

# SERVICE MANUAL

NT

MP1000

MULTI PARAMETER PATIENT MONITOR



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## 1. STRUCTURE OF MP-1000NT

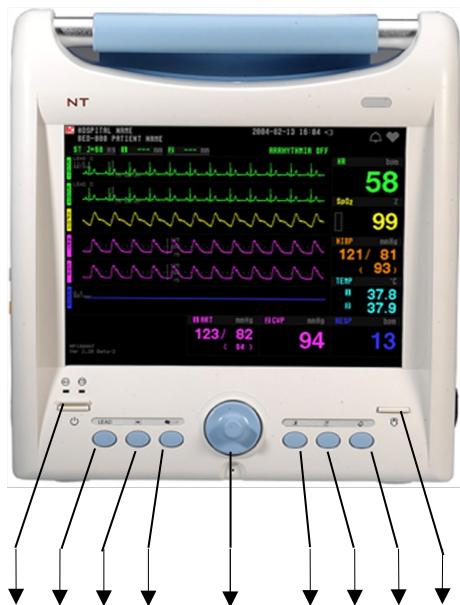
### (1) Standard Functions and Accessories

- Multi Parameter Patient monitor (ECG1, ECG2, SpO2, NIBP, IBP1, IBP2, Resp, TEMP1, TEMP2) 1EA
- Adult SpO2 Sensor 1EA
- NIBP HOSE 1EA
- NIBP CUFF 1EA
- 5 CABLE CLAMPS 1EA
- POWER CABLE 1EA
- GROUND CABLE 1EA
- 10 DISPOSABLE ELECTRODES
- FUSES 2EA
- USER'S MANUAL 1EA

### (2) Additional Options and Accessories

- 58mm THERMAL PRINTER MODULE 1EA
- 58mm THERMAL PRINTER ROLL PAPER 1ROLL
- IBP MODULE (Invasive Blood Pressure)
- IBP SENSOR SET 1EA
- TEMP MODULE (Temperature)
- TEMPERATURE SENSOR 1EA
- RS232 CABLE 1EA
- CO<sub>2</sub> MODULE 1EA
- CO<sub>2</sub> MODULE applicable Sensor & HOSE 1Set

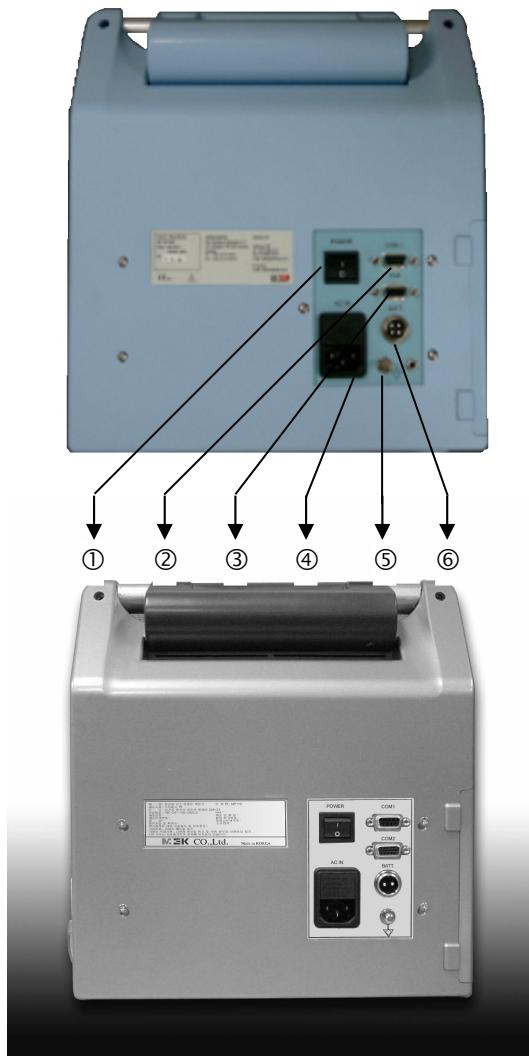
### (3) Exterior Structure



- ① **POWER** : Screen displays when pressed
- ② **LEAD** : Used to select ECG LEAD.
- ③ **FREEZE** : Button to turn ON/OFF FREEZE function. Initial press to freeze the wave, second press to resume display.
- ④ **NIBP** : Activates NIBP measurement.
- ⑤ **ENCODER** : Views the Pop-UP menu when Encoder is pressed Rotate to left and right direction to select desired menu.
- ⑥ **EXIT** : Removes the menu tree when pressed.
- ⑦ **PRINT** : Prints the data being measured when pressed.
- ⑧ **ALARM** : Press for temporary standstill for 30 seconds during the course of alarm activation.
- ⑨ **NURSE CALL** : Calls for the attendance of personnel in charge(Doctor/Nurse)when linked to central program(MP600)



- ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨  
②



① **POWER** : Main Power Switch.

② **SERIAL PORT** : Links to PC when MEK Genuine Central Program(MP600) is applied(In conformity with RS-232C Standard)

③ **VGA OUT** : Visual output to ordinary PC Monitor.

④ **Power Supplying Slot and Fuse Case** : 100VAC~230VAC, 50/60Hz Power Supply, Fuse capacity 2A.

⑤ **Ground Pole** : Connection to Ground Pole.

⑥ **Battery Supply** : Power Connection to Car Battery (DC12V)when the device is implemented on motor vehicle(vehicle-mounted).

## (4) MONITOR SPECIFICATION

### **Display**

10.4" Color TFT LCD 640 X 480  
 Resolution 640 X 480 VGA STD  
 Trace line 1~6waveform(ECG, SpO2, IBP, or Resp.)  
 Trace speed ECG/SpO2/IBP  
 6.3, 12.5, 25mm/sec  
 Resp.  
 3.1, 6.3, 12.5, 25mm/sec  
 Trend HR,SpO2,NIBP,RESP,IBP,TEMP trend selective.  
 30min, 1,2,4, 8,12,24 Hours or Auto Setting  
 Vital sign graphic mode HR, SpO2, NIBP, IBP, TEMP, Resp.

### **Display parameter**

Heart rate and alarm limit  
 SpO2 rate and alarm limit  
 Blood pressure (NIBP, IBP)  
 Respiration  
 Temperature  
 Trend of HR or the other Vital signs, Value & time  
 Name, Bed ID, Date & time, Menu and menu information,  
 Event message

### **Performance**

#### **ECG**

Channel : 2 channel  
 Electrode ; 3 or 5electrode  
 Lead ; 6Lead(I, II, III, aVR, aVL, aVF) selective  
 Dynamic range 10mV  
 Frequency response: menu selective  
 Diagnostic mode  
 Lower side 0.05 or 0.5Hz  
 Upper side 40Hz or 80Hz  
 Digital band-stop filter (notch filter) - on/off  
 Monitoring mode (Default Mode): 0.5 ~ 40Hz  
 and digital band stop filter on (50 / 60Hz)  
 Heart rate 20 ~300 bpm  
 Accuracy +/- 2%  
 Input signal range +/- 0.5mV ~ +/-5mV

#### **Respiration**

Method ; Impedance for ECG Lead  
 Respiration rate 2 ~ 150 bpm  
 Accuracy +/- 1 bpm  
 Frequency response 0.1 ~ 4Hz (-3dB)  
 Impedance range 100 ~ 2K ohm  
 Detect sensitivity 0.5 ohm min

#### **SpO2 Percentage Oxygen Saturation**

Probe MSSOA Finger type reusable sensor  
 Measurement range 40% ~ 100%  
 Accuracy Adult  
 +/- 2%, for readings between 70 % ~ 100%  
 +/- 3%, for readings between 50% ~ 69%  
 Neonate  
 +/- 3 % 70%~ 95%  
 Unspecified 0 ~ 49%  
 Setting time Wave out time : 2 sec  
 SpO2 percentage Display : 10 sec  
 Averaging (after setting time) 8beat

#### **NIBP (Oscillometric method upon inflation and deflation)**

Pressure  
 Measurement range 0 ~300mmHg(+/-2mmHG)  
 Cuff  
 Reusable cuff Adult/Child cuff (STD. accessory)  
 Disposable cuff Neonatal cuff. (optional)  
 Auto deflation pressure  
 Adult 300mmHg  
 \* Neonate 150mmHg  
 Measurement time max 40sec at standard adult cuff & normal

### **IBP (2-IBP : Optional)**

Measurement range -50 ~ 300 mmHg  
 Sensor 5uV /mmHg (optional)  
 Accuracy +/- 2%  
 Zero balance + / - 150mmHg  
 Automatic Biasing and scaling for IBP Signal Display

### **Temperature**

Sensor YSI 400 series(optional)  
 Resolution 0.2 °C  
 Measurement range 0 ~ 50 °C  
 Accuracy +/- 0.4 °C ( 15~34 °C,41~45 °C )  
 +/-0.2 °C (34~41 °C )

### **Alarms**

ECG Heart rate  
 High limit 30 ~ 300 bpm , Low limit 20 ~ 290 bpm

### Respiration rate

High limit 10 ~ 150 bpm , Low limit 2 ~ 145 bpm

\* Do not use for the detection of Apnea.

### **SpO2**

High Saturation 52 ~ 100%, 2% Interval (default = off)  
 Low Saturation 51 ~ 99%, 2% Interval (default = 81%)

### **NIBP**

Systolic high and low limit setting, 40~300/30~290 ,5mmHg Interval  
 Diastolic high and low limit setting, 30~290 /20~280, 5mmHg Interval  
 Mean high and low limit setting, 35~295/25~285, 5mmHg Interval

### **IBP**

Systolic high and low limit setting, 40~300/30~290 ,5mmHg Interval  
 Diastolic high and low limit setting , 30~290 /20~280, 5mmHg Interval  
 Mean high and low limit setting, 35~295/25~285, 5mmHg Interval

### **Temp**

high limit 20 ~ 50°C  
 Low limit 10 ~ 40°C

Alarm silence ; 30 second

Alarm on/off ; all parameters on/off selective independently

### **Power input**

100 VAC ~ 240VAC, 50/60Hz 60VA

or 12V +/- 10% external power input

### **Battery**

12 V 2Ah - Continuous operating time: 1 Hr min

### **Power consumption**

50 W max

### **Dimensions**

W 282 x H 315 x D 165

### **Weight**

5 Kg max

### **Environmental**

Operating temperature 10 ~ 40°C (50°F ~ 104°F)  
 Storage temperature -20 ~ 70°C (-4°F ~ 158°F)  
 Relative humidity 10 ~90% (storage)

0~95% non-condensing (operating)

### **Input and Output communication**

COM1 RS-232 Baud rate 19200 bps STD I/O communication port  
 COM2 VGA Signal Output

### **Option**

Printer Thermal printer (58mm paper width)

Temperature Sensor, YSI 401 type

IBP Sensor Kit (Disposable), Deltran II Series

IBP Cable for MP1000

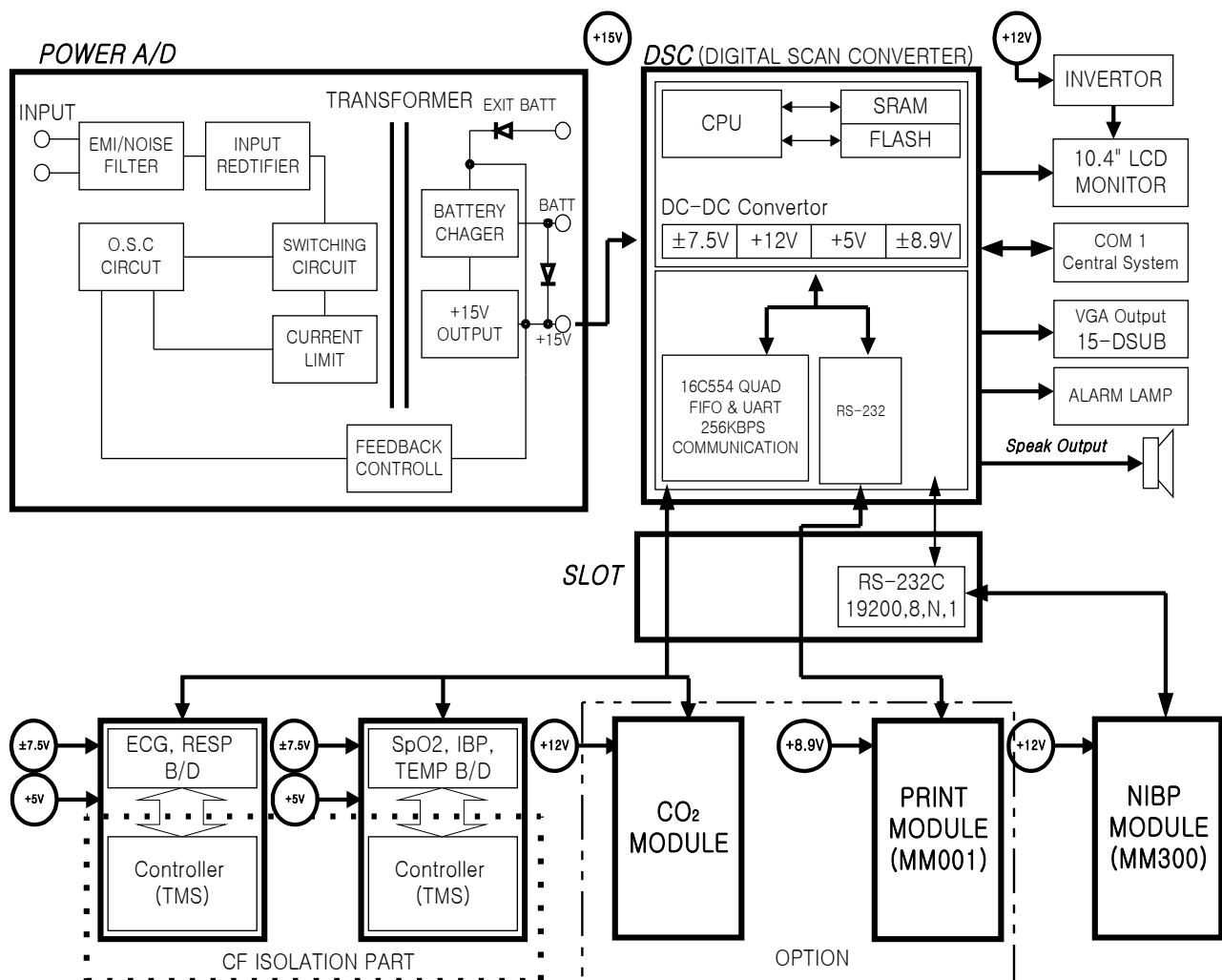
\*\* Central station MP600: 8ch Central station

### **Accessories**

ECG lead cable( 3 electrode type )  
 SpO2 sensor, Cuff (Adult / Child) & Hose  
 Cuff(Adult/Child) & Hose

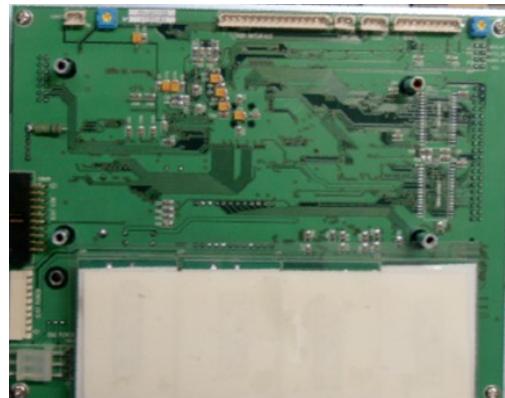
## 2. SYSTEM DIAGRAM

## (1) OVERALL BLOCK DIAGRAM

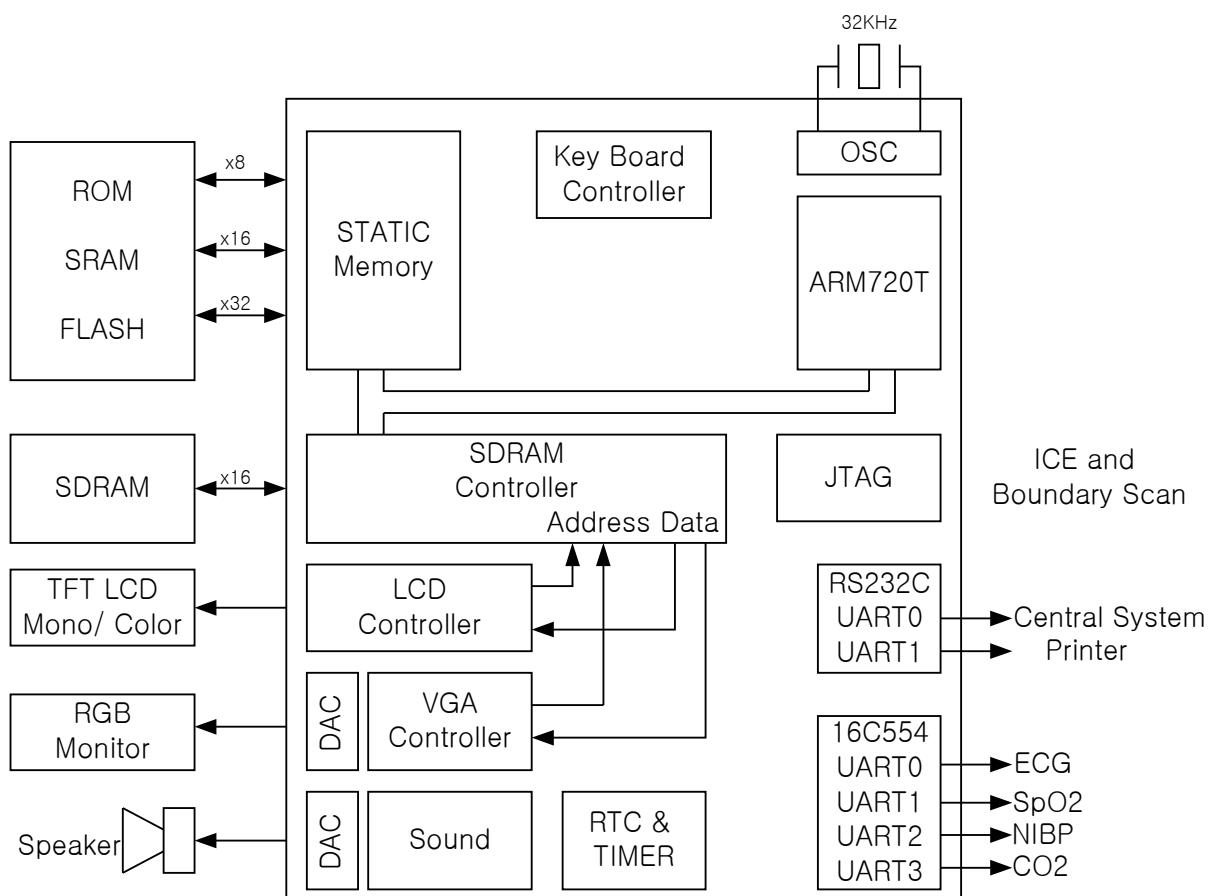


(2) **DSC B/D** (PCB Ver 8A)

### A. BOARD SNAPSHOT

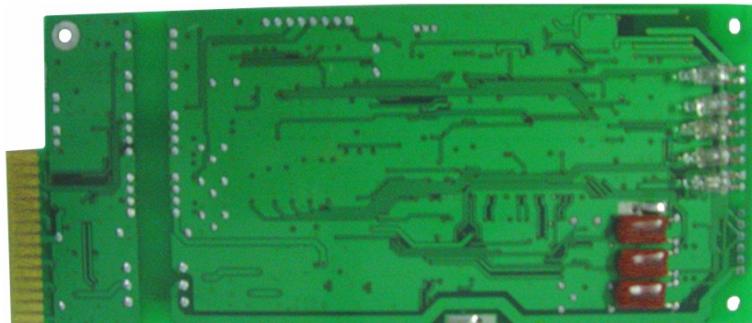
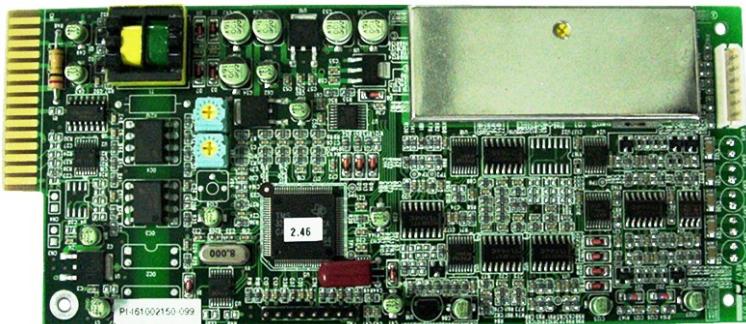


### B. BLOCK DIAGRAM

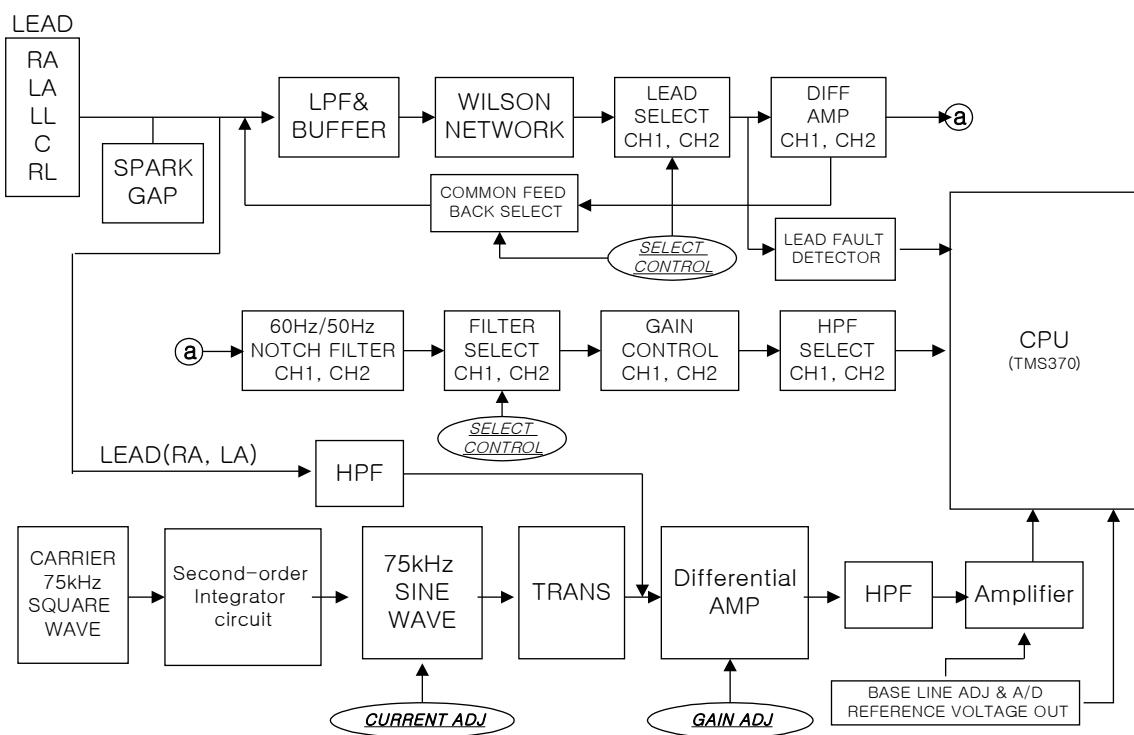


(3) **ECG B/D** (PCB Ver 7A)

**A. BOARD SNAPSHOT**



**C. B. BLOCK DIAGRAM**



a. SPARK GAP

Electric Discharge to prevent Electronic Shock when High Voltage(Defibrillator) is applied.

b. LPF(Low Pass Filter)

Filters and passes low frequency signals only. ( $1/2\pi RC$ )

c. Buffer

5 Electrodes on Patient's body consist of RA(right arm), LA(left arm), LL(left Leg), RL(right leg), C(chest) and signals from these electrodes are to be input to Buffer which is made p of OP amp. Circuit Clamping diode and Neon lamp circuit on the amplifier is to prevent instant high voltage of power supply.

d. Wilson network & Lead selector

Respective signal from the Buffer links Lead Selector which consists of Analogue Multiplexer and LEAD Vector is selected by control signal from the CPU depending on the key input.

LD(2-0)	SELECT	DIFF AMP( + )	DIFF AMP ( - )
000	I	LA	RA
001	II	LL	RA
010	III	LL	LA
011	AVR	RA	LA+LL
100	AVL	LA	RA+LL
101	AVF	LL	RA+LA
110	C	V	RA+LA+LL
111	CAL		

e. Differential Amp

Electrocardiograms signal from the Analogue Multiplexer is first amplified through differential amplifier with CMRR. Reason for applying differential amplifying is to eliminate the noise not only form the electrocardiogram signal from the electrode attached to the patient but also to get rid of the noise such as noise from the circuit simultaneously.

f. Lead fault detector

Circuit to detect high-resistance substance and display on the screen in order to report the status where the attached electrode is detached or improperly attached. Signals from the differential amplifier are used to detect the facts of saturation through window parallel drawing device and display on the screen and eventually authorize the signals on the transformer .

g. 60/50Hz Notch filter

Used to filter unnecessary frequency range. Generally used to eliminate the frequency of

60/50Hz form the power supply.

#### h. GAIN CONTROL

Used to control the gains from wave on analogue basis. CH1 GAIN and CH2 GAIN are controlled by VR1 and VR2 respectively.

#### i. HPF SELECT

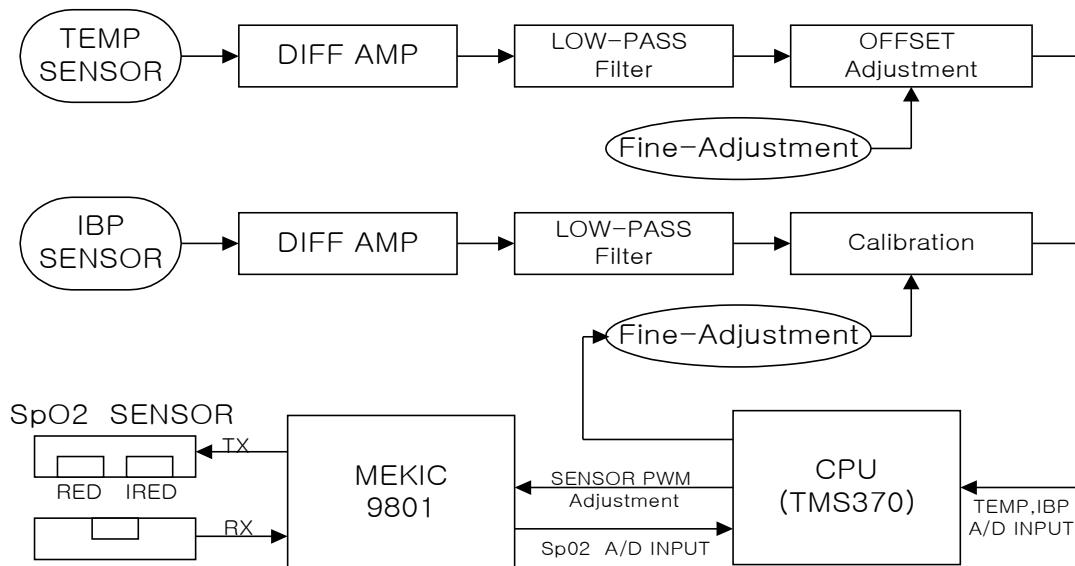
Only filters the high frequency range.

### (4) SpO<sub>2</sub> B/D (PCB Ver 8A)

#### A. BOARD SNAPSHOT



#### D. B. BLOCK DIAGRAM



Above diagram displays brief flow of the system.

- Sensor Section : RED ray(880nm)and IRED ray(980nm) are used. Bottom concept is red color for Hbo<sub>2</sub> and black color for Hb. Light source including RED and IRED reflects from one side and evaluates the reduced figure and measures accordingly.

980nm wave length is used as a standard for measuring environment standard and revised

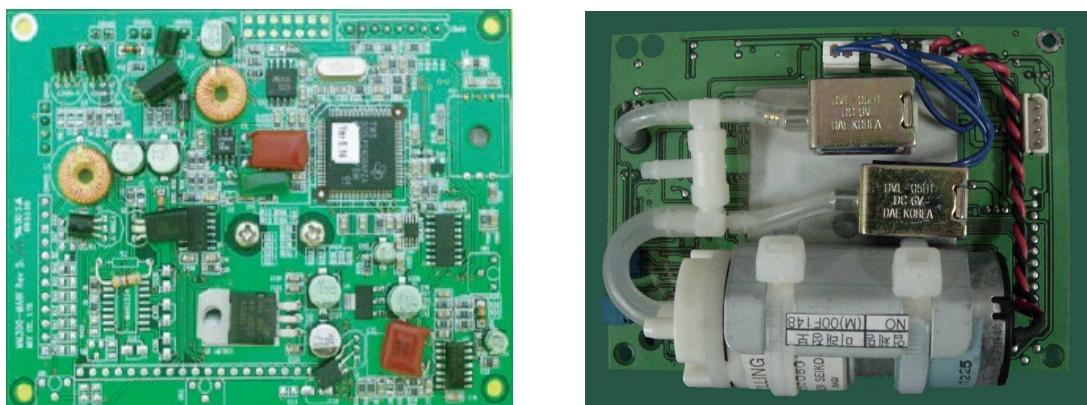
value standard. 880nm wave length will appear as a resulting figure of measured object.

- Analog Processing : To control the electricity in order to adjust the intensity of light or to receive the measured data

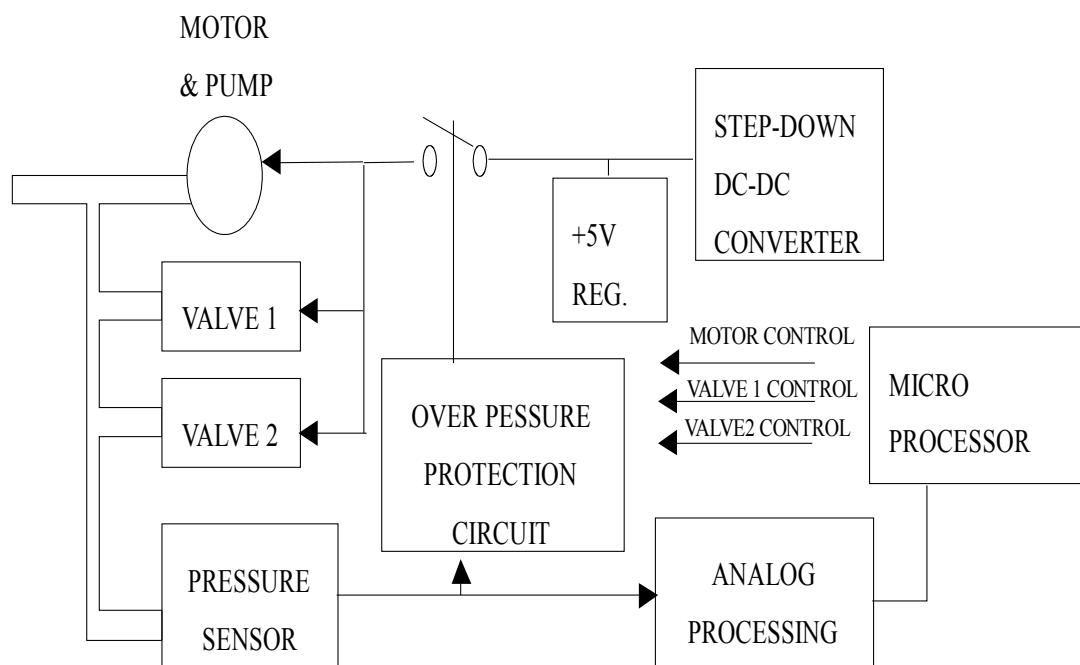
CPU(Signal Processing & Control) : Receive data(TEMP, SpO2, IBP)are being AD and the result are used to calculate the heart rate and SpO2. If the resulted figure is not within the range of revised value, then adjustment will be made to determine the need for another intensity control. Additional function is to transmit and receive the data to and from external entity.

(5) **NIBP B/D** (PCB Ver 5A)

**A.**  
**BOARD SNAPSHOT**

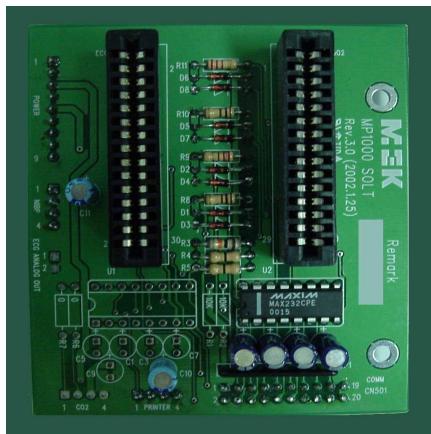


**(6) BLOCK DIAGRAM**



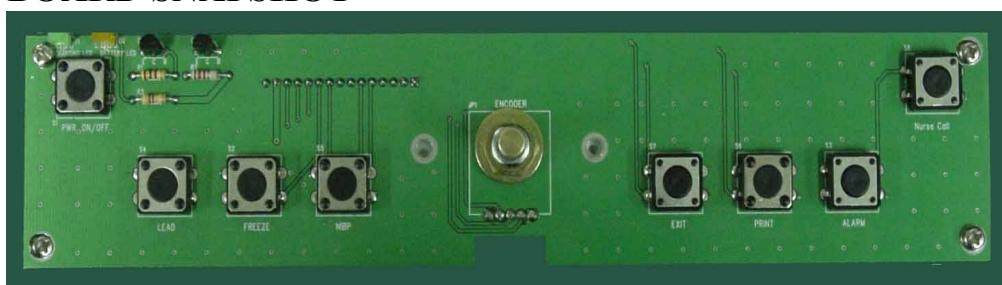
## (6) SLOT B/D

### A. BOARD SNAPSHOT



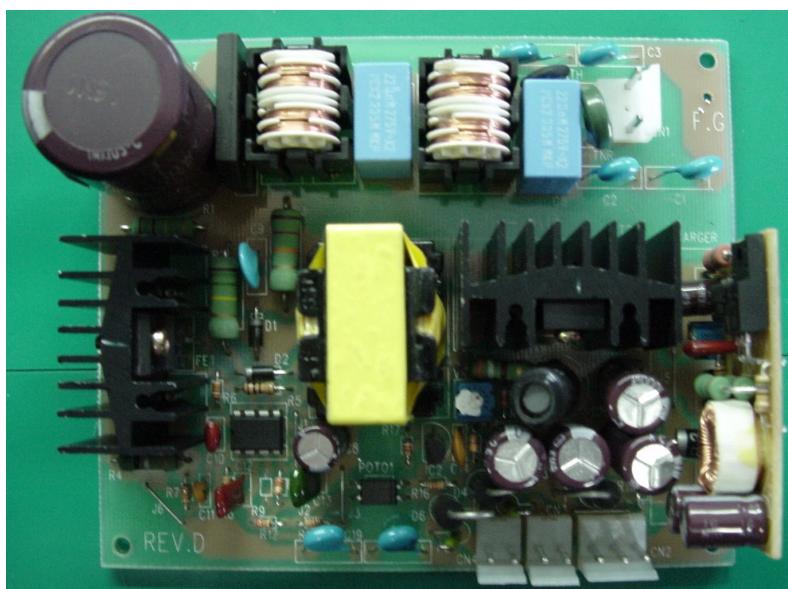
## (7) KEY B/D

### A. BOARD SNAPSHOT



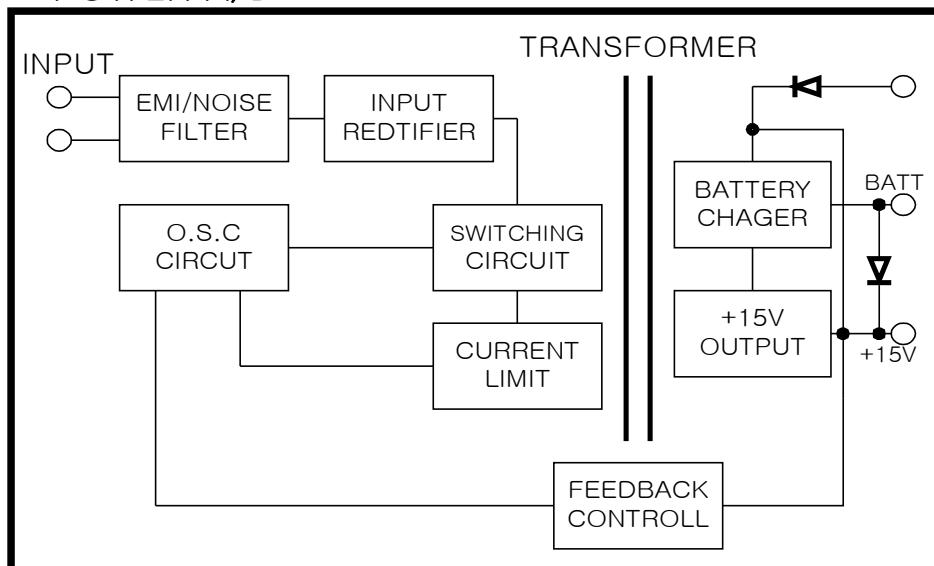
## (7) POWER B/D(AC-DC)

### A. BOARD SNAPSHOT



### B. BLOCK DIAGRAM

*POWER A/D*



#### a. General Characteristic

This power supplying device is a converter with FLY BACK application which receives AC88V~AC264V and supplies DC+15 necessary for MP1000NT +8.9V, +5V, ±7.5, +12V

and BATTERY CHARGER are supplied with this voltage,. AC input is FREE VOLTAGE which generates within the range of AC88V~AC264V without external manual control.

b. INPUT WOLTAGE AND FREQUENCY

MP1000NT A/D

Rated Output Voltage	Input Variation Rate	Frequency Range	Remarks
AC 110V/220V Single Phase	88V~264V	45~66Hz	FREE VOLTAGE

MP1000NT DC-DC CONVERTOR

Rated Output Voltage	Input Variation Rate	Frequency Range	Remarks
DC +15V	DC+9V~+15V	-	-

c. Output Characteristics

MP1000NT A/D

NO.	Description	+15V MAIN	+13.8V CHARGER	
1	Rated Output Voltage	+15V	+13.8V	
2	No-Load Voltage Range(%)	±5%	±1%	
3	Load Rated Current	2A	1A	
4	Load Voltage Range	±5%	Above +10V	
5	RIPPLE & NOISE (Rated Input & Rated)	200mV P-P	-	
6	Over Current Protection	AC110V-above6A AC220V-above8A	Above 1.5A Below 5V	Time consumed for BATTERY Recharge 4H±30m BATTERY Voltage above +11.55V
7	Output Power	30W	10W	

\*Input Voltage : AC220V Standard

MP1000NT DC-DC CONVERTOR

NO.	Description	+8.9V	+5V	±7.5V	+12V	비고
1	Rated Output Voltage	+8.9V	+5V	±7.5V	+12V	
2	No-Load Voltage Range(%)	±1%	±1%	±5%	±5%	
3	Load Rated Current	2.5A	1.5A	0.3A	+12V 0.6A	
4	Load Voltage Range	±1%	±1%	±5%	±5%	
5	RIPPLE & NOISE (Rated Input & Rated Current)	100mV P-P	100mV P-P	250mV P-P	+12V 250mV P-P	

6	Over Current Protection (In case of Short Output)	Normal	Normal	Normal	Normal	
7	Output Power	20.5W	7.5W	4.5W	5.5W	

\*Input Voltage based on DC+15V

d. Input voltage variation Rate

In case the rated current is loaded, even if the input voltage fluctuates as b, #4 on C is satisfied the range of voltage.

e. Load Variation Rate

AC110V or 220V, DC-DC = +9V~ +15V under rated input condition to satisfy the range of output voltage in case of #3,4 on c under loaded current.

f. Efficiency(AC220 Input)

Efficiency exceeds 65% for the measurement under MP1000NT A/D rated input and rated loaded current.

g. Leakage Current

In case of rated input condition on MP1000NT A/D, the leakage current between input LINE and F.G is below 200uA under AC 264V.

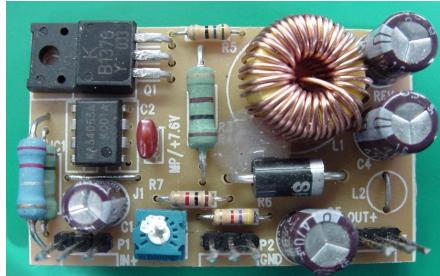
h. Inrush Current

In case of rated input condition on MP1000NT A/D, the inrush current is below 30A PEAK when the power is switched ON.

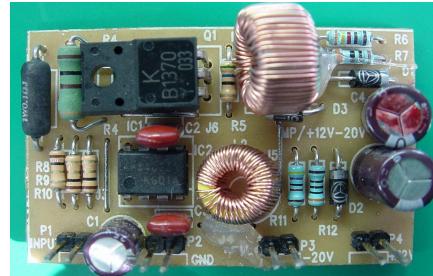
## (10) POWER B/D(DC-DC)

### A. BOARD SNAPSHOT

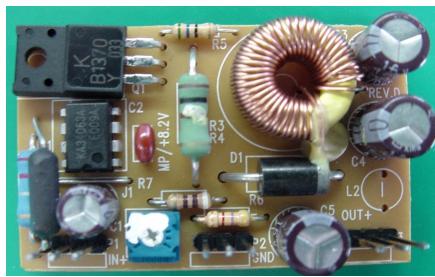
<< +12V DC-DC B/D>>



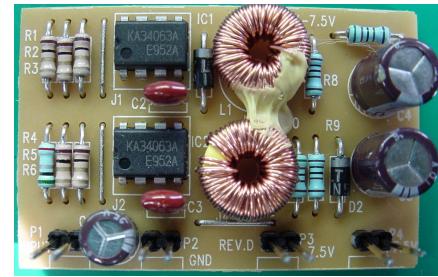
<<+5V DC-DC B/D>>



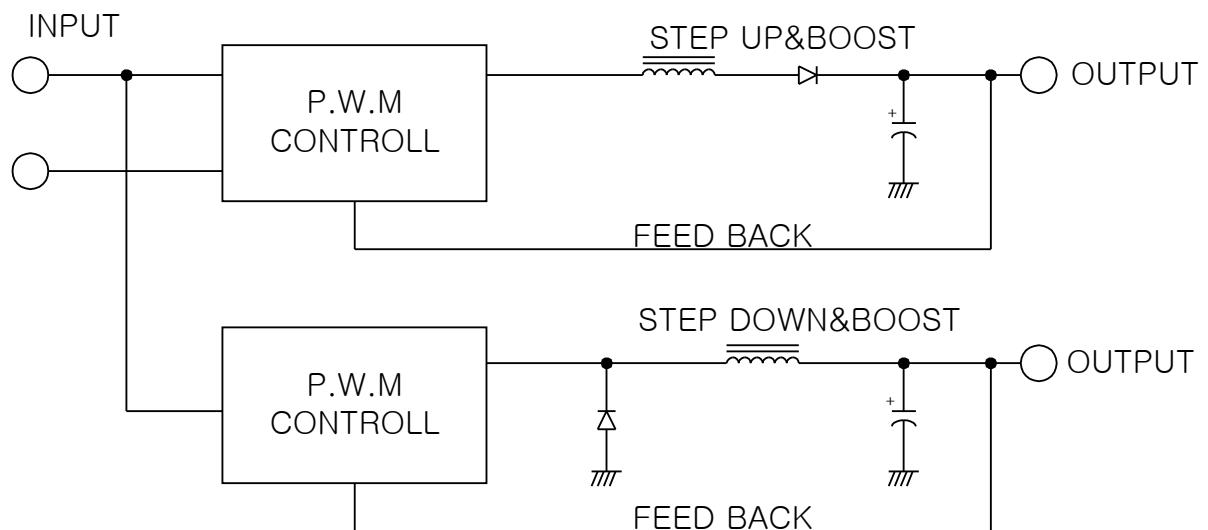
<<+7.5V/-7.5V DC-DC B/D>>



<<+8.9V DC-DC B/D>>



## (11) BLOCK DIAGRAM



### 3. INSTRUCTION FOR OPERATION

#### (1) ECG(Electrocardiogram) Measurement

##### 1). LEAD FAULT CHECK

- ① Check LEAD FAULT on LCD Display when attached LEAD on the simulator.(check all LEADS)

##### 2). ECG GAIN CONTRAOL(CH1, CH2)

- ① Adjust to 10mm by changing CH1-VR1, CH2-VR2 on ECG Board while monitoring the QRS wave(Set SIMULATOR and device as GAIN : 1mv, Select LEAD:II

##### 3). LEAD Check

- ① Set each lead in sequence to inspect normal operation.(Unaided eye observation)

##### 4). SPEED GAIN Check

- ① Set each SPEED and GAIN to inspect normal operation.(Unaided eye observation)

##### 5). FILTER Check

- ① Inspect each filter for normal operation.

##### 6). RESPRATION Control

- ① Insert into the MP1000NT after ECG cable connected the ECG simulator.  
(In case of no simulator, don't control)
- ② Gain adjust the x1 after RESP speed set for 12.5mm/sec in the MP1000NT menu.
- ③ Control after RESP simulator set for BASE : 1.5K, LEAD : II, RESP Ohm : 3 Ohm.
- ④ Measure the TP8 (T3) with oscilloscope and then control till wave of oscilloscope will be normal wave.
- ⑤ Simulator set for BASE : 500, 1K, 1.5K control after RESP Normal and To other than it re-regulates the from before

#### (2) SpO2 Measurement Operation

##### 1). GAIN Check

- ① Check to confirm if SpO2 gain has been changed on the GAIN MENU.

##### 2). SPEED Check

- ① Check to confirm if SpO2 speed has been changed on the GAIN MENU.

##### 3). Check Value

- ① By using SpO2 SIMULATOR, check to confirm if the changed value on the simulator is in conformity with the displayed value(Error Allowed ±2%)

##### 4). Check Accuracy

- ① By using the SpO2 simulator, check and confirm if the tested value is within the range of error allowance of SpO2 70%~99% (오차 ±2%) #

### (3) TEMP(Temperature) Measurement Operation

#### 1). TEMP1,2 Operation

- ① Connect the temperature JIG to the connector and then choose the 37°C.
- ② Control VR3 and set the Temperature at 37.0°C.
- ③ Choose the 40 for temperature JIG and then check that temperature match or not.
- ④ In case temperature is higher than 40°C, process the above No.2 again and control the error range of 40 will be accepted +,-0.2 by changing the temperature 36.9°C or 40.1°C with VR3.

#### ■ Correlation between Temperature and Resistance(YSI 400 Series)

The following table is a data sheet to display the correlation between temperature of YSI Series temperature sensor and the resistance.

NO.	Temp (°C)	RES (Ω)												
1	-40	75.79K	13	4	6011	25	16	3379	37	28	1977	49	40	1200
2	-35	54.66K	14	5	5720	26	17	3226	38	29	1894	50	41	1153
3	-30	39.86K	15	6	5444	27	18	3082	39	30	1815	51	42	1108
4	-25	21.87K	16	7	5184	28	19	2944	40	31	1740	52	43	1065
5	-20	16.43K	17	8	4937	29	20	2814	41	32	1668	53	44	1024
6	-15	16.43K	18	9	4704	30	21	2690	42	33	1599	54	45	984.2
7	-10	12.46K	19	10	4483	31	22	2572	43	34	1534	55	46	946.6
8	-5	9534	20	11	4273	32	23	2460	44	35	1471	56	47	910.6
9	0	7355	21	12	4075	33	24	2354	45	36	1412	57	48	876.2
10	1	6990	22	13	3887	34	25	2253	46	37	1355	58	49	843.2
11	2	6645	23	14	3708	35	26	2156	47	38	1301	59	50	811.7
12	3	6319	24	15	3539	36	27	2065	48	39	1249	60	55	672.9

## (4) NIBP(Non-Invasive Blood Pressure) measurement Operation 법

### 1). Preparation Task for Measurement

- ① Run after Installing MM300 PROGRAM on TESTING
  - MM300.EXE ( EXE file)
  - MM300.LOG
- ② Connect Communication JIG and COM1 PORT on PC.
- ③ Connect HOSE and CUFF to BP-PUMP SIMULATOR.
- ④ Connect Power after connecting MM300 and Communication JIG.

### 2). MM300 Inspection and Operational Procedure

#### ① Inspection for Communication

- a. Inspect the communication between the PC and MM300(NIBP MODULE).
- b. Press F1 on the keyboard of the computer – Initiate communication–Straight line will appear on the graph hen normal– Straight line on the graph must appear without noise– Inspect TMS or ANALOG PATR if NOISE appears
- c. Press F2 on PC– communication interrupt – stops the straight on the graph
- d. Press F3 on PC – RESET – back to initial setting
- e. Press F4 on PC – Measures BP
- f. Press F5 on PC – Switch ADULT and NEONATE

#### ② SOLENOIDE Inspection.

- a. Press V(Valve) on PC
- b. Numerical key 0 on PC – SOLENOIDE 1(JR2) OFF / SOLENOIDE 2(JR3) OFF
- c. Numerical key 1 on PC – SOLENOIDE 1(JR2) ON / SOLENOIDE 2(JR3) OFF
- d. Numerical key 2 on PC – SOLENOIDE 1(JR2) OFF / SOLENOIDE 2(JR3) ON
- e. Numerical key 3 on PC – SOLENOIDE 1(JR2) ON / SOLENOIDE 2(JR3) ON

For SOLENOIDE, inspect if the contact point on the valve is operative.

#### ③ Inspection for PUMP (MOTOR) Operation.

- a. Press M(Motor Pump)on PC.
- b. Numerical key 1–9 on PC for setting of pressure on the Motor Pump (10%–90%)
- c. Numerical key 0 on PC–to stop the Motor Pump
- d. Press(–)key on PC – to start the Motor Pump, Inspect the operation of Motor Pump.

#### ④ Pressure Adjustment

- a. Close all SOLENOIDE Valve – Press V key and 3.

- b. Set the BP-PUMP SIMULATOR at TESTS MODE with pressure of 200, and Internal Cuff
- c. Press BP-PUMP START TEST
- d. When pressure value reaches 200 on the BP-PUMP, set the pressure at 200 in case of BP-PUMP, at on the screen by VR2.
- f. Range of error allowance  $\pm 1\text{mmHg}$

⑤ Blood Pressure measurement TEST

- a. Set BP-PUMP at PRESET MODE and test respectively selected SIMULATION condition is resulting appropriate outcome.
- b. Press F3(RESET) then measure by pressing F4(READ-measure).
- c. Set Adult Mode of the Test Program on the PC.
- d. 1rd condition on BP-PUMP – Sys 120 / M 93 / Dia 80 / HR 80
- e. 2rd condition on BP-PUMP – Sys 80 / M 60 / Dia 50 / HR 80
- f. 3rd condition on BP-PUMP – Sys 200 / M 166 / Dia 150 / HR 80
- g. 4rd condition on BP-PUMP – Set SIMULATION MODE and select SYS 120 / DIA 80 / HR 60
- h. After setting each condition, Press F3(RESET) and inspect the appropriate measurement by pressing F4(READ measure).
- i. PASS is Inspection if allowed difference is within the range of  $\pm 5\%$ .
- j. Set NEONATE MODE in the TEST Program of the computer.
- k. Set– Sys 60 / M 40 / Dia 30 / HR 80(120) on the PRESET MODE of the BP-PUMP and inspect the appropriate measurement of the Blood Pressure.

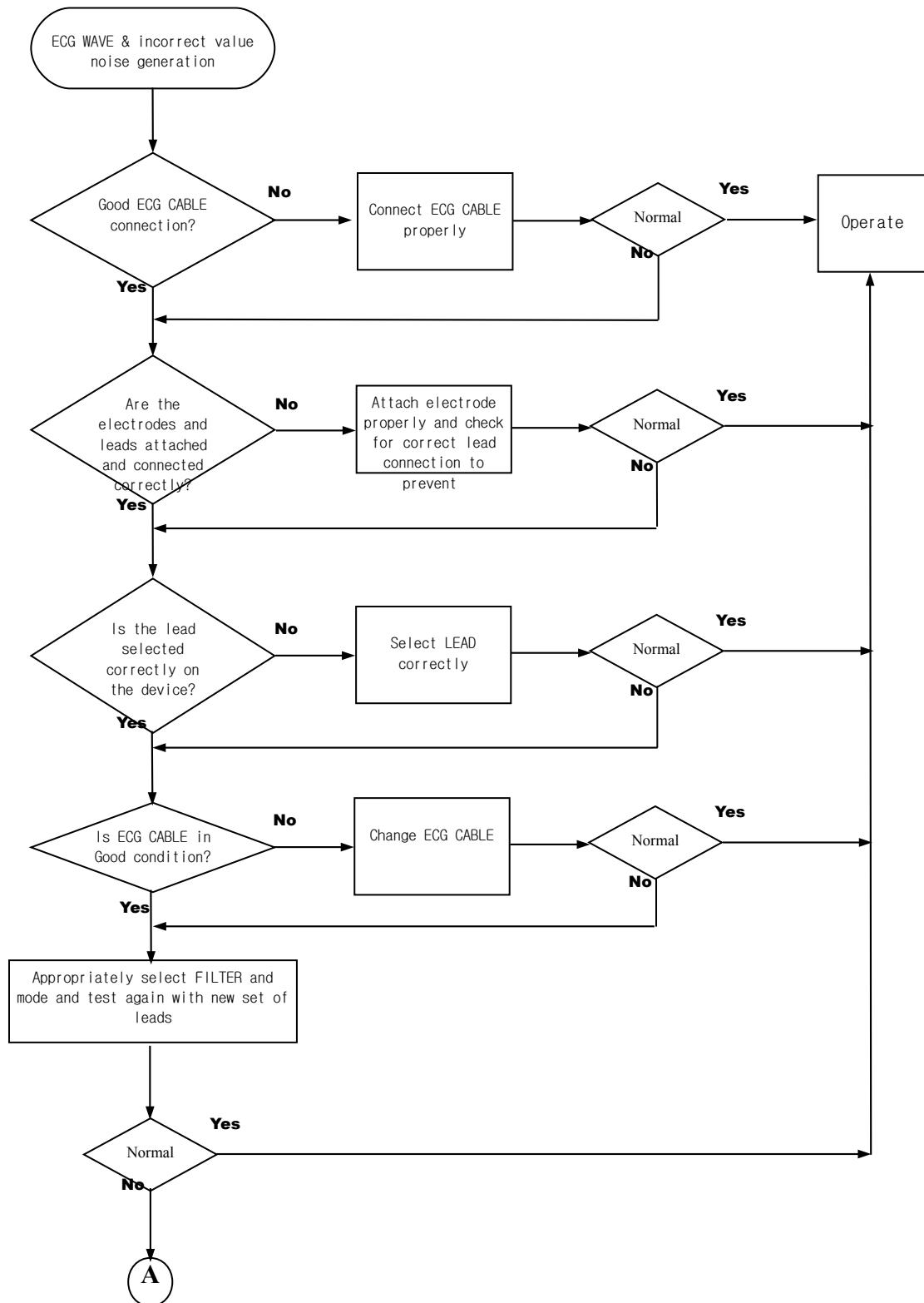
⑥ The living body TEST

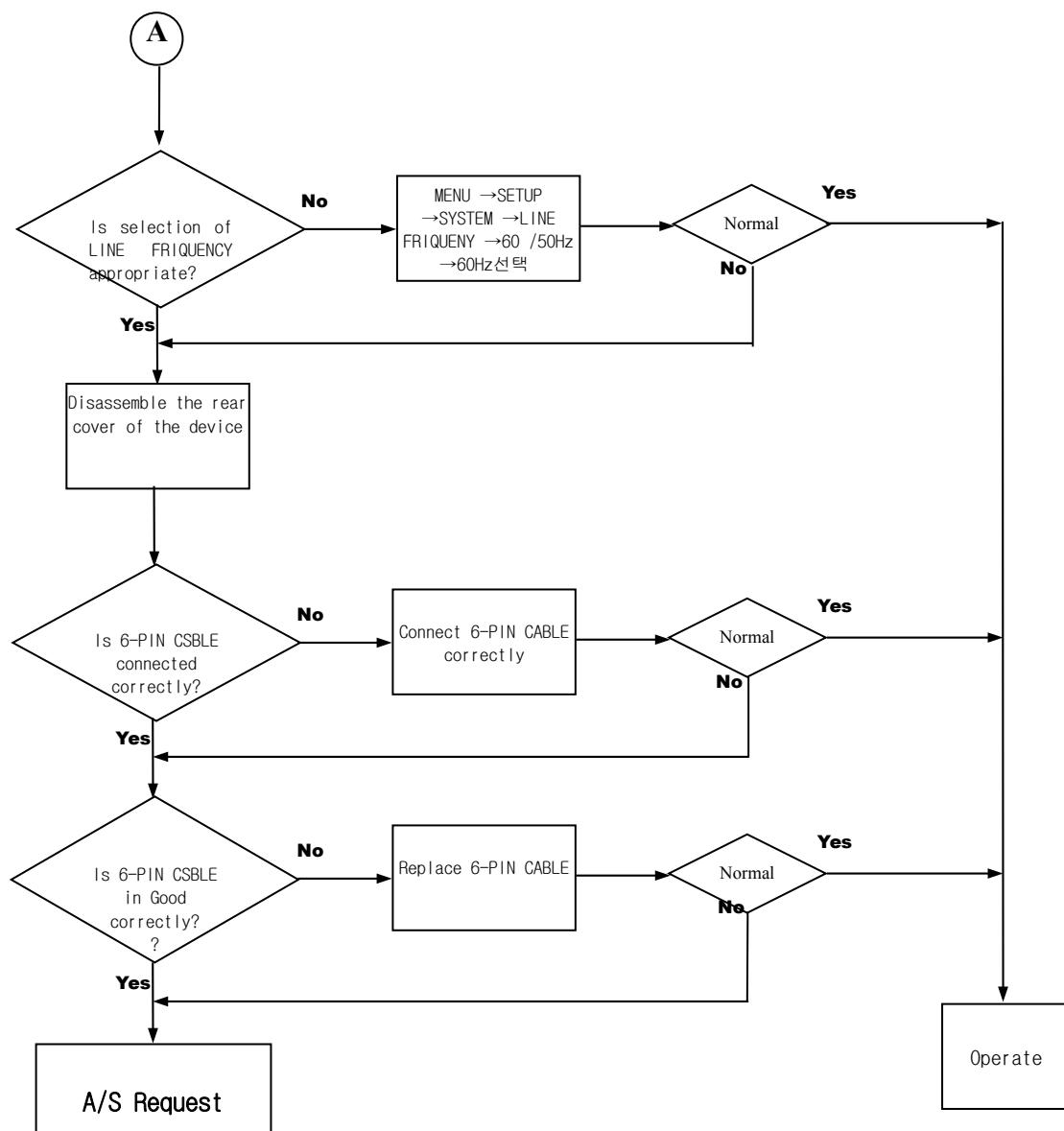
- a. Wind the CUFF around arms and set ADULT MODE on PC TESTING
- b. Press F3(RESET) followed by pressing F4(READ to measure) for measurement.

## 4. TRUBLE SHOOTING

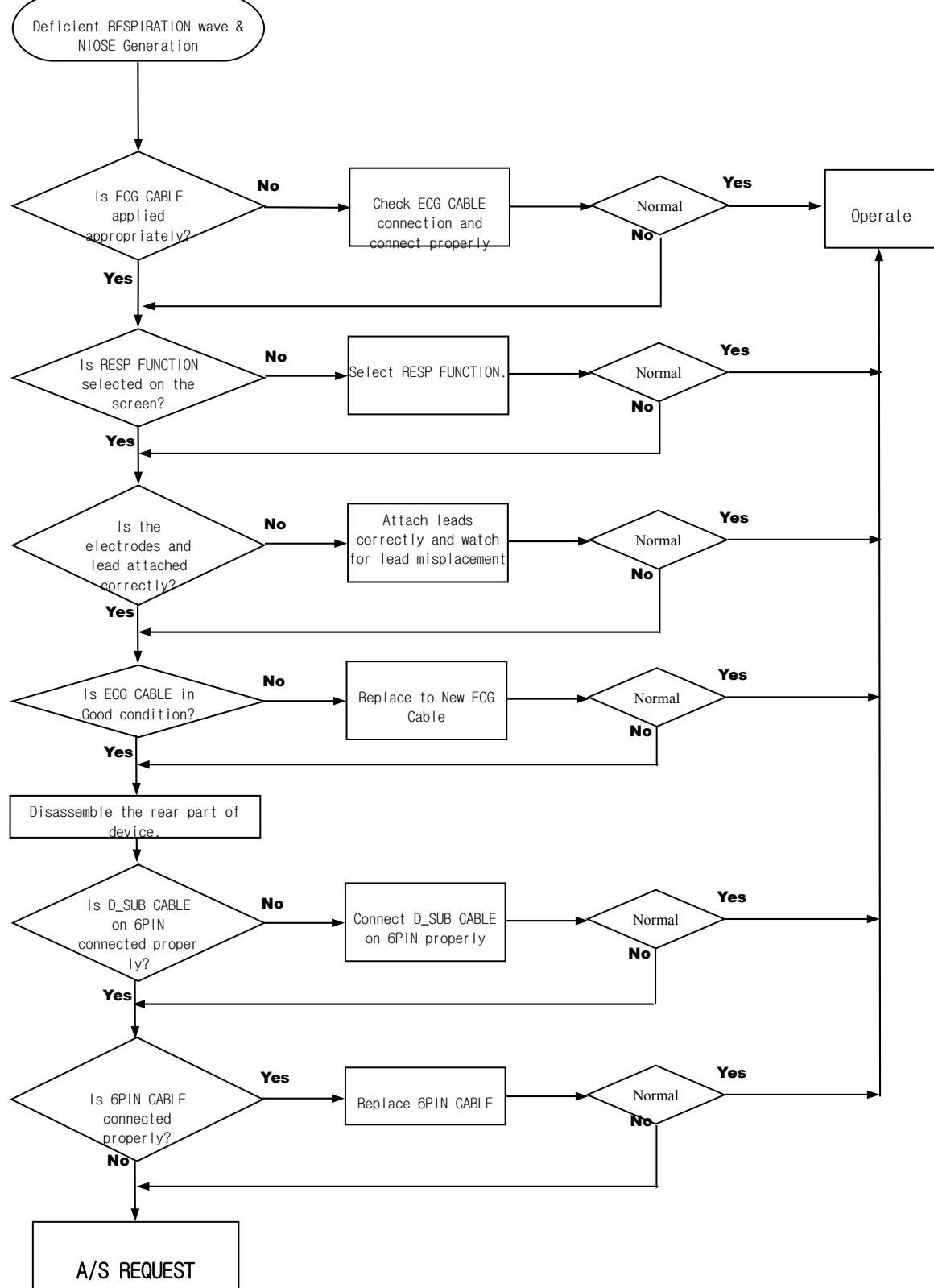
NO	B/D	Trouble Description	Referred PAGE
#1	ECG B/D	ECG Wave & Odd Figure and NIOSE	20
#2	ECG B/D	RESPIRATION Deficient Wave & NIOSE	22
#3	SpO2 B/D	SpO2 Inoperative	23
#4	SpO2 B/D	SpO2 Wave & Odd Figure	24
#5	SpO2 B/D	IBP Inoperative & Odd Figure miscellaneous deficiency	25
#6	SpO2 B/D	Unable to Measure TEMP	27
#7	NIBP B/D	Unable to Measure NIBP.	28
#8	POWER B/D	Power Deficiency & Unable to turn on the decive	29

## #1 . ECG Wave & Incorrect value, NIOSE

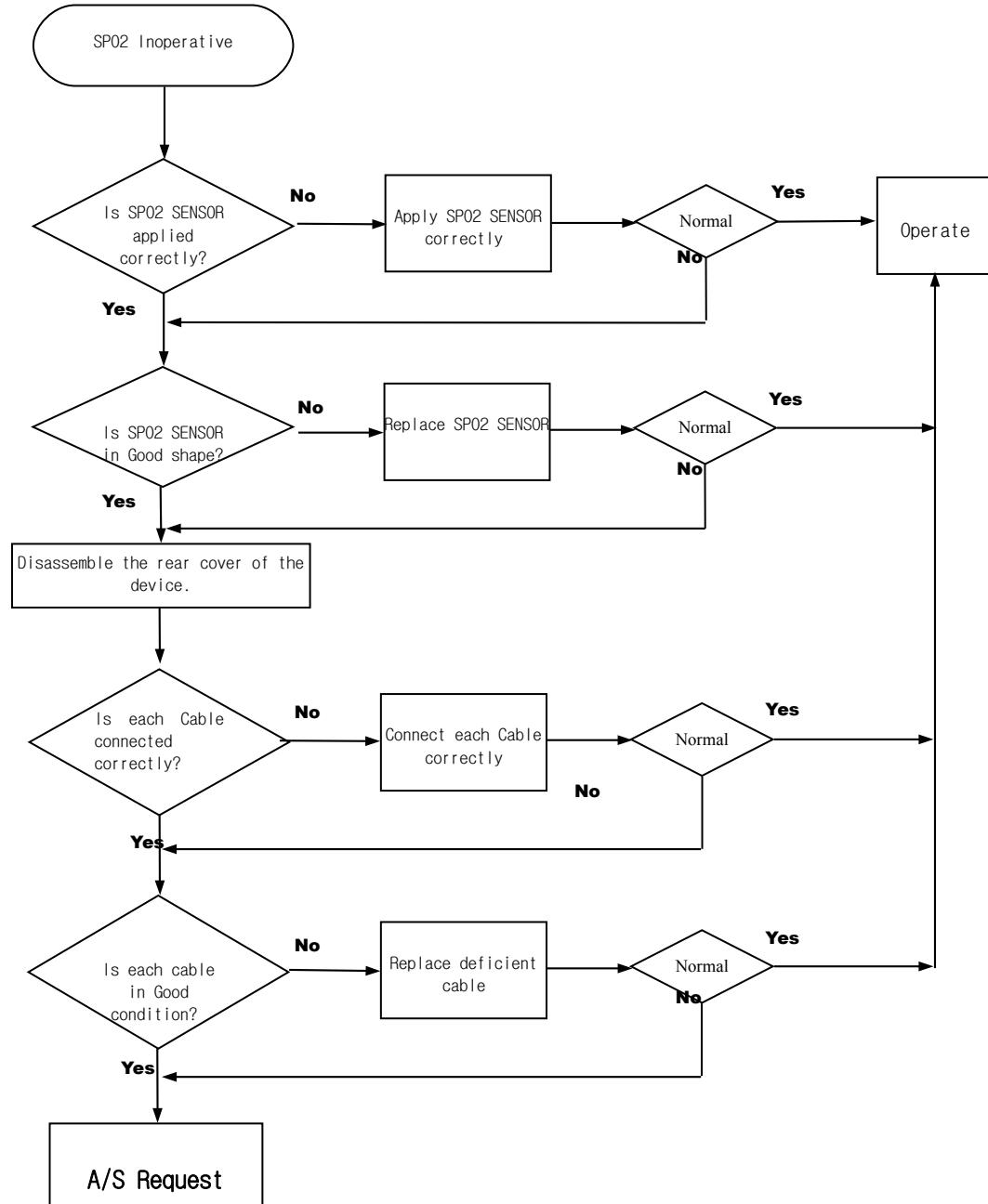




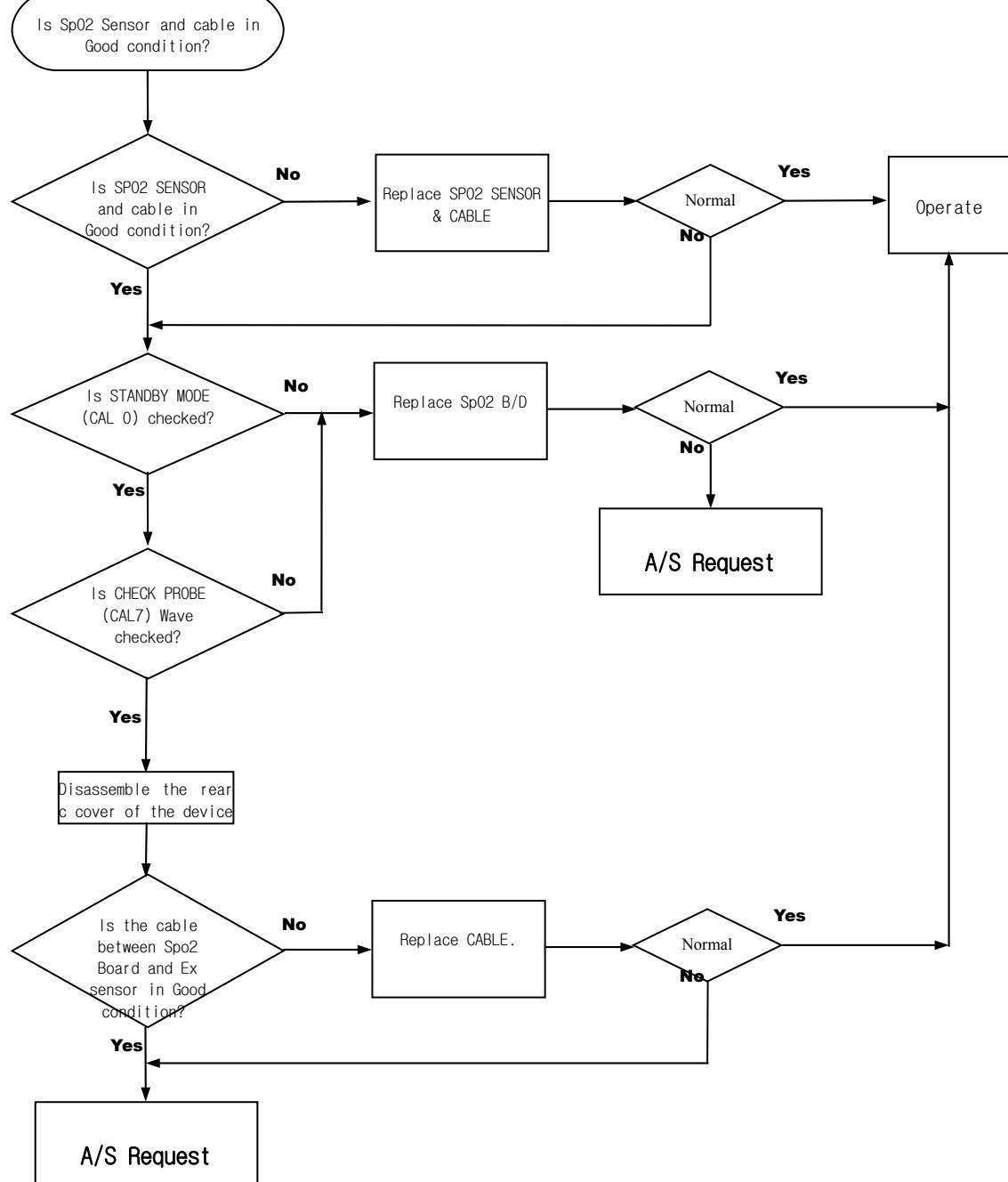
## #2. RESPIRATION deficient wave & NIOSE



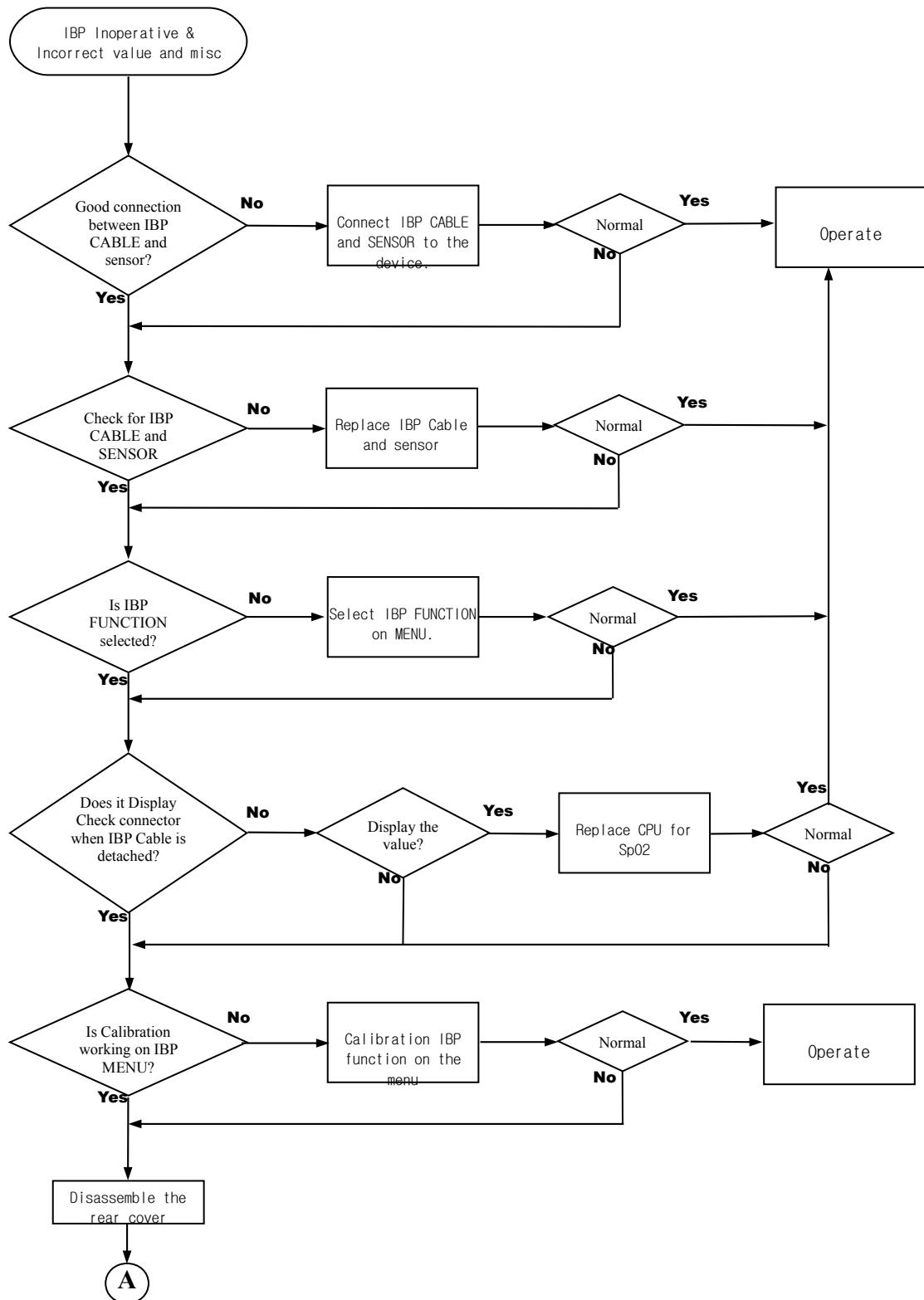
### #3. SpO2 Inoperative

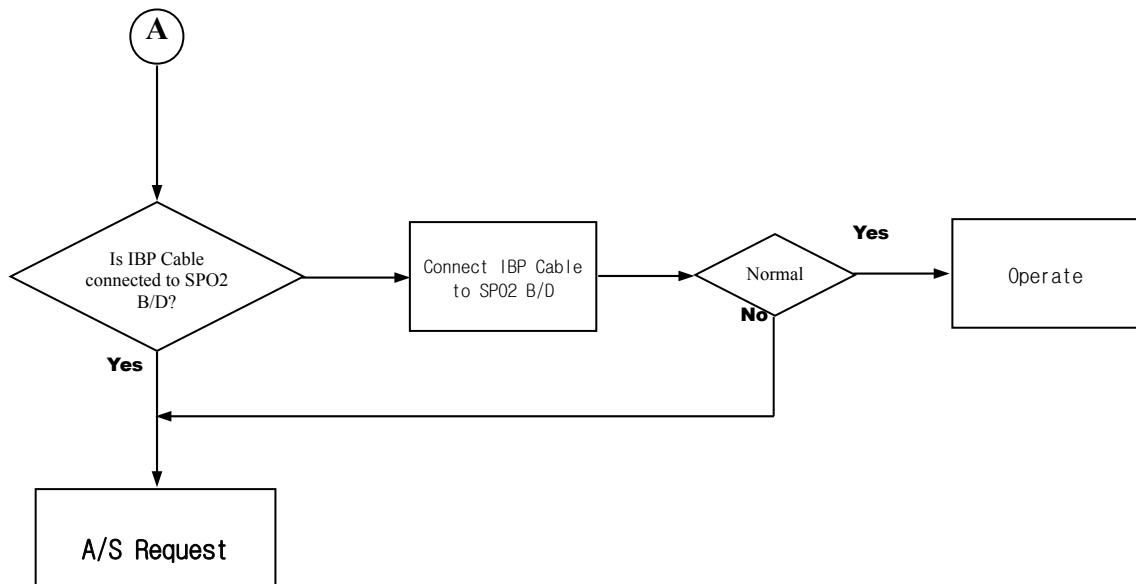


#### #4. SpO2 Wave & Incorrect value

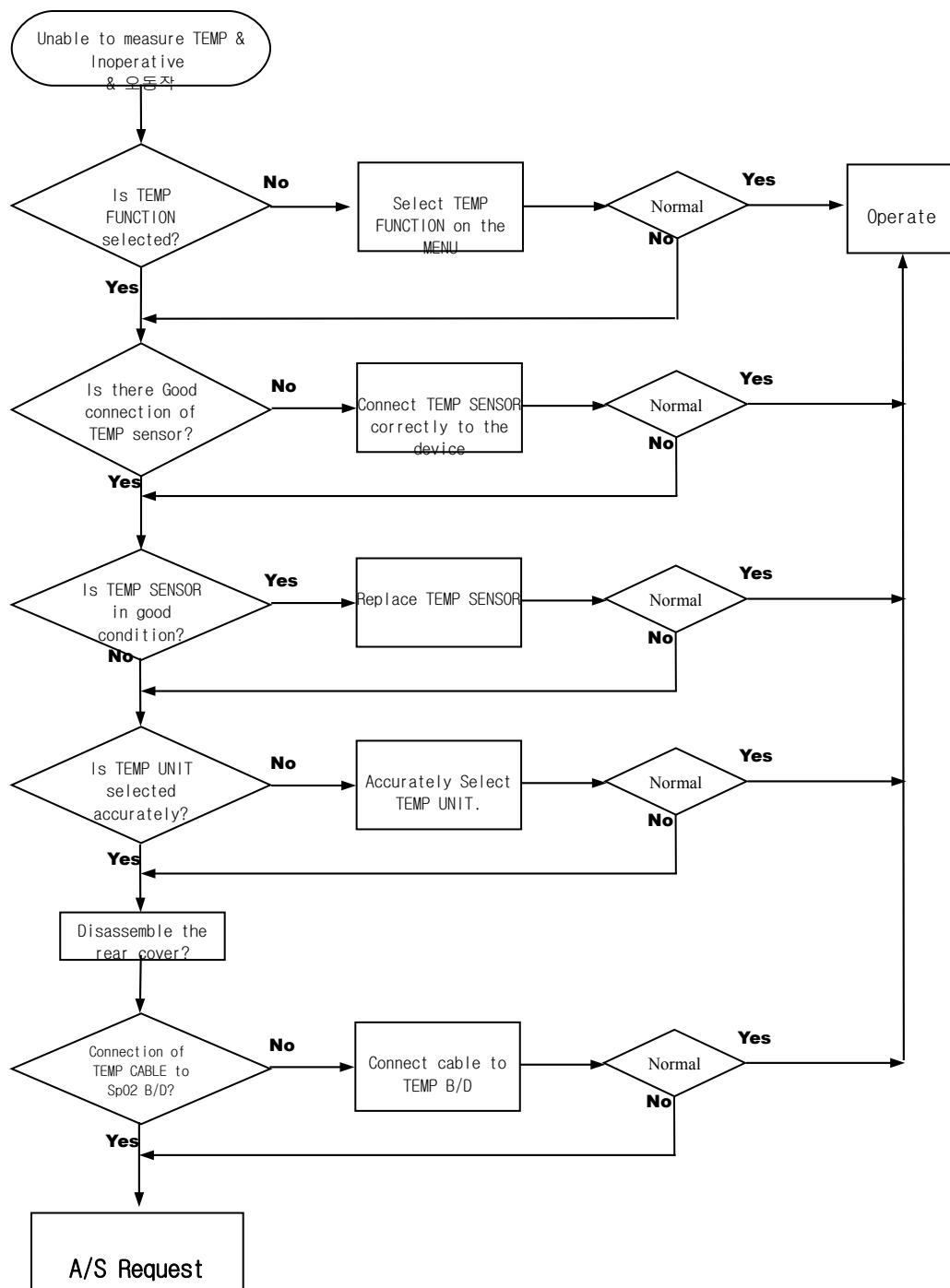


## #5. IBP Inoperative & Incorrect value and miscellaneous deficiency

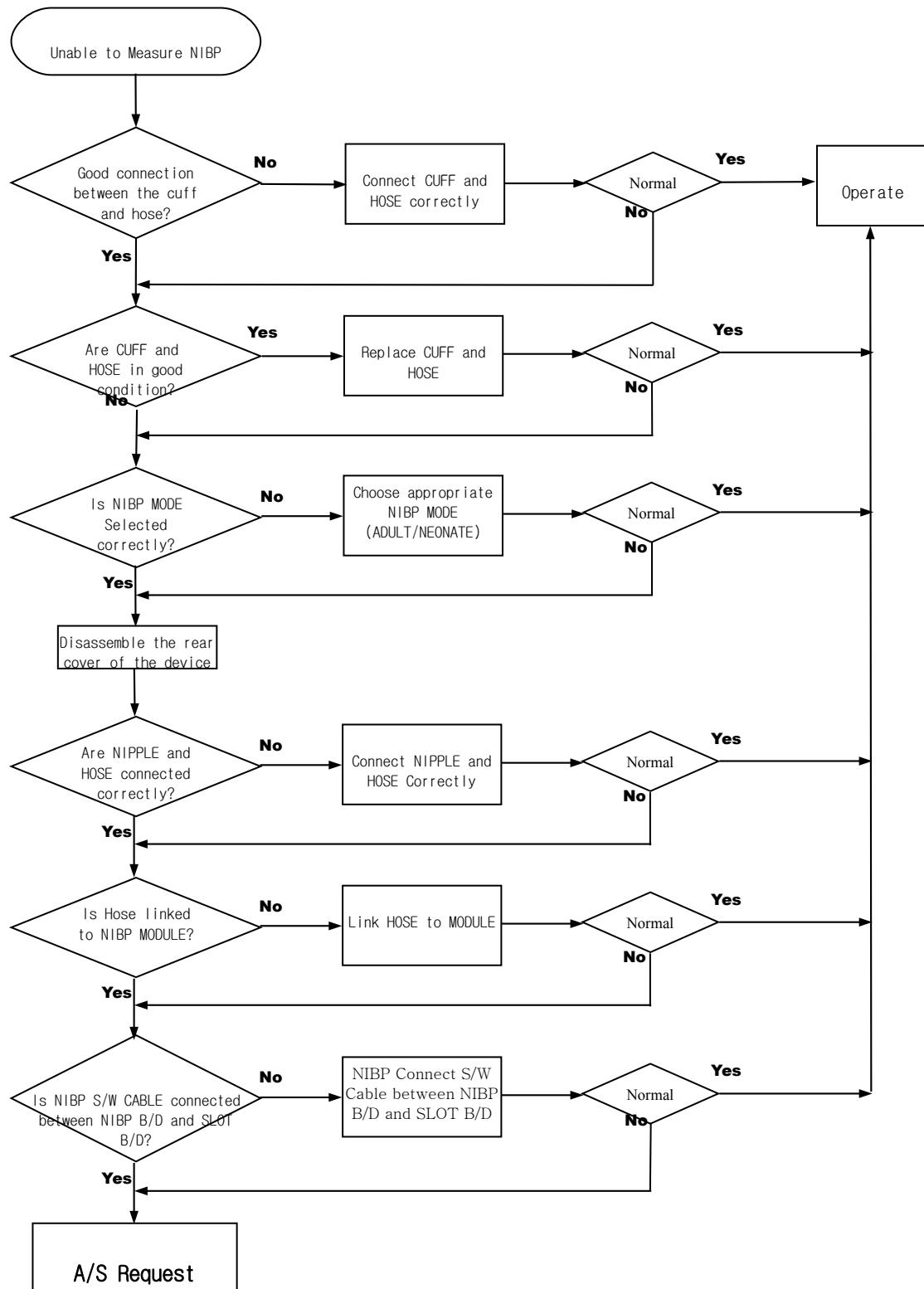




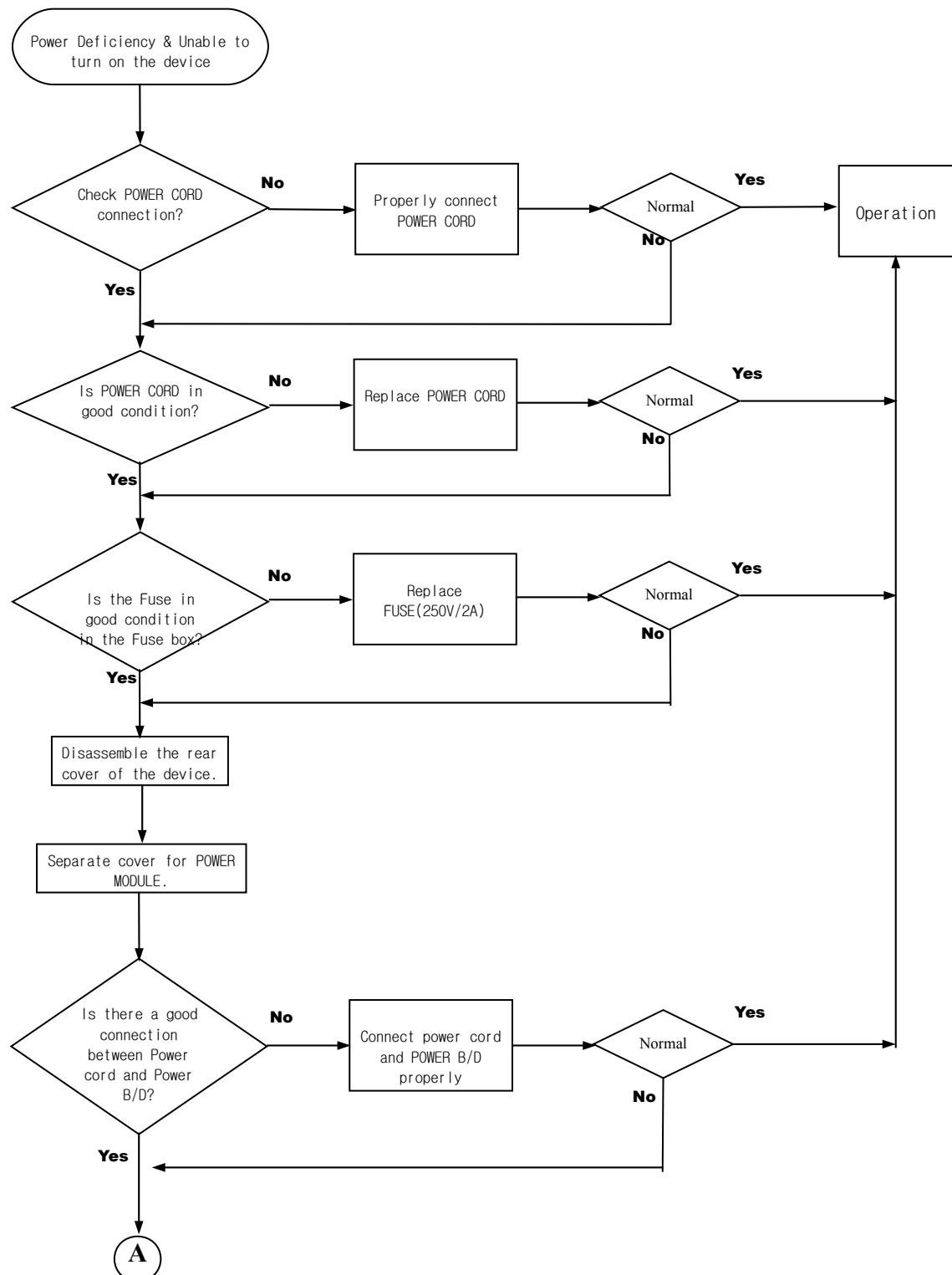
## #6. Unable to measure TEMP

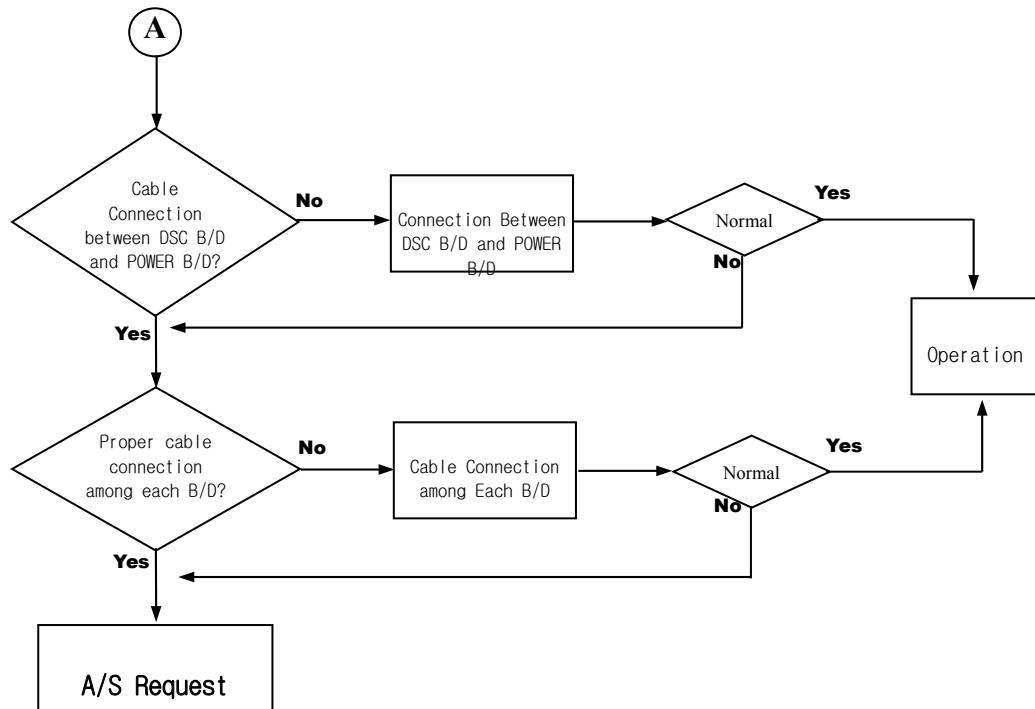


## #7. Unable to measure NIBP.



## #8. Power Deficiency & unable to turn on the device



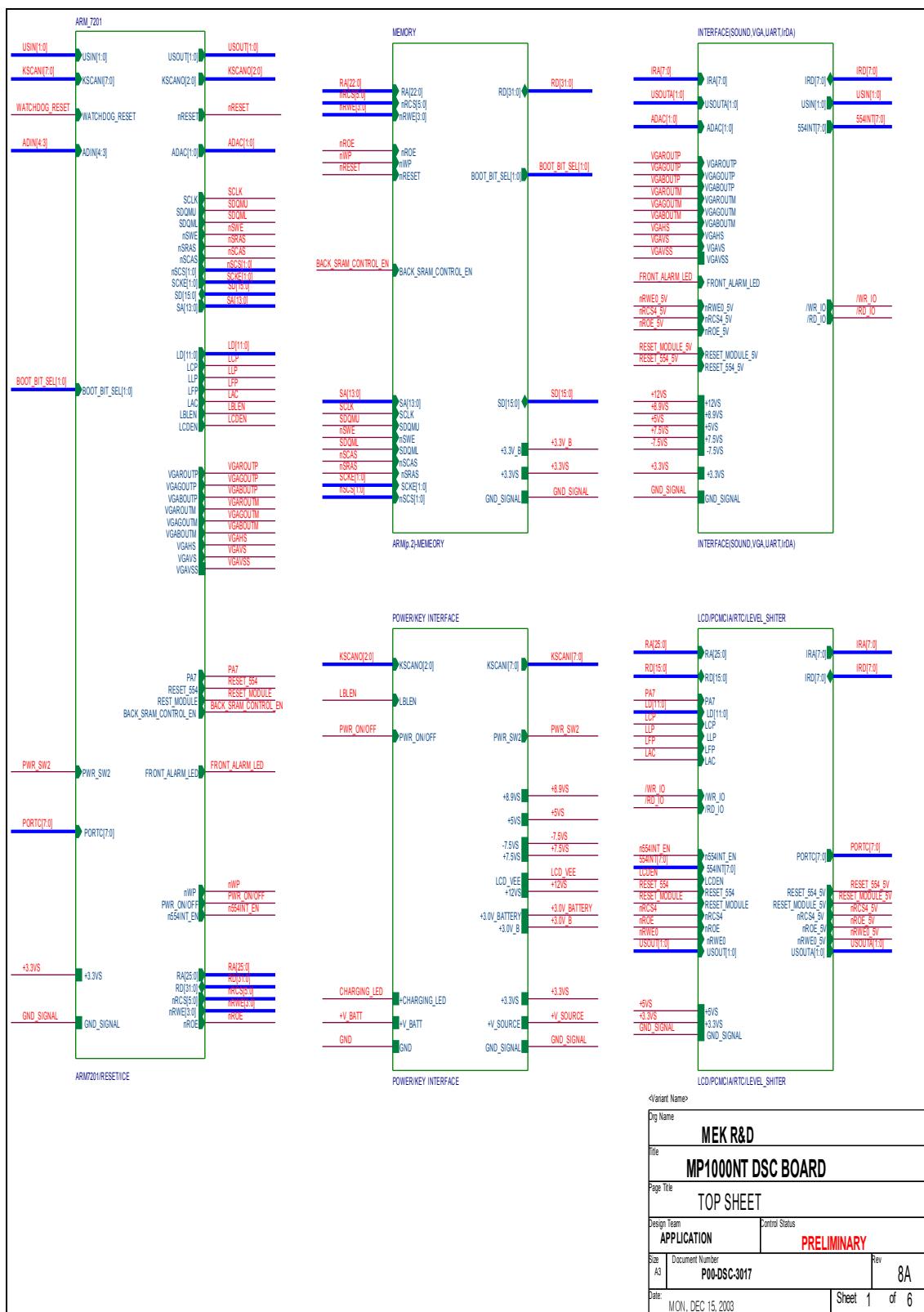


## 5. Circuit Diagram

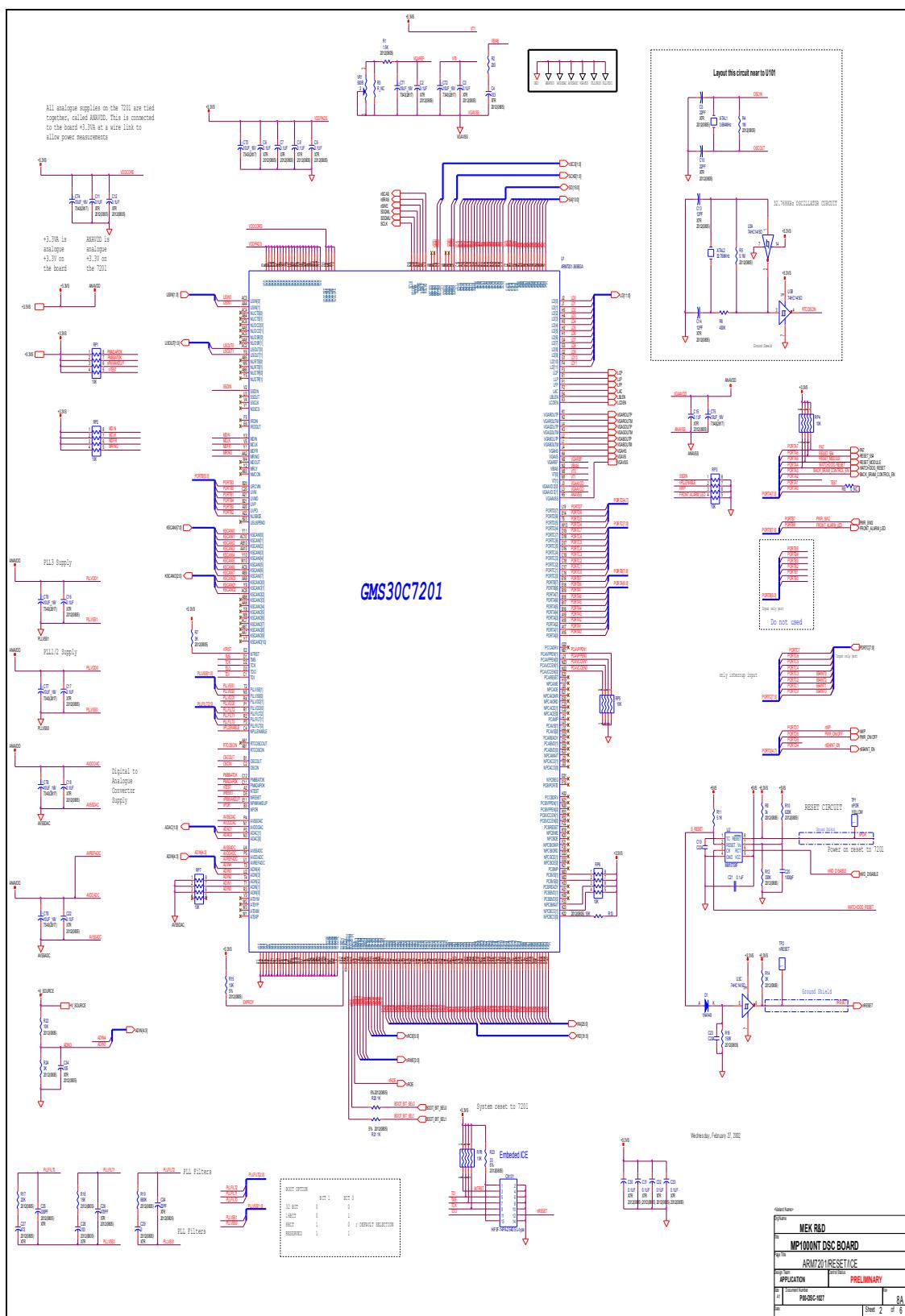
### (1) Circuit Diagram LIST

NO	Dwg NO	Description	Revision NO	Revision Data
1	P00-DSC-3017	MP1000 DSC BOARD(TOP SHEET)	8A	–
2	P00-DSC-1027	MP1000 DSC BOARD (ARM7201/RESET/ICE)	8A	–
3	P00-DSC-1037	MP1000 DSC BOARD (SOUND/VGA/UART/IrDA)	8A	–
4	P00-DSC-1047	MP1000 DSC BOARD (LCD/PCMCIA/RTC/LEVEL/SHIFTER)	8A	–
5	P00-DSC-2057	MP1000 DSC BOARD(MEMORY)	8A	–
6	P00-DSC-2067	MP1000 DSC BOARD (POWER/KEY INTERFACE)	8A	–
7	P00-ECG-1077	MP1000 ECG BOARD(CPU)	7A	–
8	P00-ECG-2087	MP1000 ECG BOARD(ECG)	7A	–
9	P00-ECG-2107	MP1000 ECG BOARD(RESPIRATION)	7A	–
10	P00-SPO-2017	MP1000 SpO2 BOARD(SpO2)	8B	–
11	P00-SPO-2027	MP1000 SpO2 BOARD(MAIN/CPU)	8B	–
12	P00-SP0-2047	MP1000 SpO2 BOARD (TEMP)	8B	–
13	P00-SP0-2037	MP1000 SpO2 BOARD (IBP)	8B	–
14	M30-MAN-3014	MM300 NIBP MODULE (MAIN/CPU)	5A	–
15	M30-MAN-3024	MM300 NIBP MODULE (NIBP)	5A	–
16	P00-SLO-1133	MP1000 SLOT BOARD	3.0	–
17	P00-KBD-1142	MP1000 KEY FRONT BOARD	2.0	–
18	–	POWER B/D(AC-DC +15V)	–	–
19	–	POWER B/D(DC-DC +12V)	–	–
20	–	POWER B/D(DC-DC +5V)	–	–
21	–	POWER B/D(DC-DC +7.5V/-7.5V)	–	–
22	–	POWER B/D(DC-DC +8.9V)	–	–

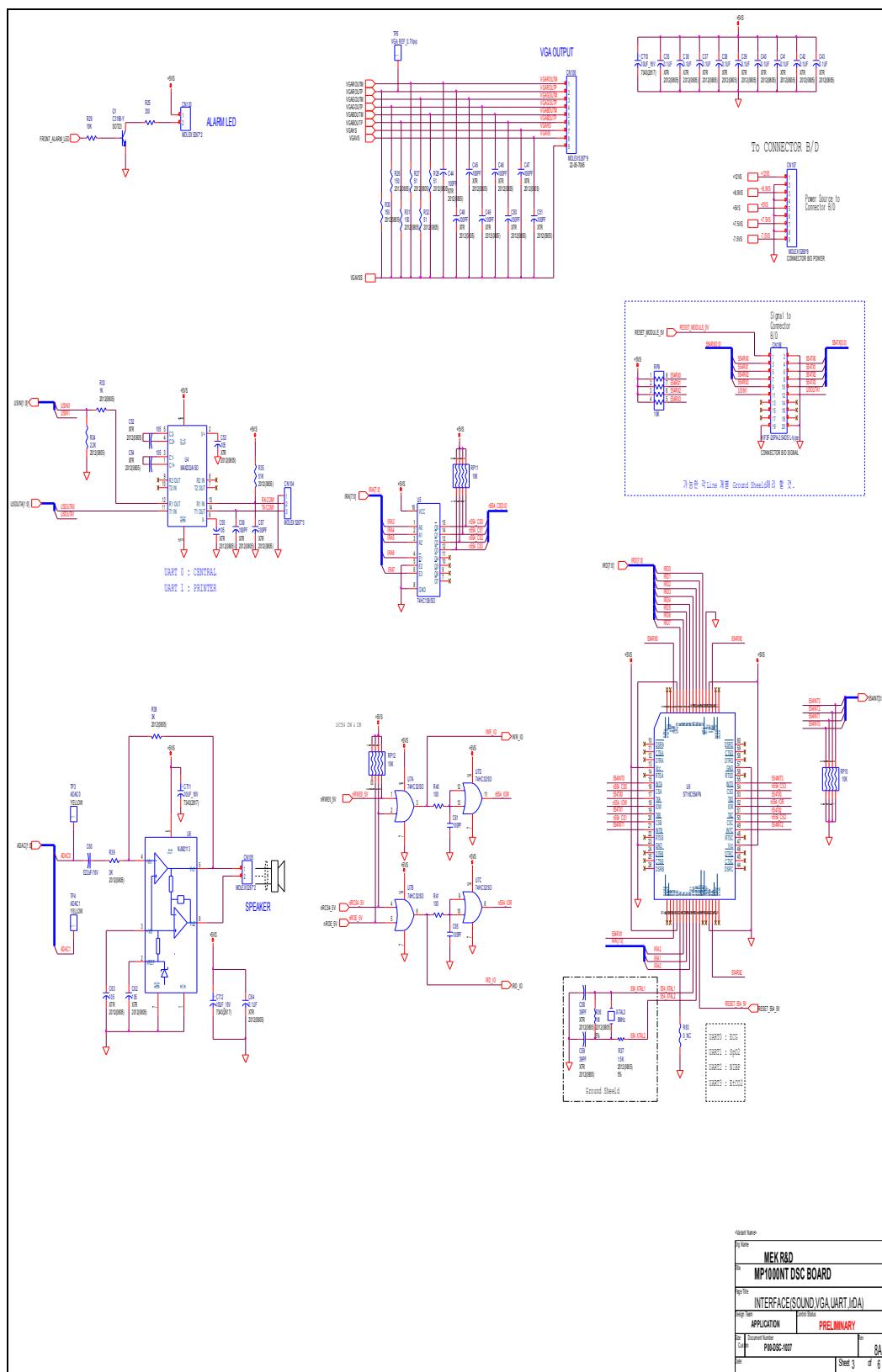
## (2) MP1000 DSC BOARD(TOP SHEET)



(3) MP1000NT DSC BOARD(ARM7201/RESET/ICE)ECG B/D

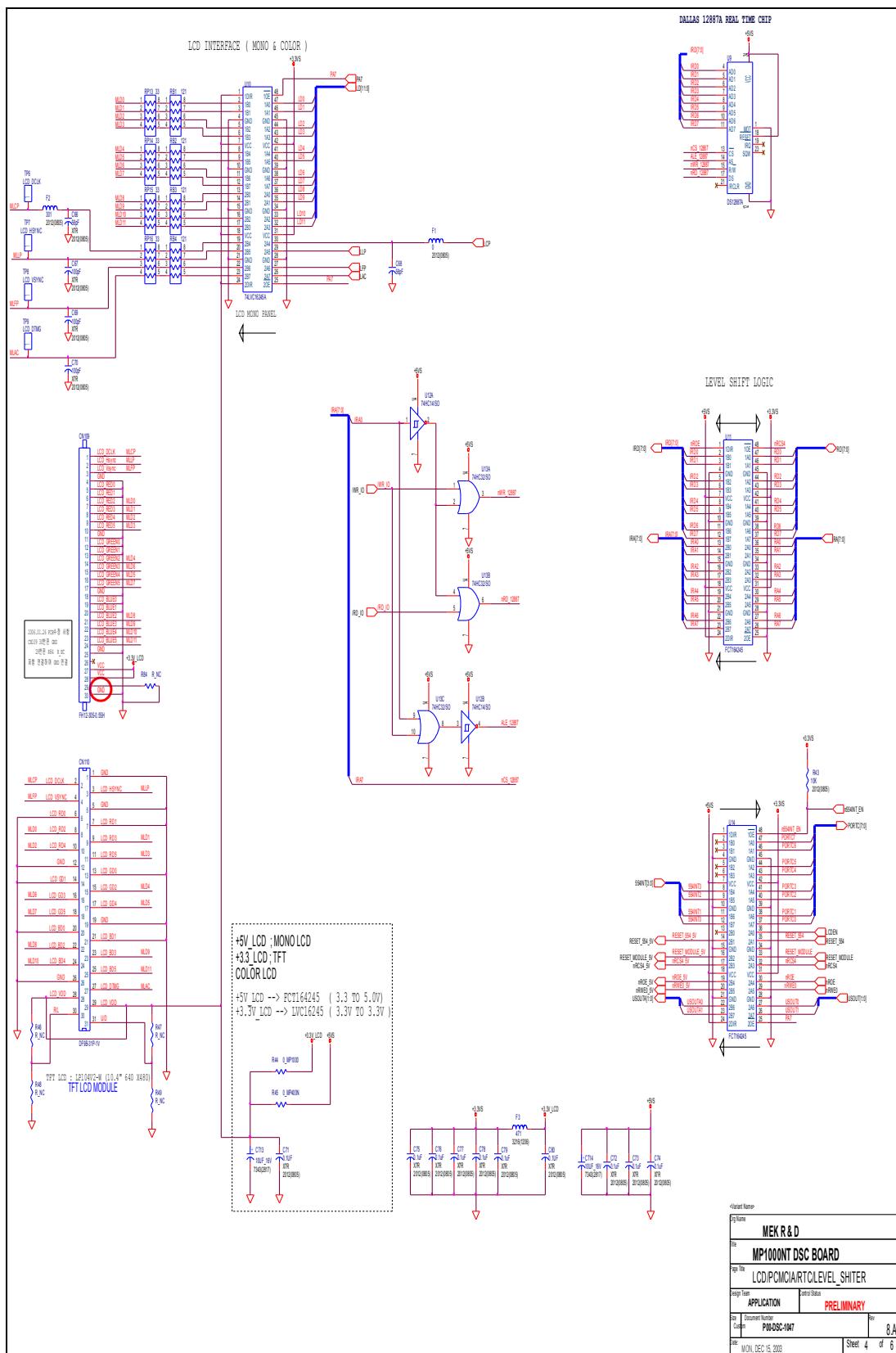


#### **(4) MP1000 DSC BOARD(SOUND/VGA/UART/IrdA)**

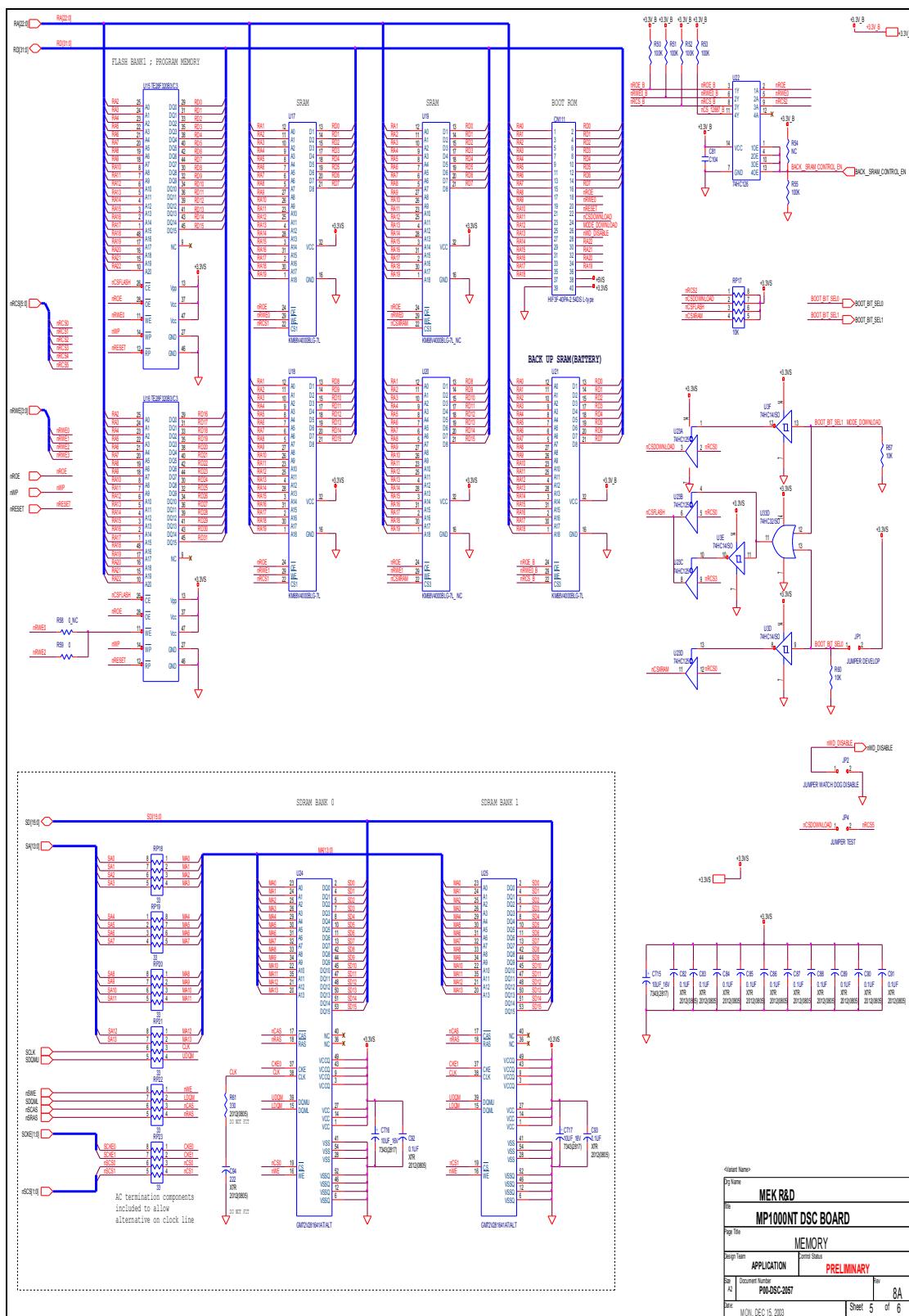


(5)

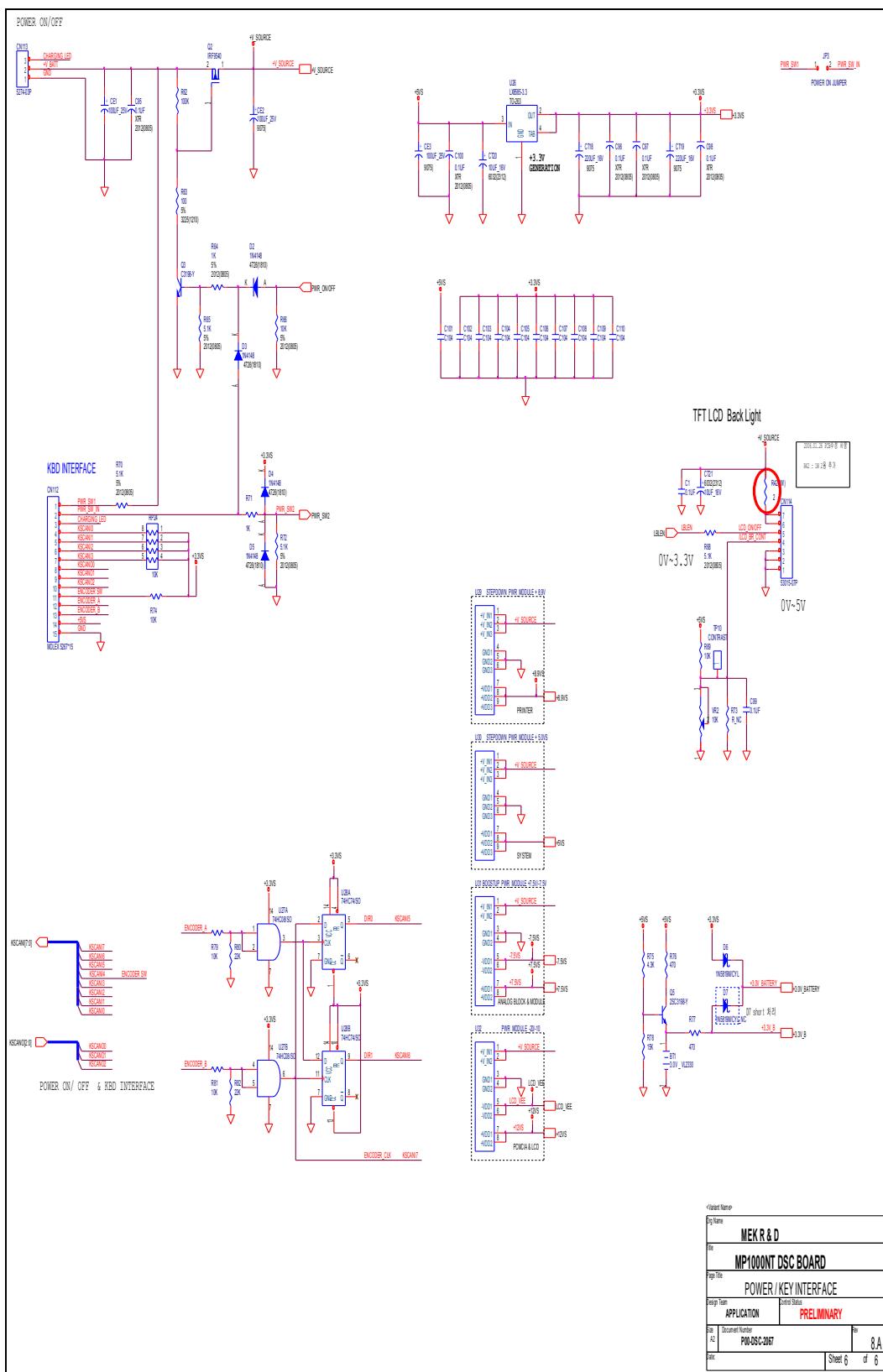
## MP1000 DSC BOARD(LCD/PCMCIA/RTC/LEVEL/SHIFTER)



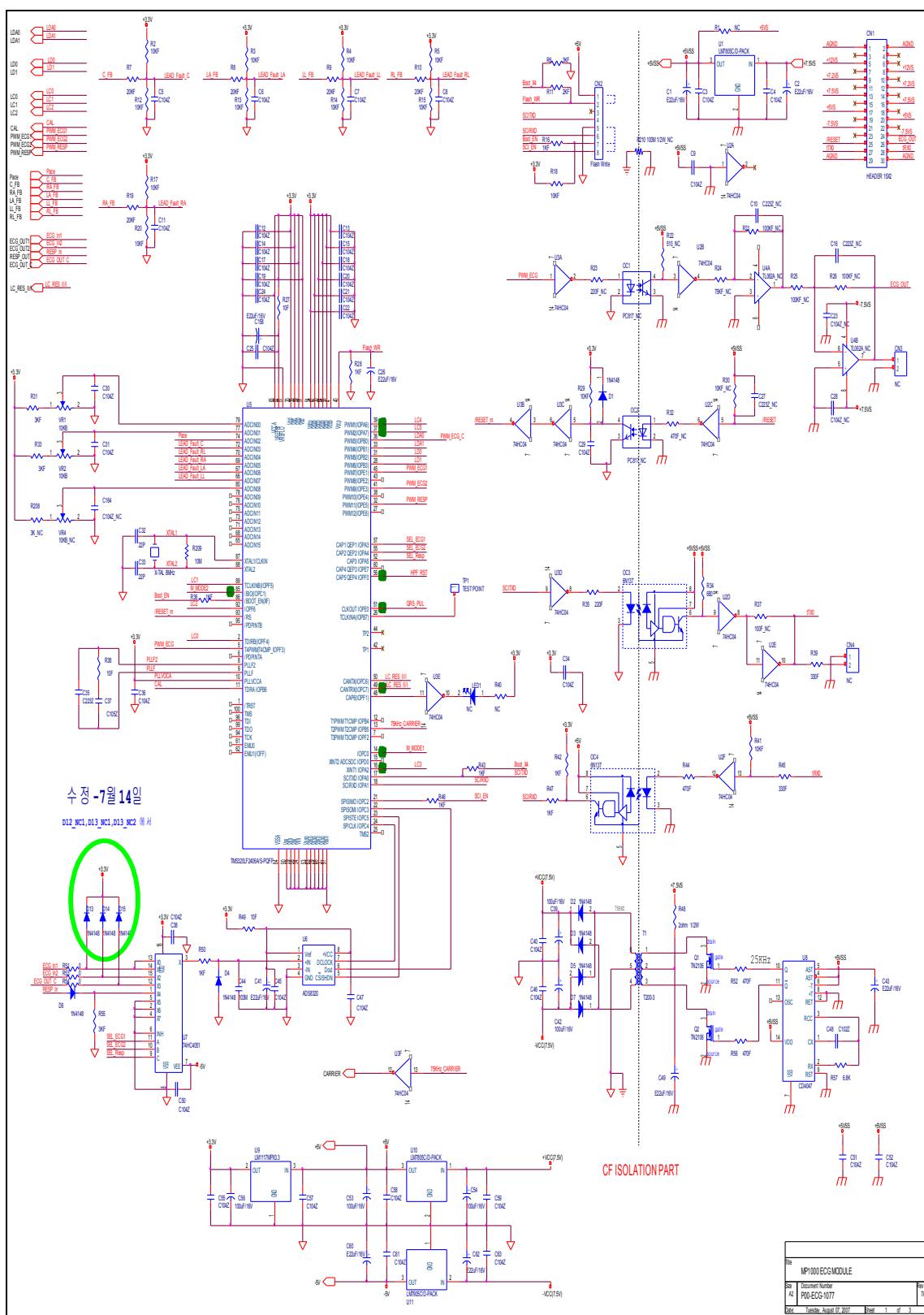
**(6) MP1000 DSC BOARD(MEMORY)**



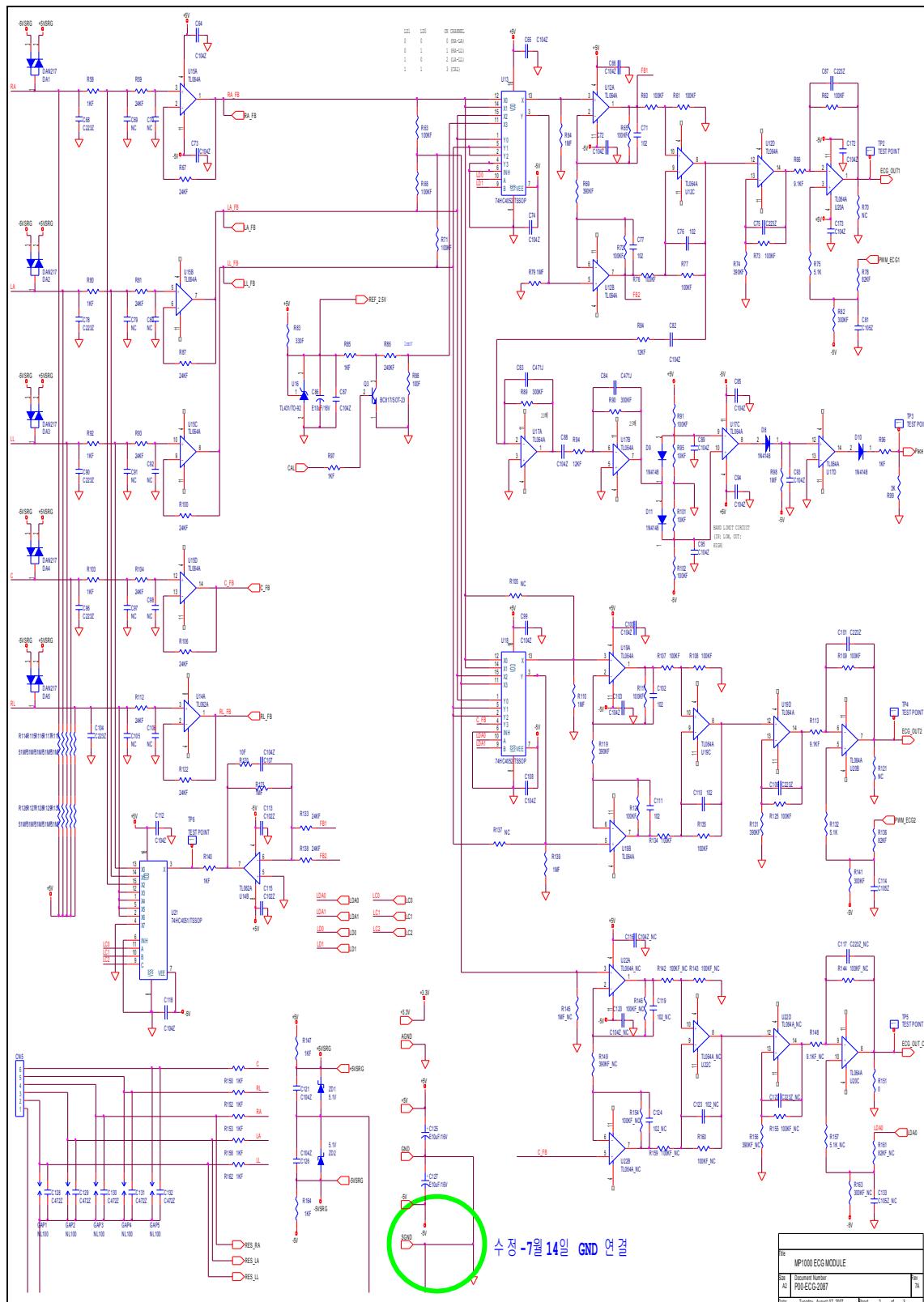
#### **(7) MP1000 DSC BOARD(POWER/KEY INTERFACE)**



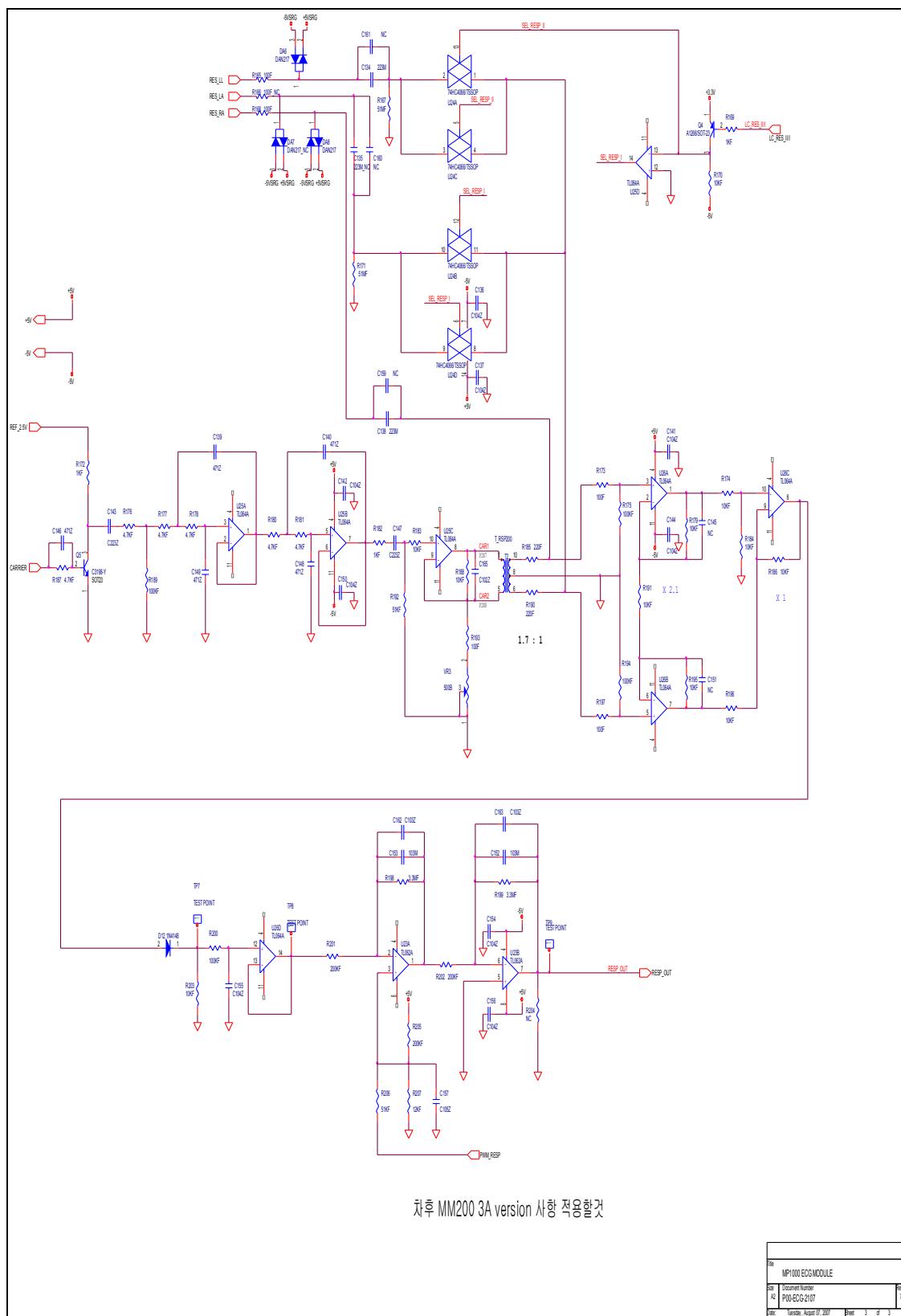
## (8) MP1000 ECG BOARD(CPU)



## **(9) MP1000 ECG BOARD(ECG)**



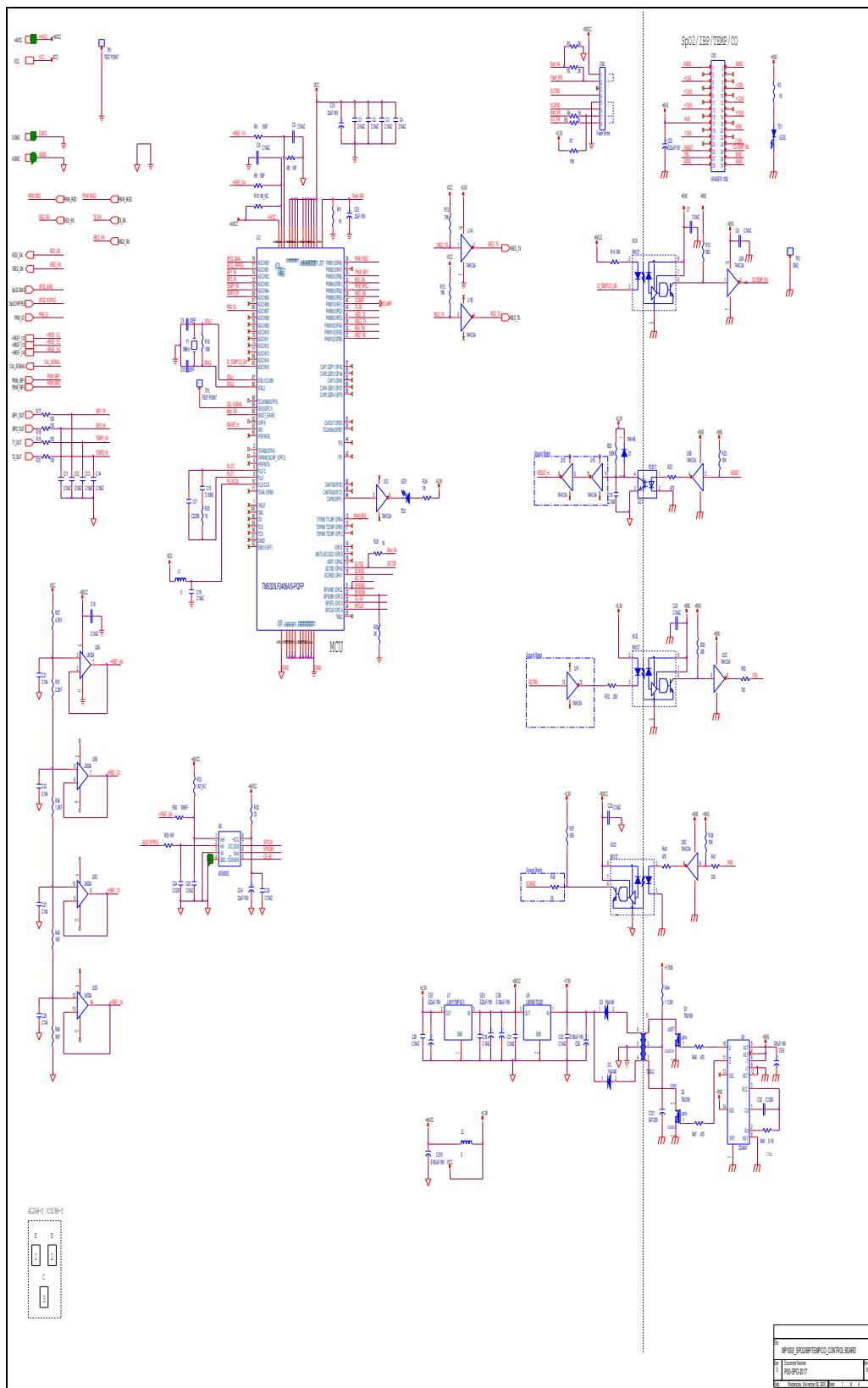
## (10) MP1000 ECG BOARD(RESPIRATION)



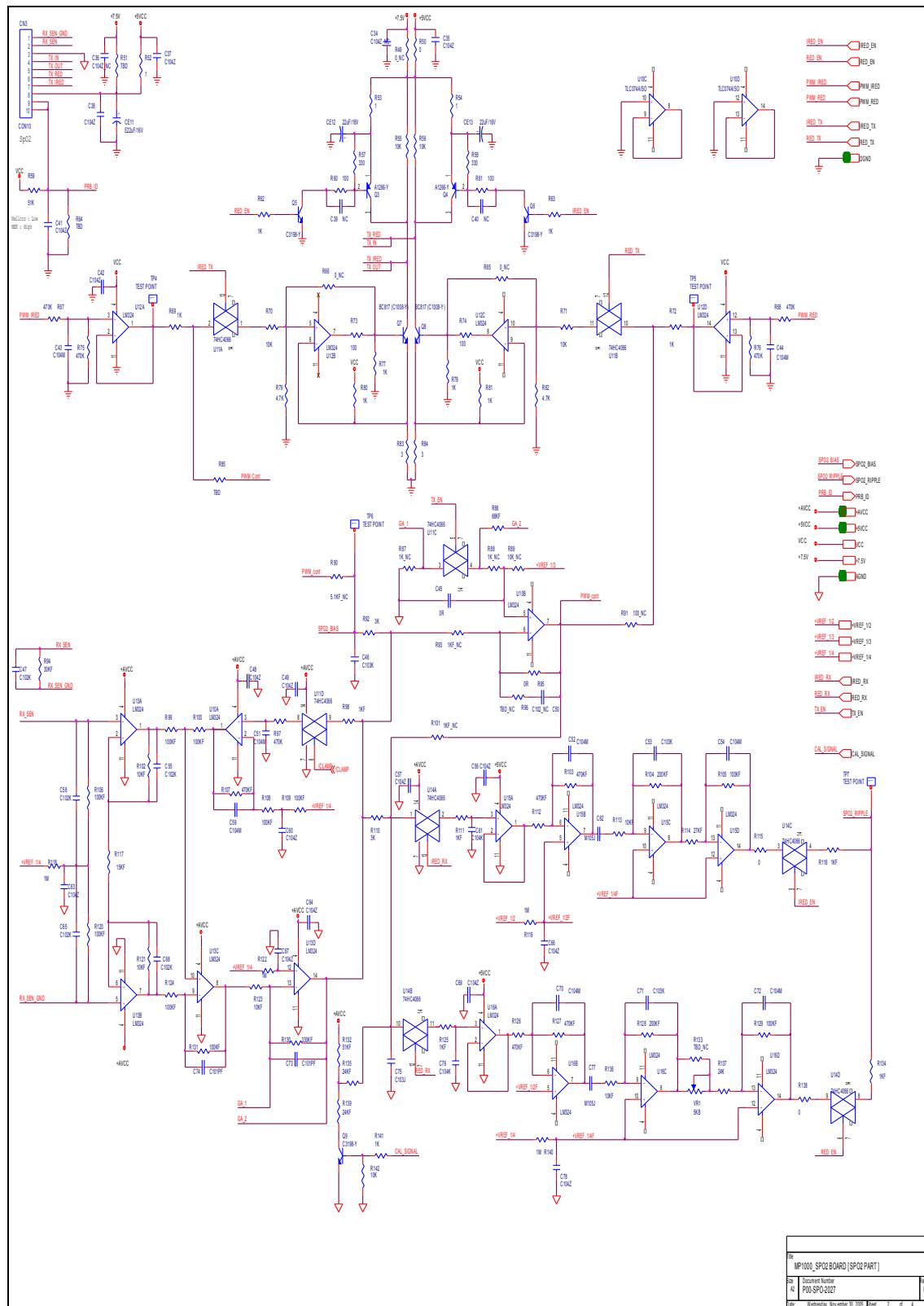
차후 MM200 3A version 사용 적용할것

MP1000 ECG MODULE	
Rev	A1
Document Number	P0-ECG-2107

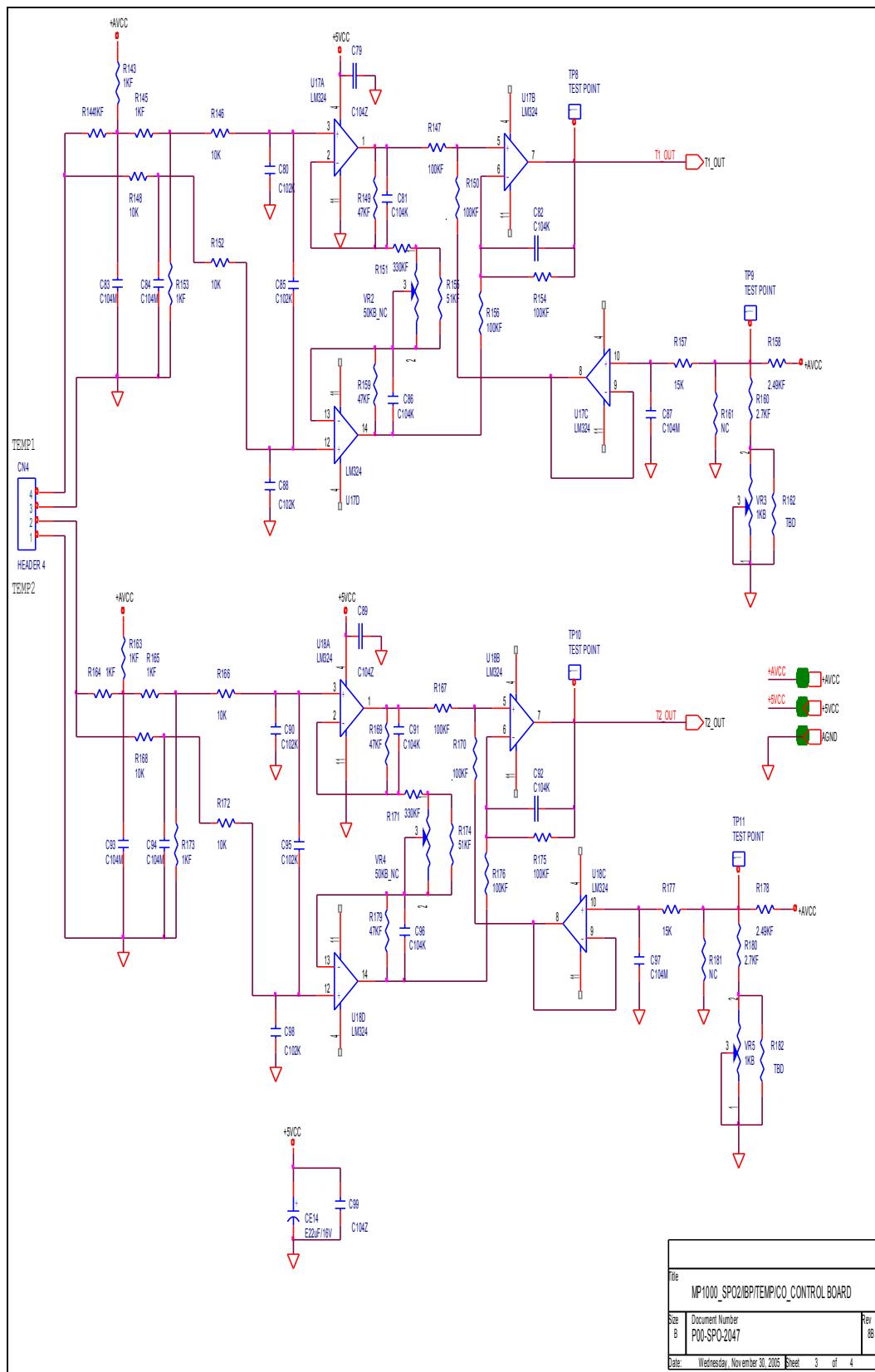
## (11) MP1000 SpO2 BOARD(MCU & digital interface)



## (12) MP1000 SpO2 BOARD(SpO2 analog)

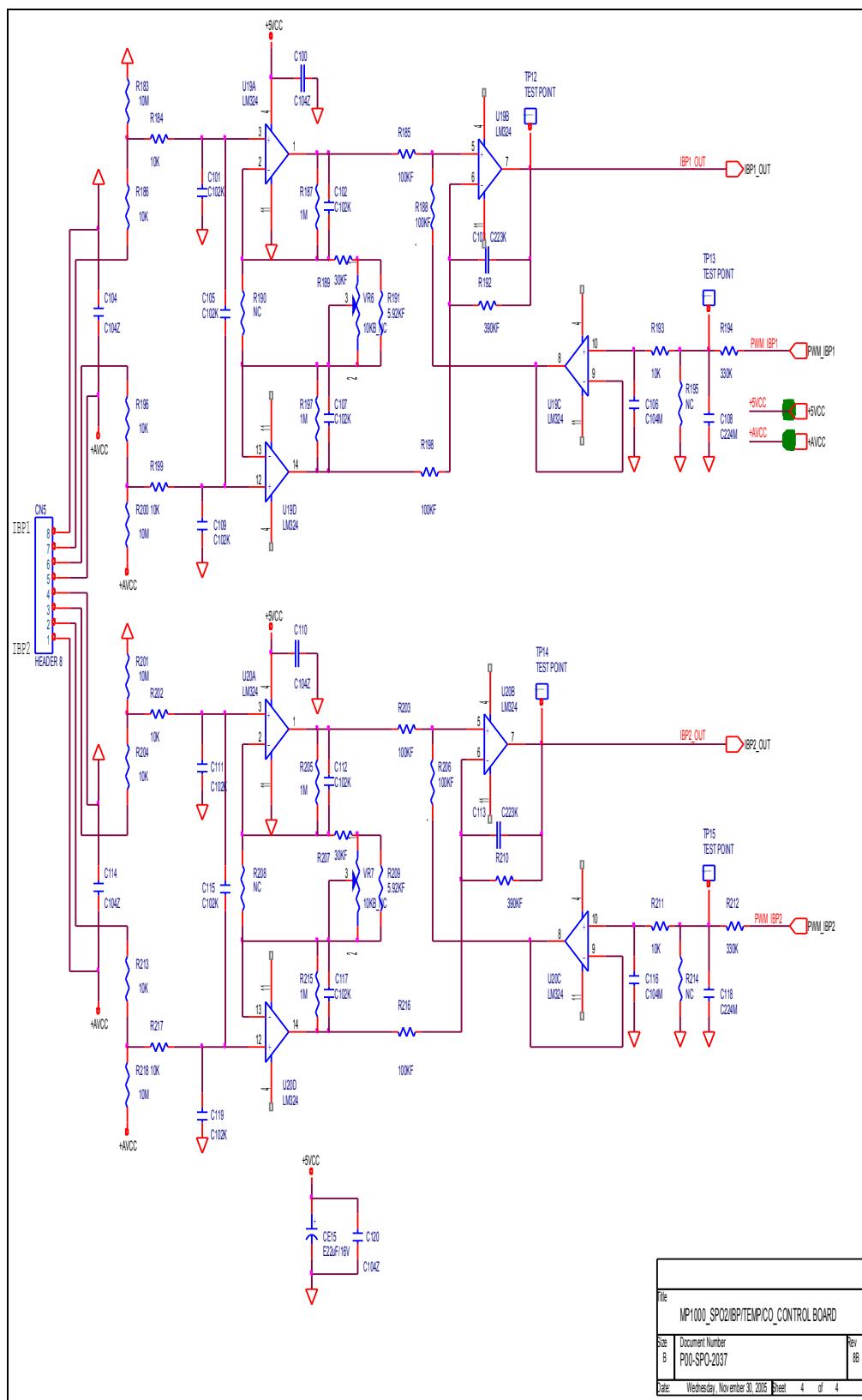


## (13) MP1000 SpO2 BOARD(TEMP)

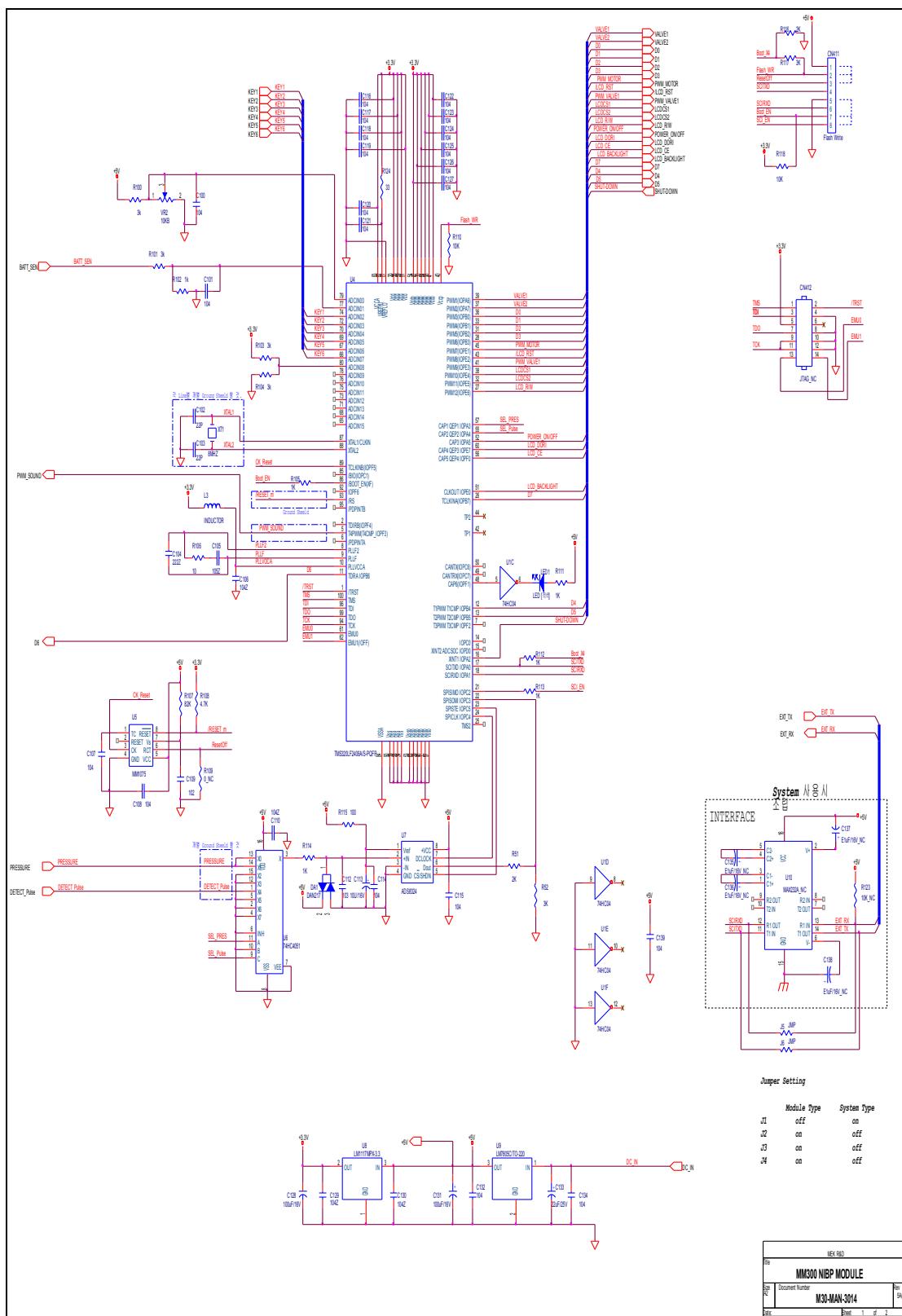


Title		
MP1000_SPO2/IBP/TEMP/CO_CONTROL BOARD		
Size	Document Number	Rev
B	P00-SPC-2047	BB
Date:	Wednesday, November 30, 2005	Sheet 3 of 4

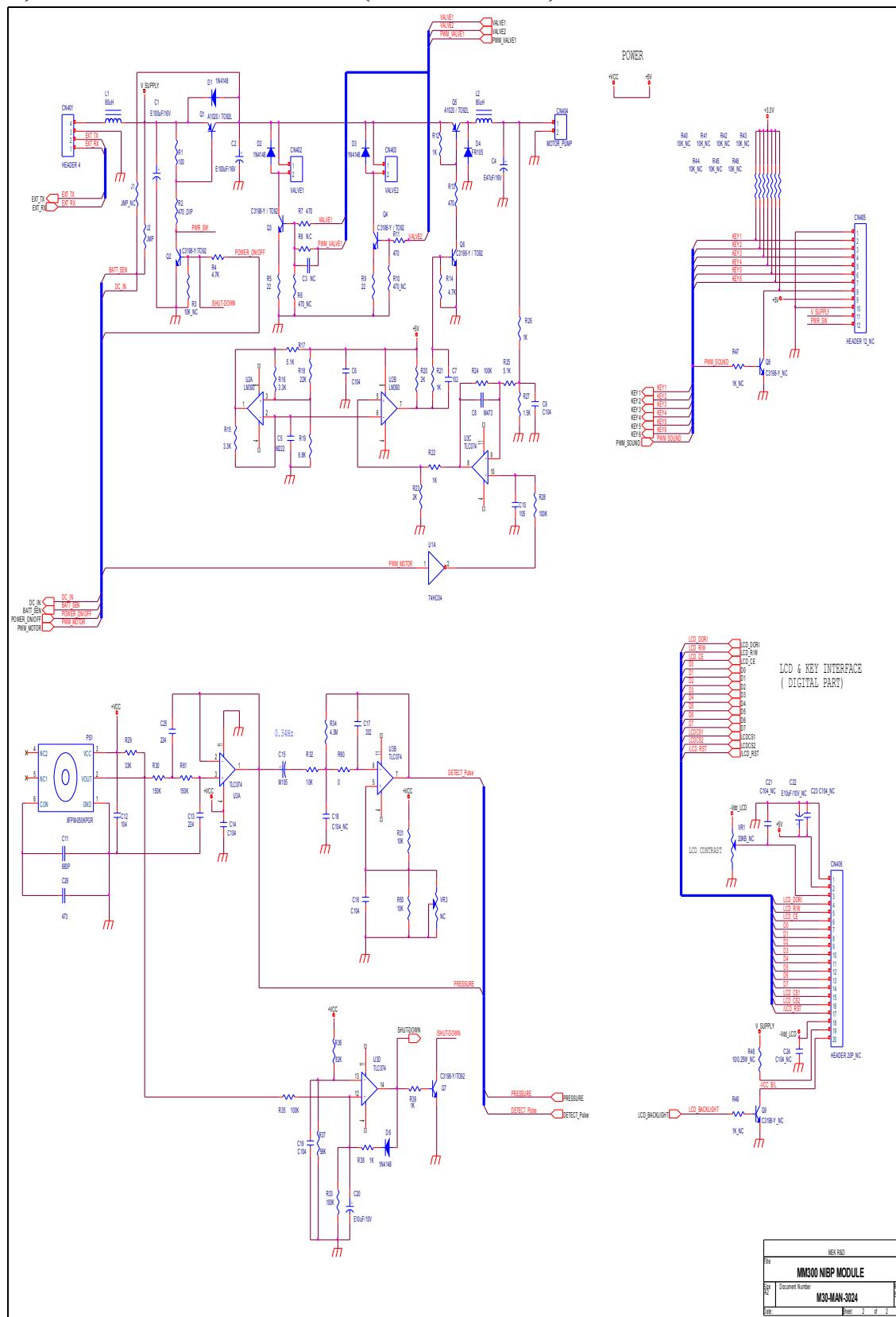
## (14) MP1000 SpO2 BOARD(IBP)



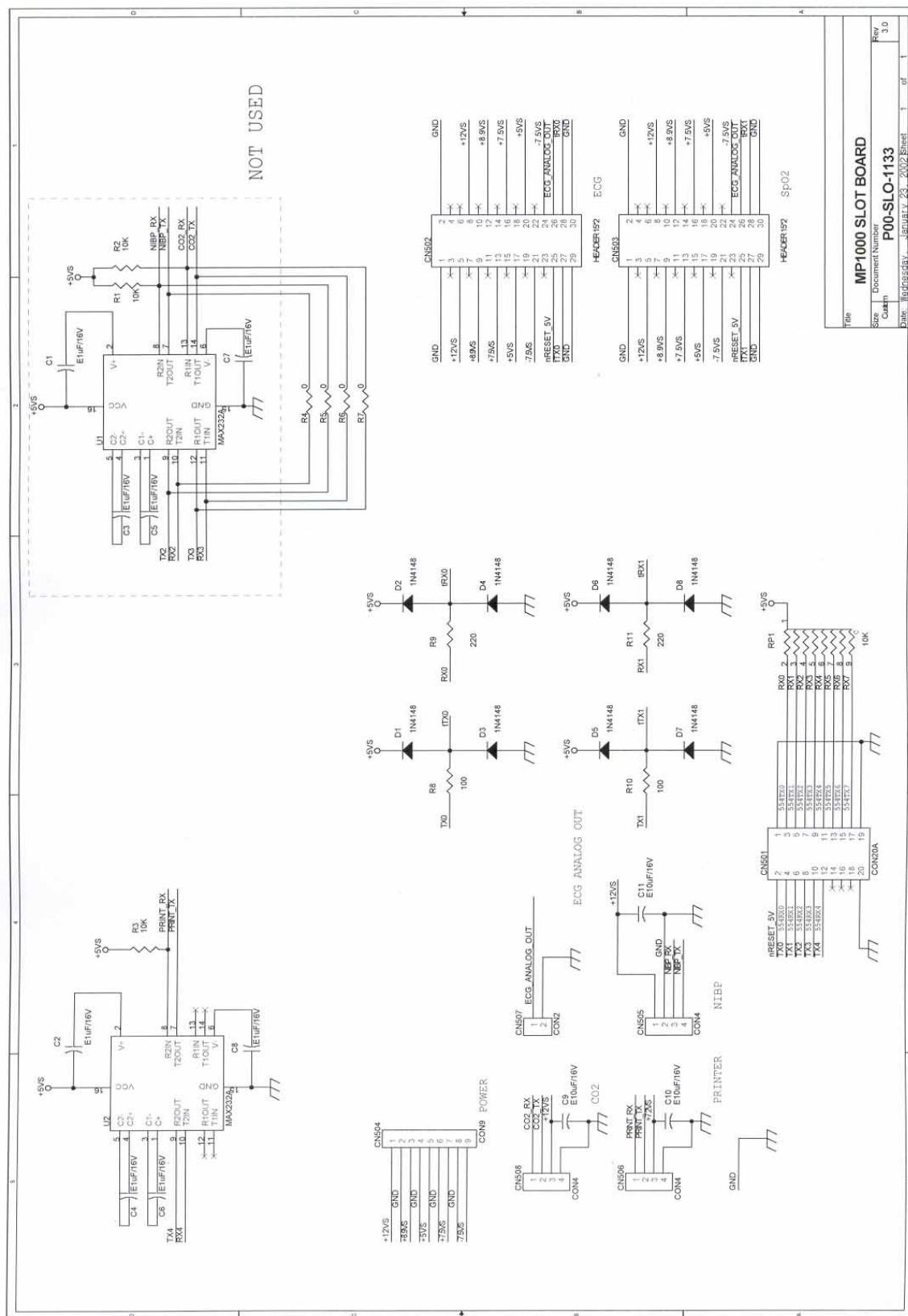
## (15) MM300 NIBP MODULE(cpu part)



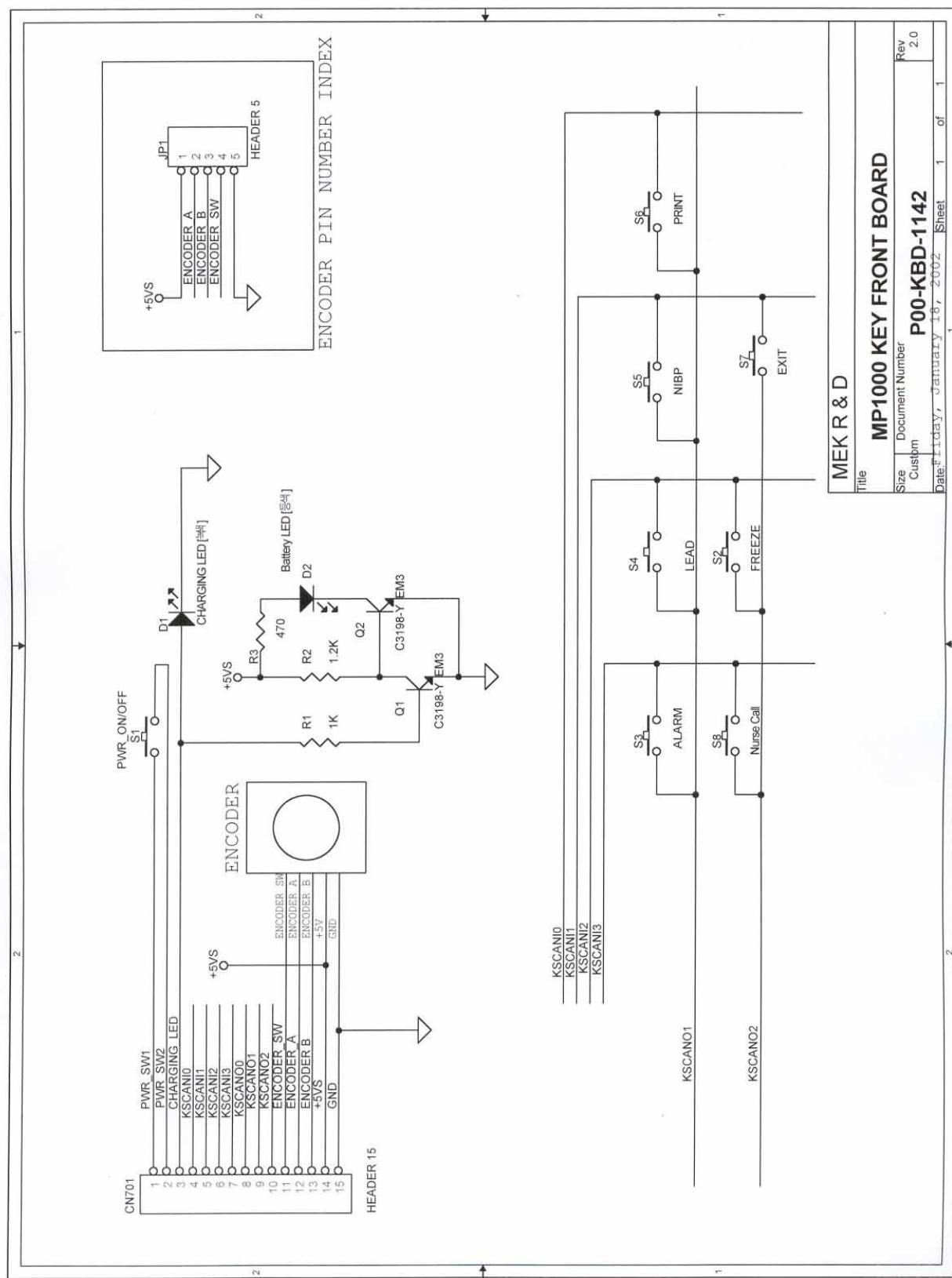
## (16) MM300 NIBP MODULE(MM300 NEW)



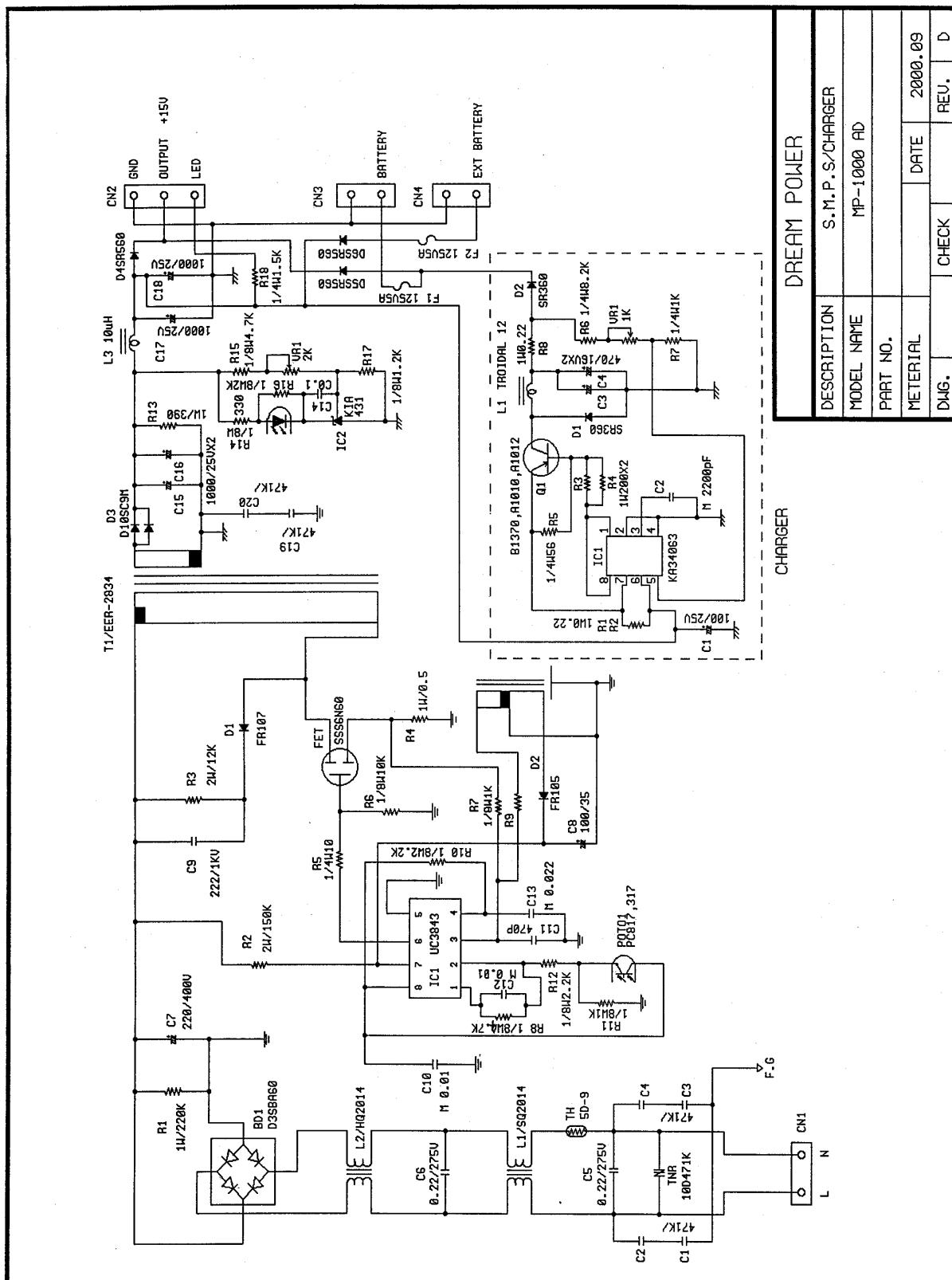
## (17) MP1000 SLOT BOARD



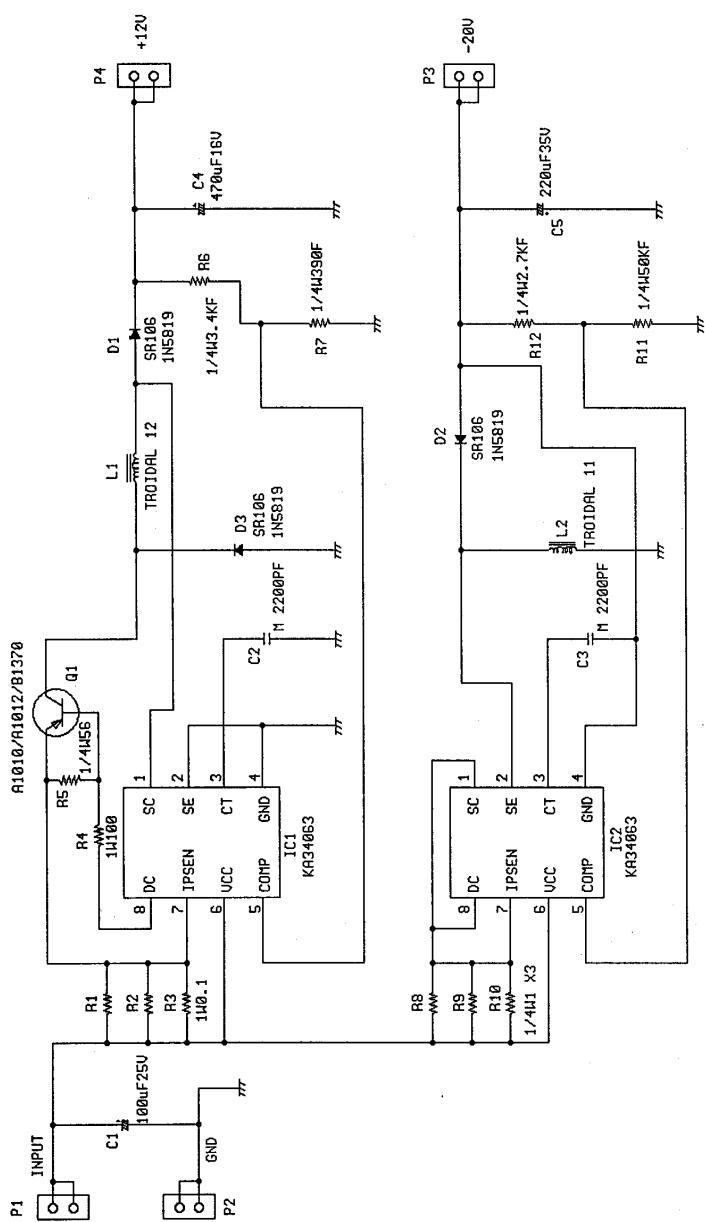
## (18) MP1000 KEY FRONT BOARD



## (19) POWER B/D(AC-DC +15V)

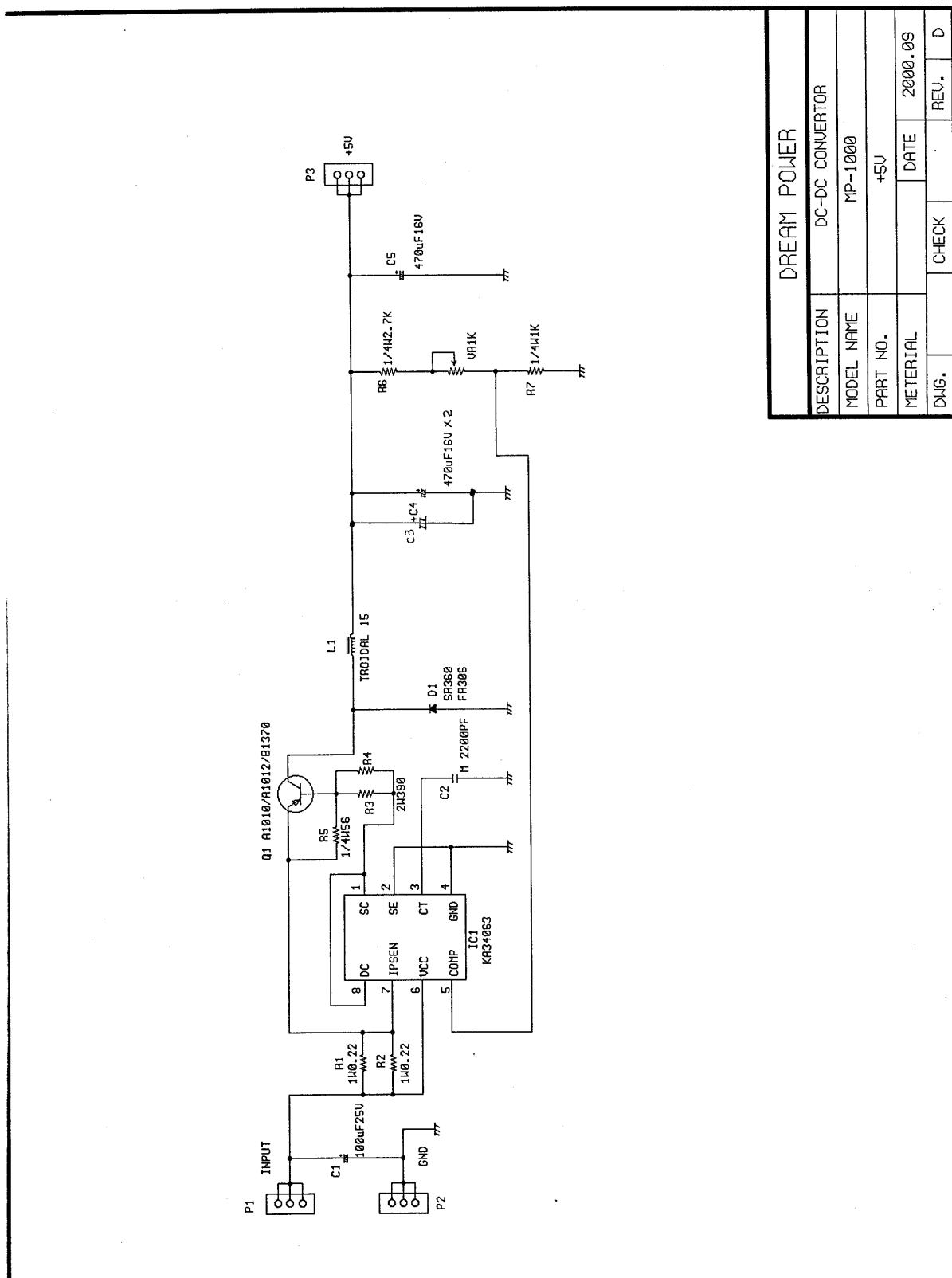


## (20) POWER B/D(DC-DC +12V/-20V)

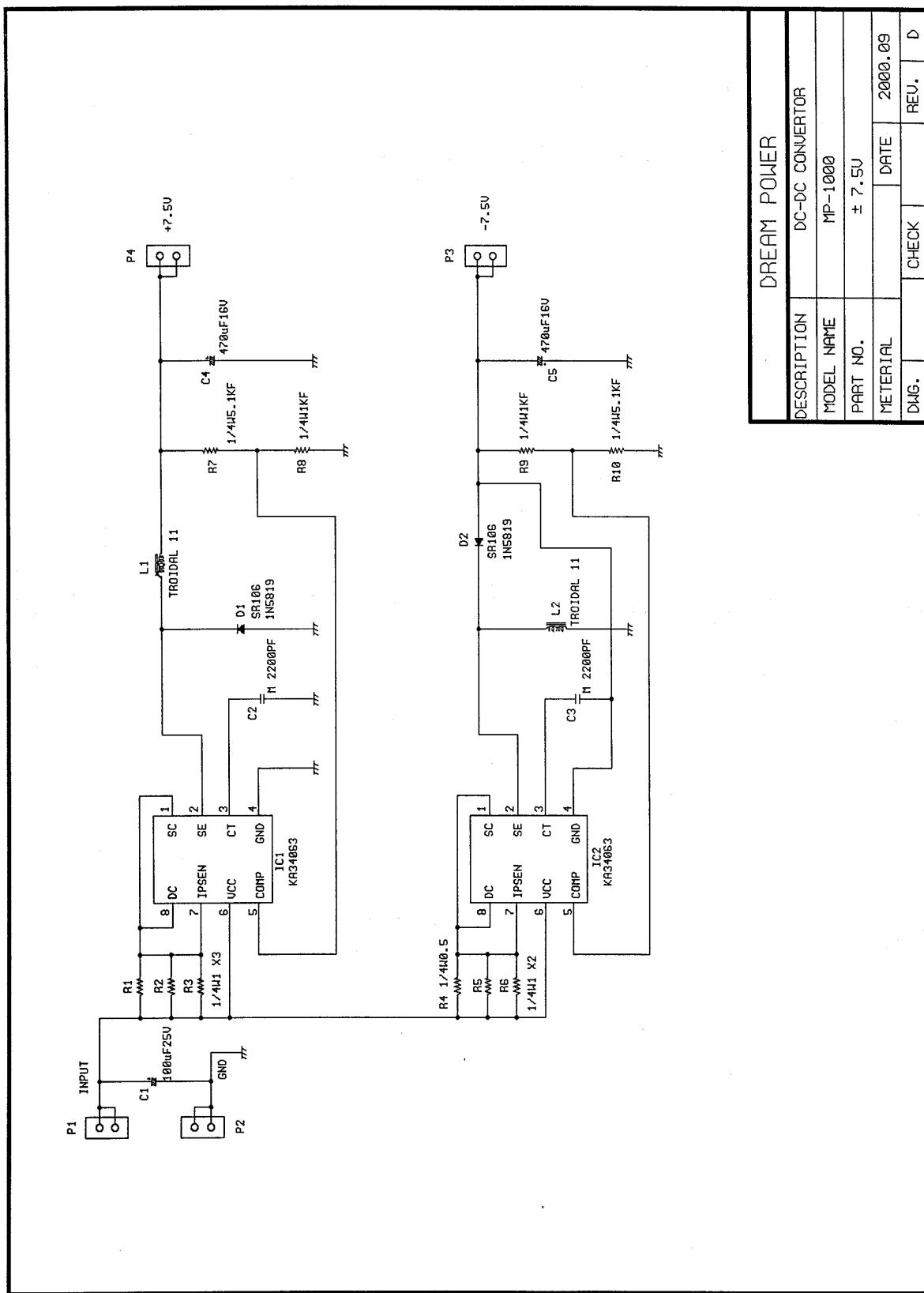


DREAM POWER					
DESCRIPTION	DC-DC CONVERTOR				
MODEL NAME	MP-1000				
PART NO.	+12V/-20V				
MATERIAL	DATE	2000.09			
DIG.	CHECK	REV.	D		

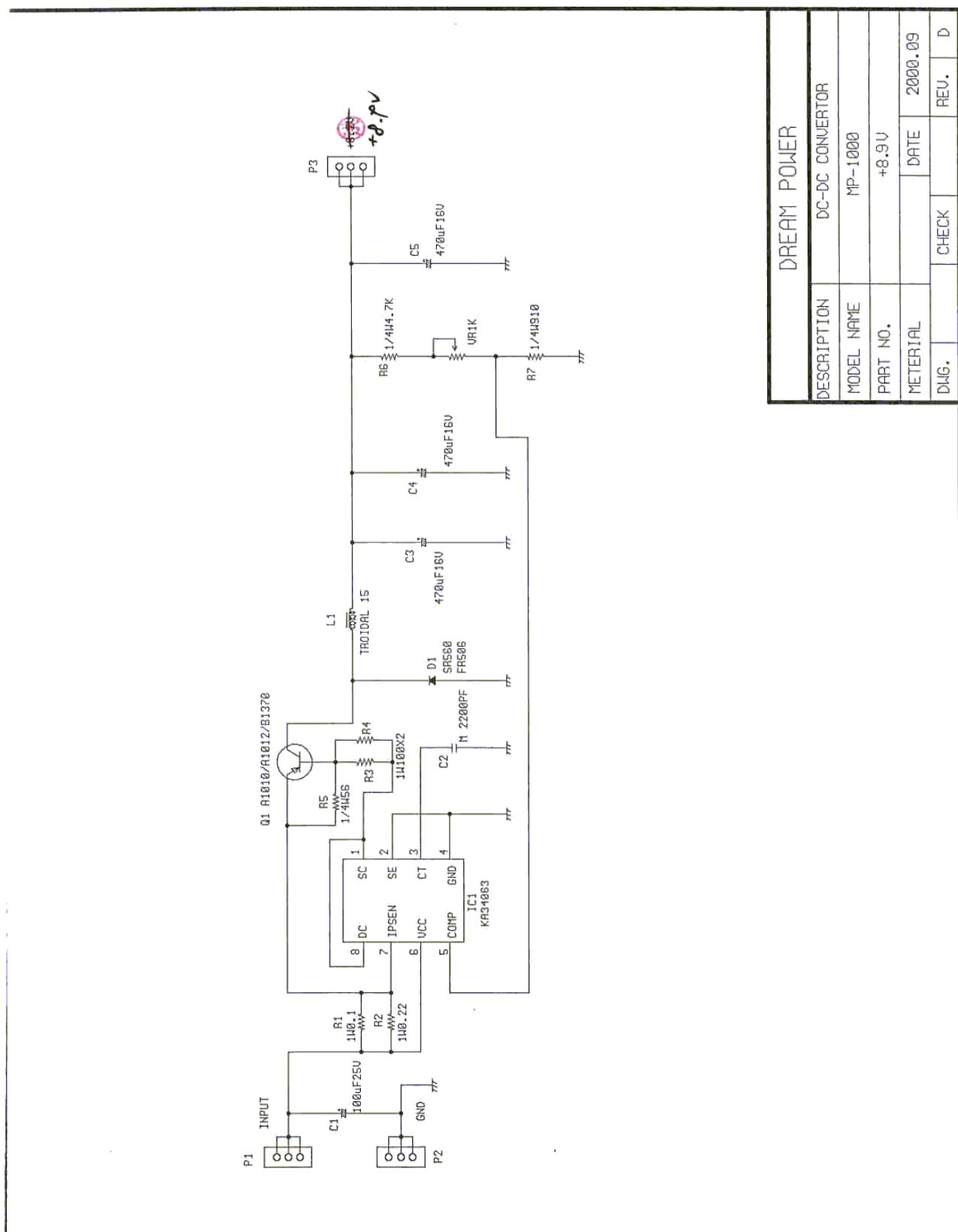
## (21) POWER B/D(DC-DC +5V)



## (22) POWER B/D(DC-DC +7.5V/-7.5V)



## (23) POWER B/D(DC-DC +8.9V)



## 6. PART LIST

### (1) DSC B/D (ver 8A)

NO.	품명	수량	단위	REF NO.	비고
	MP1000 DSC	1	AY		
	DSC B/D	1	AY		
1	NC	18	ea	R3,R8,R45,R46,R47,R48,R49,R54,R58,R73,R83,BT1,U19,U20	
2	MP1000 D/D +12V	1	ea	U32	
3	MP1000 D/D +5V	1	ea	U30	
4	MP1000 D/D +7.5V	1	ea	U31	
5	MP1000 D/D +8.9V	1	ea	U29	
6	TL16C554 SMD	1	ea	U8	
7	NJM2113M SMD	1	ea	U6	
8	TE28F320C3BA-100 SMD	2	ea	U15,U16	
9	GMS30C7201 SMD	1	ea	U1	
10	HY57V281620AT-H SMD	2	ea	U24,U25	
11	KM68V4000BLT -7L SMD	3	ea	U17,U18,U21	
12	74LVC16245TPA SMD	1	ea	U10	
13	74FCT164245TPA SMD	2	ea	U11,U14	
14	74HC08 SMD	1	ea	U27	
15	74HC125 SMD	1	ea	U23	
16	74HC126 SMD	1	ea	U22	
17	74HC138 SMD	1	ea	U5	
18	74HC14 SMD	2	ea	U3,U12	
19	74HC32 SMD	3	ea	U7,U13,U33	
20	74HC74 SMD	1	ea	U28	
21	LX8585 SMD	1	ea	U26	
22	MAX232 SMD	1	ea	U4	
23	MM1075XF Reset IC SMD	1	ea	U2	
24	DS12887A DIP	1	ea	U9	
25	IRF9540 P-CH	1	ea	Q2	
26	RESISTOR 0 J 2012	3	ea	R44, R59, C29	
27	RESISTOR 0 J 3216	1	ea	F1	
28	RESISTOR 100 J 2012	3	ea	R40,R41,R63	
29	RESISTOR 1K J 2012	6	ea	R20,R21,R33,R64,R69,R71	
30	RESISTOR 10K J 2012	11	ea	R13,R15, R22, R29,R43, R57,R60, R66,R74, R79, R81	
31	RESISTOR 100K J 2012	6	ea	R50,51,52,53,55,62	
32	RESISTOR 1M J 2012	2	ea	R4,R36	
33	RESISTOR 150 J 2012	3	ea	R26,R30,R31	
34	RESISTOR 1.5K F 2012	2	ea	R1,R37	
35	RESISTOR 15K J 2012	1	ea	R18,R78	
36	RESISTOR 150K J 2012	1	ea	R16	
37	RESISTOR 200 J 2012	1	ea	R2	
38	RESISTOR 2.2K J 2012	1	ea	R34	
39	RESISTOR 22K J 2012	3	ea	R17,R80,R82	
40	RESISTOR 3K J 2012	6	ea	R7,R9,R14,R24,R38,R39	
41	RESISTOR 33 J 2012	1	ea	R23	
42	RESISTOR 330 J 2012	2	ea	R61,R25	
43	RESISTOR 330K J 2012	1	ea	R12	
44	RESISTOR 4.3K J 2012	1	ea	R75	
45	RESISTOR 430K J 2012	1	ea	R6	
46	RESISTOR 470 J 2012	1	ea	R76,77	
47	RESISTOR 51 J 2012	3	ea	R27,R28,R32	
48	RESISTOR 5.1K J 2012	5	ea	R11,R65,R68,R70,R72	
49	RESISTOR 51K J 2012	1	ea	R35	

50	RESISTOR 5.1M J 2012	1	ea	R5	
51	RESISTOR 620K J 2012	1	ea	R10	
52	RESISTOR 680K J 2012	1	ea	R19	
53	RESISTOR 0 J 1/4W	1	ea	D7	
54	RESISTOR 2 J 1W	1	ea	R42	
55	ARRAY RESISTOR 10K 3216	14	ea	RP1, RP2, RP3, RP4, RP5, RP6, RP7, RP8, RP9, RP10, RP11, RP12, RP17, RP24,	A type
56	ARRAY RESISTOR 33 3216	10	ea	RP13, RP14, RP15, RP16, RP18, RP19, RP20, RP21 , RP22, RP23,	A type
57	Volume 10KGF06P I type	1	ea	VR2	
58	Volume 500GF06P I type	1	ea	VR1	
59	ELECT 100uF 25V SMD	3	ea	CE1, CE2, CE3	
60	ELECT 22uF 16V SMD	1	ea	C60	
61	ELECT 220uF 16V SMD	2	ea	CT18	
62	CERAMIC 100pF 50V B	15	ea	C44, C45, C46, C47, C48, C49, C50, C51, C56, C57, C61, C65, C67, C69, C70	
63	CERAMIC 0.001uF 50V B	1	ea	C20	
64	CERAMIC 0.01uF 50V B	2	ea	C4, C28	
65	CERAMIC 0.1uF 50V B	74	ea	C1, C2, C3, C6, C7, C8, C9, C11, C12, C15, C16, C17, C18, C21, C22, C30, C31, C32, C33, C35, C36, C37, C38, C39, C40, C41, C42, C43, C64, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110	
66	CERAMIC 1uF 50V B	7	ea	C34, C52, C53, C54, C55, C62, C63	
67	CERAMIC 12pF 50V B	2	ea	C13, C14	
68	CERAMIC 22pF 50V B	3	ea	C5, C10, C24	
69	CERAMIC 0.0022uF 50V B	1	ea	C94	
70	CERAMIC 0.22uF 50V B	1	ea	C23	
71	CERAMIC 330pF 50V B	1	ea	C25	
72	CERAMIC 0.33 Uf 50V B K-TYPE	1	ea	C19	
73	CERAMIC 39pF 50V B	2	ea	C59, C58	
74	CERAMIC 470pF 50V B	1	ea	C26	
75	CERAMIC 0.0047uF B	1	ea	C27	
76	CERAMIC 56pF 50V B	2	ea	C68, C66	
77	TANTAL 10uF 16V 3225	19	ea	CT1, CT2, CT3, CT4, CT5, CT6, CT7, CT8, CT9, CT10, CT11, CT12, CT13, CT14, CT15, CT16, CT17, CT20, CT21	
78	BEAD HB-1M2012-301J	1	ea	F2	
79	BEAD F1-A3216-471K	1	ea	F3	
80	BEAD HB-4M3216-121J	4	ea	RB1, RB2, RB3, RB4	
81	WAFER 6239-30 PIN (SMD)	1	ea	CON109	
82	WAFER 5267-02P	2	ea	CN103, CN105	
83	WAFER 5267-03P	1	ea	CN104	
84	WAFER 5267-09P	1	ea	CN106	
85	WAFER 5267-15P	1	ea	CN112	
86	WAFER 5268-09P	1	ea	CON107	
87	WAFER 5274-03P	1	ea	CN113	
88	WAFER 53015-07P	1	ea	CN114	
89	HIF3F-14PA-2.54DS L-type	1	ea	CN101	
90	HIF3F-20PA-2.54DS L-type	1	ea	CN108	
91	HIF3F-40PA-2.54DS L-type	1	ea	CN111	
92	Jumper Jack 2P	1	ea		

93	Header pin 2*4P L-TYPE	1	ea	JP1, JP2, JP3, JP4	
94	1N4148 Diode SMD	5	ea	D1,D2,D3,D4,D5	
95	1N5819 Diode DIP	1	ea	D6	
96	TR C3198 SMD	3	ea	Q1,Q3,Q5	KEC
97	X-TAL 3.6864MHz Half type	1	ea	X-TAL1	
98	X-TAL 32.768MHz	1	ea	X-TAL2	
99	X-TAL 8MHz	1	ea	X-TAL3	
100	BATTERY VL2330 1HF	1	ea	BT1	PANASONIC
101	MP1000 DSC PCB 8.0	1	ea		하도전자

**(2) ECG B/D(ver4.0)**

NO.	품명	수량	단위	REF NO.												비고
	MP100 ECG															
	ECG B/D VER 7A		ay													
1	NC	68	ea	R1	LED1	CN3	CN4	R40	C69	R70	C70	U22	R145			
				C116	C79	C80	C91	C92	C97	C98	R146	R105	C105			
				C106	C120	R142	C119	R121	C123	C124	R137	C145				
				C151	R204	C159	C160	C161	R143	R160	R159	R154	C122			
				R155	R156	R148	C117	R144	R157	R161	C133	R163	R23			
				OC1	OC2	R32	R30	C27	R22	R24	U4	C10	R21			
				R25	C16	R26	C23	C28	R37	R208	VR4	C164				
2	NC_TEST POINT	9	ea	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9				
3	74HC04MTCX SMD TSSOP Fairchild	2	ea	U2	U3											
4	74HC4051PW SMD TSSOP PHILLIPS	2	ea	U21	U7											
5	74HC4052PW SMD TSSOP PHILLIPS	2	ea	U13	U18											
6	74HC4066ADTR2 SMD TSSOP ONSEMI	1	ea	U24												
7	ADS8320 SMD	1	ea	U6												
8	CD4047 SMD	1	ea	U8												
9	KIA7805AF DPACK	2	ea	U10	U1											
10	KIA7905AF DPACK	1	ea	U11												
11	LM1117MPX-3.3 SMD INTEGRAL	1	ea	U9												
12	TL062CD SMD T.I	2	ea		U14	U23										
13	TL064CD SMD DO14 T.I	7	ea	U12	U15	U17	U19	U20		U25	U26					
14	TMS320LF2406A SMD T.I	1	ea	U5												
15	TN2106 FET SMD	2	ea	Q1	Q2											
16	6N137 PHOTO COUPLER FAIRCHILD	2	ea	OC3	OC4											
17	TL431 DIP	1	ea	U16												
18	RESISTOR 0 J 1608	4	ea	R51	R53	R151	R54									
19	RESISTOR 10 F 1608	4	ea	R27	R38	R49	R120									
20	RESISTOR 100 F 1608	7	ea		R88	R165	R166	R168	R173	R197	R193					
21	RESISTOR 1K F 1608	26	ea	R16	R28	R36	R42	R43	R46	R47	R50	R58	R80			
				R85	R92	R96	R97	R103	R140	R147	R150	R152	R153			
				R158	R162	R164	R169	R172	R182							
22	RESISTOR 10K F 1608	26	ea	R2	R3	R4	R5	R12	R13	R14	R15	R17	R18			
				R20	R29		R41	R95	R101	R170	R174	R179	R183			
				R184	R186	R188	R191	R195	R196	R203						
23	RESISTOR 100K F 1608 WASHIN	25	ea			R60	R61	R62	R63	R65	R68	R71				
				R72	R73	R76	R77	R91	R102	R107	R108	R109	R111			
				R124	R125	R134	R135									
						R175	R189	R194	R200							
24	RESISTOR 1M F 1608	6	ea	R64	R79	R98	R110	R123	R139							
25	RESISTOR 10M F 1608	1		R209												
26	RESISTOR 12K F 1608	3	ea	R84	R94	R207										
27	RESISTOR 2K F 1608	1	ea	R11												
28	RESISTOR 20K F 1608	5	ea	R19	R10	R9	R8	R7								
29	RESISTOR 200K F 1608 WASHIN	3	ea	R201	R202	R205										
30	RESISTOR 220 F 1608	3	ea		R35	R185	R190									
31	RESISTOR 24K F 1608	12	ea	R59	R67	R81	R87	R93	R100	R104	R106	R112	R122			
				R133	R138											
32	RESISTOR 240K F 1608	1	ea	R86												
33	RESISTOR 3K J 1608	5	ea	R99		R6	R31	R33	R55							
34	RESISTOR 300K F 1608	4	ea	R82	R89	R90	R141									
35	RESISTOR 330 F 1608	3	ea	R39	R45	R83										
36	RESISTOR 3.3M F 1608	2	ea	R199	R198											
37	RESISTOR 390K F 1608	5	ea	R69	R74	R119	R131	R149								
38	RESISTOR 470 F 1608	3	ea		R44	R52	R56									

39	RESISTOR 4.7K F 1608 WASHIN	6	ea	R176	R177	R178	R180	R181	R187				
40	RESISTOR 5.1K J 1608	2	ea	R75	R132								
41	RESISTOR 51K F 1608	2	ea		R192	R206							
42	RESISTOR 51M F 1608	11	ea	R114	R115	R116	R117	R118	R126	R127	R128	R129	R130
				R167									
43	RESISTOR 680 J 1608	1	ea	R34									
44	RESISTOR 6.8K J 1608	1	ea	R57									
45	RESISTOR 82K F 1608	2	ea	R78	R136								
46	RESISROT 9.1K F 1608	2	ea	R66	R113								
47	RESISTOR DIP 20hn (1/2W)	1	ea	R48									
48	VOLUME 10K GF06P I TYPE	2	ea	VR1	VR2								
49	VOLUME 500 GF06P I TYPE	1	ea	VR3									
50	ELECT 10uF 16V SMD 4Φ	3	ea	C86	C125	C127							
51	ELECT 100uF 16V SMD 6Φ	5	ea	C39	C42	C53	C54	C56					
52	ELECT 22uF 16V SMD 4Φ	9	ea	C1	C2	C26	C41	C43	C49	C60	C62	C158	
53	CERAMIC 0.001uF 50V A	10	ea	C48	C113	C115	C165	C71	C77	C76	C102	C111	C110
54	CERAMIC 0.01uF 50V A	2	ea	C162	C163								
55	CERAMIC 0.1uF 50V A	73	ea	C3	C4	C5	C6	C7	C8C	C9	C11	C12	C13
				C14	C15	C17	C18	C19	C20	C21	C22		C24
				C25		C29	C30	C31	C34	C36	C38	C40	C45
				C46	C47	C50	C51	C52	C55	C57	C58	C59	C61
				C63	C64	C65	C66	C72	C73	C74	C82	C85	C87
				C88	C89	C93	C94	C95	C99	C100	C103	C107	C108
				C112		C118		C121	C126	C136	C137	C141	C142
				C144	C150	C154	C155	C156		C172	C173		
56	CERAMIC 1uF 50V A	4	ea	C37	C81	C114		C157					
57	CERAMIC 22PF 50V A	2	ea	C32	C33								
58	CERAMIC 0.022uF 50V A	12	ea			C35	C67	C68	C75	C78	C90	C96	
				C101	C104	C109			C143	C147			
59	CERAMIC 470PF 50V A J	2	ea	C83	C84								
60	CERAMIC 470PF 50V A	5	ea	C139	C140	C146	C148	C149					
61	CERAMIC 0.0047uF 50V A	5	ea	C128	C129	C130	C131	C132					
62	MYLAR 0.01uF 50V	3	ea	C44	C152	C153							
63	MYLAR 0.022uF	3	ea	C134	C135	C138							
64	WAFER 5267-06P	1	ea	CN5									
65	Header pin 1*8P	1	ea	CN2									
66	1N4148 Diode SMD	15	ea	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
				D11	D12	D13	D14	D15					
67	1N5231 DIODE SMD	2	ea	ZD1	ZD2								
68	DAN217 Diode SMD ROHM	8	ea	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8		
69	TR A1266 SMD (A 1504,SOF23) KEC	1	ea	Q4									
70	TR BC817 SMD SOT-23 LRC	1	ea	Q3									
71	TR C3198 SMD	1	ea	Q5									
72	X-TAL 8MHz Half type	1	ea	Y1									
73	MP1000 ECG PCB Ver 7.0	1	ea	PCB									
74	MP1000 Respiration Trans	1	ea	T2									
75	MP700 Power Trans	1	ea	T1									
76	NEONLAMP 100V	6	ea	GAP1	GAP2GAP3	GAP3	GAP4	GAP4	GAP5				

### SpO2 B/D(ver4.0)

NO.	품명	수량	단위	REF NO.												비고
	MP1000 SpO2 B/D VER8.A															
	SpO2 B/D		ay													
1	NC	24	ea	C36	C39	C50	R10	R33	R91	R49	R65	R66	R87			
				R88	R89	R90	R93	R101	R133	R96	C40	R161	R181			
				R190	R195	R208	R214									
2	74HC04 SMD	2	ea	U1	U3											
3	74HC4066 SMD ONSEMI,TI	2	ea	U11	U14											PHILLIPS
4	ADS8320 SMD	1	ea	U6												T.I
5	CD4047 SMD FAIRCHILD	1	ea	U9												
6	LM1117MPX-3.3 SMD INTEGRAL	1	ea	U7												INTEGRAL
7	LM324 SMD PHILLIPS	10	ea	U5	U12	U15	U16	U17	U18	U19	U20	U10	U13			PHILIPS
8	TMS320LF2406A SMD T.I	1	ea	U2												T.I
9	TN2106 FET SMD SUPERTEX	2	ea	Q1	Q2											KEC
10	6N137 PHOTO COUPLER FAIRCHILD	3	ea	ISO1	ISO2	ISO3										
11	KIA7805AF DPACK	1	ea	U8												TO-220
12	PC817 PHOTO COUPLER SHARP	1	ea	OC1												
13	RESISTOR 0 J 1608	5	ea	R50	R115	R138	C45	R95								WASHIN
14	RESISTOR 0 J 2012	2	ea	L1	L2											
15	RESISTOR 10 J 1608	1	ea	R25												WASHIN
16	RESISTOR 100 J 1608	9	ea	R17	R18	R19	R21	R30	R60	R61	R73	R74				WASHIN
17	RESISTOR 100 F 1608	2	ea	R6	R9											
18	RESISTOR 1K F 1608 WASHIN	16	ea	R8	R39	R43	R98	R111	R116	R125	R134	R143	R144			WASHIN
				R145	R153	R163	R164	R165	R173							
19	RESISTOR 1K J 1608	16	ea	R3	R4	R5	R11	R24	R26	R42	R62	R63	R69			WASHIN
				R72	R77	R78	R80	R81	R141							
20	RESISTOR 10K F 1608	31	ea	R7	R12	R14	R15	R22	R38	R55	R56	R70	R102			WASHIN
				R113	R121	R123	R136	R142	R146	R148	R152	R166	R168			
				R172	R184	R186	R193	R196	R199	R202	R204	R211	R213			
				R217												
21	RESISTOR 100K F 1608 WASHIN	25	ea	R36	R99	R100	R105	R106	R108	R109	R120	R124	R129			WASHIN
				R131	R147	R150	R154	R156	R167	R170	R175	R176	R185			
				R188	R198	R203	R206	R216								
22	RESISTOR 1M J 1608	8	ea	R118	R119	R122	R140	R187	R197	R205	R215					WASHIN
23	RESISTOR 10M J 1608	5	ea	R16	R183	R200	R201	R218								WASHIN
24	RESISTOR 1.2K F 1608 WASHIN	1	ea	R34												WASHIN
25	RESISTOR 15K F 1608 WASHIN	1	ea	R117												WASHIN
26	RESISTOR 15K J 1608	2	ea	R157	R177											WASHIN
27	RESISTOR 1 J 1608 WASHIN	3	ea	R52	R53	R54										WASHIN
28	RESISTOR 200 J 1608 WASHIN	1	ea	R32												WASHIN
29	RESISTOR 2K J 1608	1	ea	R2												
30	RESISTOR 200K F 1608 WASHIN	2	ea	R104	R128											WASHIN
31	RESISTOR 2.2K F 1608 WASHIN	1	ea	R31												WASHIN
32	RESISTOR 24K F 1608 WASHIN	2	ea	R135	R139											WASHIN
33	RESISTOR 24K J 1608	1	ea	R137												WASHIN
34	RESISTOR 2.7K F 1608 WASHIN	2	ea	R160	R180											WASHIN
35	RESISTOR 27K F 1608 WASHIN	1	ea	R114												WASHIN
36	RESISTOR 2.49K F 1608	2	ea	R158	R178											WASHIN
37	RESISTOR 3K F 1608	1	ea	R45												WASHIN
38	RESISTOR 3K J 1608	4	ea	R1	R28	R92	R110									WASHIN
39	RESISTOR 30K F 1608 WASHIN	3	ea	R94	R189	R207										WASHIN
40	RESISTOR 33 J 1608	1	ea	R35												WASHIN
41	RESISTOR 330 J 1608	3	ea	R41	R57	R58										WASHIN
42	RESISTOR 330K F 1608	3	ea	R130	R151	R171										WASHIN



(3) NIBP B/D(ver 5A)

NO.	품명	수량	단위	REF NO.	비고
	MP500 NIBP		AY		
	NIBP B/D	1	AY		
1	NC		ea	CN405, CN406, CN412, C3, .C18, C21, C23, C24, C22, C135, C136, C137, C138, J1, Q8, Q9, R8, R3, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R123, R6, R10, U10, VR1, U10	
2	74HC04 SMD	1	ea	U1	
3	74HC4051 SMD	1	ea	U6	
4	ADS8320 SMD	1	ea	U7	
5	LM1117MPX-3.3 SMD	1	ea	U8	
6	LM393MX SMD	1	ea	U2	
7	MM1075XF Reset IC SMD	1	ea	U5	
8	TLC074CD SMD	1	ea	U3	
9	TMS320LF2406A SMD	1	ea	U4	
10	LM7805	1	ea	U9	
11	RESISTOR 0 J 2012	5	ea	J2, 5, 6, L3, R60	
12	RESISTOR 10 J 2012	1	ea	R106	
13	RESISTOR 100 J 2012	2	ea	R1, 115	
14	RESISTOR 1K J 2012	12	ea	R12, 21, 22, 26 38, 39, 102, 105, 111, 112, 113, 114	
15	RESISTOR 10K J 2012	5	ea	R31, 32, 50, 110, 118	
16	RESISTOR 100K J 2012	4	ea	R24, 28, 33, 35	
17	RESISTOR 1.5K J 2012	1	ea	R27	
18	RESISTOR 150K J 2012	2	ea	R30, 61	
19	RESISTOR 2K J 2012	4	ea	R20, 23, 51, 116	
20	RESISTOR 22 J 2012	2	ea	R5, R9	
21	RESISTOR 22K J 2012	1	ea	R18	
22	RESISTOR 3K J 2012	6	ea	R52, 100, 101, 103, 104, 117	
23	RESISTOR 33 J 2012	1	ea	R124	
24	RESISTOR 3.3K J 2012	2	ea	R15, 16	
25	RESISTOR 33K J 2012	1	ea	R29	
26	RESISTOR 4.3M J 2012	1	ea	R34	
27	RESISTOR 470 J 2012	3	ea	R7, 11, 13	
28	RESISTOR 4.7K J 2012	3	ea	R4, 14, 108	
29	RESISTOR 5.1K J 2012	2	ea	R17, 25	
30	RESISTOR 56K J 2012	1	ea	R37	
31	RESISTOR 6.8K J 2012	1	ea	R19	
32	RESISTOR 82K J 2012	2	ea	R36, 107	
33	RESISTOR 470 J 1/4W	1	ea	R2	
34	Volume 10K GF06S L type	1	ea	VR2	
35	ELECT 10uF 16V SMD 4Φ	2	ea	C20, 113	
36	ELECT 100uF 16V SMD 6Φ	4	ea	C1, C2, 128, 131	
37	ELECT 22uF 25V SMD 6Φ	1	ea	C133	
38	ELECT 47uF 16V SMD 6Φ	1	ea	C4	
39	CERAMIC 0.001uF 50V B	2	ea	C7, 109	
40	CERAMIC 0.01uF 50V B	1	ea	C112	
41	CERAMIC 0.1uF 50V B	31	ea	C6, 9, 12, 14, 16, 19, 106, 110, 129, 130, 100, 101, 107, 108, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 132, 134, 139	
42	CERAMIC 1uF 50V B	2	ea	C10, 105	

43	CERAMIC 22pF 50V B	2	ea	C102, 103	
44	CERAMIC 0.0022uF 50V B	1	ea	C104	
45	CERAMIC 0.22uF 50V B	2	ea	C13, C25	
46	CERAMIC 0.0033uF 50V B	1	ea	C17	
47	CERAMIC 0.047uF 50V B	1	ea	C26	
48	CERAMIC 680pF 50V B	1	ea	C11	
49	CERAMIC 105pF 68V MLCC	1	ea	C15	
50	MYLAR 0.0022uF 50V	1	ea	C5	
51	MYLAR 0.047uF 50V	1	ea	C8	
52	WAFER 5267-02P	3	ea	CN402, 403, 404	
53	WAFER 5267-04P	1	ea	CN401	
54	Header pin 1*8P	1	ea	CN411	
55	1N4148 Diode SMD	4	ea	D1, 2, 3, 6	
56	DAN217 Diode SMD	1	ea	DA1	
57	FR105 Diode DIP	1	ea	D4	
58	TR C3198Y TO92	5	ea	Q2, 3, 4, 6, 7	
59	TR A1020 TO92L	2	ea	Q1, 5	
60	X-ATL 8MHz Half type	1	ea	XT1	
61	MM300 Module PCB 5.0	1	ea		
62	LED 2012 RED LTST-C170CKT	1	ea	LED1	
63	Inductor 88uH	2	ea	L1, 2	
64	Pressure sensor XFPMP-050KPGP	1	ea	PS1	
65	Rolling pump P54C05	1	ea		
66	Solenoid valve DVL-05H1	2	ea		
67	T-Valve	1	ea		
68	Motor b/k	1	ea		
69	AIR Resistor	1	ea		

**(4) SLOT B/D(ver3.0)**

NO.	품명	수량	단위	REF NO.	검사 유무	비고
	SLOT	1	ay			
1	RESISTOR CF 0.5% 1/4W	2	ea	R4, R5		
2	RESISTOR CF 100 5% 1/4W	2	ea	R8, 10		
3	RESISTOR CF 220 5% 1/4W	2	ea	R9, 11		
4	RESISTOR CF 10K 5% 1/4W	1	ea	R3		
5	ARRAY RESISTOR A10K 9PIN	1	ea	RP1		
6	ELECT 10uF 16V 20%	2	ea	C10, C11		
7	ELECT 1uF 16V 10%	4	ea	C2, 4, 6, 8		
8	DIODE SWITHING 500mW	8	ea	D1, 2, 3, 4, 5, 6, 7, 8		
9	MAX232CPE	1	ea	U2		
10	CONNECTOR 5267-04 'I' TYPE	2	ea	CN505, CN506		
11	CONNECTOR 5267-09 'I' TYPE	1	ea	CN504		
12	BOX HEADER HIF3F-20PA-2.54DS 'I' TYPE	1	ea	CN501		
13	CONNECTOR SLOT 2X15PIN DIP TYPE	2	ea	CN502, CN503		
14	SLOT B/D PCB 1.6T, EPOXY(2-LAYER)	1	ea			
15	M3x6mm BOLT	2	ea			
16	SLOT B/D TO DSC B/D POWER	1	ea			
17	SLOT B/D TO NIBP	1	ea			
18	SLOT B/D TO PRINTER	1	ea			
TOT						

**(5) KEY B/D(ver2.0)**

NO.	품명	수량	단위	REF NO.	검사 유무	비고
	KEY FRONT B/D	1	ay			
1	RESISTOR CF 1K 5% 1/4W	1	ea	R1		
2	RESISTOR CF 1.2K 5% 1/4W	1	ea	R2		
3	RESISTOR CF 470 5% 1/4W	1	ea	R3		
4	TR NPN 2SC3198-Y (DIP)	2	ea	Q1, Q2		
5	LED 2x4 mm DIP GREEN (Charging LED)	1	ea	D1		
6	LED 2x4 mm DIP ORANGE (Battery LED)	1	ea	D2		
7	TACT S/W JTP1212 (Height: 5mm)	8	ea	S1, S2, S3, S4, S5, S6, S7, S8		
8	ROTARY ENCODER	1	ea	JP1		
9	CONNECTOR 5267-15 'I' TYPE	1	ea	CN701		
TOT						

## (6) POWER B/D(AC\_DC +15V)

NO.	DESCRIPTION	SPECIFICATION	Q'TY	REF NO.	비고
	POWER AC_DC	1			
	POWER B/D	1			
1	BOX CAPACITOR	0.22uF 275V	2	C5, C6	
2	ELECT CAPACITOR	220uF 400V	1	C7	
3	ELECT CAPACITOR	100uF 35V 8*12	1	C8	
4	ELECT CAPACITOR	1000uF 25V 10*0	4	C15, C16, C17, C18	
5	IC	UC3843	1	IC1	
6	IC	TL431		IC2	
7	FET	SSS6N60A	1	FET	
8	PHOTO	PC817, 317	1	POTO1	
9	SCHOTTKY DIODE	D10SC9M	1	D3	
10	TNR	10D471K	1	TNR	
11	THERMISTOR	5D-9	1	TH	
12	VR	2K GF06P	1	VR1	
13	BRIDGE DIODE	D3SBA60	1	BD1	
14	F/R DIODE	FR107	1	D1	
15	F/R DIODE	FR105	1	D2	
16	SCHOTTKY DIODE	SR560	3	D4, D5, D6	
17	C CAPACITOR	470PF AC250V	6	C1-C4, C19, C20	
18	C CAPACITOR	2200PF 1KV	1	C9	
19	C CAPACITOR	470PF 50V	1	C11	
20	C CAPACITOR	0.1uF 50V	1	C14	
21	CONNECTOR	5096-2P	1	CN1	
22	CONNECTOR	5273-3P	1	CN2	
23	CONNECTOR	5273-2P	2	CN3, CN4	
24	M CAPACITOR	0.01uF 100V	2	C10, C12	
25	M CAPACITOR	0.022uF 100V	1	C13	
26	RESISTOR	2W 150K	1	R2	
27	RESISTOR	2W 12K	1	R3	
28	RESISTOR	1W 220K	1	R1	
29	RESISTOR	1W 0.5	1	R4	
30	RESISTOR	1W 390	1	R13	
31	RESISTOR	1/4W 1.5K	1	R18	
32	RESISTOR	1/4W 10	1	R5	
33	RESISTOR	1/8W 10K	1	R6	
34	RESISTOR	1/8W 1K	2	R7, R11	
35	RESISTOR	1/8W 2.2K	2	R10, R12	
36	RESISTOR	1/8W 4.7K	1	R8	
37	RESISTOR	1/8W 1.2K	1	R17	
38	RESISTOR	1/8W 4.7K	1	R15	
39	RESISTOR	1/8W 330	1	R14	
40	RESISTOR	1/8W 2K	1	R16	
41	MAIN TRANS	EER2834	1	T1	
42	LINE FILTER	SQ2014 33mH	2	L1, L2	
43	CHOKE COIL	BAR CORE 10uH	1	L3	
44	HEAT SINK	MP-1000 A/D	2	HT1, HT2	
45	JUMP WIRE	0.6Φ 10mm	6	J1-J6	

46	SCREW	M3X8	2	HT1, HT2	
47	P.C.B	117X97.4X1.6T FR4	1	MP-1000 A/D	
48	Label	S/N 25*20	1		
49	FUSE	125V 5A(저Resistanse TYPE)	2	F1, F2	
50	MP-1 CHARGER	MP-1CH P.C.B	1	CHARGER	
	TOT				

### (7) POWER B/D(DC-DC CHARGE B/D)

NO.	DESCRIPTION	SPECIFICATION	Q'TY	MFG PART NO.	ORIGINAL	REF NO.	비고
	POWER CHARGE	1					
	POWER B/D	1					
1	IC	KA34063A	1			IC1	
2	TR	A1010, A1012, B1370	1			Q1	
3	SCHOTTKY DIODE	SR360	2			D1, D2	
4	VR	1K GF06P	1			VR1	
5	ELECT CAPACITOR	470uF 16V 8*12	2			C3, C4	
6	ELECT CAPACITOR	100uF 25V 6.5*12	1			C1	
7	CHOKE COIL	12Φ	1	150uH	V-TYPE	L1	
8	M CAPACITOR	2200pF 100V	1			C2	
9	RESISTOR	1W 0.22	2			R1, R8	
10	RESISTOR	1W 200	2			R3, R4	
11	RESISTOR	1/4W 56	1			R5	
12	RESISTOR	1/4W 8.2K	1			R6	
13	RESISTOR	1/4W 1K	1			R7	
14	JUMP WIRE	0.6Φ 10mm	2			J1, J2	
15	WAFER PIN	2.5mm 2P * 24mm	3	PHA03-	178-40G	P1, P2, P3	
16	P.C.B	50 * 35 * 1.6T FR1	1			MP-1CH	
	TOT						

**(8) POWER B/D(DC-DC +12V)**

NO.	DESCRIPTION	SPECIFICATION	Q'TY	MFG PART NO.	ORIGINAL	REF NO.	비고
		POWER DC_DC	1				
1	IC	KA34063A	2			IC1, IC2	
2	TR	A1010, A1012, B1370	1			Q1	
3	SCHOTTKY DIODE	SR106, 1N5819	3			D1, D2, D3	
4	ELECT CAPACITOR	470uF 16V 8*12	1			C4	
5	ELECT CAPACITOR	220uF 35V 8*12	1			C5	
6	ELECT CAPACITOR	100uF 25V 6.5*12	1			C1	
7	CHOKE COIL	12Φ	1	150uH	V-TYPE	L1	
8	CHOKE COIL	11Φ	1	260uH	H-TYPE	L2	
9	M CAPACITOR	2200pF 100V	2			C2, C3	
10	RESISTOR	1W 0.1	1			R1	
11	RESISTOR	1W 100	1			R4	
12	RESISTOR	1/4W 56	1			R5	
13	RESISTOR	1/4W 3.4KF	1			R6	
14	RESISTOR	1/4W 390	1			R7	
15	RESISTOR	1/4W 2.7KF	1			R12	
16	RESISTOR	1/4W 50KF	1			R11	
17	RESISTOR	1/4W 1	3			R8, R9, R10	
18	JUMP WIRE	0.6Φ 10mm	6			J1-J6	
19	WAFER PIN	2.5mm 2P * 24mm	4	PH03-	115-40G	P1, P2, P3, P4	
20	P.C.B	55 * 35 * 1.6T FR1	1			MP/+12V -20V	
21							
22							
23							
	TOT						

**(9) POWER B/D(DC-DC +5V)**

NO.	DESCRIPTION	SPECIFICATION	Q'TY	MFG PART NO.	ORIGINAL	REF NO.	비고
		POWER DC_DC	1				
1	IC	KA34063A	1			IC1	
2	TR	A1010, A1012, B1370	1			Q1	
3	SCHOTTKY DIODE	SR360	1			D1	
4	VR	1K GF06P	1			VR1	
5	ELECT CAPACITOR	470uF 16V 8*12	3			C3, C4, C5	
6	ELECT CAPACITOR	100uF 25V 6.5*12	1			C1	
7	CHOKE COIL	15Φ	1	300uH	H-TYPE	L1	
8	M CAPACITOR	2200pF 100V	1			C2	
9	RESISTOR	1W 0.22	2			R1, R2	
10	RESISTOR	2W 390	1			R3	
11	RESISTOR	1/4W 56	1			R5	
12	RESISTOR	1/4W 2.7K	1			R6	
13	RESISTOR	1/4W 1K	1			R7	
14	JUMP WIRE	0.6Φ 10mm	1			J1	
15	WAFER PIN	2.5mm 3P * 20mm	3	PH03-	115-40G	P1, P2, P3	
16	P.C.B	55 * 35 * 1.6T FR1	1			MP/+5V	
17							
18							
19							
TOT							

**(10) POWER B/D(DC-DC +7.5V/-7.5V)**

NO.	DESCRIPTION	SPECIFICATION	Q'TY	MFG PART NO.	ORIGINAL	REF NO.	비고
		POWER DC-DC	1				
1	IC	KA34063A	2			IC1, IC2	
2	SCHOTTKY DIODE	SR106, IN5819	2			D1, D2	
3	ELECT CAPACITOR	470uF 16V 8*12	2			C4, C5	
4	ELECT CAPACITOR	100uF 25V 6.5*12	1			C1	
5	CHOKE COIL	15Φ	2	260uH	H-TYPE	L1, L2	
6	M CAPACITOR	2200pF 100V	2			C2, C3	
7	RESISTOR	1/4W 1K	5			R1, R2, R3, R5, R6	
8	RESISTOR	1/4W 0.5	1			R4	
9	RESISTOR	1/4W 5.1KF	2			R7, R10	
10	RESISTOR	1/4W 1KF	2			R8, R9	
11	JUMP WIRE	0.6Φ 10mm	4			J1-J4	
12	WAFER PIN	2.5mm 2P * 20mm	4	PH03-	115-40G	P1-P4	
13	P.C.B	55 * 35 * 1.6T FR1	1			MP/+7.5V -7.5V	
14							
15							
16							
TOT							

**(11) POWER B/D(DC-DC +8.9V)**

NO.	DESCRIPTION	SPECIFICATION	Q'TY	MFG PART NO.	ORIGINAL	REF NO.	비고
	POWER DC_DC		1				
	POWER B/D		1				
1	IC	KA34063A	1			IC1	
2	TR	A1010, A1012, B1370	1			Q1	
3	SCHOTTKY DIODE	SR560	1			D1	
4	VR	1K GF06P	1			VR1	
5	ELECT CAPACITOR	470uF 16V 8*12	3			C3, C4, C5	
6	ELECT CAPACITOR	100uF 25V 6.5*12	1			C1	
7	CHOKE COIL	15Φ	1	300uH	H-TYPE	L1	
8	M CAPACITOR	2200pF 100V	1			C2	
9	RESISTOR	1W 0.1	1			R1	
10	RESISTOR	1W 0.22	1			R2	
11	RESISTOR	1W 100	2			R3, R4	
12	RESISTOR	1/4W 56	1			R5	
13	RESISTOR	1/4W 4.7K	1			R6	
14	RESISTOR	1/4W 910	1			R7	
15	JUMP WIRE	0.6Φ 10mm	1			J1	
16	WAFER PIN	2.5mm 3P * 20mm	3	PH03-	115~40G		
17	P.C.B	55 * 35 * 1.6T FR1	1			P1, P2, P3	
18						MP/+8.9V	
19							
TOT							