEPROM on subsequent Chassis Controller power-ups.

Reset_Time Register 14

When performing a “Hard Reset” the value in this register determines how long the PSU is disabled before being switched back on. The value represents intervals of 100ms. A setting of 0 results in the maximum period of 25.6 seconds. This value is automatically stored and recalled from EEPROM.

Reset_Time Register 15

Currently unassigned. The value is automatically stored and recalled from EEPROM.

EEPROM Registers 16-80

64 Bytes of general purpose EEPROM start from register 16 onwards.