ASUS NEW ID 200W ADAPTER SPEC
NEW CONNECT

0. History:

REV	Description	Issue Day	Prepared By	Checked By	Approved By
00	Issue	2023/04/07	Arvin Cheng		
01	2.3.5 DC PLUG OTP 阻值變更 4.5 Surge & Impulse Test	2023/07/14	Jason Hsiao		
02	Update 2.3.5 DC PLUG OTP 2.2.10 Peak load 7.Power unit Dimension: 11. Environmental Laws and Regulations 13. BCM Mode Function	2023/11/13	Arvin Cheng		
03	Updated 13. BMC Mode Function 2.3.5 DC Plug OTP	2024/01/04	Arvin Cheng		
04	Updated 2.3.5 DC Plug OTP	2024/1/17	Arvin Cheng		
05	Updated 2.3.1 Over Current Protection (OCP)	2024/2/5	Arvin Cheng		

1. Introduction:

This specification define the input, output, performance characteristics, environment, noise and safety requirements for the power supply.

2. Electrical Requirements:

2.1 Input Requirements:

2.1.1 Input Voltage

-Normal voltage: 100~240Vrms

-Voltage Range: 90~264Vrms

2.1.2 Input Frequency

-Normal Frequency: 50~60Hz

-Frequency Range: 47~63Hz

2.1.3 Input Current

-Under **TBD** Arms at 100Vac & Max. load

2.1.4 Configuration

-3 Conductors (Line, Neutral, Ground,)

2.1.5 Input Fuse

-An adequate internal fuse on the AC input line shall be provided.

2.1.6 Inrush Current

-The inrush current of the power supply shall be less than the rating of its critical components (include bridge diode, surge limiting device) for all condition of line voltage of 2.1.1

-The I^2t shall less then 22% of the fuse, surge limiting device and bridge diode rating.

- The I^2t should less than 169 (A^2sec)

2.1.7 Efficiency

-The power supply shall meet DOE VI+1% / COC V5 Tier 2 spec measuring at the cable end.

2.1.8 Power Factor

-0.9 min @ full load at input AC power 230Vac.

-With active PFC function to meet EN61000-3-2 harmonic current requirement.

2.1.9 Primary Aluminum Capacitor

- 450Vdc (min.)

- The voltage stress of anode foil must be larger than 620V.

2.2 Output Requirements:

2.2.1 Electrical

No.	Item	Condition	Specification
1	Output Voltage	Rating	20V
		Output Voltage Range	19~21V
		Ripple & Noise	350mV
2	Output Load Current	Operation Max.	10A
		Operation Min.	0A
3	2) Transient Load Current	Current	0.05~10A
		Transient Frequency	100Hz ~ 100KHz
		Slew rate	2.5A/us

2) The output voltage regulation shall less than(+/- 5 %)of the rated output voltage in transient mode.

Ripple noise measure by **20M** Hz bandwidth in oscilloscope and applied **0.1uF** high frequency capacitor and **10uF** electrolytic capacitor across output connector terminals

2.2.2 Output Voltage Requirement

-The total output voltage regulation shall be meet the spec., including the effects of AC line voltage variation, load current, ripple and noise.

-The effect of transient load changes is included in this limit.

2.2.3 Overshoot

-The output overshoot at turn on shall not exceed 21.0voltage value with or without the load connected.

2.2.4 Hold Up Time

-The power supply shall maintain voltage regulation within the specified limits in paragraph 2.2.1 for at least 16ms after lost of input voltage measure at 100Vac and at maximum output load.

2.2.5 Output Rise Time

-At turn on the rise time of output voltage shall be less than 40ms.

＊Measured from the 10% point to the 90% point of the normal.

2.2.6 Turn On Delay Time

-No Load Power Consumption supply shall reach voltage regulation within the specified limits in table 2.2.1 for 3sec max. after AC input the power supply.

-The input voltage measure at 100/240Vac and at maximum output load.

2.2.7 No Load Power Consumption

-Maximum non-load power consumption is less than 0.15W at 115Vac/60Hz and 230Vac/50Hz

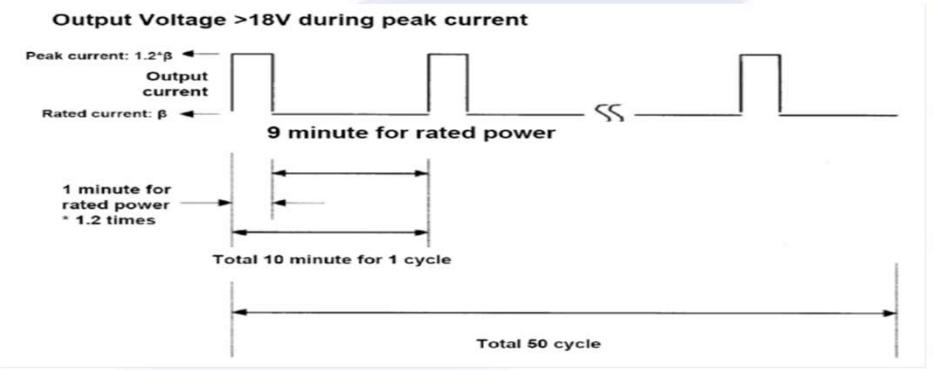
2.2.8 Power saving requirement

-Vin=115Vac/60Hz and 230Vac/50Hz

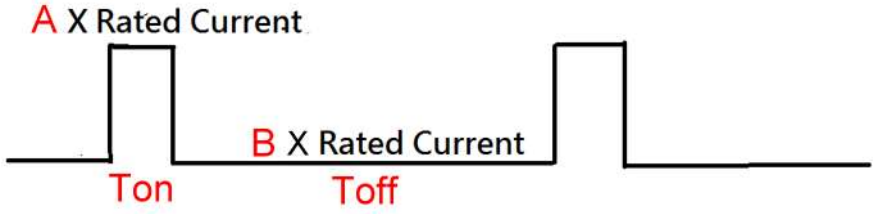
Output Power (W)	Pin Power (W)	Eff %
18	< 23.5	
5W~6.5W		>80%
11	< 14	
3	< 5	
1.65	< 3	
1.5	< 2.2	
1	< 1.6	
0.25	<0.45	

2.2.9 Surge load:

The adapter shall support a surge load with 120% of maximum load for 1min ,maximum load for 9min and Output Voltage more than 18.5V at input voltage is 100-240Vac



The adapter shall support below loading condition without any damage, safety issues and protection happen(OTP is allow). The output voltage shall more than 18.3V at input voltage is 100-240V/50Hz .



Spec	Ton	Toff	A	B
1	2ms	18ms	200%	90%
2	1ms	13.5ms	225%	87.5%

2.2.11 Hot Plugging :

-Plugging a live AC adapter into the system with 2000 uF capacitance shall not trigger any protections or cause the adapter to shut down.

2.2.12 Voltage Dips

- Follow the test item " 30% reduction , 25 periods " in IEC 61000-4-11 Standard.
- Criteria : A

(a) AC Input = 100Vac/50Hz

(b) Load : Full Load

2.3 Power Output Protection:

2.3.1 Over Current Protection (OCP)

-The maximum constant current shall be 12A~18A at 90Vac and 264Vac.

-The adapter Shall be Latch off and no component damage.

-The adapter cannot have any safety issue or be damaged when the load condition is before over current protection point (OTP is allowed).

- Debounce time 400ms

2.3.2 Over Voltage Protection (OVP)

-The output shall be protected to latch off at over-voltage condition, maximum value can't be over 27V.

2.3.3 Short Circuit Protection (SCP)

-The power supply short output shall be Latch off and no component damage.

2.3.4 Over Temperature Protection (OTP)

- The adapter shall be Latch off and no component damaged, no fire and no melting of the enclosure.

2.3.5 DC Plug OTP

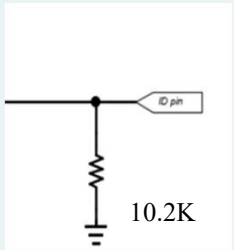
Adapter 使用PD IC

系統使用類比方式偵測 CC pin 分壓 Between 1.8V-2.4V,
使用ADC方式動作

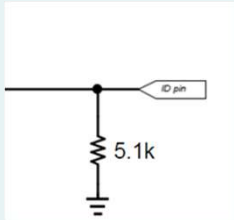
系統使用PD IC 偵測CC PIN分壓1.1V~1.7V,
使用BMC方式動作

System Side ID pin Resister

CC PIN With Analogy Circuit



CC PIN With PD IC



ADC Mode

ID Level	Adapted Behavior
1.8V~2.4V	Normal Out
< 0.67V	Latch off (Debounce time 300ms)

BMC Mode

Follow Item 13

3. Reliability:

3.1 MTBF:

-The power supply shall be designed and produced to have a MTBF of 150,000 operation hours at 90% confidence – level while operating under the following condition

-AC input voltage: 100 and 240Vrms

-Ambient Temp. : 25˚C

3.2 Life/Power On Hours

-The power supply must be designed to operate for 26280 power on hours.

-AC input voltage: 100 and 240Vrms

-Ambient Temp. : 25˚C

3.3 Burn-in Test Condition

- More than 4 hours at 35˚C, normal input voltage.
- AC on/off must be tested.

3.4 Surge Voltage (For DT Type Only)

Follow *ASUS RD Test Plan for NB Adapter latest version*

4. Safety & EMC:

4.1 Safety Certificate

- The power supply unit shall be tested with the following safety standard(IEC62368-1 3rd).
- Certificate : Follow safety control table
- Trade mark: ASUS

4.2 Insulation Resistance

- Insulation resistance shall be > 30M ohm at 500Vdc between primary Live, Neutral and secondary.

4.3 Hi-Pot Test

-Primary to Secondary : 3.0KVac or 4242Vdcfor 1minute
-Primary to F.G :1.5KVac for 1minute

4.4 Leakage Current

-The power supply leakage current shall be less than 100 uA.@240Vac/50Hz

-Test with AC cable 80cm

4.5 Surge & Impulse Test

-Lighting Surge : ±1.5KV (L-N) ; ± 2.5KV (L-FG; N-FG)

-Impulse Noise Test: 1KV

4.6 EMI standard

-The power supply shall comply with a following RFI/EMI standards when tested in a system configuration.

-F.C.C part15

-EN55032

-The limits shall be met with a margin more than 6dB with all system applicable

4.7 Electrostatic Discharge (ESD)

This Adapter is capable to withstand ESD test voltage at any point around the enclosure as below.

±15KV air discharge Performance Criterion A

±8KV contact discharge Performance Criterion A.

5. Environment Requirements:

5.1 Temperature

-Operation: 0~35˚C ;Storage: -30~80˚C

5.2 Humidity (no condensing)

-Operation: 5~90% ; Storage: 5~90%

5.3 Surface Temperature rise

- Output 200W and ambient 25℃; input voltage 100Vac/240Vac 50Hz
  Top case temperature rise<45℃,Bottom case temperature rise<50℃

5.4 Acoustic test:

Input Condition

Vin: 90Vac~264Vac Frequency : 47Hz to 63 Hz

Load Condition:

Dynamic Load : Follow ASUS Transient Load Current Spec

Static Load (from 0A to Full Load , 0.1A pre step)

NB ADAPTER SPEC :

Static Load

Desktop Type : Microphone at a distance of 5cm from the surface and noise level is less than **20dB**

Dynamic Load

Desktop Type : Microphone at a distance of 5cm from the surface and noise level is less than **25dB**

6. Mechanical Requirements:

6.1 Bending test:

- 200g weight,90° angle to each side(Total angle 180°),3000 & 10000 cycles of arbitrary direction 40 cycles/min.
  Disconnection rate < 10%/100% between case to S/R between case to S/R for 3000 / 10000 cycles
  Disconnection rate < 30% /100% between plug to coil 3000 /10000 cycles
  Without damage to the insulations

6.2 Winding test:

-200g weight,1080° angle on X-axis and Y-axis ,500 cycles of each direction 4 cycles/min.
Disconnection rate of the wire shall be less than 30%

6.3 Drop Test

Drop 6 times (**6 faces**) on each cycles from a height of 1.0M onto a **concrete surface.** Increase the height in steps of 0.2M until the case is broken. Must has 10cm margin during design stages

Electrical

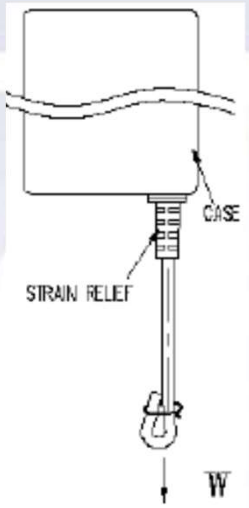
- The unit should meet all specification and no function error after test.1.1M testing

Mechanical

- There shall be no visual damage and safety concern after 1.3M testing

6.4 Tensile Test :

Load : 10Kgf at Plug end and Bushing each for 1minute
Angle: 90˚ /180˚
Criteria: The withdrawal of cord should be less than 2mm or without disconnection of cord

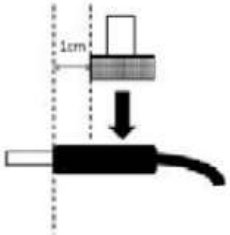


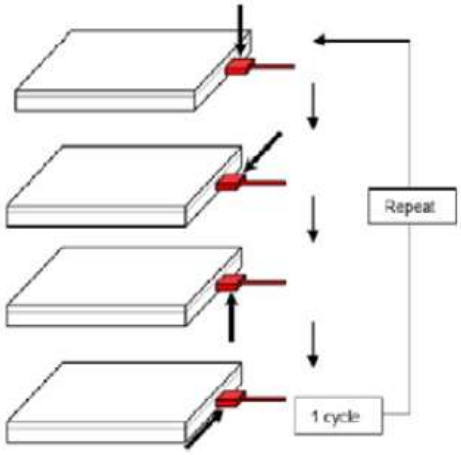
6.5 DC Power Cord Wire Push Test

Test condition : a) Fixture: 6mm, 10.5mm & 20mm aluminum block and ψ12mm aluminum bar
b) Increase pressure by speeding up 2 mm per minute on the tested item until maximum force reached to 150 kg
Criteria: After testing the V+ wire and Ground wire can't short

6.6 DC Plug Requirements

- Must demonstrate a minimum strength of 1.75 Nm in all 4 orientations, rather than 0.75 Nm as defined in section 3.8.1.7 (refer to Type C Spec)
- Can exceed the maximum plug strength of 2.0 and 3.5 Nm as defined in section 3.8.1.7
- Transverse overload force in all 4 orientations should meet 9Kg/1cm/50 cycles (as below)

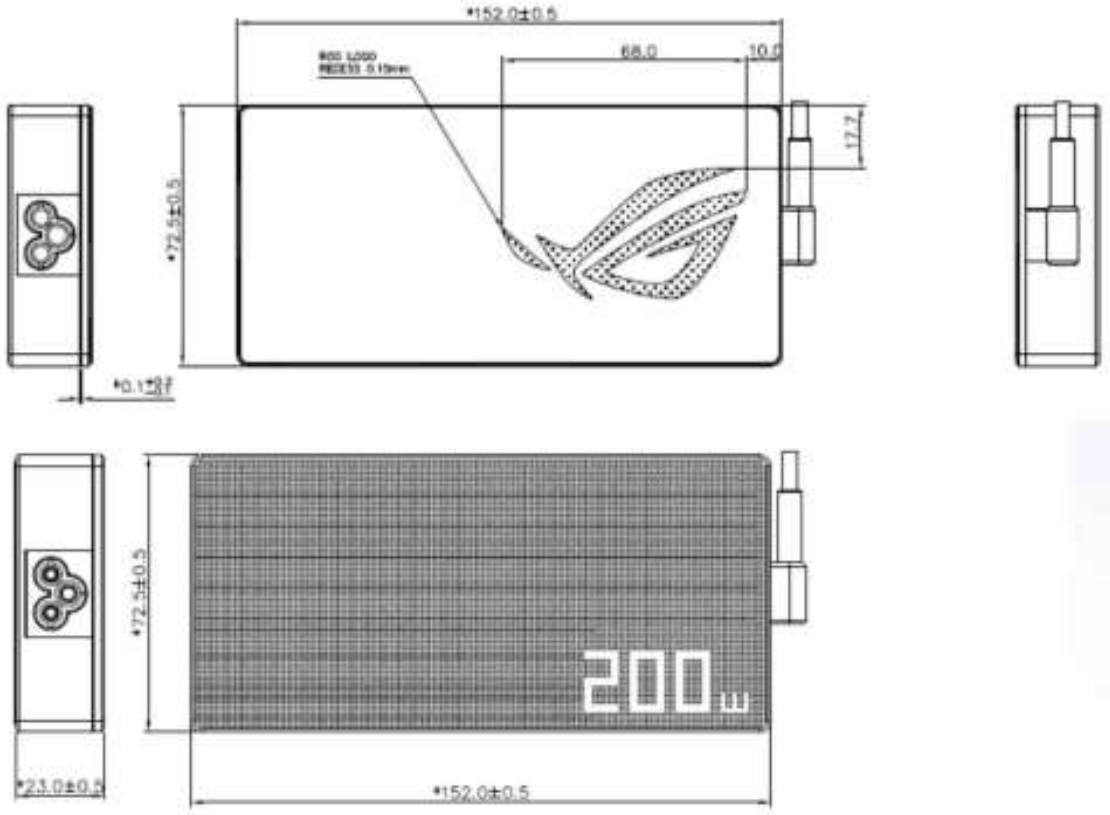




7. Power unit Dimension:

-Dimension

152.0*72.5*23.0



8. Input AC Inlet:
-Socket type C6

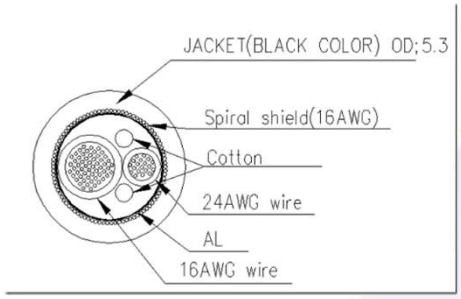
9. Output Cable:
-1800mm ±50mm

10. Output Plug:
Vender –ACES
Plug Type- Follow ASUS Requirement

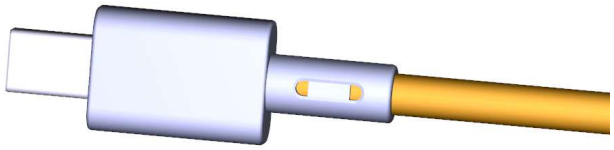
11. Environmental Laws and Regulations
-Meet the deduct 50% condition of Swedish "Law (2016:1067) about tax on chemicals in certain electronic products".
-Meet TCO 9.0 regulation
-Meet EPEAT 2018 Item 4.1.1.1 / 4.1.2.1 / 4.1.4.1 / 4.1.5.2 (1 point) / 4.1.6.1 / 4.1.8.1 (1 point) / 4.1.9.1 / 4.1.9.2 / 4.1.9.3 (2points) / 4.5.1.4 / 4.7.1.1

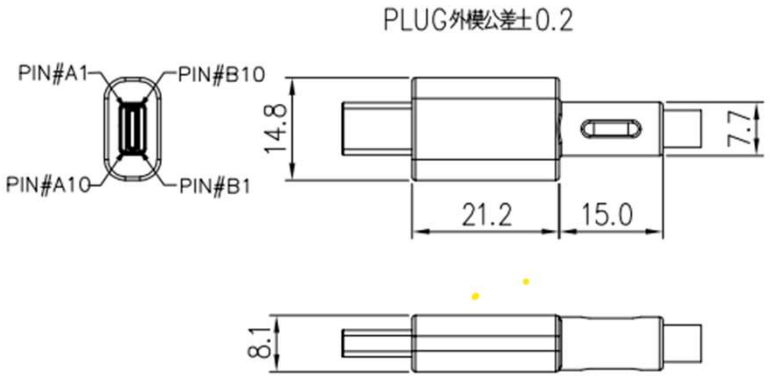
12. Weight
< 500g

19. Wire Structure



20. Plug ID





13. BMC Mode Function

13.1 Provide Manufacturing Information

- Allow Sink to use ***Get_Source_Cap_Extended*** to read the information below.
- Allow Sink to use *Discover Identity* to read **VID & PID** in VDM mode.

Source_Cap_Extended	Value	Remark
VID	0x0B05	ASUS VID
PID	Item 13.6	
XID	0x0000	w/o USB Certification
FW Version	0x01	update version to 0x02, 0x03… if modified after MP.
HW Version	0x01	

13.2 Provide Temperature & Protection Flags

- Allow Sink to use ***Get_Status*** to read the real-time temperature

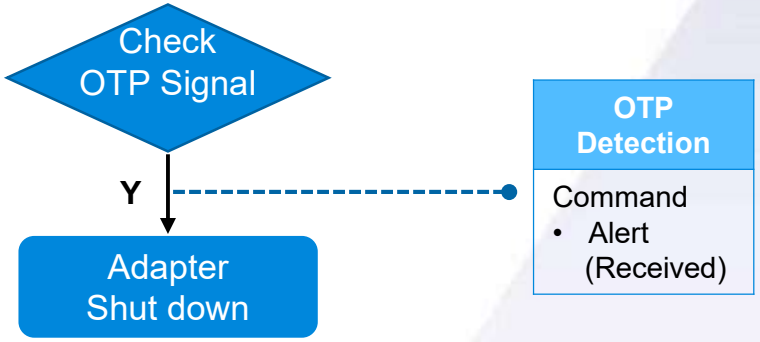
13.3 Set Protection Flags & Send Alert

- The adapter shall set OCP/OTP/OVP event flag to 1 immediately when the corresponding protection condition is triggered, and send *Alert* to Sink simultaneously.
- The adapter shall delay N ms to turn off the Vbus switch when the OCP/OTP/OVP condition is triggered. (The deglitch time for triggering OCP/OTP/OVP condition is not affected)

Protection	Delay N ms
OCP	10ms
OTP	100ms
OVP	No delay

13.4 Latch off Adapter

- When system send **Alert** by OTP to adapter side ,the adapter should be Latch off



13.5 Read Source Cap

- Allow Sink to use **Get_Source_Cap** to read the information below
  - Rated Vo
  - Rated Io/2

13.6 PID

PID	XID	瓦數	廠商	WM/3P/ VAR	帶線/不帶線	Description	Output Rating
0x1C1F	0x00000000	200	Delta	3Pin	帶線	Compact Plug with PD	20V/10A
0x1C2F	0x00000000	200	Chicony	3Pin	帶線	Compact Plug with PD	20V/10A

Thank You!