Section 5 Power Unit

5.1 General and Circuit Description

Composition : HI VISION Preirus power is composed of the following units.

1. HM-824A : Main power unit of the system, which is a multi-output switching regulator built in with an isolating transformer and power-factor improvement circuit. It mainly supplies AC for the service outlet and DC for the analog high voltage system and analog low voltage system. When all DC voltages are outputted normally from main power unit, POWER LED(upper LED) on the front side of main power unit lights.

2. HM-824K : DC/DC converter unit provided at the secondary side of main power unit HM-824A. Its input is the DC output of the power unit. It supplies DC mainly for the SELV system to the DSC and PC units. (SELV : Safety Extra-Low Voltage) When all DC voltages are outputted normally from DC/DC converter unit, DC/DC LED(lower LED) on the front side of main power unit lights.

Power unit circuit description:

1. POWER TRANSFORMER
   Isolation transformer for the service outlet, which isolates the primary circuit from the secondary circuit. A temperature fuse is built in power transformer. (136°C)

2. PFC CIRCUIT
   PFC circuit suppresses harmonics as well as improves distortion of voltage waveform and current wave height value to realize power-factor improvement.
   The protection circuit shuts off input by a signal from the over voltage protection circuit.

3. PS CIRCUIT
   The switching conversion system converts power to AC and supplies it to each DC converter via the transformer to isolate the primary and secondary circuits

4. OVER CURRENT PROTECTION CIRCUIT
   When the load is short-circuited or over current occurs, this circuit protects the load.

5. OVER VOLTAGE PROTECTION CIRCUIT
   When output voltage exceeds over the rating, this circuit protects power unit.

6. FILTER BORAD
   Removes noise from input.

7. CHOPPER CIRCUIT
   The chopper type circuit stabilizes DC output and reduces output ripples.

8. VOLTAGE MONITORING
   Communicates with CONT PCB through serial communication, and monitors all output voltages.

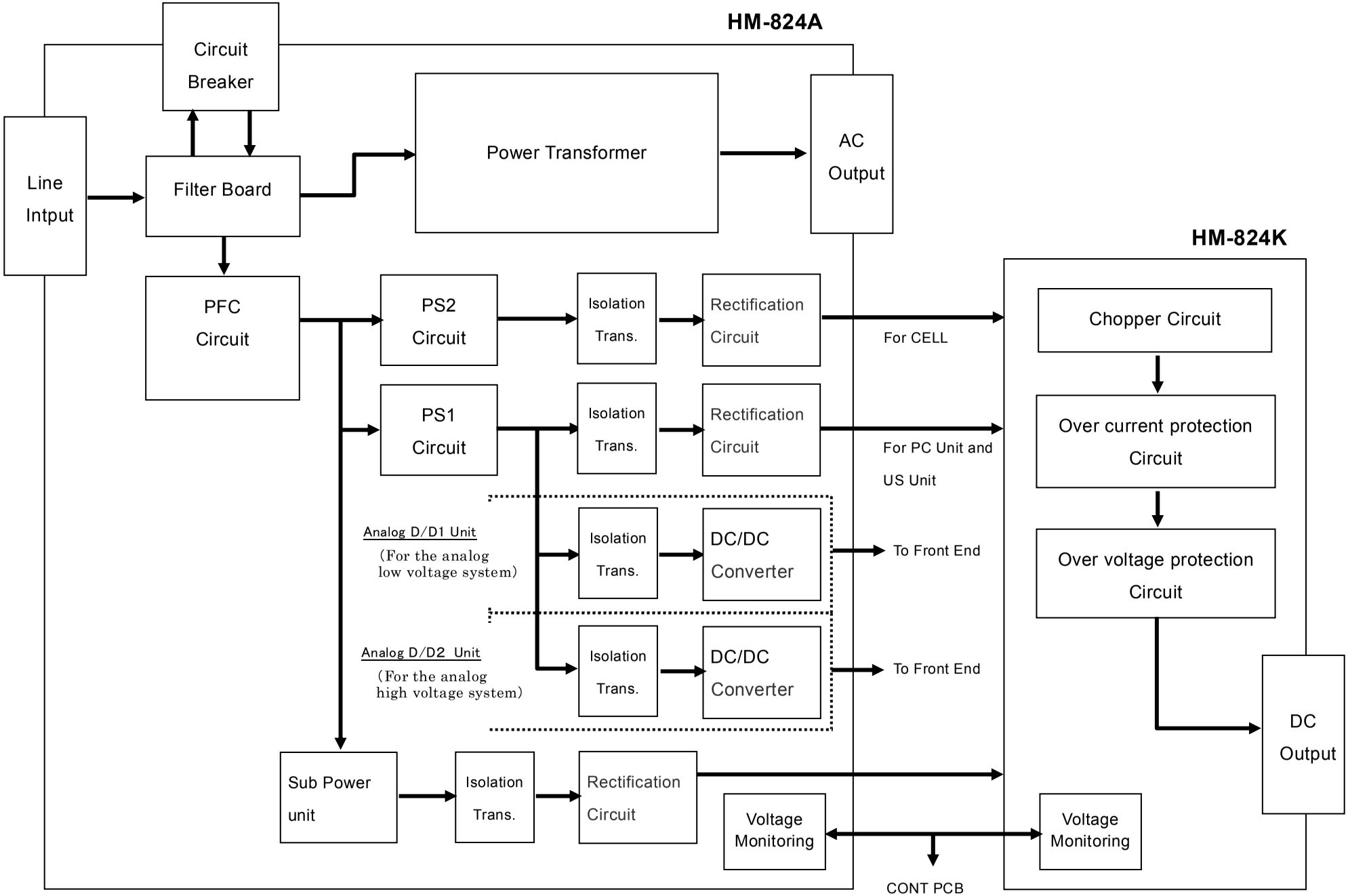

Fig. 5.1.1 POWER UNIT Block Diagram

5.2 Power Unit Connectors

HM-824A: CN1 : DC output connector for the analog high voltage.
CN2 : DC output connector for the analog low voltage.
CN3 : Connector for the serial communication.
CN4 : DC output connector for the digital system.
CN5 : AC output connector for the outlet.

HM-824K: Edge connector : 20VDC input (Digital system DC output of HM-824A).
Edge connector : Digital system DC output.

Specifications of connector connection:

HM-824A

Connector No	Pin No.	Signal name	Rated output voltage	Remarks
CN1	A1	+12HV	+12V	Outputs to PRB and Tx PCB.
	A2	+75HV	+75V	Outputs to Tx PCB.
	A3	AGND		
	A4	+100HV	+100V	Outputs to PRB PCB.
	A5	AGND		
	A6	NC		
	A7	AGND-200HV		Outputs to PRB PCB.
	A8	-200HV	-200V	Outputs to PRB PCB.
	B1	AGND		
	B2	-12HV	-12V	Outputs to PRB and Tx PCB.
	B3	-75HV	-75V	Outputs to Tx PCB.
	B4	AGND		
	B5	-100HV	-100V	Outputs to PRB PCB.
	B6	NC		
	B7	NC		
	B8	+200HV	+200V	Outputs to PRB PCB.

Connector No	Pin No.	Signal name	Rated output voltage	Remarks
CN2	A1	-12LV	-12V	Output to Rx, CW and CONT PCB.
	A2	+12LV	+12V	Output to Rx, CW and CONT PCB.
	A3	-6LV	-6V	Output to Rx, CW and DBF PCB.
	A4	-6LV	-6V	Output to Rx, CW and DBF PCB.
	A5	+6LV	+6V	Output to Rx, CW and DBF PCB.
	A6	+6LV	+6V	Output to Rx, CW and DBF PCB.
	B1	AGND		
	B2	AGND		
	B3	AGND		
	B4	AGND		
	B5	AGND		
	B6	AGND		

Connector No	Pin No.	Signal name	Remarks
CN3	1	P-CONT2	Control signal which be used to power on or off CELL PCB.
	2	GND	
	3	PWR_SIG_A	Signals for the serial communication which be used to monitor all output voltages of power unit.
	4	PWR_SIG_B	
	5	GND	
	6	PWR_LED	Control signal indicating whether all output voltages of HM-824K are normally.

Connector No	Pin No.	Signal name	Rated output voltage	Remarks
CN4	A1	GND		
	A2	+20V1	+20V	Output to HM-824K. (Used for the digital system except CELL PCB)
	A3	+20V1	+20V	Output to HM-824K. (Used for the digital system except CELL PCB)
	A4	GND		
	A5	+20V2	+20V	Output to HM-824K. (Used for CELL PCB)
	A6	+20V2	+20V	Output to HM-824K. (Used for CELL PCB)
	A7	+20V2	+20V	Output to HM-824K. (Used for CELL PCB)
	A8	GND		
	A9	+5VSB		Output to PC unit, HM-824K, CONT PCB and CELL PCB. +5VSB is a standby voltage.
	A10	P-CONT		P-CONT is control signal which be used to power on or off all except CELL PCB.
	B1	GND		
	B2	+20V1	+20V	Output to HM-824K. (Used for the digital system except CELL PCB)
	B3	+20V1	+20V	Output to HM-824K. (Used for the digital system except CELL PCB)
	B4	GND		
	B5	GND		
	B6	+20V2	+20V	Output to HM-824K. (Used for CELL PCB)
	B7	+20V2	+20V	Output to HM-824K. (Used for CELL PCB)
	B8	GND		
	B9	GND		
	B10	PROTECT		PROTECT is signal which be used to protect circuits from overvoltage.

Connector No	Pin No.	Signal name	Rated output voltage	Remarks
CN5	1	N	0V	AC output for the service outlet.
	2	L	100～120V or 220～240V	
	3			
	4			
	5	GND		

HM-824K

Connector No.	Edge connector No.	Signal name	Rated output voltage	Remarks
CN1	1～12	+20V2	+20V	Input of HM-824K.（Used for CELL PCB）
CN2	1～12	+20V1	+20V	Input of HM-824K.（Used for PCB except CELL PCB）
CN3	1～12	+12VC2	+12V	Output to CELL PCB.
CN4	1～12	+12VC1	+12V	Output to CELL PCB.
CN5	41～45	+5VSB	+5V	+5VSB is a standby voltage that may be used to circuits that require power input during power-down.
	51	PWR_SIG_B		PWR_SIG_A and PWR_SIG_B are signals for the serial communication which be used to monitor all output voltages of power unit.
	56	PWR_SIG_A		
	66	PWR_LED		PWR_LED is control signal for DC/DC LED and indicates whether all output voltages of HM-824K are normally.
	55	P-CONT2		P-CONT2 is control signal which be used to power on or off CELL PCB. (Output signal to HM-824A)
	65	P-CONT1		P-CONT1 is control signal which be used to power on or off CELL PCB. (Input signal from CONT PCB)
	75	P-CONT		P-CONT is control signal which be used to power on or off all except CELL PCB.
	85	PW-OK		PW_OK is a power good signal and indicates that the +5V and +3.3V outputs are above the voltage thresholds of HM-824K.
	95	PROTECT		PROTECT is signal which be used to protect circuits from overvoltage.
	106～115	-12V	-12V	Output to PC unit, CONT PCB, MTDRV PCB and BIO PCB.
CN6	36～55	+5VS2	+5V	Output to DBF PCB.
	91～110	+5VS1	+5V	Output to CONT PCB and MTDRV PCB.
CN7	21～40	+5V	+5V	Output to PC unit, Keyboard panel and BIO PCB.
	76～95	+3.3V	+3.3V	Output to PC unit, Keyboard panel and TVIF PCB.
CN8	16～40	+12V	+12V	Output to PC unit, LCD, CONT PCB, MTDRV PCB and BIO PCB.

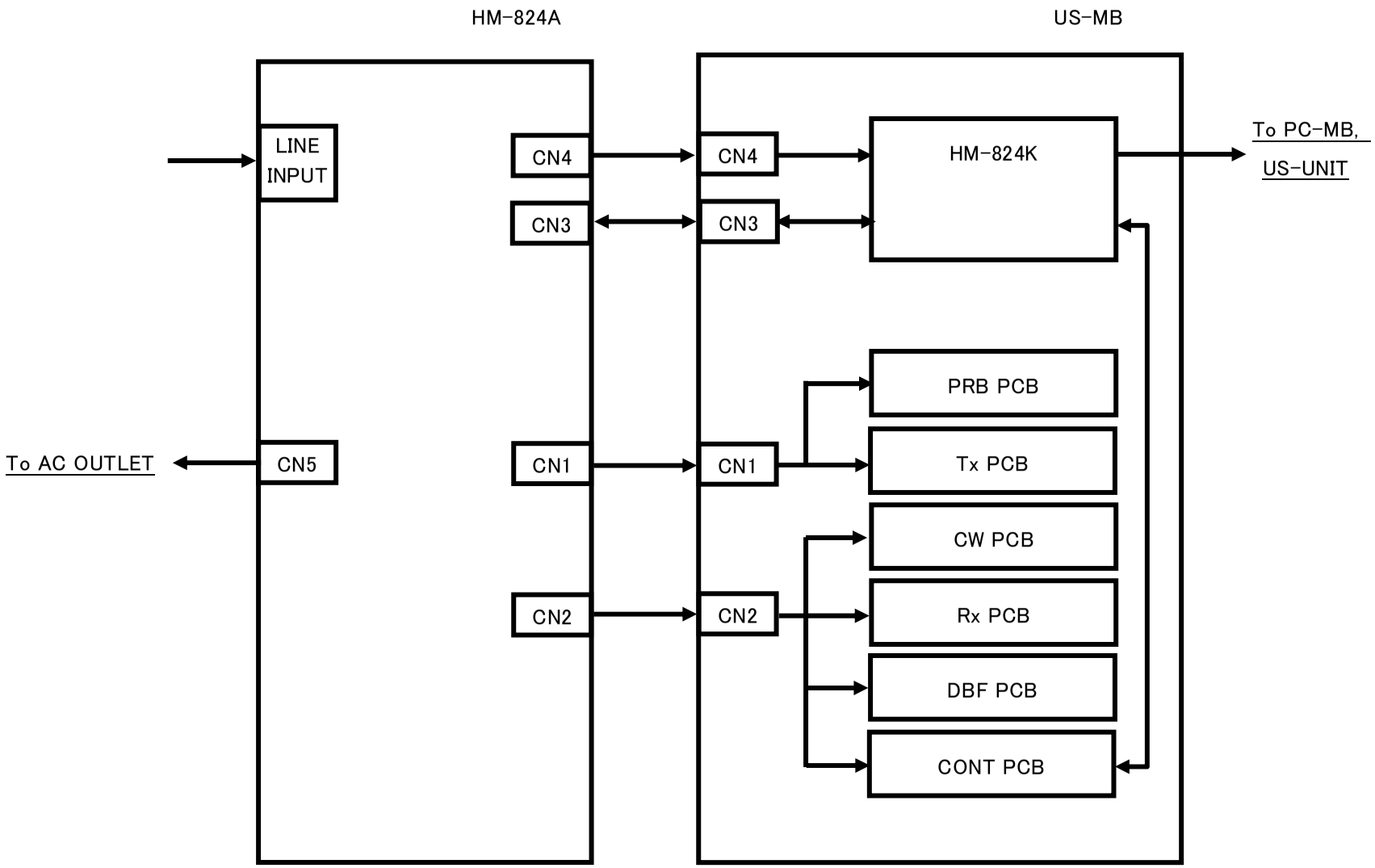

Fig. 5.2.1 Power Unit Connection Diagram

Table 5.1 Table of Power Supplies by Unit and PCB

		HM-824K(*1) (For the digital system)								
		+3.3V	+5VSB	+5V	+12V	-12V	+12VC1	+12VC2	+5VS1	+5VS2
PC Unit		✓	✓	✓	✓	✓				
US Unit	LCD				✓					
	KB	✓		✓						
	DBF									✓
	CONT		✓		✓	✓			✓	
	CELL		✓				✓	✓		
	BIO			✓	✓	✓				
	TVIF	✓								
	MTDRV				✓	✓			✓	
		CN10 -1pin (*3)	CONT +5VSB (*2)	CN10 -4pin (*3)	CONT +12V	CONT -12V	DC/DC CN4-1	DC/DC CN3-1	CONT +5V	DBF +5VD

		HM-824A(*1) (For the analog low voltage system)				HM-824A(*1) (For the analog high voltage system)							
		+6LV	-6LV	+12LV	+-12LV	+12HV	-12HV	+75HV	-75HV	+100HV	-100HV	+200HV	-200HV
Front End	PRB					✓	✓			✓	✓	✓	✓
	Tx					✓	✓	✓	✓				
	CW	✓	✓	✓	✓								
	Rx	✓	✓	✓	✓								
	DBF	✓	✓										
	CONT			✓	✓								
		Rx +6V (*5)	Rx -6V (*5)	Rx +12V (*5)	Rx -12V (*5)	Tx +12V (*5)	Tx -12V (*5)	Tx +75V (*5)	Tx -75V (*5)	PRB +100V (*5)	PRB -100V (*5)	CN1A -5pin (*4)	CN1A -1pin (*4)

(*1) Before measuring each voltage, please check LEDs on the front side of HM-824A. If POWER LED (upper LED) is on, all voltages of HM-824A are outputted normally. If POWER LED is off, there are some voltages of HM-824A which aren't outputted. Similarly, if DC/DC LED (lower LED) is on, all voltages of HM-824K are outputted normally. If DC/DC LED is off, there are some voltages of HM-824K which aren't outputted.

(*2) If LED of the circuit breaker is on, 5VSB is outputted normally.

(*3) CN10 cable is the power cable which connects between MB board and PC unit.

(*4) CN1A cable is the power cable which connects between Filter BOX and HM-824A. If measuring the voltage of +200HV or -200HV, please connect GND of multi-meter to CN1A-3pin.

(*5) When the check pin on Rx, Tx, and PRB PCB cannot be touched, please remove JMP PCB.