判斷 Intel SVID 狀態的方法

Prepare: NB power(B122)
Chris Huang
2011/11/08

判斷 Intel SVID 狀態的方法

介紹原因：

自Intel platform由Calpella轉爲Huron River後，VID傳送方式也由PVID改爲SVID。但轉爲SVID後，電壓及許多狀態變的不易得知，在此介紹一個 Intel的SVID解析軟體，希望對後續機種產生問題時有些許助益。

文中將先介紹原本目識檢測方法，再介紹Intel後續所提供的軟體的方便性。

判斷 Intel SVID 狀態的方法

目識判斷方法：

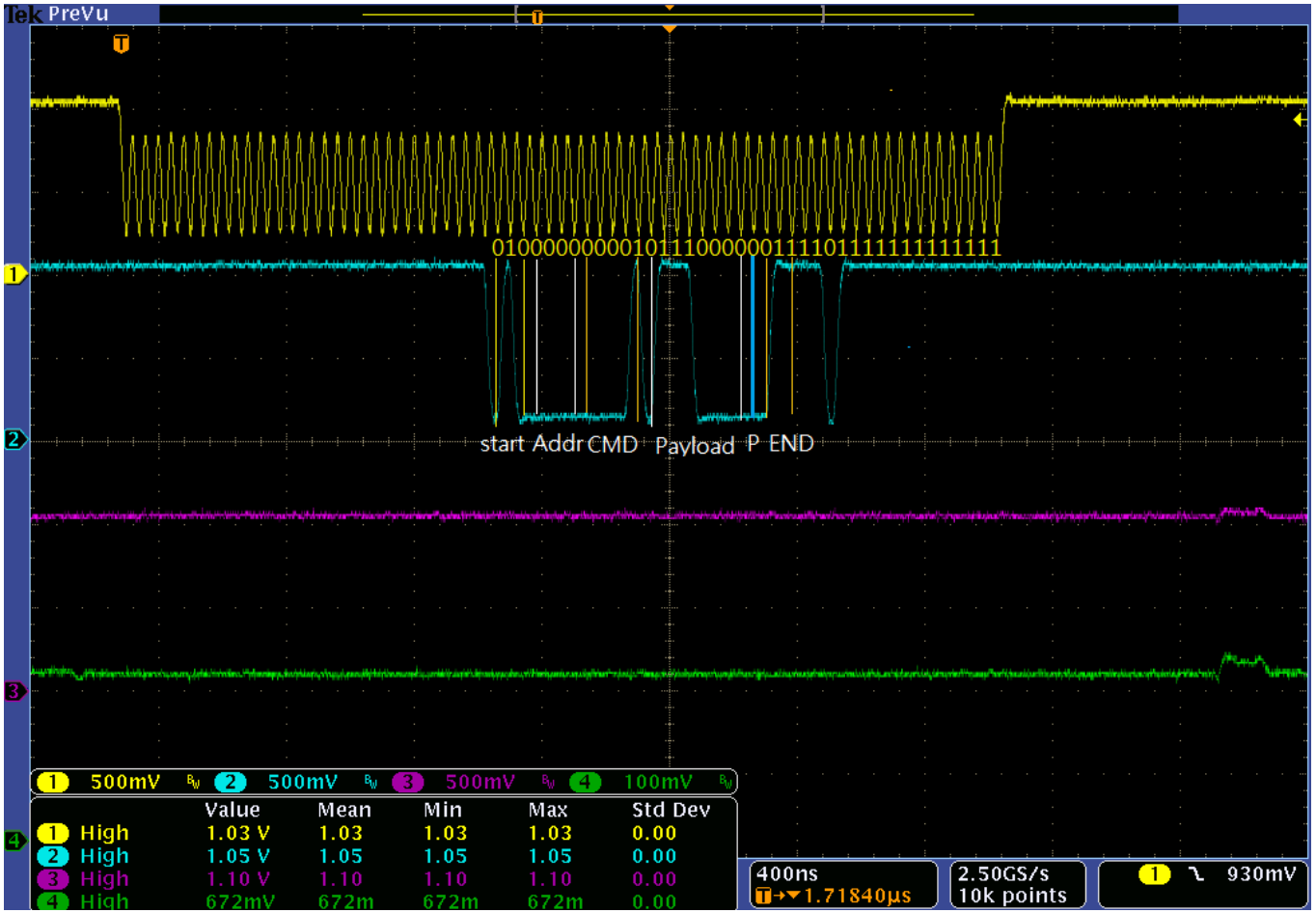
1.先抓取以下波形
   Ch1 SVID_CLK
   Ch2 SVID_DATA

2.比對CLK及DATD判斷出0或1。

3.根據位元長度來解讀判斷碼。

“010” START
“0000” Addr
“00001” CMD
“01110000” Payload
“0” P(檢查碼)
“011” END

4.對照各判斷碼，解析出狀態。



判斷 Intel SVID 狀態的方法

Addr(二進制)

VR12 and IMVP7 based platforms address usage						
Index	Servers Socket R	Servers Ararat-2	Server Socket B2	Desktop socket R	Destop Socket H2	Mobility Socket G2 rPGA BGA
0000b	Vcore	Vuncore,cache	Vcore	Vcore	Vcore	Vcore
0001b	VSA	+1 not used	VSA	VSA	VGFX	VGFX
0010b	VDDR1	Vcore1	VDDR1	VDDR1	VDDR	
0011b	+1 not used	+1 not used				
0100b	VDDR2	Vcore2	VDDR2	VDDR2		
0101b	+1 not used	+1 not used				
0110b		Vcore3				
0111b		+1 not used				
1000b		Vcore4				
1001b		+1 not used				
1010b						
1011b						
1100b						
1101b						
1110b	All Call	All Call	All Call	All Call	All Call	All Call
1111b	All Call	All Call	All Call	All Call	All Call	All Call

CMD(十六進制)

SerialVID Commands Table			
Index	CMD Name	Description	PayLoad
01h	SetVID-fast	Set the new VID target, VR Jumps to new VID target with controlled (up or down) slew rate programmed by the VR(Slew rate is 10mV/us)	VID
02h	SetVID-slow	Set the new VID target, VR Jumps to new VID target with controlled (up or down) slew rate programmed by the VR(Slew rate is 2.5mV/us)	VID
03h	SetVID-decay	Set the new VID target, VR Jumps to new VID target, but does not control the slew rate, the output voltage decays at a rate proportional to the load current.	VID
04h	SetPS	Sends information to VR controller, so it can configure VR to improve efficiency, especially at light load.	Pstate
05h	SetRegADR	Sets the address pointer in the data register table. Typically the next command SetRegDAT is the payload that gets loaded into this address.	Register
06h	SetRegDAT	Writes the contents to the data register that was previously identified by the address pointer with SetRegADR.	Data
07h	GetReg	Slave returns the contents of the specified register as the payload. The majority of the VR monitoring data is accessed through this command.	Register
08h	Test Mode	TBD by vendor	

Payload(十六進制)

VID								Hex		V_O (V)
7	6	5	4	3	2	1	0			
0	1	1	0	1	1	1	0	6	E	0.79500
0	1	1	0	1	1	1	1	6	F	0.80000
0	1	1	1	0	0	0	0	7	0	0.80500
0	1	1	1	0	0	0	1	7	1	0.81000
0	1	1	1	0	0	1	0	7	2	0.81500

P.S. 關於Payload

若CMD是VID，請搜尋VID table，若是Data 或 Register，請參考下頁。

所以可得CPU正傳送以下訊號給PWM IC

➔**Vcore、SetVID-fast、0.805V**。

判斷 Intel SVID 狀態的方法

Data and Configuration Register File Definition				
Index	Reg. Name	Description	Default	Comments
00h	Vendor ID	Identifies the VR vendor, assigned by Intel	Note 1	Required
01h	Product ID	VR vendor assigns this number	Note 1	Required
02h	Product Revision	VR vendor assigns this number	Note 1	Required
03h	Product Date Code	Identifies the manufacturing date code	Note 1	Note 3
04h	Lot Code	Identifies parts lot code	Note 1	Note 3
05h	Protocol ID	Version of SVID protocol	Note 1	Required
06h	Capability	Indicating what optional telemetry reg. are supported	00h	Required
07h	Reg_07_Test	Reserved for vendor use		
08h	Reg_08_Test	Reserved for vendor use		
09h	Reg_09_Test	Reserved for vendor use		
0Ah	Reg_0A_Test	Reserved for vendor use		
10h	Status1	B0: VR settled; B1: Thermal Alert B2: Iccmax Alert; B7: Read Status2	Note 2	Required
11h	Status2	B0: SVID parity error; B1: SVID data frame error	Note 2	Required
12h	Temperature zone	Containing the temp data of the platform	Note 2	Required
13h	Current zones			Note 3
15h	Output Current	Detecting the output current	Note 2	Required
16h	Output Voltage	Detecting the output voltage	Note 2	Note 3
17h	VR Temperature	Detecting the VR Temperature	Note 2	Note 3
18h	Output Power	Detecting the output power	Note 2	Note 3
18h	Output Power	Detecting the output power	Note 2	Note 3
19h	Input Current	Detecting the input current	Note 2	Note 3
1Ah	Input Voltage	Detecting the input voltage	Note 2	Note 3
1Bh	Input Power	Detecting the input power	Note 2	Note 3
1Ch	Status2_lastread	Copy of Status2		Required
21h	ICC max	Containing the Icc max the platform supports	Note 2	Required
22h	Temp max	Containing the temp max the platform supports	Note 2	Required
23h	DC_LL		Note 2	Note 3
24h	Slew Rate Fast	Containing the fast slew rate capability	0Ah	Required
25h	Slew Rate Slow	Containing the slow slew rate capability	02h	Required
26h	Vboot	Containing the Vboot value	Note 2	Required
27h	VR Tolerance	Containing the VR TOB based on board parts.	Note 2	Note 3
28h	Current-Offset	Current sensor calibration constant.		Note 3
29h	Temperature-Offset	Temp sensor calibration constant.		Note 3
30h	Vout max	Containing the max VID	Note 2	Required
31h	VID setting	Current VID setting	Note 2	Required
32h	Power state	Current PS setting	Note 2	Required
33h	VID offset	Number of VID offset steps	Note 2	Required
34h	Multi VR Config	B0: VR_Ready 0V; B1: Lock VID/PS	00h	Required
35h	SetRegADR	SetRegADR pointer reg.		Note 3

Notes:

1. These registers are shared for multi output PWMs.
2. These registers are per address and not shared even if there are multiple outputs in one PWM
3. Optional register response - VR should respond with a Reject (11b) ACK if a GetReg command is issued to an optional data register

e SerialVID /

判斷 Intel SVID 狀態的方法

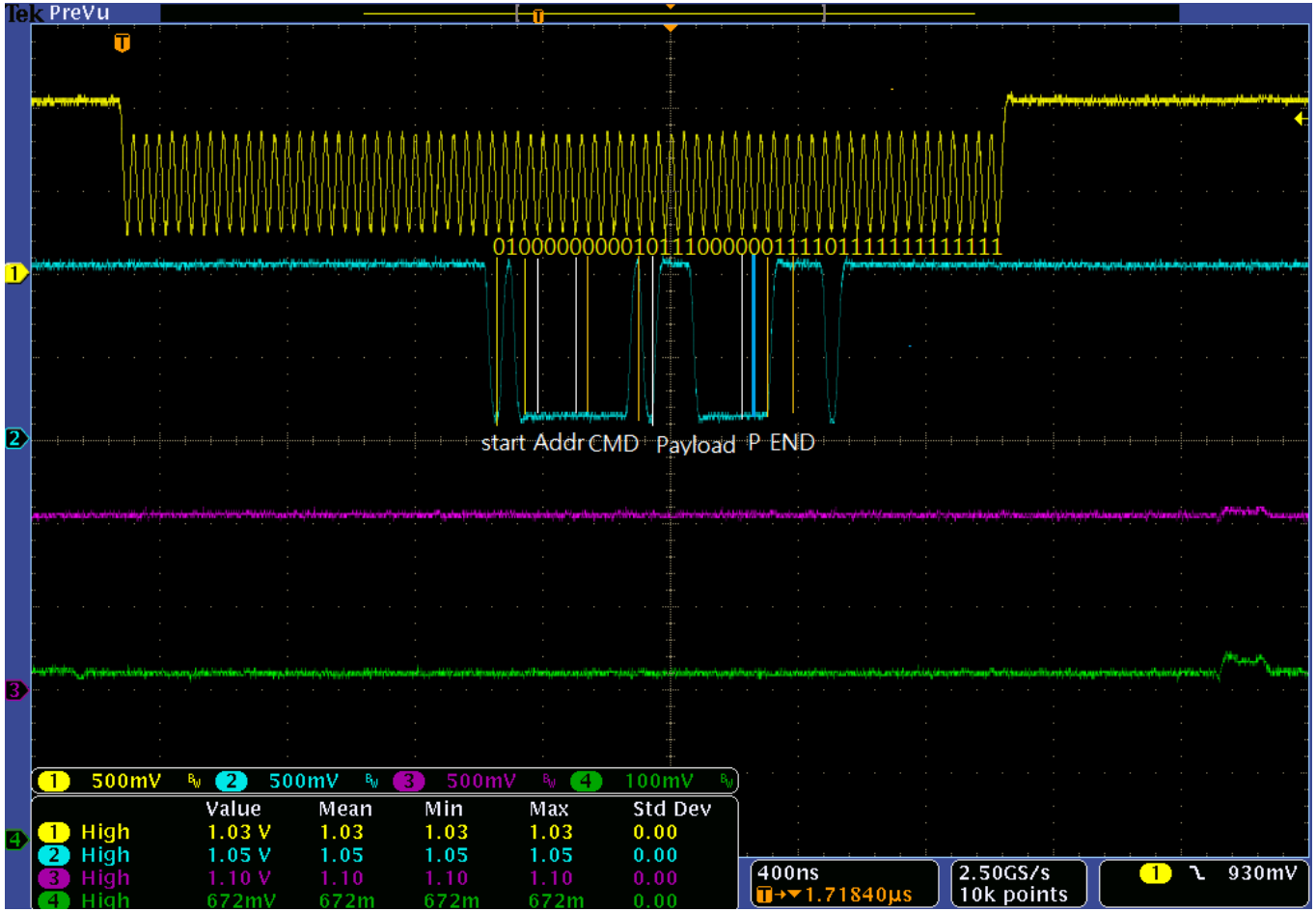
下面介紹Intel 軟體

1.首先抓取以下訊號波形
   Ch1 SVID_CLK
   Ch2 SVID_DATA
   Ch3 SVID_ALERT#
   Ch4 VCC_CORE

2.將各個波形存成
   *.CSV檔。

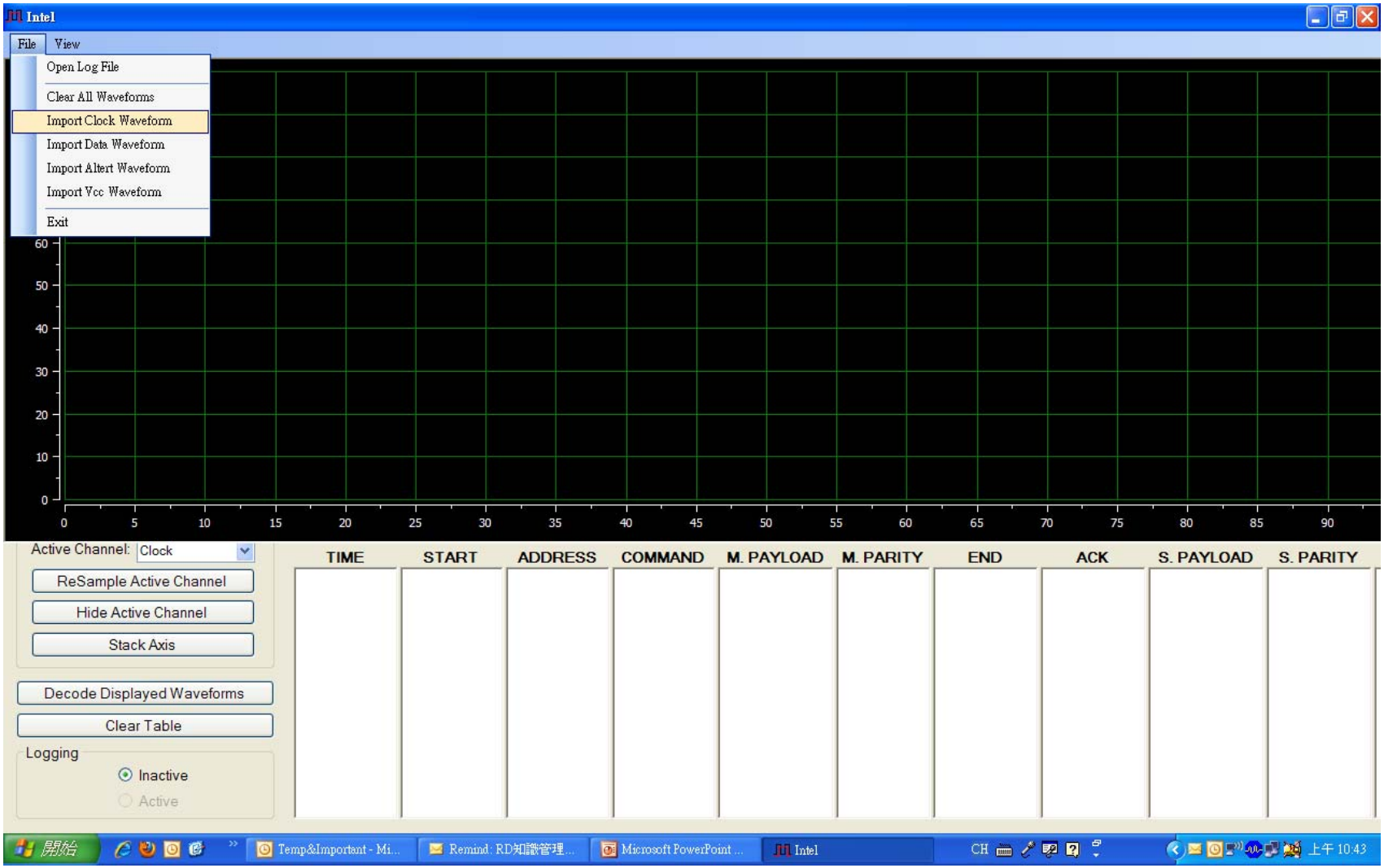
3.上Intel網站下載並安裝編號468436文件。

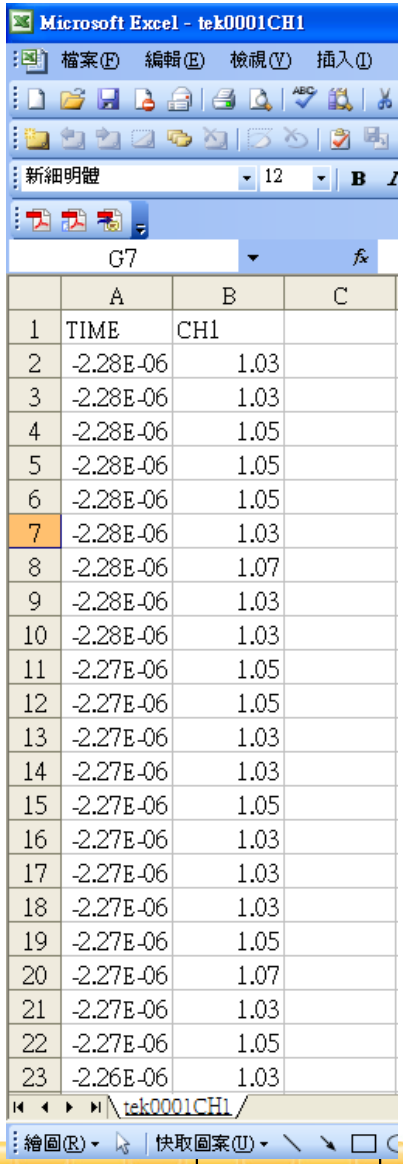
4.再執行安裝後的
   Intel® SVID。



判斷 Intel SVID 狀態的方法

3.請按Import載入四個檔案-Clock、Data、Alert、Vcc。(若無法載入，請注意*.CSV檔必須為乾淨的檔，如右下圖，多餘的資料請刪除。

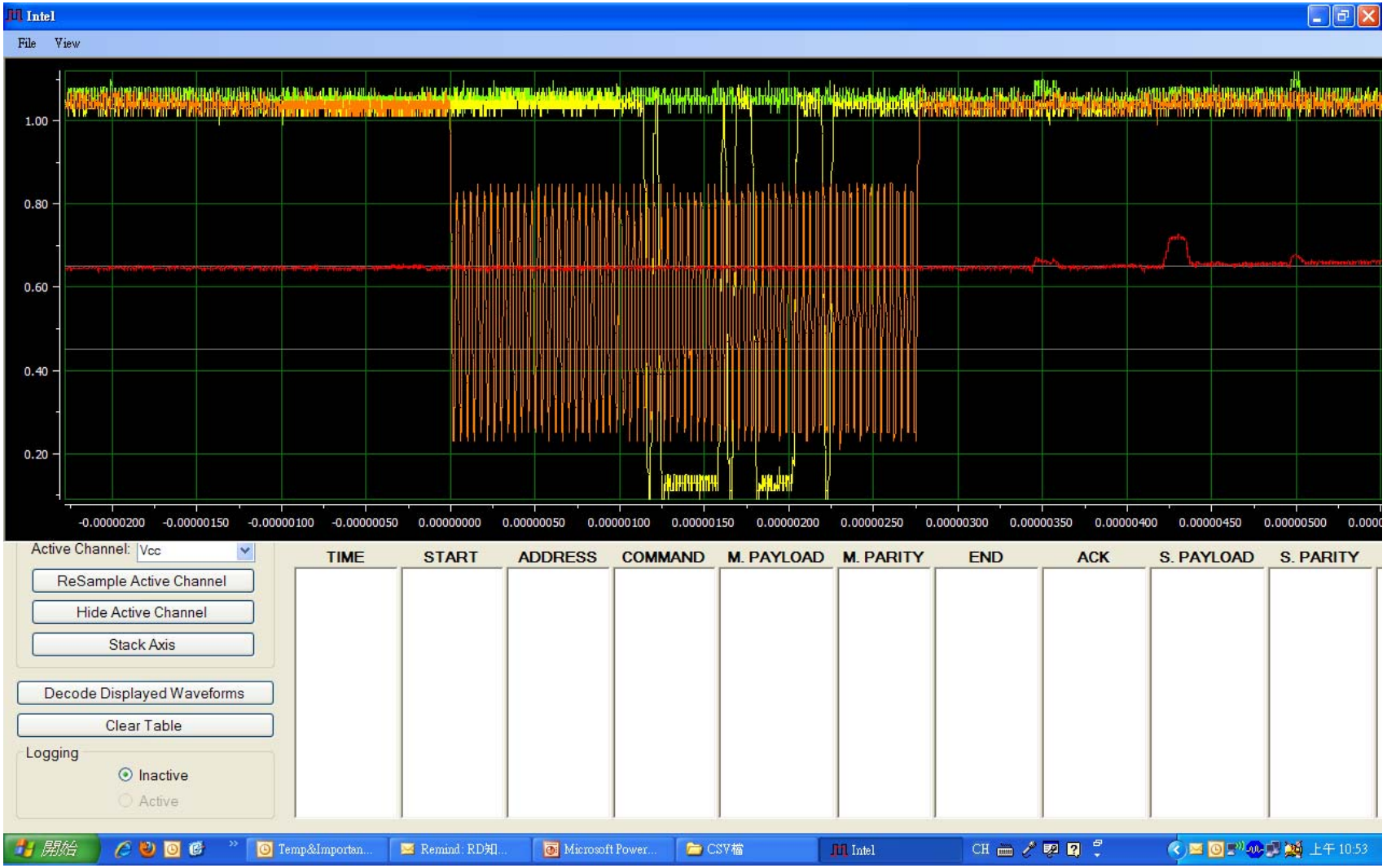




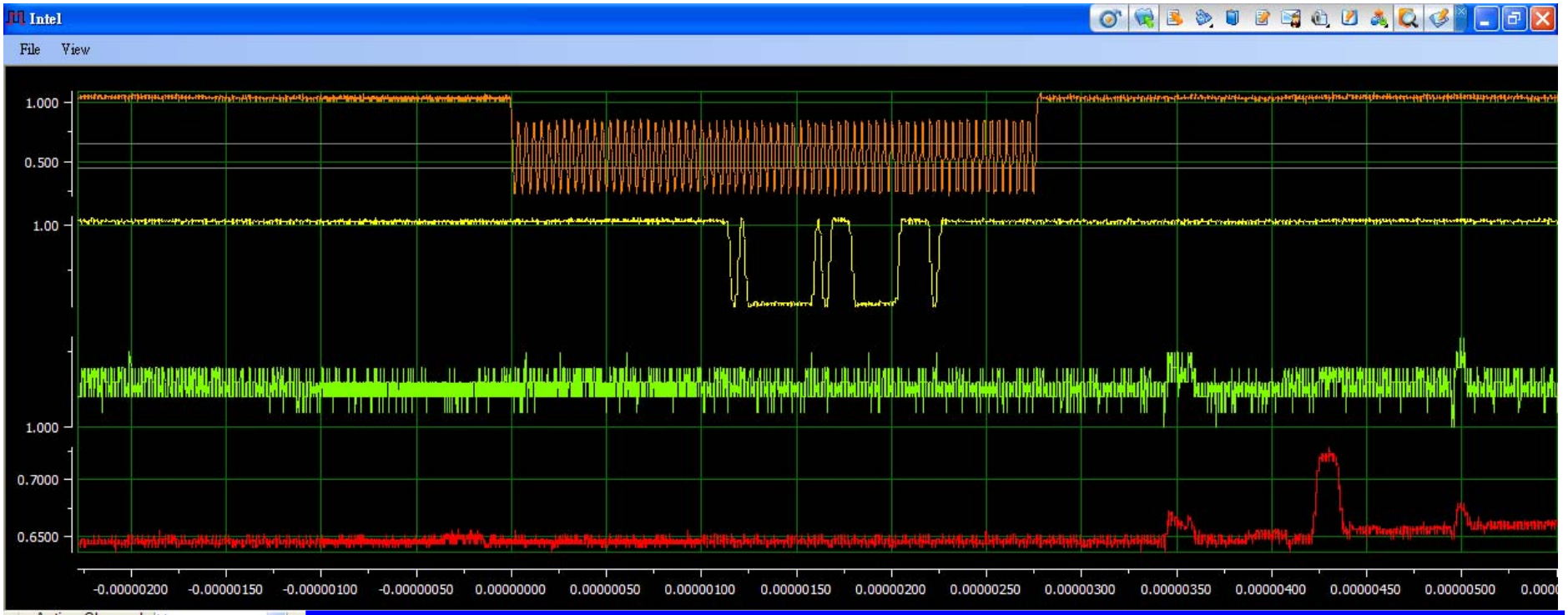
	A	B	C
1	TIME	CH1	
2	-2.28E-06	1.03	
3	-2.28E-06	1.03	
4	-2.28E-06	1.05	
5	-2.28E-06	1.05	
6	-2.28E-06	1.05	
7	-2.28E-06	1.03	
8	-2.28E-06	1.07	
9	-2.28E-06	1.03	
10	-2.28E-06	1.03	
11	-2.27E-06	1.05	
12	-2.27E-06	1.05	
13	-2.27E-06	1.03	
14	-2.27E-06	1.03	
15	-2.27E-06	1.05	
16	-2.27E-06	1.03	
17	-2.27E-06	1.03	
18	-2.27E-06	1.03	
19	-2.27E-06	1.05	
20	-2.27E-06	1.07	
21	-2.27E-06	1.03	
22	-2.27E-06	1.05	
23	-2.26E-06	1.03	

判斷 Intel SVID 狀態的方法

3.載入後，請按Stack Axis分離重疊的波形(結果如下一頁)。



3. 再按Decode displayed Waveform，即可解出訊號。



Active Channel: Vcc

ReSample Active Channel

Hide Active Channel

UnStack Axis

Decode Displayed Waveforms

Clear Table

TIME	START	ADDRESS	COMMAND	M. PAYLOAD	M. PARITY	END	ACK	S. PAYLOAD	S. PARITY
1.170000e-006	Start	00H	SetVID-fast	0.805V	0	End	Ack	--	--

TIME	START	ADDRESS	COMMAND	M. PAYLOAD	M. PARITY	END	ACK	S. PAYLOAD	S. PARITY
1.170000e-006	Start	00H	SetVID-fast	0.805V	0	End	Ack	--	--

判斷 Intel SVID 狀態的方法

結論：

改成SVID後，CPU很多狀態常常是無法估計的，現在有了這套軟體，就可以清楚快速的知道SVID狀態來判別CPU或是PWM IC是否有異常。

例如：

1.系統Hang的時候，CPU做什麼動作?

2.CPU爲什麼無法超頻？是不是溫度的關係？

3.SVID trace 是否有受到干擾？

4.PWM是否按照 CPU需求動作？

以上參考

1. Intersil SVID Command

2. 468436 [Huron River] Platform, [Sugar Bay] Platform - Intel® Serial Voltage Identification Debug Tool - Rev 1.0