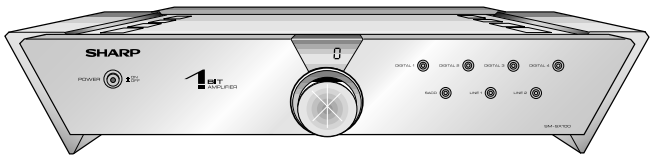
SHARP SERVICE MANUAL

No. S3021SMSX100/



SM-SX100

1 BIT AMPLIFIER

- In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

CONTENTS

SHARP CORPORATION

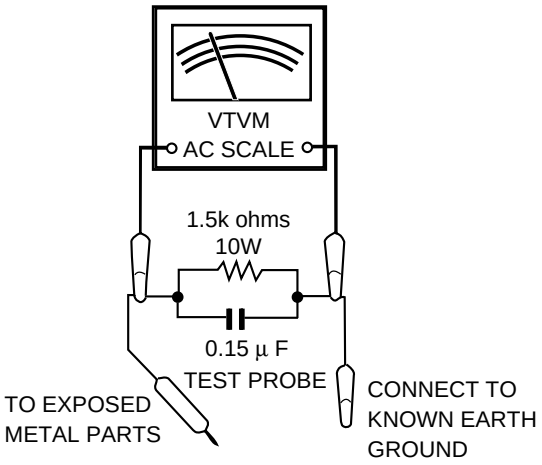
FOR A COMPLETE DESCRIPTION OF THE OPERATION OF THIS UNIT, PLEASE REFER TO THE OPERATION MANUAL.

IMPORTANT SERVICE NOTES (FOR U.S.A. ONLY)

BEFORE RETURNING THE AUDIO PRODUCT
(Fire & Shock Hazard)
Before returning the audio product to the user, perform the following safety checks.

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the audio product.
2. Inspect all protective devices such as insulating materials, cabinet, terminal board, adjustment and compartment covers or shields, mechanical insulators etc.
3. To be sure that no shock hazard exists, check for leakage current in the following manner.

* Plug the AC line cord directly into a 120 volt AC outlet.
* Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15μF capacitor in series with all exposed metal cabinet parts and a known earth ground, such as conduit or electrical ground connected to earth ground.
* Use a VTVM or VOM with 1000 ohm per volt, or higher, sensitivity to measure the AC voltage drop across the resistor (See diagram).
* Connect the resistor connection to all exposed metal parts having a return path to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.



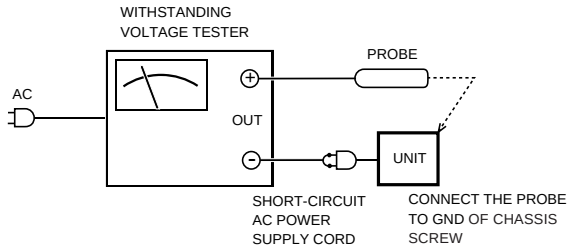
All check must be repeated with the AC line cord plug connection reversed.
Any reading of 0.3 volt RMS (this corresponds to 0.2 milliamp. AC.) or more is excessive and indicates a potential shock hazard which must be corrected before returning the audio product to the owner.

IMPORTANT SERVICE NOTES (FOR U.K. ONLY)

Before returning the unit to the customer after completion of a repair or adjustment it is necessary for the following withstand voltage test to be applied to ensure the unit is safe for the customer to use.
Setting of Withstanding Voltage Tester and set.

Set name	set value
Withstanding Voltage Tester	
Test voltage	2,120 VPEAK 1,500 VRMS
Set time	60 secs
Set current(Cutoff current)	4 mA
Unit	
Judgment	

OK: The “GOOD” lamp lights.
NG: The “NG” lamp lights and the buzzor sounds.



SPECIFICATIONS

Rated output power:
RMS; 100 W + 100 W (DIN 45 500)
Total harmonic distortion:
0.02 % (1 kHz, 1 W)
Frequency response:
5 Hz-20 kHz (+1dB, -1dB)
5 Hz-100 kHz (+1dB, -3dB)
Dynamic range:
105 dB (5 Hz-20 kHz)
A/D noise shaping:
7th-order ΔΣ (delta-sigma) modulation
Input terminals:
DIGITAL1; ST link optical
DIGITAL2; BNC coaxial
DIGITAL3; RCA coaxial
DIGITAL4; Square type optical
SACD; RCA analog, 1 BIT digital
LINE 1; RCA analog
(350 mV rms / 50 k ohms)
LINE 2; XLR analog balanced
(350 mV rms / 50 k ohms)
Output terminals:
DIGITAL OUT; Square type optical
LINE OUT; RCA analog
SPEAKERS; 8 ohms/4 ohms selectable
Power source/power consumption:

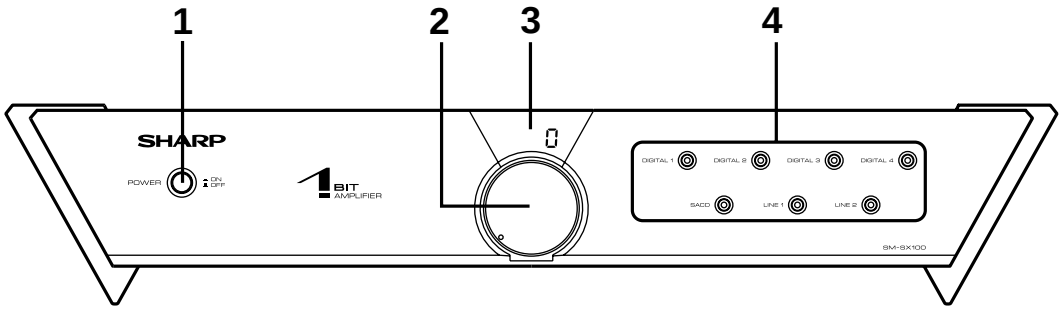
	POWER SOURCE	POWER CONSUMPTION
North America	120 V, 60 Hz	76 W
Europe	230 V, 50 Hz	70 W
Australia, New Zealand	220 - 240 V, 50/60 Hz	70 W
Singapore	230V, 50 Hz	70 W
Hong Kong	220 V, 50 Hz	72 W
Other countries	110 - 120 V, 50/60 Hz	70 W
	220 - 240 V, 50/60 Hz	70 W

Dimensions:
Width; 472 mm (18 - 5/8")
Height; 89 mm (3 - 1/2")
Depth; 462 mm (18 - 3/16")
Weight:
Approx. 18.5 kg (40.8 lbs.)

Specifications for this model are subject to change without prior notice.

NAMES OF PARTS

■ Front Panel



1 Power button

Turns the unit on or off.

2 Volume control knob

Controls the sound level.

3 Volume display

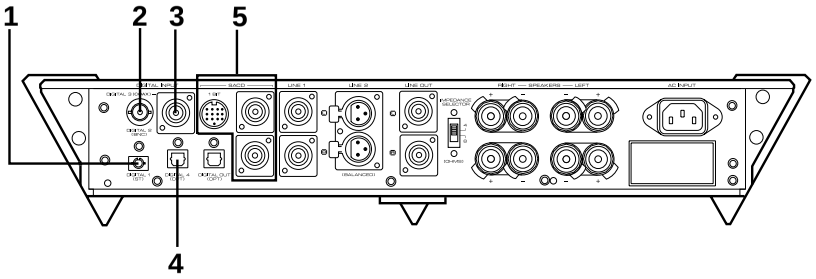
Displays the sound level within the range of "0" - "128".

4 Input selector buttons

Used to select the equipment source you want to play back.
When the power is turned on, the unit is switched to "SACD".

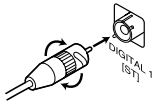
To cut the output to the speaker with the power turned on:
Set the sound level at "0" then press and hold the corresponding input selector button for 2 seconds or more.
The signal output to the speaker returns when you reset the sound level at "1" or higher.

■ Rear Panal



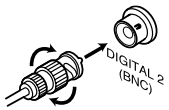
1 Digital 1 input terminal (ST) *

Connect equipment using ST link optical digital cable.



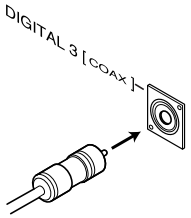
2 Digital 2 input terminal (BNC) *

Connect equipment using BNC coaxial cable.



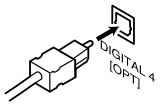
3 Digital 3 input terminal (COAX) *

Connect equipment using RCA coaxial cable.



4 Digital 4 input terminal (OPT) *

Connect equipment using the square type optical digital cable.

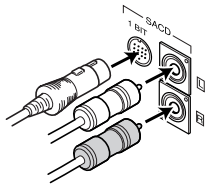


5 SACD/1-bit signal input terminals

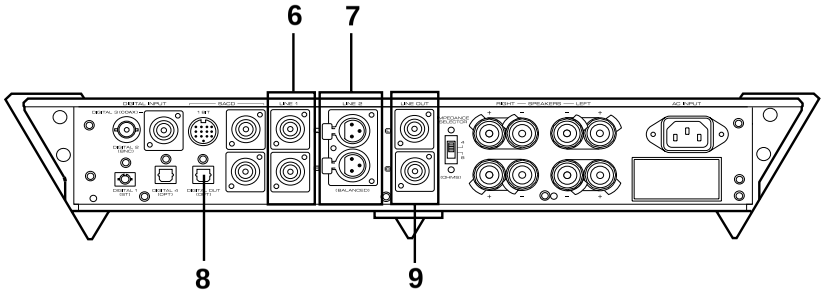
Connect the super audio CD player using RCA cords or the 1-bit signal cable included with your Sharp SACD player.

When both the RCA cords and the 1-bit signal cable are connected, signals from the latter have priority.

When nothing is connected to the 1 BIT input terminal, signals from the RCA cords are used.
(If you use the 1 BIT input terminal, refer to the operation manual for equipment which has a 1-bit signal output terminal.)

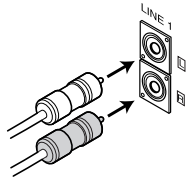


* **For digital input to this product, use equipment which adapts to the digital audio interface.**
(32kHz, 44.1kHz, 48kHz)



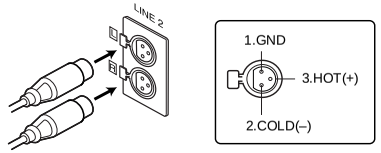
6 Line 1 input terminals

Connect equipment using RCA cords.

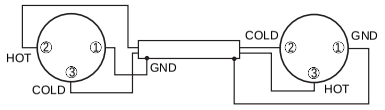


7 Line 2 input terminals (BALANCED)

Connect equipment using XLR cables.



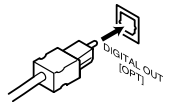
BALANCED terminal:
The balanced output terminal pins 2.COLD (-) and 3.HOT (+) are reversed on some equipment, such as a CD player. If you connect such equipment to this product using XLR cables, the signals are in antiphase. In this case, change the pins 2 and 3 of one connector of the XLR cable to match them to the equipment that you are connecting. See diagram below.



CD player etc. This product

8 Digital output terminal (OPT)

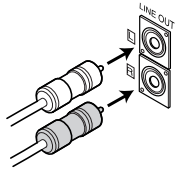
Connect equipment using a square type optical digital cable.



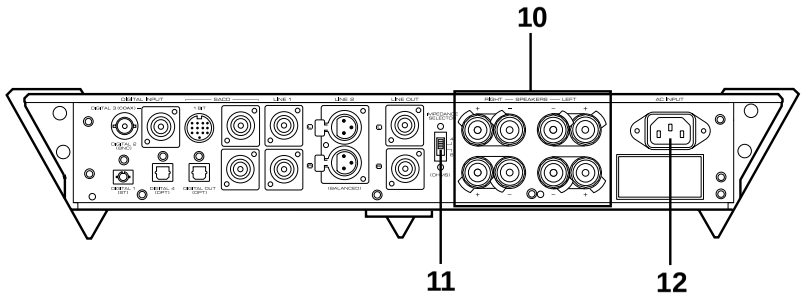
This terminal send signals of the external equipment connected to the DIGITAL 1, 2 , 3 or 4 terminal.

9 Line output terminals

Connect equipment using RCA cords.

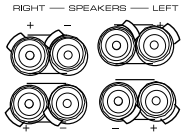


These terminals send signals of the external equipment connected to the RCA (of SACD), LINE 1 or LINE 2 terminals.

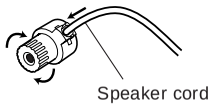


10 Speaker output terminals

(compatible to bi-wiring)
Speaker output terminals of the RIGHT and the LEFT channels are located above and below each other in two rows for speaker bi-wiring.
Since the upper and lower rows have common specifications, you can connect your speakers to either row when using a conventional speaker system. When connecting a bi-wired compatible speaker system, the upper row is used for the high frequency speaker drivers, and the lower row is used for the low frequency speaker drivers.

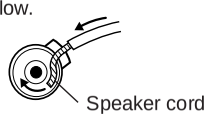


Plug the speaker cord in firmly and be careful that the end of the cord does not touch the next terminal or speaker cord, as this could cause damage to the amplifier.



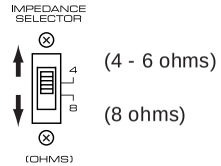
Use a speaker system which has 100 W or more rated power input and 4 ohms - 8 ohms impedance.

Note for users in areas other than North America:
When connecting the speaker cord, wind it firmly around the terminal as shown in the illustration below.



11 Impedance selector

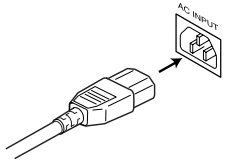
This amplifier is designed to operate with a variety of speaker systems. Set the impedance selector switch to the proper setting depending on your speaker system's impedance.
Switch to 4 OHMS if the impedance of the speaker system is 4 - 6 ohms, to 8 OHMS if it is 8 ohms .



Note:
Be sure to turn the amplifier power off when changing the impedance selector switch position. Failure to turn the power off may cause damage to your speakers.

12 AC input socket

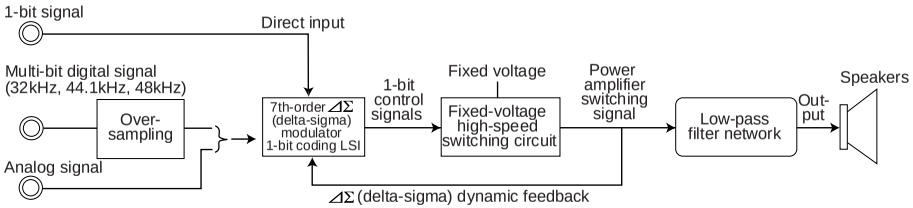
Connect the power cord to an AC INPUT socket.



■ 1 bit amplification process

This product uses 1-bit signals as control signals. As a result, amplification which maintains a 1-bit signal performance is realized by switching the fixed-voltage power with precise quartz-crystal accuracy.
Adopting the concept of " ΔΣ (delta-sigma) Dynamic Feedback", this product enables stable amplification faithful to the original sound by sending back the power voltage fluctuations (which affects the audio signal) to the "7th-order ΔΣ (delta-sigma) modulator 1-bit coding LSI" which corrects the 1-bit control signal in real time.

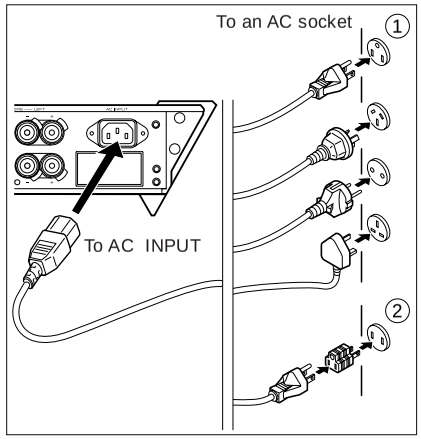
Sampling the input signal at a high-frequency approx. 2.8 MHz (64fs), the ΔΣ (delta-sigma) modulation circuit yields a 1-bit signal stream which faithfully reproduces the original sound.
In this 7-th order ΔΣ (delta-sigma) modulation block, the quantization noise is shifted to higher range to generate 1-bit signals which secure high signal to noise ratio in the playback band. Using these 1-bit signals as control signals, the fixed-voltage high-speed switching circuit is controlled. The signals abstracted from the switching circuit are sent to the low-pass filter network and used to drive speakers.



This amplifier has no analog amplifier elements and can obtain speaker driving power by "creating 1-bit control signals through high-speed sampling" and "synchronized high-speed switching to the sampling frequency". In consequence, amplification with excellent movement and transient characteristics is fulfilled.

NOTES FOR USE

■ Connecting the AC power cord



Power supply voltage:
The voltage used by this product varies, depending on the shipping destination. Check if the voltage written on the rear panel of the unit is suitable for that of your country.

Notes:
- Plug the AC power cord into a convenient AC socket, after any connections.
- Unplug the AC power cord from the AC socket if the unit will not be in use for a prolonged period of time.
- Never use a power cord other than the one supplied. Use of a power cord other than the one supplied may cause an electric shock or fire.

AC Plug Adaptor:
In areas (or countries) where an AC socket as shown in illustration ② is used, connect the unit using the AC plug adaptor supplied with the unit, as illustrated. The AC plug adaptor is not included in areas where the AC wall socket and AC power plug can be directly connected (see illustration ①).

Note for users in Australia and New Zealand:
An AC plug adaptor is not supplied if the cord has an Australian Standard plug.

■ Speaker cord connection

Be sure that the power is turned OFF when connecting the speaker cord. Failure to turn the power off can result in a short circuit that will place the amplifier into the protection circuit mode and cause the amplifier to shut down. If this occurs, make sure that the amplifier is off, then disconnect the power cord from the socket to reset the circuit breaker. You can then reconnect the cord to use the amplifier.

■ Volume setting

Make sure to set the volume to the minimum sound level before turning on the amplifier power or performing any input switching. Failure to do this may result in damage to your speaker system.

- The supply voltage of the switching circuit is not linked with volume adjustment. Therefore, a constant voltage is supplied even if not playing back sound and residual sound may be generated slightly such as when the volume is turned up. This is normal.

■ If a problem occurs

If this product is subjected to strong external interference (excessive shock, static electricity, abnormal supply voltage due to lightning, etc.) or if it is operated incorrectly, it may malfunction.
In such a case, turn the power off.
Turn the power on again and check that the product works normally.
(If problems still occur, contact the dealer.)

DISASSEMBLY

Caution on Disassembly

Follow the below-mentioned notes when disassembling the unit and reassembling it, to keep it safe and ensure excellent performance:

1. Be sure to remove the power supply plug from the wall outlet before starting to disassemble the unit.
2. Take off nylon bands or wire holders where they need to be removed when disassembling the unit. After servicing the unit, be sure to rearrange the leads where they were before disassembling.
3. Take sufficient care on static electricity of integrated circuits and other circuits when servicing.

STEP	REMOVAL	PROCEDURE	FIGURE
1	Top Panel B	1. Hexagon Screw (2.5mm) ..... (A1) x2	7-1
2	Top Panel A	1. Hexagon Screw (2.5mm) ..... (B1) x6	7-1
3	Side Panel, Sub (Left/Right)	1. Screw ..... (C1) x4	7-1
4	Side Panel (Left/Right)	1. Screw ..... (D1) x18	7-1, 7-2
5	Connect Bracket B	1. Screw ..... (E1) x2	7-2
6	Connect Bracket A	1. Screw ..... (F1) x12	7-3
7	Shield Cover A	1. Screw ..... (G1) x14	7-3, 8-1
8	Shield Cover B	1. Screw ..... (H1) x12	8-1
9	Shield Cover C	1. Screw ..... (J1) x7	8-1
10	Rear Panel	1. Screw ..... (K1) x14 2. Socket ..... (K2) x4 3. Soldering ..... (K3) x4	7-3 8-5
11	Digital PWB	1. Screw ..... (L1) x5 2. Socket ..... (L2) x5	8-2
12	Main PWB/Power Support PWB	1. Screw ..... (M1) x10 2. Hexagon Specer ... (M2) x5 3. Socket ..... (M3) x8	8-2 8-2, 8-5
13	Relay PWB	1. Screw ..... (N1) x3	8-2
14	Power Filter PWB	1. Screw ..... (P1) x6 2. Socket ..... (P2) x2	8-2
15	Main Volume PWB (Note 1)	1. Screw ..... (Q1) x6 2. Hexagon Screw (1.5mm) ..... (Q2) x2 3. Nut ..... (Q3) x1	8-2
16	Power Heat Cover (Note 1)	1. Hexagon Screw (1.5mm) ..... (R1) x2 2. Screw ..... (R2) x8	8-3
17	Power Switch PWB/Power PWB	1. Screw ..... (S1) x16	8-3
18	Bottom Panel	1. Screw ..... (T1) x13	8-4
19	1Bit Amp PWB	1. Screw ..... (U1) x8	8-5
20	Front Panel	1. Screw ..... (V1) x6	8-6
21	LED PWB	1. Screw ..... (W1) x4 2. Socket ..... (W2) x1	8-7
22	Display Volume PWB (Note 1)	1. Screw ..... (X1) x1 2. Knob ..... (X2) x1 3. Nut ..... (X3) x1 4. Socket ..... (X4) x1	8-7
23	Front Panel Bracket	1. Screw ..... (Y1) 12	8-7
24	Switch1 PWB/ System Micro-conputer PWB	1. Screw ..... (Z1) x13	8-7

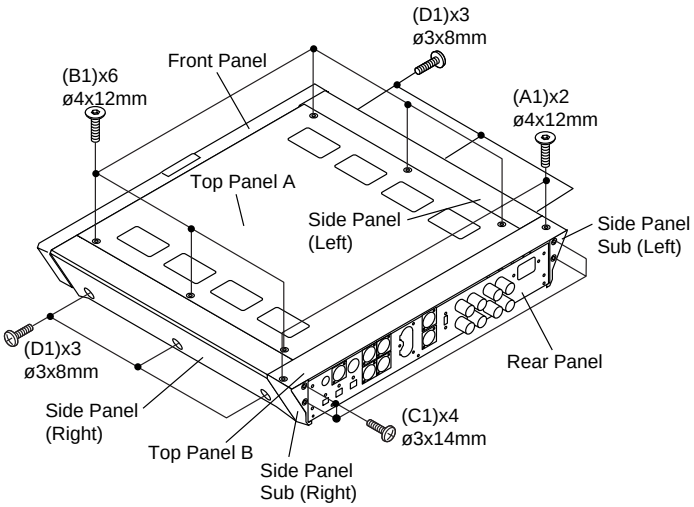


Figure 7-1

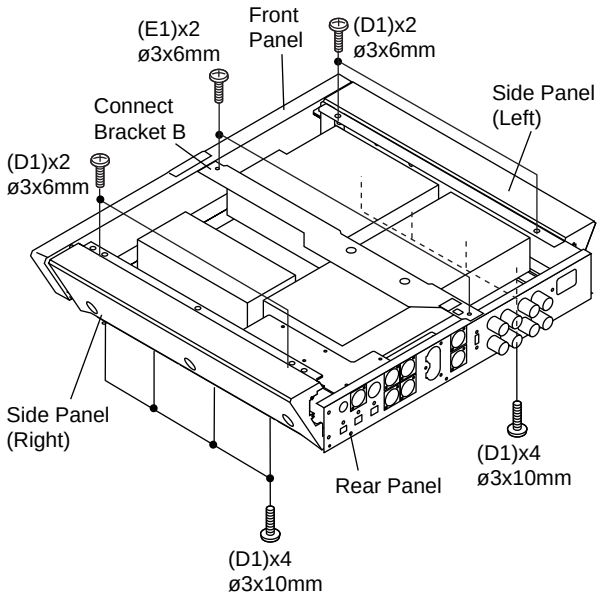


Figure 7-2

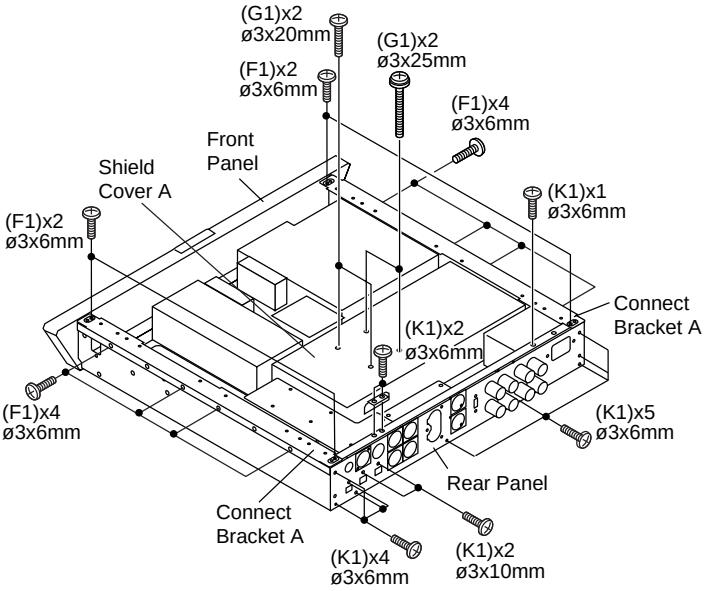


Figure 7-3

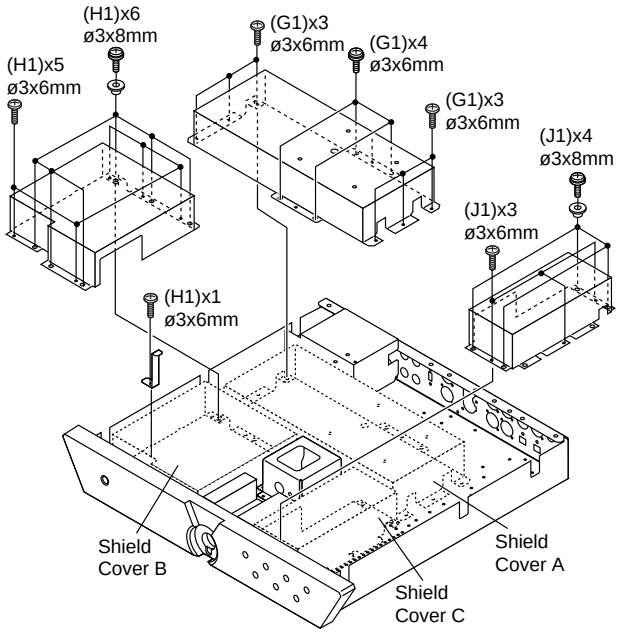


Figure 8-1

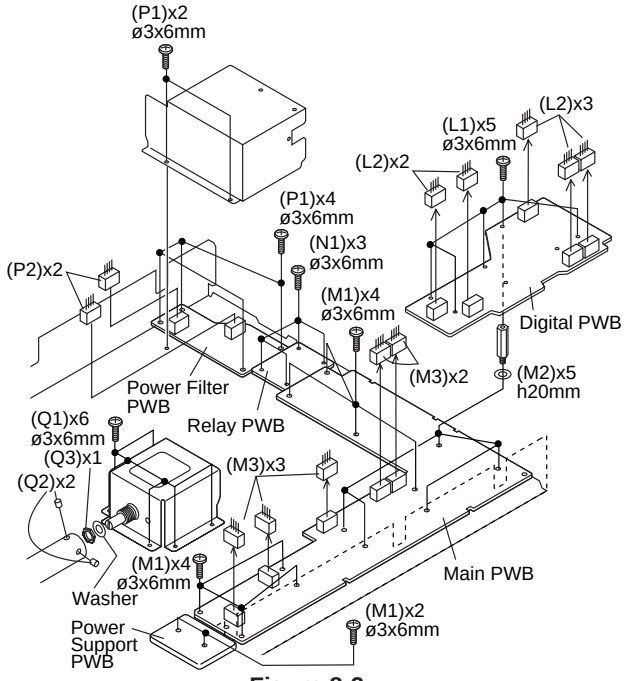


Figure 8-2

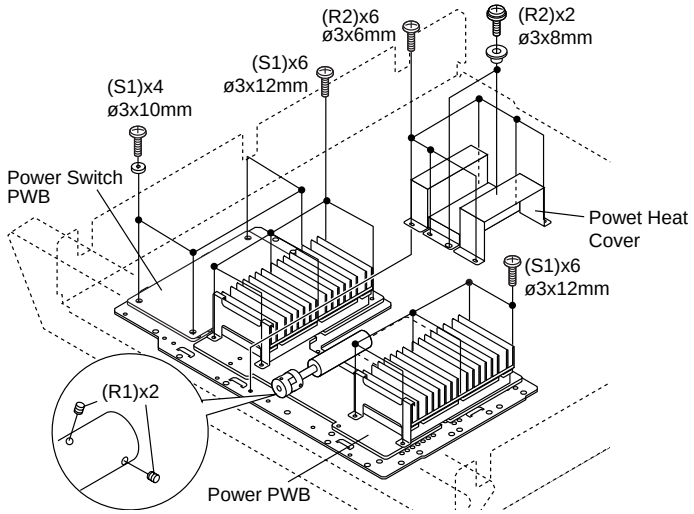


Figure 8-3

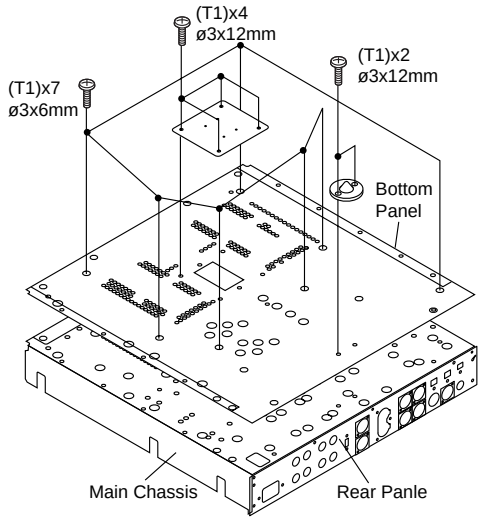


Figure 8-4

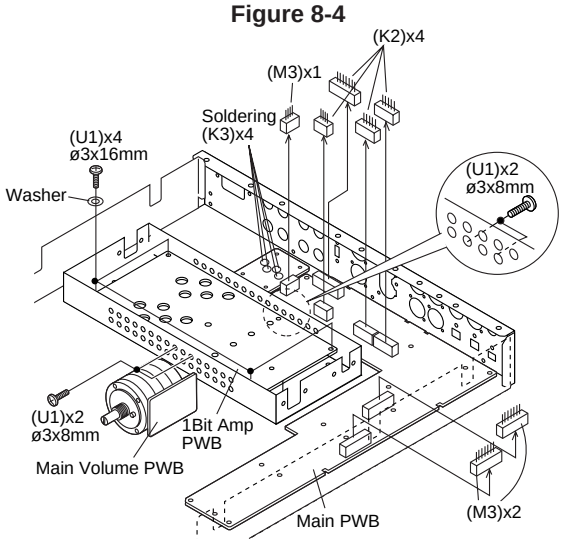


Figure 8-5

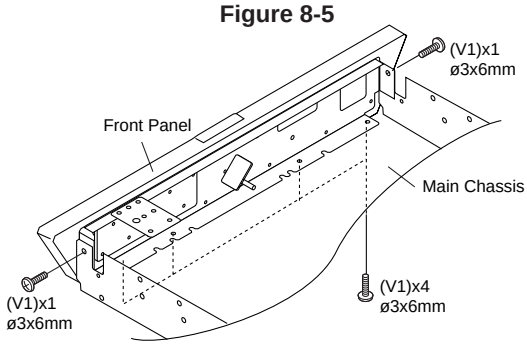


Figure 8-6

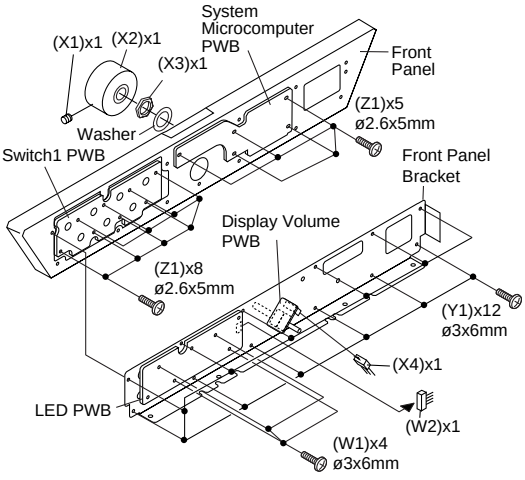


Figure 8-7

Note 1:

Positioning the volume joints

1. Rotate the sub volume shaft (inside of the set) so that the flat side faces upward. Fasten the joints in numerical order as shown in the in the figure.
2. Rotate anticlockwise both the main and sub shafts to minimum level.
3. Slide the connecting shaft until it hits the joint coupling sleeve.
4. Rotate the joint coupling and connecting shaft so that the hexagonal screws face the direction of 12 and 9 o'clock. Fasten the screw that face 12 o'clock.
5. Rotate the shaft and fasten the other hexagonal screws.
6. Rotate the volume shaft so that the flat side faces downward. Fasten the hexagonal screw from below.

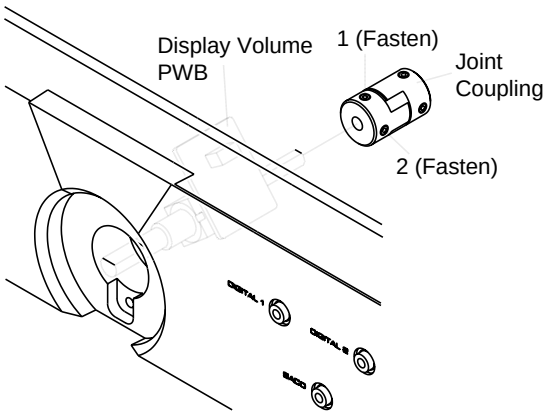


Figure 9-1

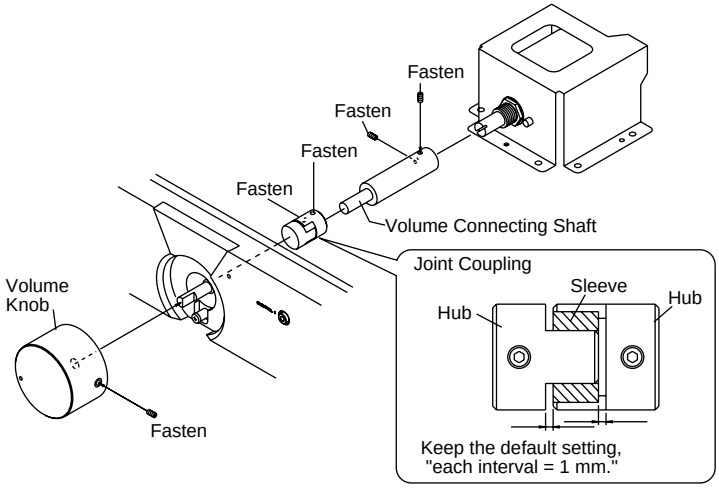
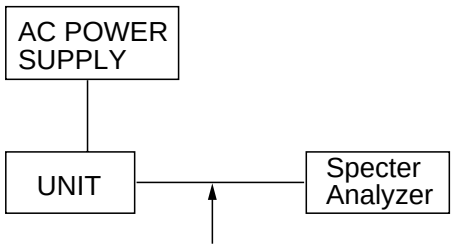


Figure 9-2

ADJUSTMENT

Measure the noise distribution between the set output terminals (Lch+, Lch- and Rch+, Rch-), and adjust VRA1 to VRA4.
The VRA adjustment sequence is the same as that of the offset voltage adjustment.

Measuring instrument: Yokokawa Electric brand SA2400
Measurement range : Refer to Fig. 10-2.
Adjustable range: ① 250Hz to 100kHz within ±3dB from the standard noise curve
② (Noise strength of 125Hz) — (Noise strength of 250Hz) ≦ 20dB



Speaker terminal
Apply the analyzer between Lch+ and Lch-,
and between Rch+ and Rch-.

Figure 10-1

Standard noise floor curve
(Frequency range 1)

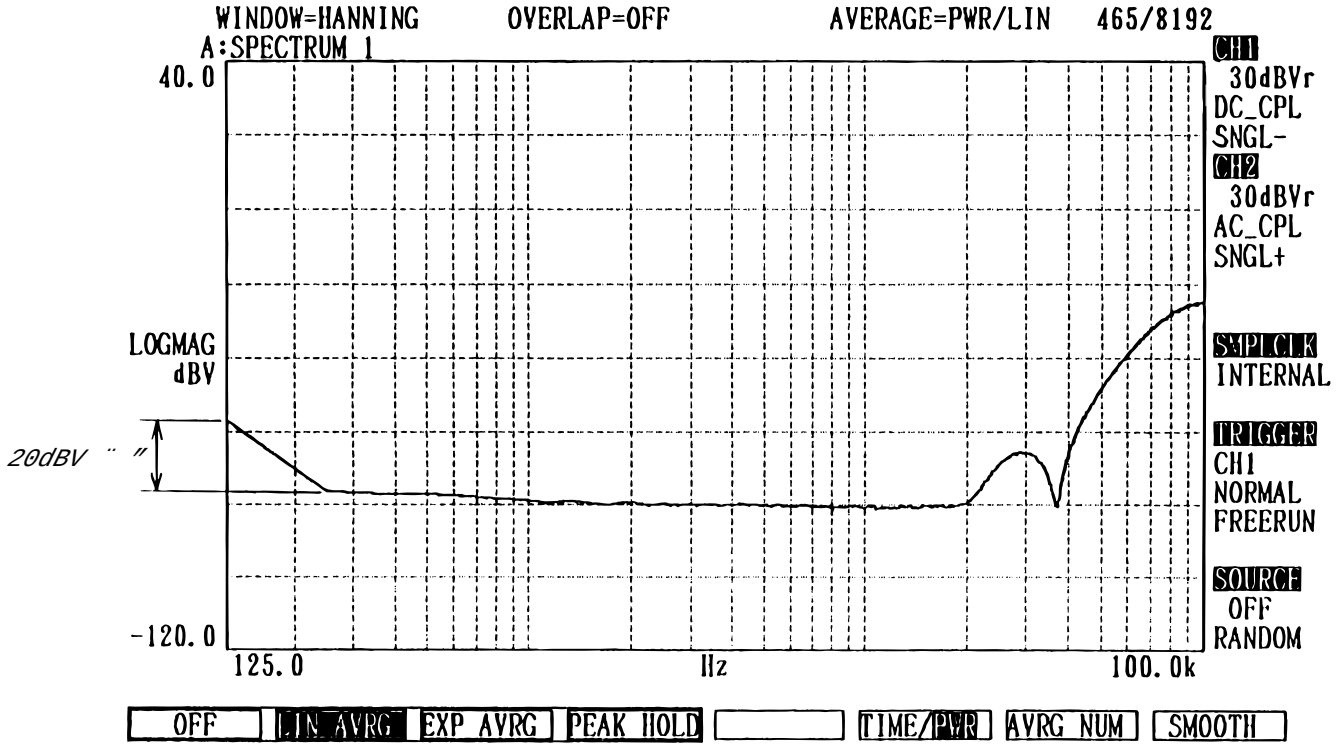


Figure 10-2

1-bit PWB adjusting method

Connect as shown Fig. 11-1.
AC IN 110-120, 220-240, 230V

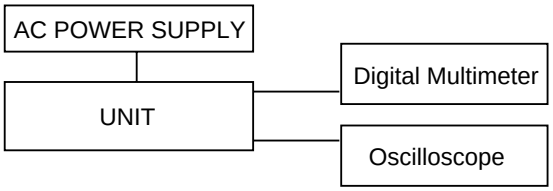


Figure 11-1

[Simplified offset voltage adjustment]
Connect the digital multimeter to the terminals of the speaker, and adjust the voltage between + and - of each terminal to 0±10mV. (Fig. 11-2)
(Adjusi from 4 ohms)

Voltage check SP Terminal	Impedance selector SW	Adjustment VOL
Rch	4 ohms	VRA1
Rch	8 ohms	VRA3
Lch	4 ohms	VRA2
Lch	8 ohms	VRA4

* On both Lch and Rch, adjust the 4 ohms side earlier.

(Terminal Board Diagram)

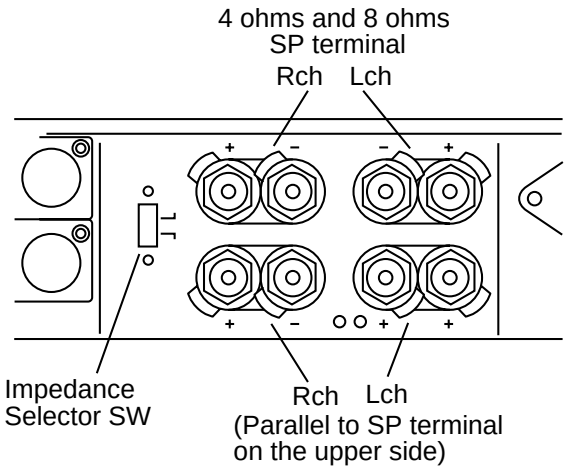
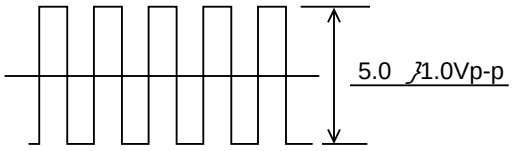


Figure 11-2

[Adjustment Check]
Connect the oscilloscope to the test point, and verify that the voltage span of the bottom figure confirmation. (Fig. 11-3)



Check both L and R.

(1 BIT AMP. PWB)

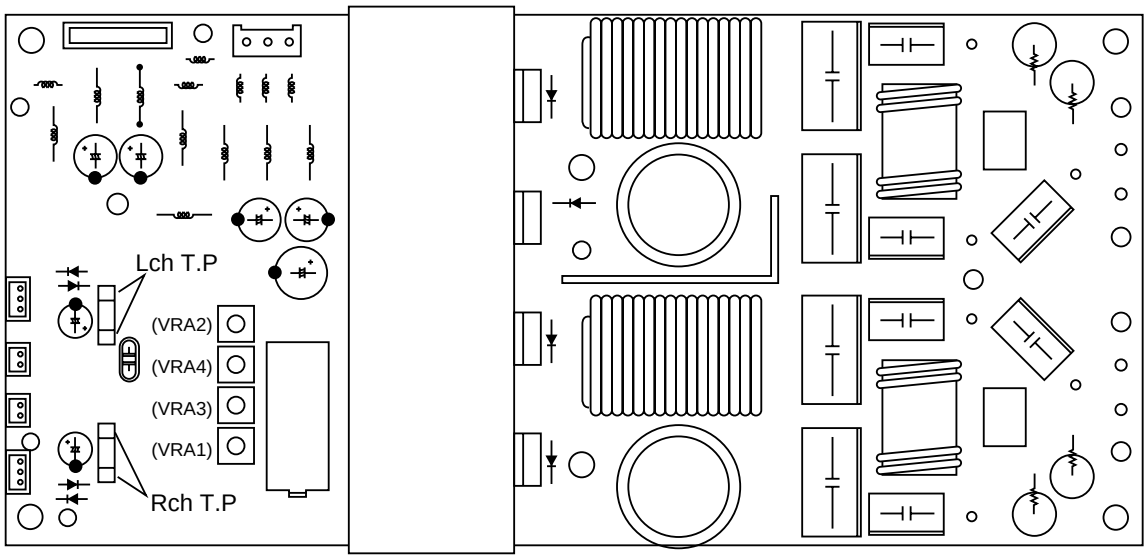


Figure 11-3

INTRODUCTION OF CIRCUIT OUTLINE

1. Technical background

1-1) Concept of coding technology

Though the PCM system is the most popular method to convert the analog audio signals into the digital codes, the basic concept of the PCM system is that the signals are sampled with the frequencies whose band is two or more times of the frequency band to be transferred and is quantized into the multi-bits.
In the other words, "sampling frequency Fs" and "quantized bit quantity" determine the frequency band (Fs/2) and the dynamic range respectively for the information to be encoded.
As another concept against the PCM encoding which principally determine the transfer range, Shannon *1) establishes the theory of the coding system which sets the transfer range with "average information quantity per unit time" from the viewpoint of the information theory.
On method of this system is "high-speed sampling 1-bit coding" system which uses the $\Delta\Sigma$ modulation. The quantized bit quantity has only 2 values of 1 bit but the sampling frequency is sufficiently increased to make it possible to gain the transfer range which assures the dynamic range.
As two systems are compared with each other, it is said that the PCM system determines the dynamic range with the quantized bit quantity, "voltage dissolution power" but the 1-bit coding system" increases time separation power" to assure the purposed dynamic range.
On the PCM signal, when the quantized bit quantity is designated b, "signal to noise ratio (S/N)" of the quantized noise to the signal is expressed as follows.

(S/N) dB = 6.02b + 1.76 dB

It shows that the ratio of signal to noise is improved in proportion to the increase of the quantized bit quantity.
When the quantized bit quantity is 16 and the signal is the sine wave, the ratio of signal to noise is practically gained as follows.

(S/N) dB = 6.02 X 16 + 1.76 = 98.08 dB

On the other hand, Fig. 12-1 shows if "7th order feedback high-speed 1-bit quantizer" is used, the quantized noise distribution can be controlled by timely setting the part feedback coefficient b1 to b3 in the algorithm.
Fig. 12-2 shows that the quantized noise monotonously increases toward the high range in the quantized noise distribution in case of b1 to b3 = 0. Figs. 12-3 and 12-4 show the same sampling frequency as shown in Fig. 12-2 but show respectively the quantized noise distributions which gain "wide D range" and and "wide frequency range" respectively by changing the values of b1 to b3.
As described above, even on the 1-bit signal of the same sampling frequency, "D range" and "frequency band" of the transferred signal can be selected at the degree of freedom with the design of the the above algorithm coefficient.
Though the 1-bit signal which is used at SACD and 1-bit amplifier is the 1-bit signal of "64fs", it is designed with the algorithm which can assure the wide transfer band (D range: 120 dB (<20 Hz), Frequency band: 100 kHz).

*1) C.E.Shannon, "A mathematical theory of communication, "Bel Syst. Tech.J.27, (1948).

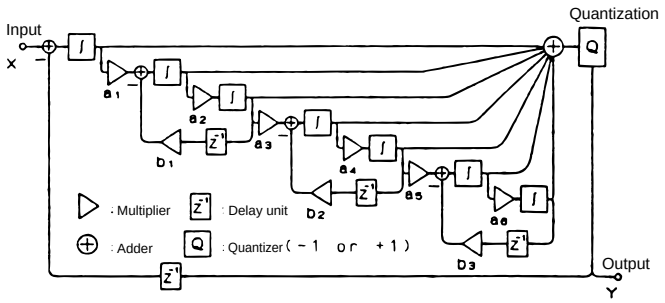


Figure 12-1

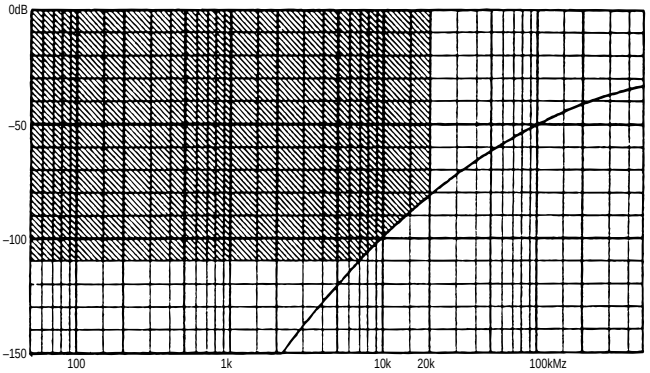


Figure 12-2

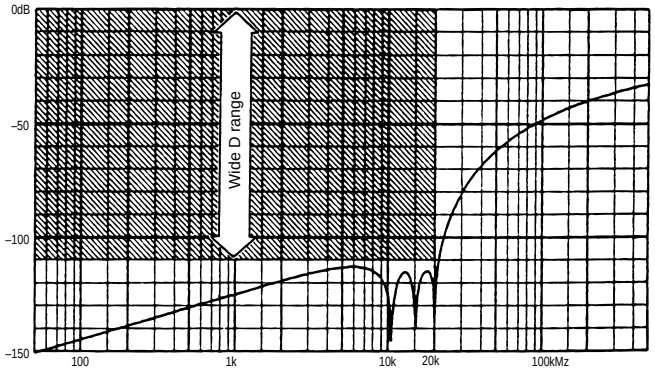


Figure 12-3

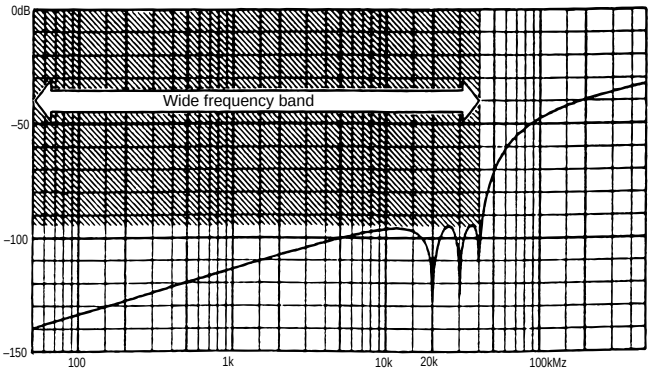


Figure 12-4

1-2) Application development of 1-bit coding technology

The technology has been applied in the field of AD/DA conversion device, and it is well known that "⊿Σ modulation" is done in the intermediate process of the analog signal and multi-bit signal.
Since "1-bit signal" is nearer to "analog signal" than "multi-bit signal, it has been proven that it is effective for the record/replay format of the audio signal. It is well known that it is introduced as <Super Audio CD> in the market.
It is particularly thought that the technology to generate the 1-bit signal, "⊿Σ modulation technology" is applied to the amplifying operation. "1-bit amplifier" has been developed by directing the attention to this point.

2. Basic technological element "⊿Σ modulation technology"

2-1) Principle of ⊿Σ modulation 1-bit signal generation

<⊿ modulation>
As the method to encode the analog signal into the 1-bit signals, "⊿ modulation coding system" is well known.
. In this system, the analog signal waveform is traced and encoded with the step waveform as follows.
. If the upward gradient of the input signal is large, it is coded as "1".
. If the downward gradient of the input signal is large, it is coded as "0".
This method is well known.
In the other words, the 1-bit signal gained through the ⊿ modulation expresses the gradient of the analog signal, the size of "differential value" with the frequencies of "0" and "1".

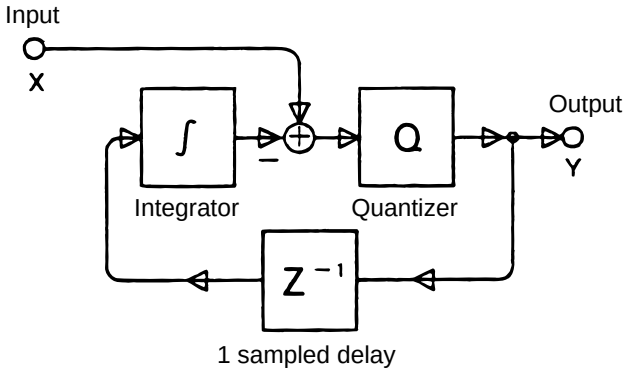


Figure 13-1 PRINCIPLE DIAGRAM OF ⊿ MODULATION

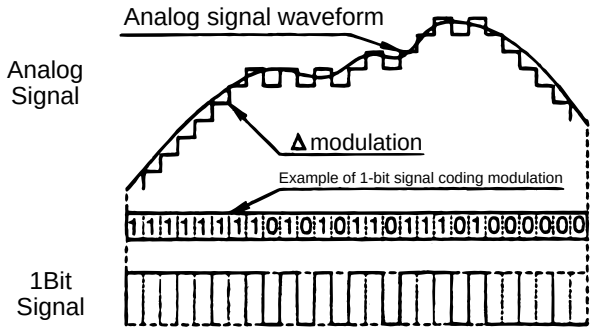


Figure 13-2 EXPLANATORY DIAGRAM OF ⊿ MODULATION OPERATION

<⊿Σ modulation>
It is found that "code array corresponding to the amplitude" of the original signal will be produced if the input analog signal is previously integrated. As this block diagram is shown in Fig. 13-3, this is the basic form of "primary ⊿Σ modulation".

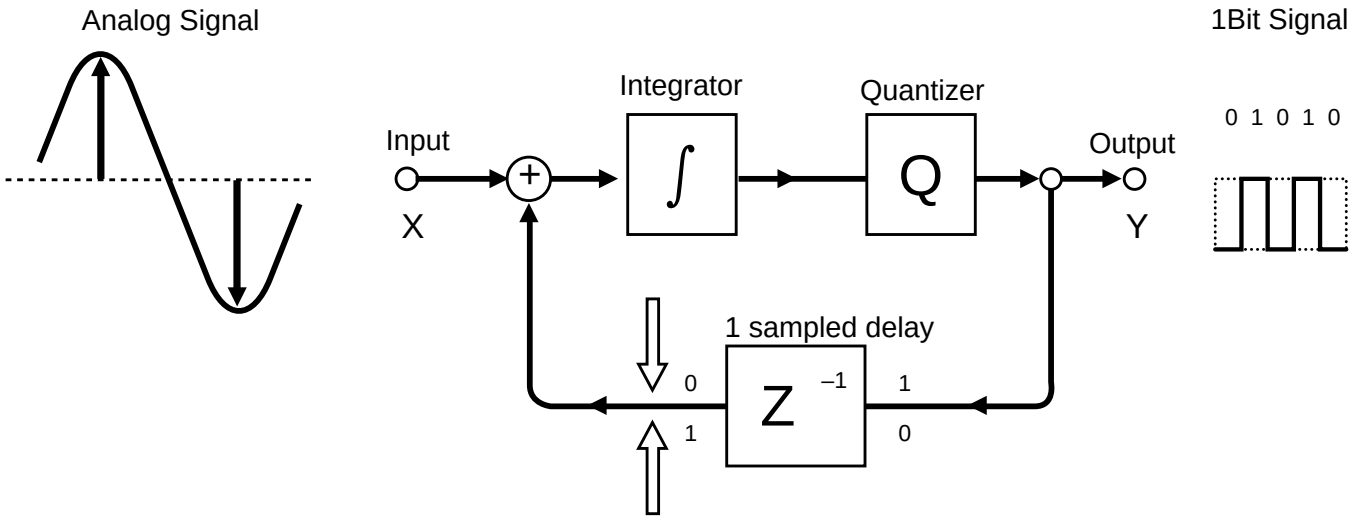


Figure 13-3 PRINCIPLE DIAGRAM OF PRIMARY ⊿Σ MODULATION

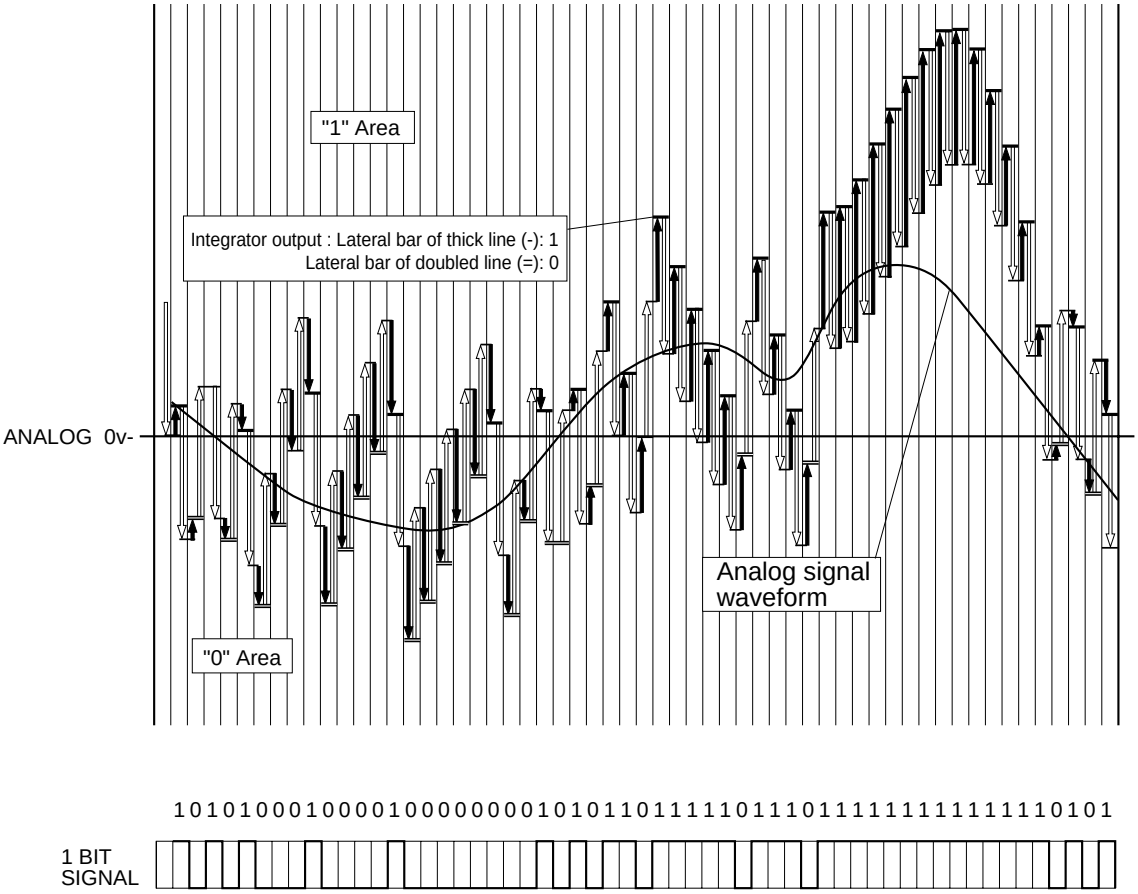


Figure 14-1 EXPLANATORY DIAGRAM OF ⊿Σ MODULATION

The operation of the ⊿Σ modulation is explained using Fig. 14-1. Here, the analog signal component from the input section is expressed with the black-filled vector, and the binary value negatively fed back is expressed with the white-blank vector. In this block, the following operation is applied.

① If the output of the integrator is "positive", subtraction of "positive unit vector" is applied to the input side. (In the figure, the downward white-blank vector is added.)

② If the output of the integrator is "native", subtraction of "negative unit vector" is applied to the input side. (In the figure, the upward white-blank vector is added.)

If the output of the integrator increases or the amplitude of the input signal increases, the figure shows that the negative feedback is applied to suppress the increase.

In the other words, the continuous "positive" output of the integrator means that the amplitude of the input signal is large, and the frequency of "1" coding increases.

On the contrary, the continuous "negative" output of the integrator means that the amplitude of the input signal is small, and the frequency of "0" coding increases.

Thus, "binary codes corresponding to the amplitude" can be gained through the operation of the ⊿Σ modulation.

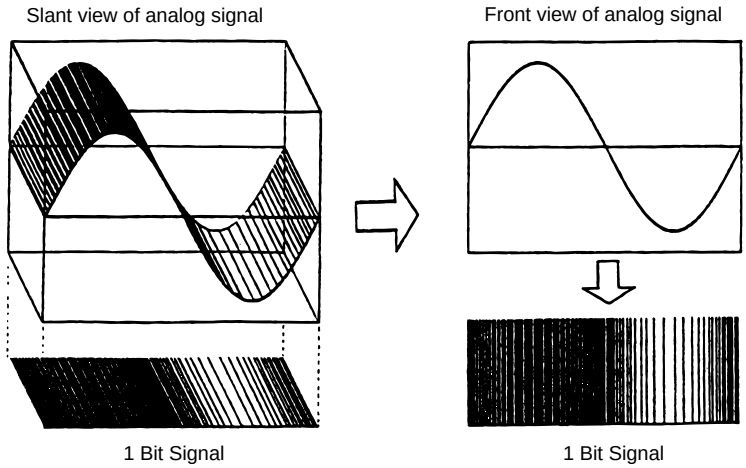


Figure 14-2 EXPLANATORY DIAGRAM OF ⊿Σ MODULATION

2-2) 7th order ΔΣ modulation circuit and devising

If any 1-bit signal is produced through the operation of the ΔΣ modulation, the quantized noise is expelled to the high range. This is well known as "noise shaping", and it is used to reduce the quantized noise of the target frequency band (example: audible band). As the operation of "primary ΔΣ modulation" is described using Fig. 15-1, it is well known that the reduction effect of the quantized noise is increased as the number of the order of the ΔΣ modulation is increased.

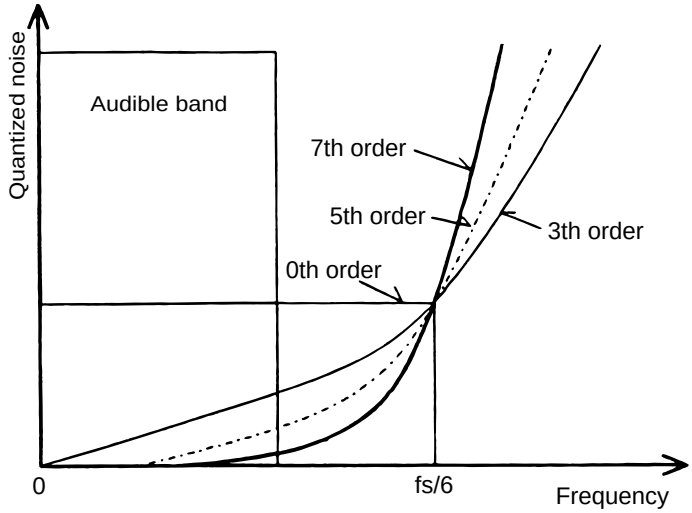


Figure 15-1 NUMBER OF ORDER, AND NOISE SHAPING

The circuit here used to produce the 1-bit signal is practiced of "7th order ΔΣ modulation algorithm" as shown in Fig. 15-2. The strong noise shaping is applied to assure the wide dynamic range in the audible range.

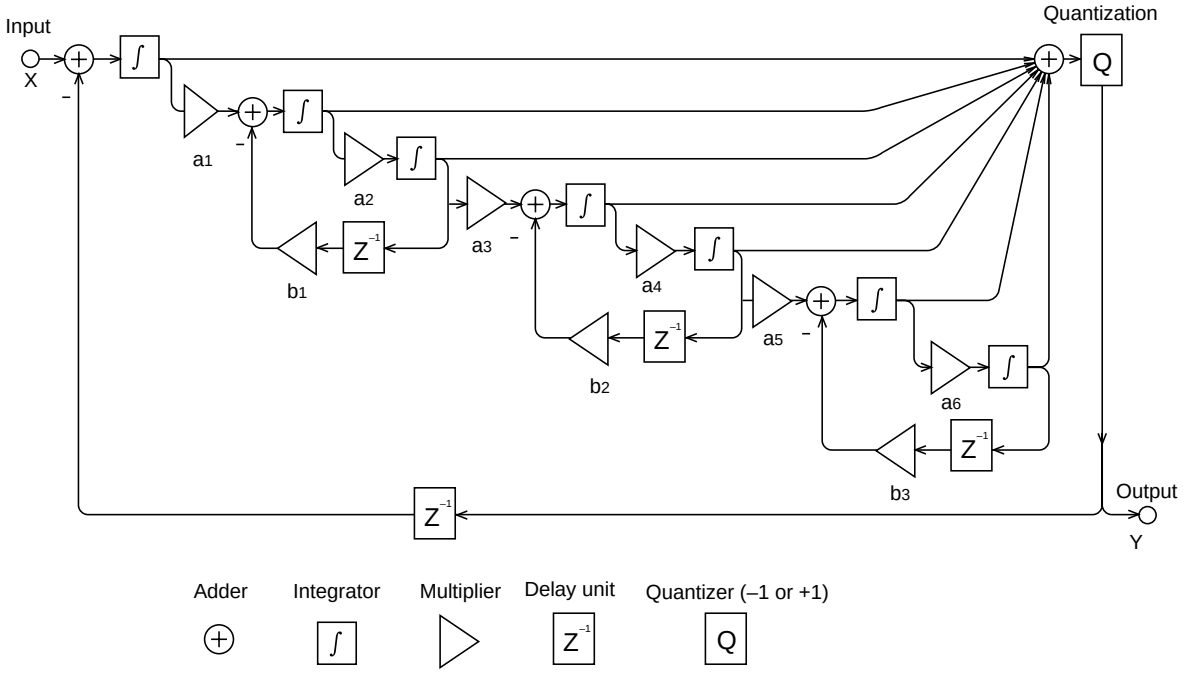


Figure 15-2 7TH ORDER ΔΣ MODULATION ALGORITHM

"7th order ΔΣ modulation LSI" gained by integrating the signal process circuit into one chip is shown in Fig. 15-3. As well as the LSI can independently generate the 1-bit signals, the input terminal is provided to apply the feedback of the ΔΣ modulation from the external in order to show the performance with the amplifying operation.

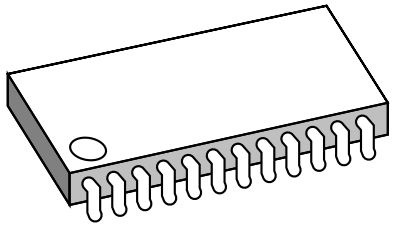


Figure 15-3 7TH ORDER ΔΣ MODULATION 1-CHIP LSI

3. Application to amplifying circuit: 1-bit amplifier

3-1) Basic block and operational principle

The system classified as "Class C amplifier" among the amplification circuits switches the high voltage to control the ON time in order to amplify the audio signal.
"PWM signal" which has the analog width in the time axis direction is generally used as the signal to control the switching.

The operational principle of Class D amplifier is developed to apply the said 7th order ⊿Σ modulation 1-bit signal to the signal which controls the signal. Thus, the 1-bit amplifier "SM-SX100" is introduced.

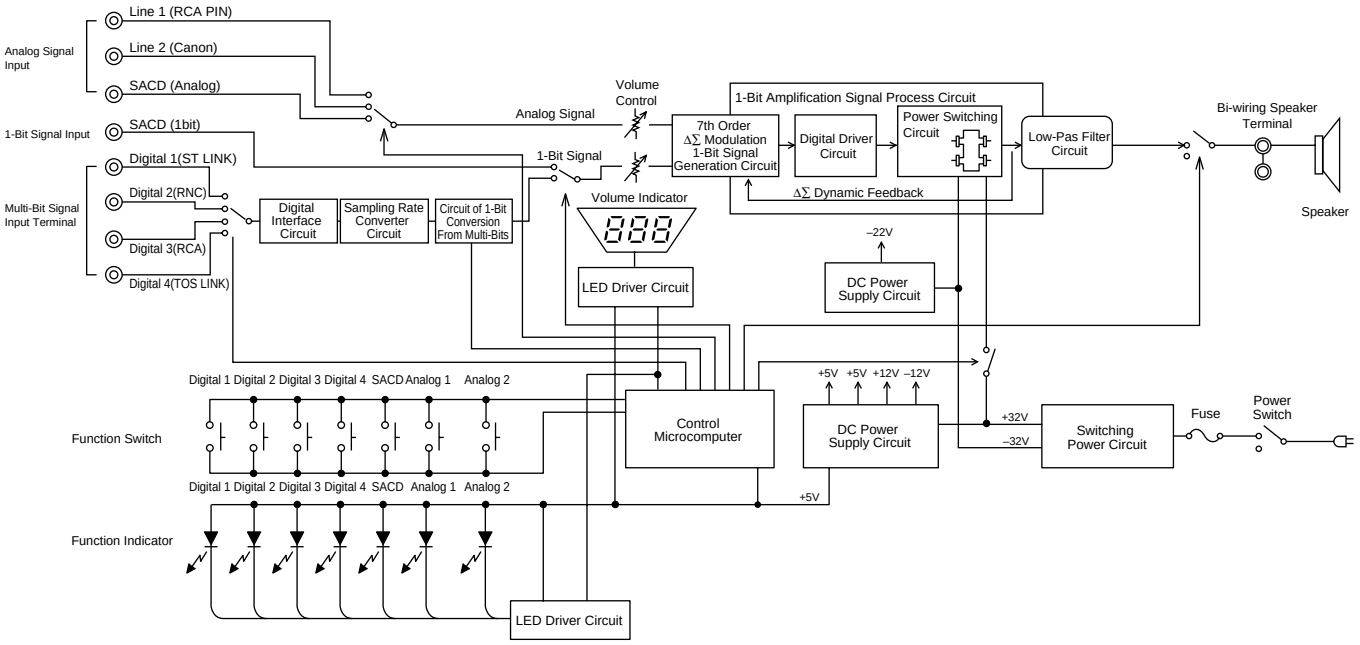


Figure 16 1-BIT AMP. SM-SX100 BLOCK DIAGRAM

Fig. 16 shows the basic block of the 1-bit amplifier. In the block diagram, the core of the amplifying operation is "1-bit amplification signal process circuit", being composed of the following four circuits.
① 7th order ⊿Σ modulation 1-bit signal generation circuit
② Digital driver circuit
③ Power switching circuit
④ Low pass filter circuit
In the circuit ①, the input signal is processed through the high-speed sampling ⊿Σ modulation circuit to generate "1-bit signal array" which is directly coded from the input information. (Said 7th order ⊿Σ modulation LSI)
Though the 1-bit signal is used as the control signal to switch the constant-voltage power supply at the timing of the quartz precision, the digital driver circuit ② controls the drive, suppressing the delay to the minimum since the full bridge power switching circuit ③ composed of Power MOS-FET is operated at the high speed.
Though the constant voltage is supplied to the power switching circuit ③, the fluctuation noise included in the power supply and the error component of the power switching are included in the output section of ③. Therefore, the "⊿Σ dynamic feedback" loop which negatively feeds the information of the output section back to "7th order ⊿Σ modulation 1-bit signal generation circuit ①" at the high speed is provided to compensate the above fluctuation noise and error component at the real time. The feedback operation achieves "power amplification faithful to input signal" without influence of the power fluctuation and so on.
Since the 1-bit signal of 64fs originally catches the analog signal at the sampling frequency of 64 x 44.1 kHz = 2.8224 MHz, the information can be transferred to the band of approx. 1.4 MHz, a half of the sampling frequency as the principle.
In the practical circuit, the band is limited at 100 kHz as the result of the following being considered to determine the pass band.

1) The quantized noise of the 1-bit signal increases toward the high range, and it eliminates the band where the quantized noise increases in the high range.
2) If any high frequency component of 100 kHz or more is included in the analog signal when an analog signal is taken out of the 1-bit signal, an abnormality will occur in the circuit system and transfer system of the following step. (Example: High frequency oscillation, unnecessary radiation, tweeter breakage, etc.)
3) The frequency component of the acoustic signal which is present in the natural is distributed in the band up to 100 kHz.

In the low pass filter circuit ④ of the last step, the components up to 100 kHz are taken out from the the switching signal for which the voltage is converted, and are output as the analog signal for the speaker drive.

3-2) The feature of 1-bit amplifier

As described above, the amplification principle whose viewpoint is different from that of the existing analog amplifying circuit assures S/N in the audible band, thus achieving the audio amplification which has the wider band.
Moreover, the operation which converts the voltage through the switching operation approximately halves the power consumption during the ordinary operation in comparison with the existing analog amplifier, thus reducing the heating amount of the amplifying section to approx. 1/5. In addition to the highly faithful replay of the audio source, it achieves both energy saving and compactness/high power at the same time.
On the other hand, an countermeasure to suppress the noise in the power amplification with the switching operation becomes inevitable. Particularly against the power line noise and unnecessary radiation, the countermeasure is taken from both sides of the circuit (minimization of coring and circuit loop) and the structure (double shield of steep plate and copper plate), thus clearing the technical standard of the electricity operation.
Moreover, the input terminal unit is provided with the originally specified 1-bit signal input terminal in addition to the three analog systems and four digital audio interface systems. This terminal is provided to be connected to SACE player of our company which will be put on sale in near future, being specified to transmit the 1-bit signal after the player is mutually recognized as the countermeasure against the illegal copy.
The analog signals of the three systems are selected with the relay circuit by the function, and the attenuation level is then set with the volume. This signal is connected to the analog input pin of the 7th order $\Delta\Sigma$ modulation 1-bit signal generation circuit, and the aforementioned "signal process of 1-bit amplifier" is applied.
The digital signals (multi-bit signals) of the four systems are input in the format of the audio interface but the sampling frequency corresponds to 32 kHz/44.1 kHz/48 kHz. These plural sampling frequencies are converted to 44.1kHz by "sampling rate converter circuit". This signal is farther oversampled, and "64fs 1 bit signal" is generated by "multi-bit to 1 bit conversion circuit".
Since the 1-bit signal which is output includes the analog information coded in the original digital signal, the analog sound volume level can be adjusted by controlling the wave height value of the 1-bit signal itself with the volume.
The signal is differentially connected to the digital input pin of the 7th order $\Delta\Sigma$ modulation 1-bit signal generation circuit, and the aforementioned "signal process of 1-bit amplifier" is applied like the analog signal.
From the special terminal of SACD, the 64fs clock of the SACD player side is supplied.
As aforementioned, the analog sound volume level can be adjusted by controlling the wave height value of the signal itself.
The signal is differentially connected to the digital input pin of the 7th order $\Delta\Sigma$ modulation 1-bit signal generation circuit, and the aforementioned "signal process of 1-bit amplifier" is applied like the analog signal.

EXPLANATION OF 1-BIT UNIT

1. ⊿Σ modulation 1-bit conversion circuit

The analog signals input from CNPA1 and CNPA2 are input from the terminals 17 and 20 of ICA1. At the input step of ICA1, the signal input signal is regarded as the differential input signal, and the switching signal which is later called "dynamic feedback" is attenuated and is regarded as the level-shifted negative feedback signal.

They are added, and is transmitted to the differential type primary integrator of the ⊿Σ modulation 1-bit conversion circuit.

After they are integrated by the 2nd to 7th order integrator group, the integrated values of 2nd to 7th are added with the adder.

The added result is compared with Vdd/2 (=2.5 V) by the comparator, and is quantized. As the result, the 1-bit signal is gained.

Since the ⊿Σ modulation circuit operates at 128fs (= 5.6448 MHz, fs = 44.1 kHz), the 1-bit signal exceeds the limit of the switching speed of the power MOS-FET which is the switching element of the switching circuit of the later step.

Therefore, the signal is passed through the double width conversion circuit which doubles the pulse width to 64fs, and is output from the terminals 2, 3, 5 and 6.

After the limiter is applied to the digital signal input from CNPA3 and CNPA4 at ZDA81 to ZDA84, it is directly transmitted to the differential type primary integrator of the ⊿Σ modulation circuit from the feedback terminals 14, 15, 22 and 23. The signal process hereafter is the same as that of the analog signal.

2. Switching logic circuit

The output signal of ICA1 is distributed to FET driver IC for the full bridge in the switching circuit by ICA2 and ICA3 of the logic circuit IC.

3. Level shift circuit

Though the output is L (0 V) or H (5 V) in ICA2 and ICA3, they shift the level from the reference voltage -32 V of the FET driver IC to L (-32 V) and H (-22 V) with QA1 to QA8 and 1 kohms (RA45 to RA52) and 390 ohms (RA37 to RA44), and it is used as the FET drive signal.

4. FET driver circuit

In the bridge circuit composed using the N channel power MOS-FET, the source of the power MOS-FET of the high side fluctuates in the potential in the output state, being the floating drive type.

Accordingly, the auxiliary power supply to supply the power to the gate becomes necessary. Here, the boot strap circuit is used as the auxiliary power supply.

When H (-22 V) is supplied to the terminal No. 6 of FET driver IC (ICA4 to ICA7), the terminal No. 8 is driven to turn on FET of the low side. As shown in the illustration of the boot strap circuit, the current ① flows, and the electric charge is accumulated in the boot strap capacitor C. In the practical circuit, it corresponds to CA36 to CA39 connected to the terminal 2.

When H (-22 V) is applied to the terminal 5, the terminal 3 is driven to turn on FET of the high side.

At this time, the electric charge accumulated at ① is discharged, and the current ② flows to charge Cgs of FET as shown in the illustration of the boot strap circuit.

5. Power switching circuit

+32 V and -32 V are switched with the power MOS-FET (QA9 to QA16).

(When the impedance switch is a 4 ohms load, +24 V and -24 V are applied.)

6. Low pass filter circuit

From the signal switched by the power switch circuit, the analog signal is picked out by the low pass filter composed of the 4th order Butterworth type of the cutoff frequency 100 kHz.

7. Dynamic feedback circuit (feedback circuit)

The signal which is switched with the power switching circuit is divided by the resistors of the fixed type of 6.8 kohms (RA101, RA102), semi-fixed type of 200 ohms (VRA1, VRA2) and the fixed type of 680 ohms (RA61 and RA62) on the variable side and the fixed type of 6.8 kohms (RA103 and RA104) and the fixed type of 750 ohms (RA63 and RA64), and is attenuated to +5 V, 0 V.

RLYA1 turns on the relay when the impedance switch is a 8 ohms load to change the resistance division ratio.

The attenuated +5 V, 0 V signal is shifted to the level of Vdd/2 of the terminals 18 and 19 through the resistor (RA91 to RA94), and is input to the feedback terminals 14, 15, 22 and 23 as the signal of +2.5 V and -2.5 V.

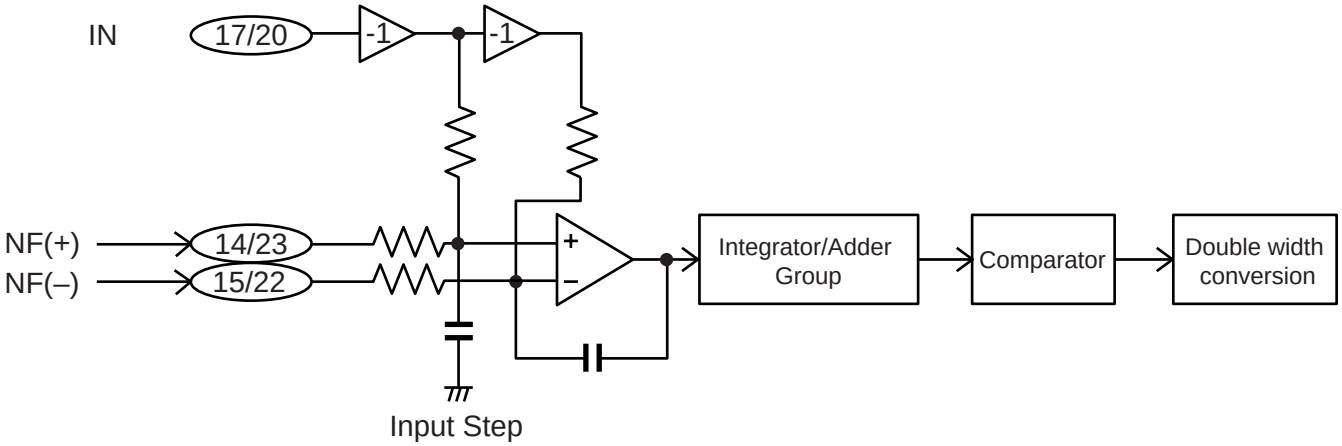


Figure 19-1 ⊿Σ MODULATION 1-BIT CONVERSION CIRCUIT

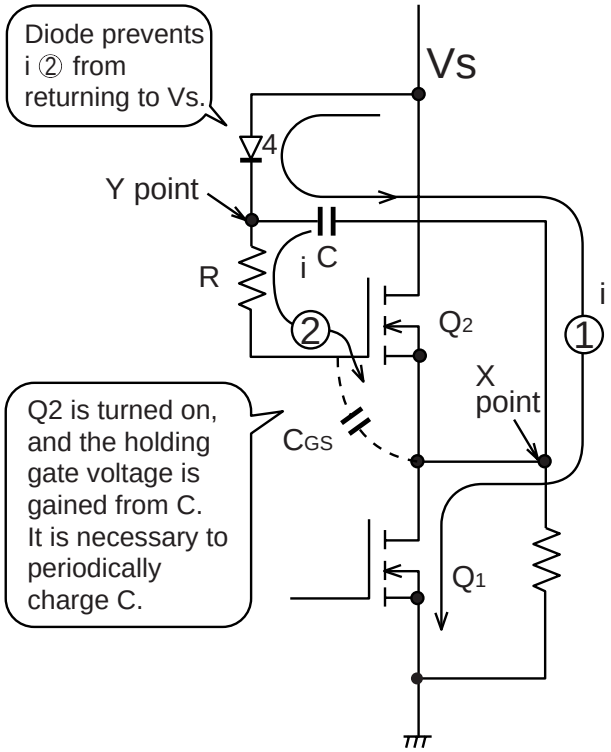


Figure 19-2 BOOT STRAP CIRCUIT

• Protect circuit

When the protect circuit is activated, the speaker relays RLY107 and RLY108 and the power relay RLY106 are turned off, and the function switch key is not received.
When the power switch is turned off, it is once reset.
For detection, the overcurrent detection circuit and the output offset detection circuit are provided and the relays and so on are controlled by the microcomputer.

• Current detection section (Fig. 20-1)

If any overcurrent flows in R256, the potential difference will be generated both ends of R256 to supply it to Pins 2 and 3 of IC201. If the output signal from Pin 1 of the output of IC201 is supplied to the comparator IC201 (Pins 5 to 7) (through the time constant circuit) and reaches the level of the specified value or more, the comparator will be activated to set H at Pin 7. Then, the transistors Q201 and Q202 will be turned on, and the signal of H level will be supplied to Pin 27 of the microcomputer IC904. Thus, the protect will be activated.

• Offset detection section (Fig. 20-2)

If any potential difference is generated between the terminals of the speaker (L+ and L- as an example), the potential which drives Q651 and Q653 will stand at the terminal connected section of the emitter of Q651 or the base of Q653, and either will be turned on. (Pin 1 of IC651 as reference)
(If + level is established, Q653 will be turned on, and if - level is established, Q651 will be turned on.)
If Q651, Q653 or Q652, Q654 are turned on, Q201 will be activated like the said current detection to supply the signal of H level to Pin 27 of the microcomputer IC904.

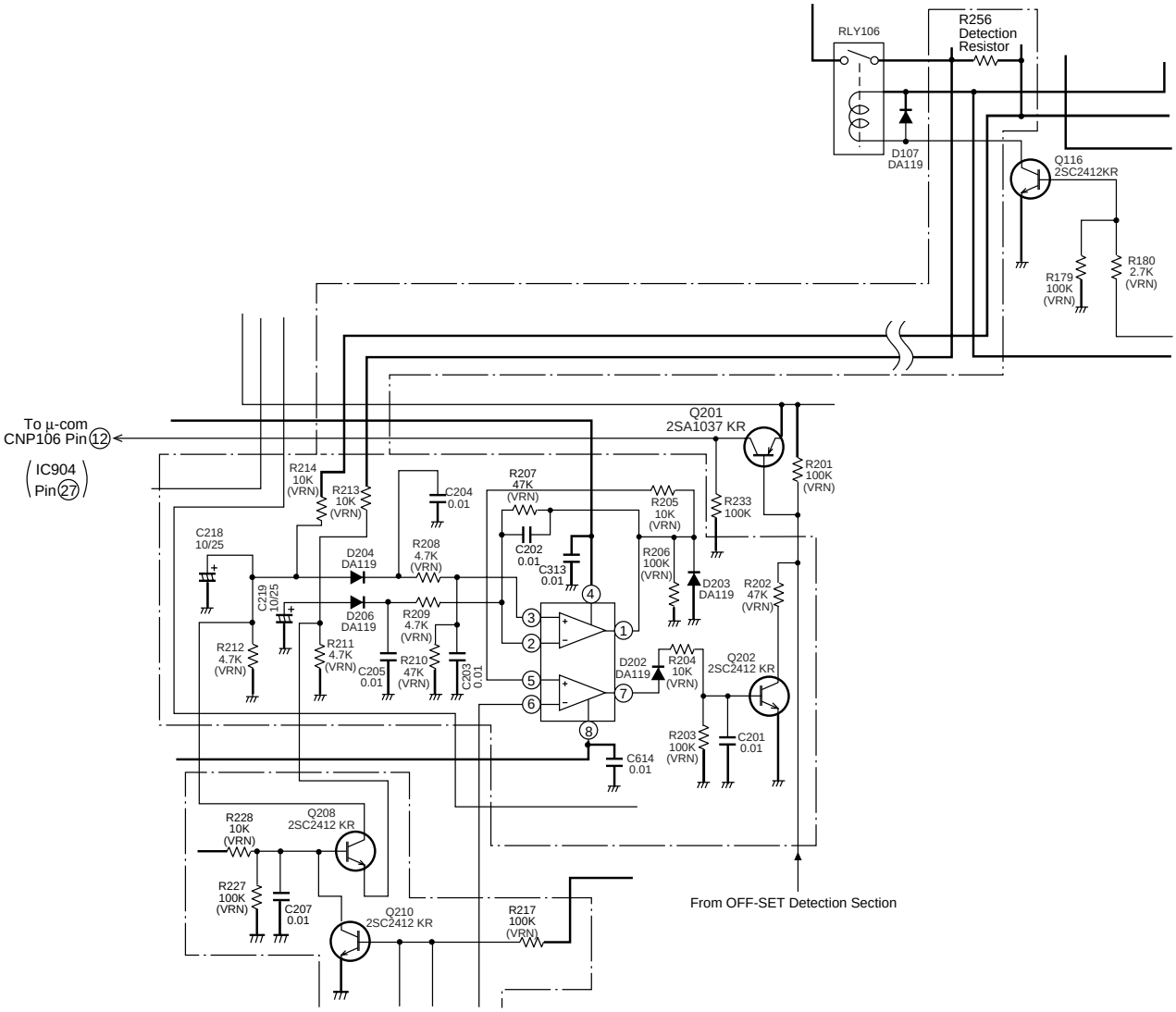


Figure 20-1 OVERCURRENT DETECTION CIRCUIT

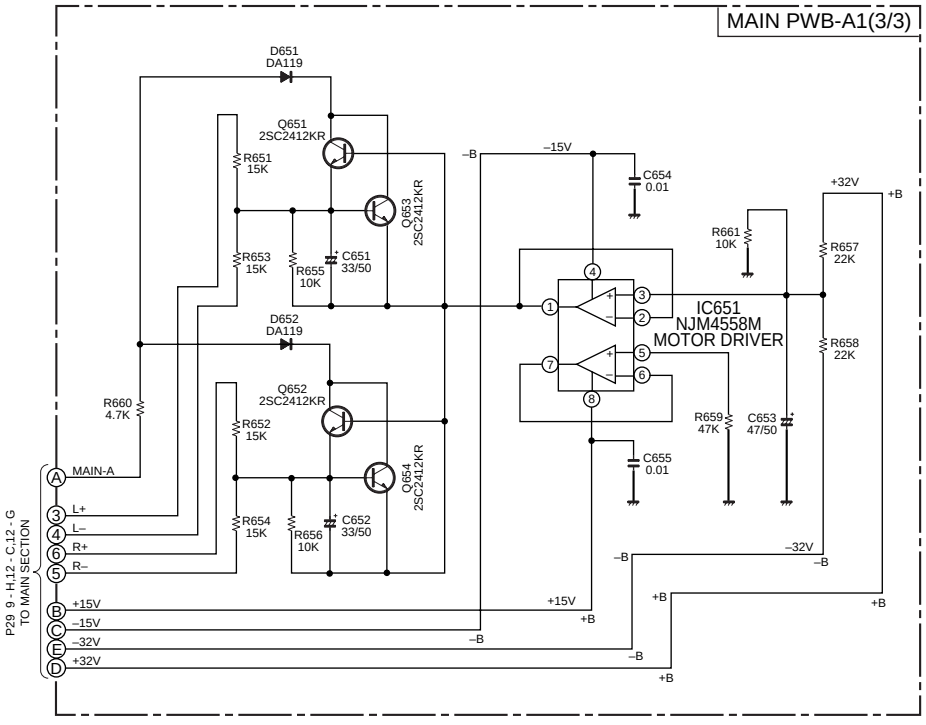


Figure 20-2

WIRING PROCESS DIAGRAM

⚠ Check the wiring process.
Any lead CNP101 (4P), CNP102 (3P) or CMP109 (6P)
does not interfere with the cement resistor or heat sink plate.

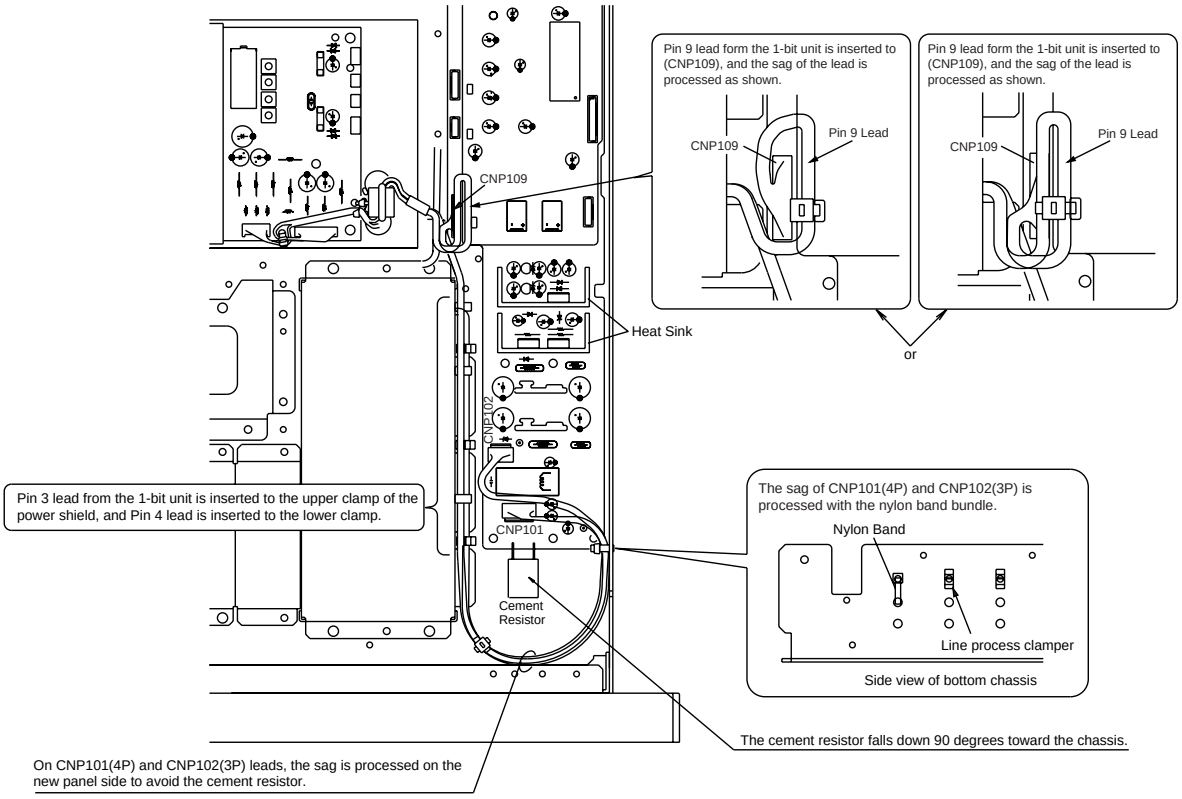


Figure 21-1

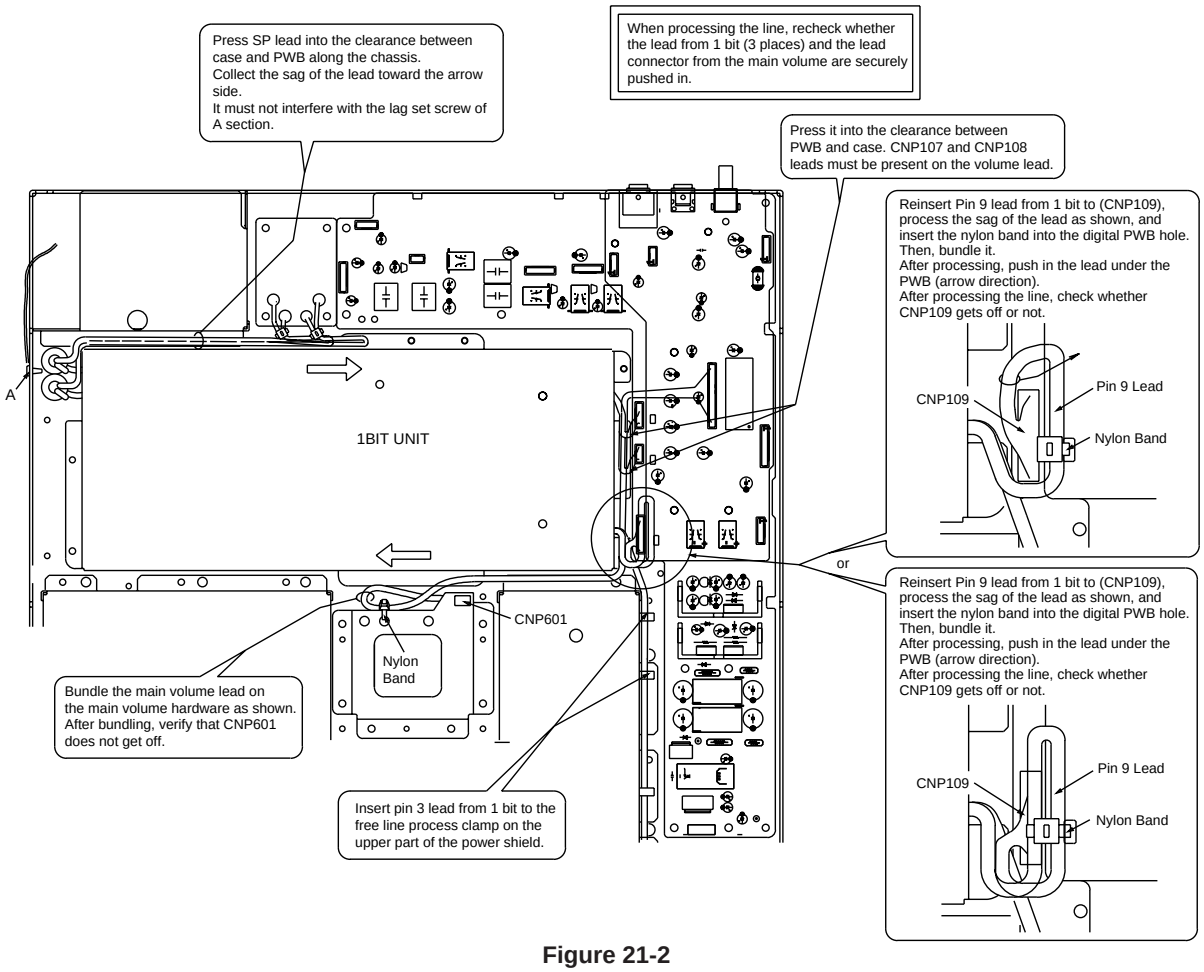


Figure 21-2

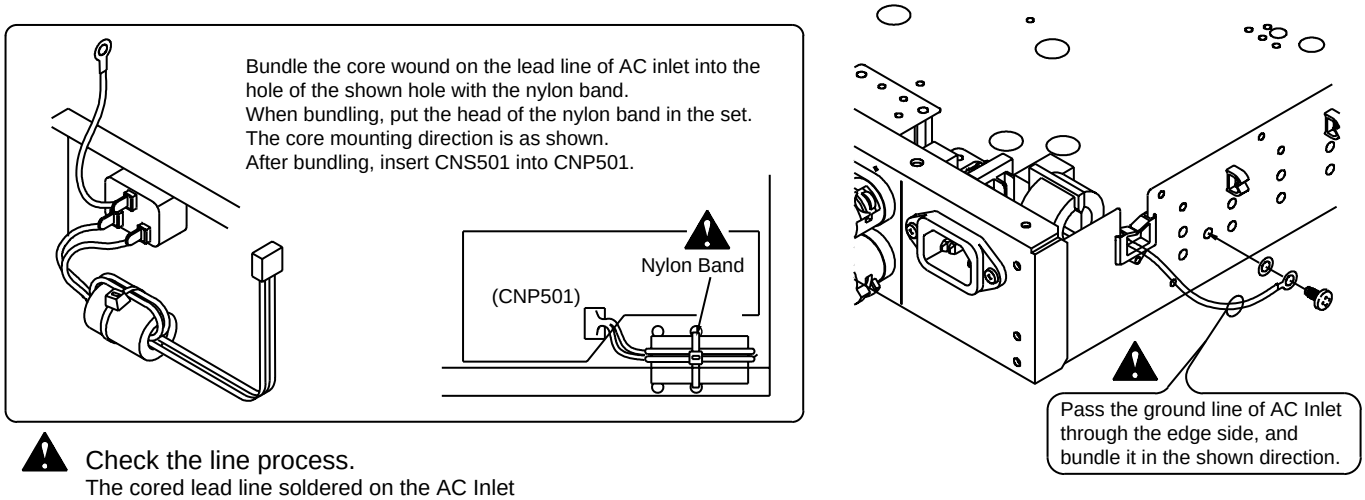


Figure 22-1

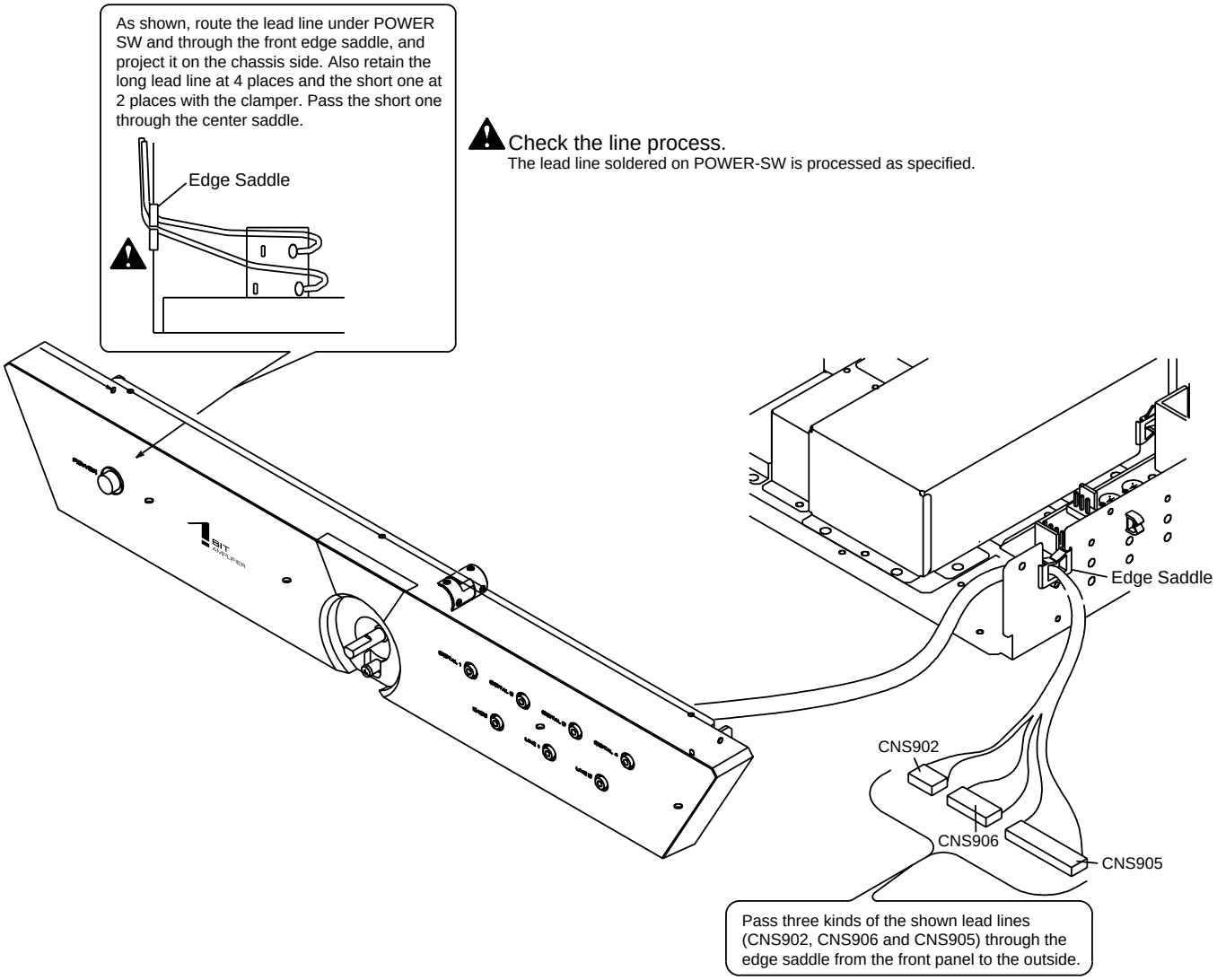


Figure 22-2

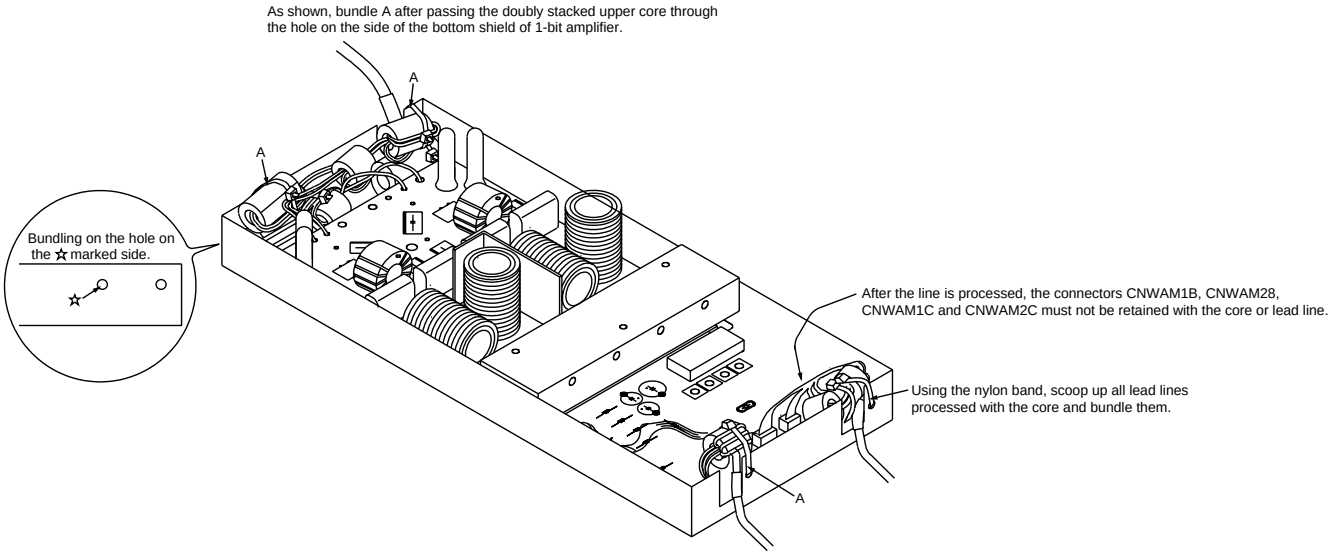


Figure 23-1

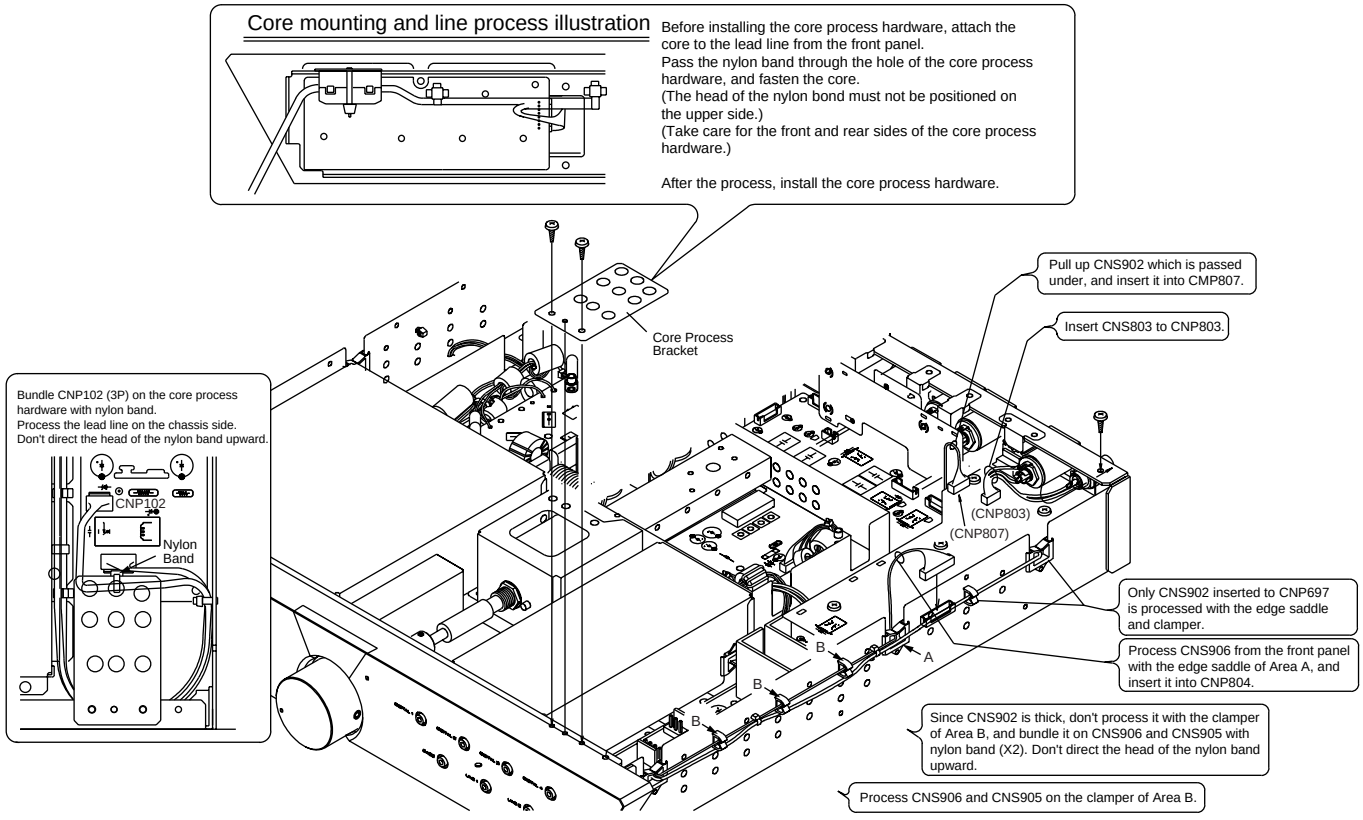


Figure 23-2

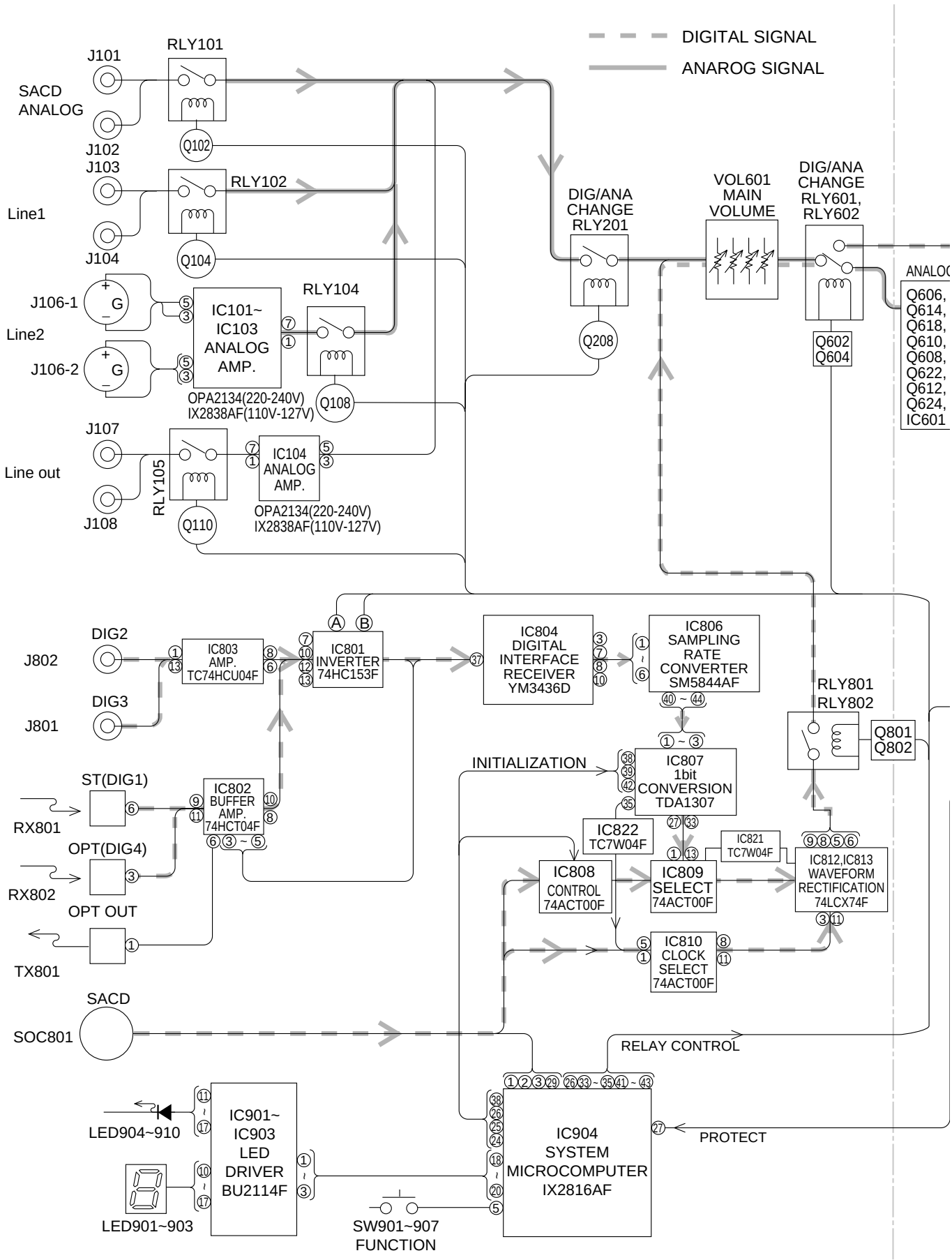


Figure 24 BLOCK DIAGRAM (1/2)

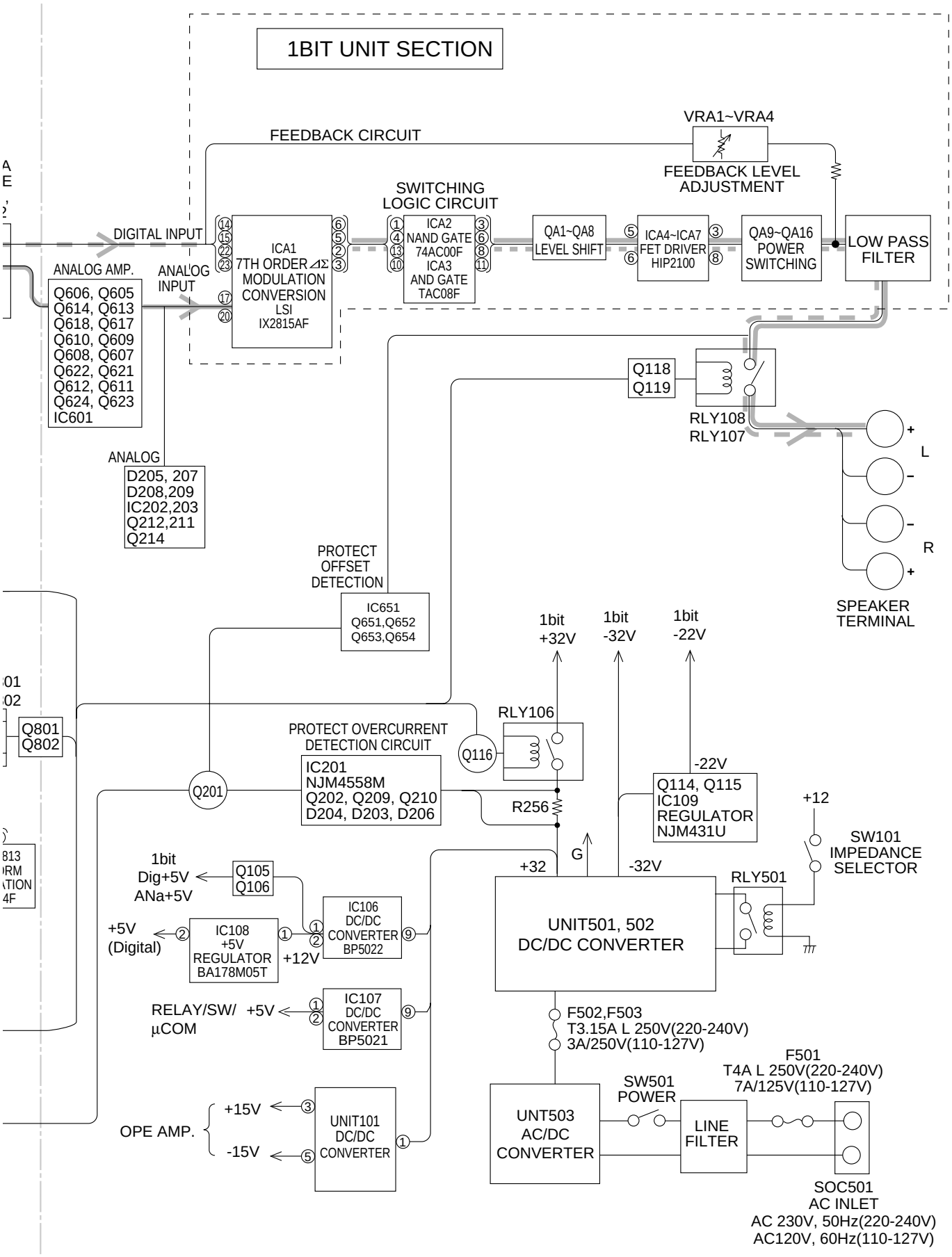
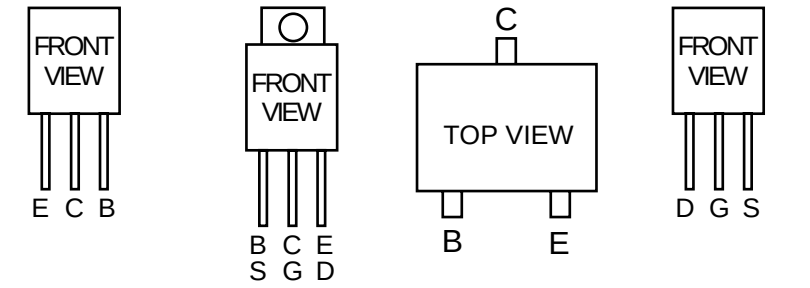


Figure 25 BLOCK DIAGRAM (2/2)

NOTES ON SCHEMATIC DIAGRAM

- Resistor:
  To differentiate the units of resistors, such symbol as K and M are used: the symbol K means 1000 ohm and the symbol M means 1000 kohm and the resistor without any symbol is ohm-type resistor. Besides, the one with “Fusible” is a fuse type.
- Capacitor:
  To indicate the unit of capacitor, a symbol P is used: this symbol P means micro-micro-farad and the unit of the capacitor without such a symbol is microfarad. As to electrolytic capacitor, the expression “capacitance/withstand voltage” is used.
  (CH), (TH), (RH), (UJ): Temperature compensation
  (ML): Mylar type
  (P.P.): Polypropylene type
- Schematic diagram and Wiring Side of P.W.Board for this model are subject to change for improvement without prior notice.
- The indicated voltage in each section is the one measured by Digital Multimeter between such a section and the chassis with no signal given.
  1. In the tuner section,
     ( ) indicates AM
     < > indicates FM stereo
  2. In the main section, a tape is being played back.
  3. In the deck section, a tape is being played back.
     ( ) indicates the record state.
  4. In the power section, a tape is being played back.
  5. In the CD section, the CD is stopped.
- Parts marked with “ ⚠ ” (⊏ 二 二 二 ⊐) are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

REF. NO	DESCRIPTION	POSITION
SW101	IMPEDANCE SELECTOR	ON—OFF
SW501	POWER	ON—OFF
SW901	DIGITAL 1	ON—OFF
SW902	DIGITAL 2	ON—OFF
SW903	DIGITAL 3	ON—OFF
SW904	DIGITAL 4	ON—OFF
SW905	SACD	ON—OFF
SW906	LINE 1	ON—OFF
SW907	LINE 2	ON—OFF

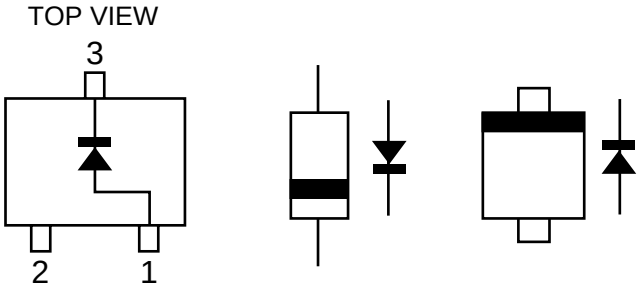


2SC1740SR
2SC3242-F

2SD2394F
IRF530

2SA1037KR
2SA1036KR
2SA1483
2SC2412KR

2SJ109
2SK170-BL
2SK389BL

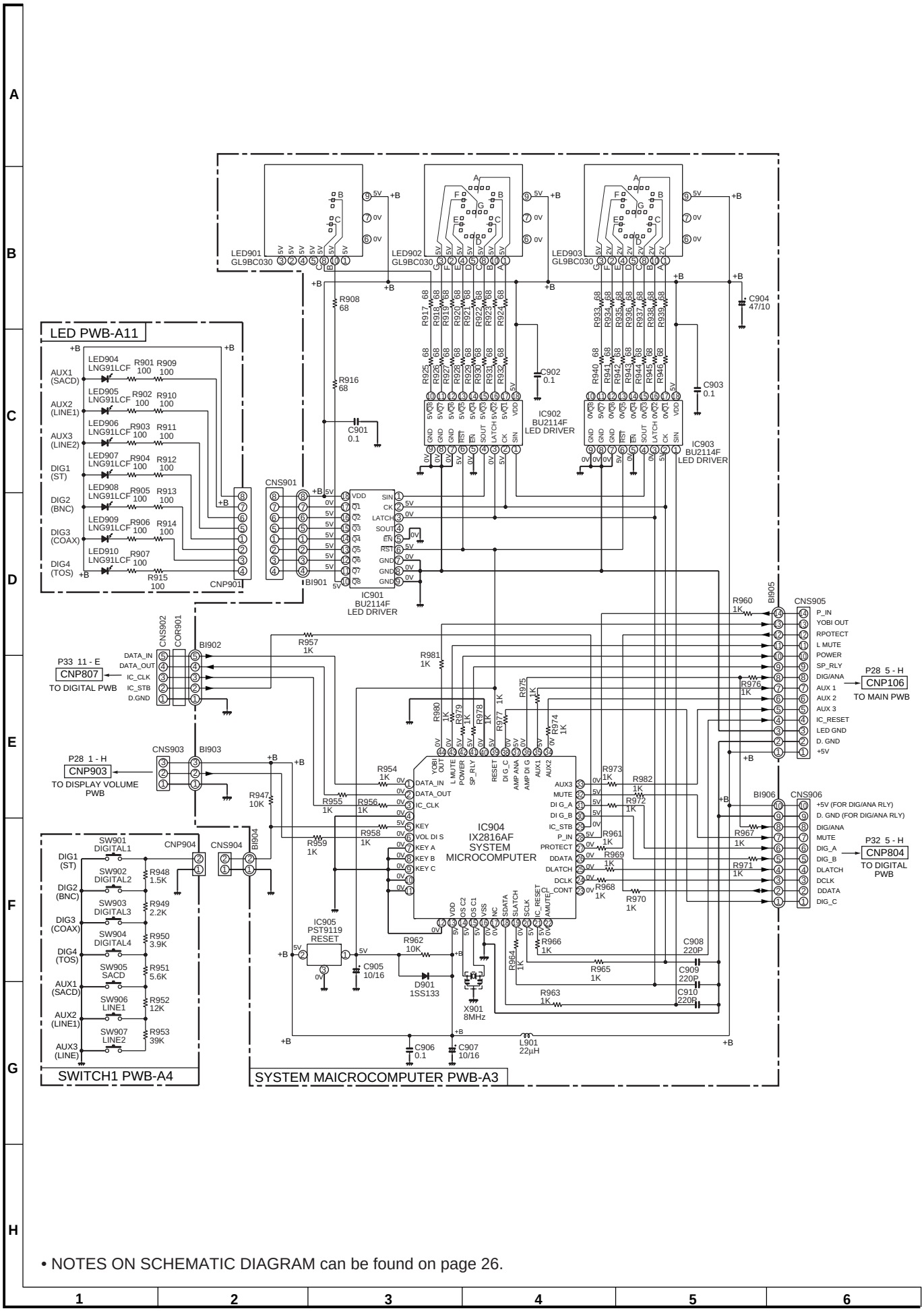


DA119

1SS133
11ES1
DRK36
SM1XP2

1SS355

Figure 26 TYPES OF TRANSISTOR AND DIODE



• NOTES ON SCHEMATIC DIAGRAM can be found on page 26.

Figure 27 SCHEMATIC DIAGRAM (1/9)

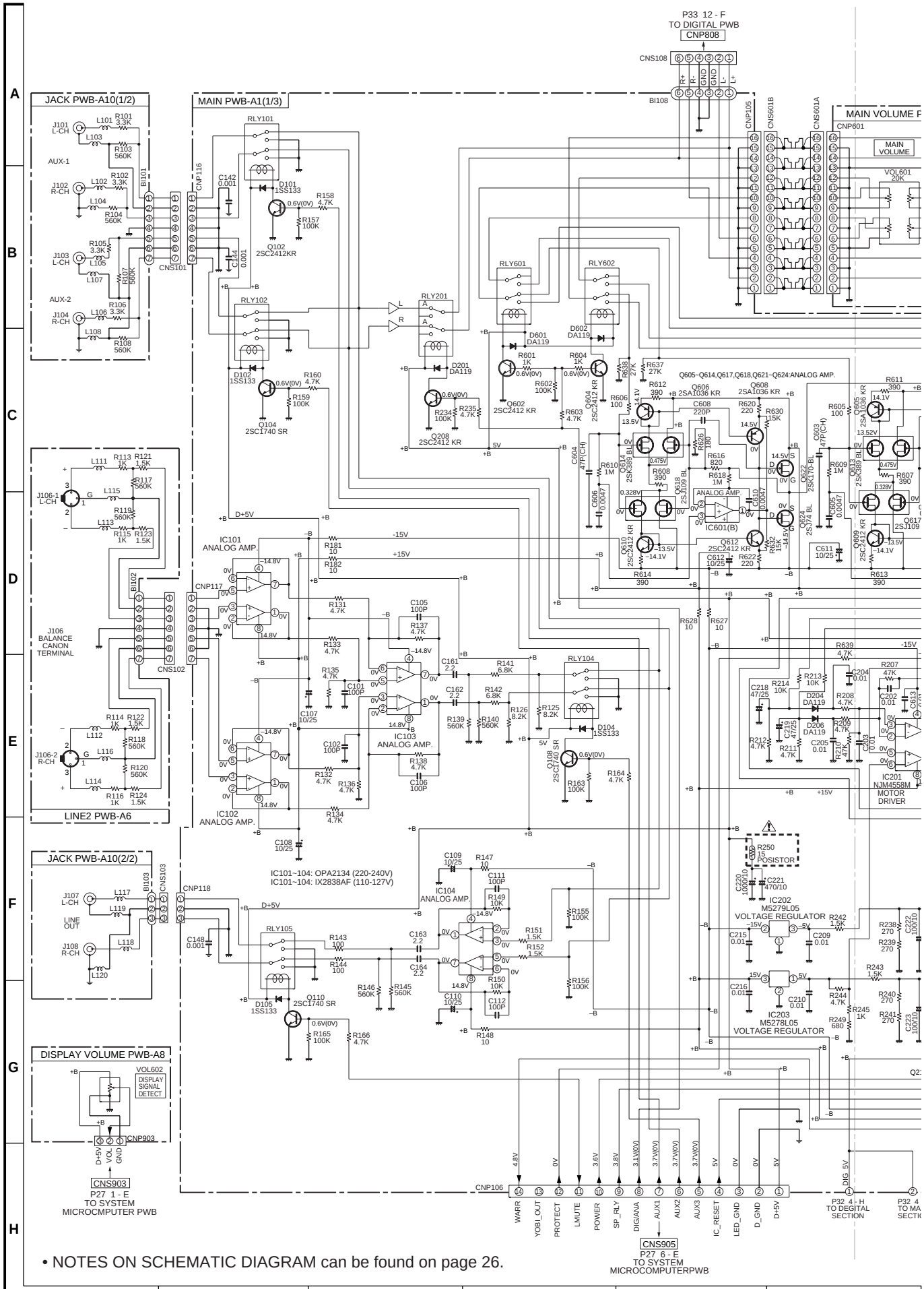


Figure 28 SCHEMATIC DIAGRAM (2/9)

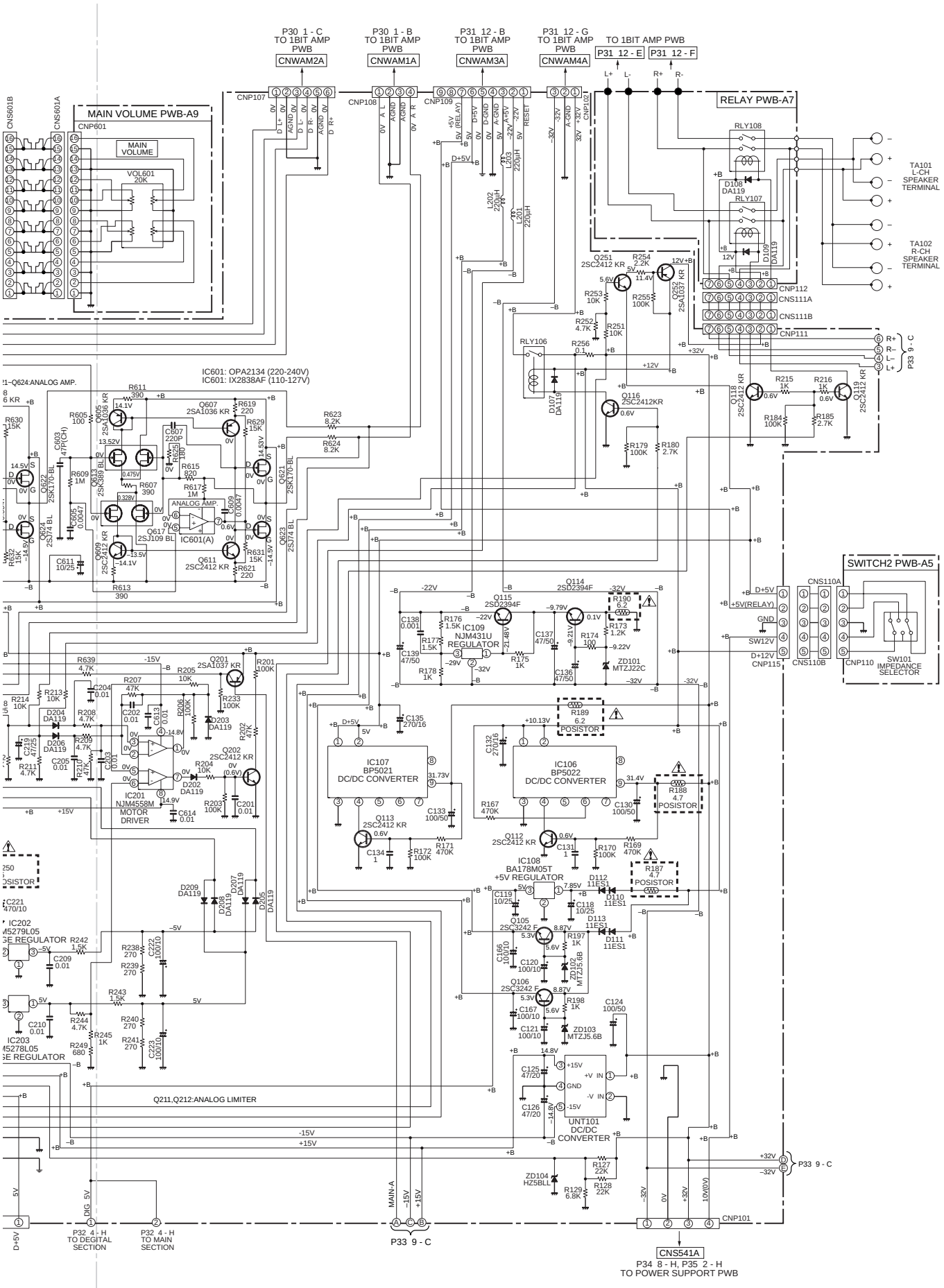
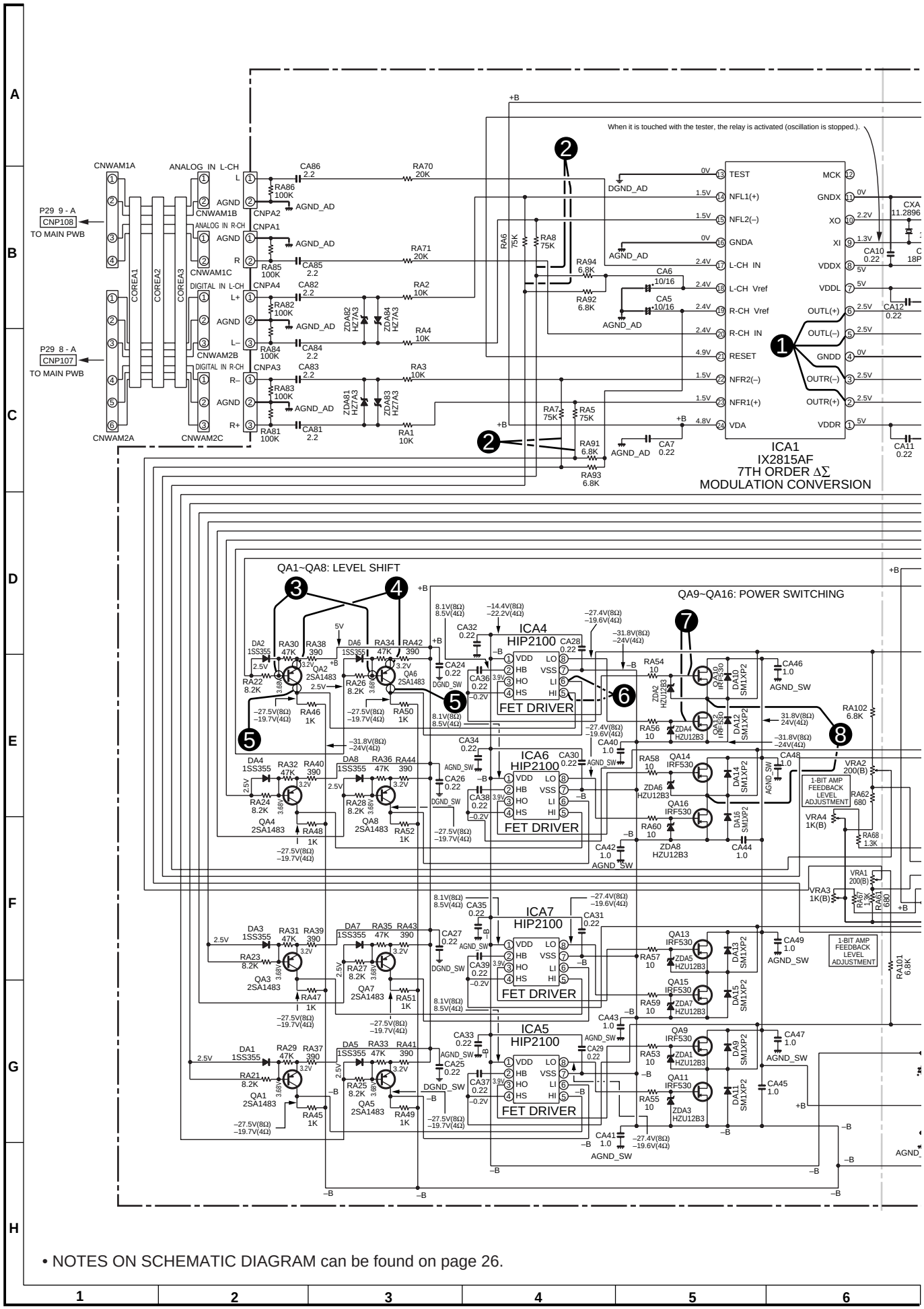
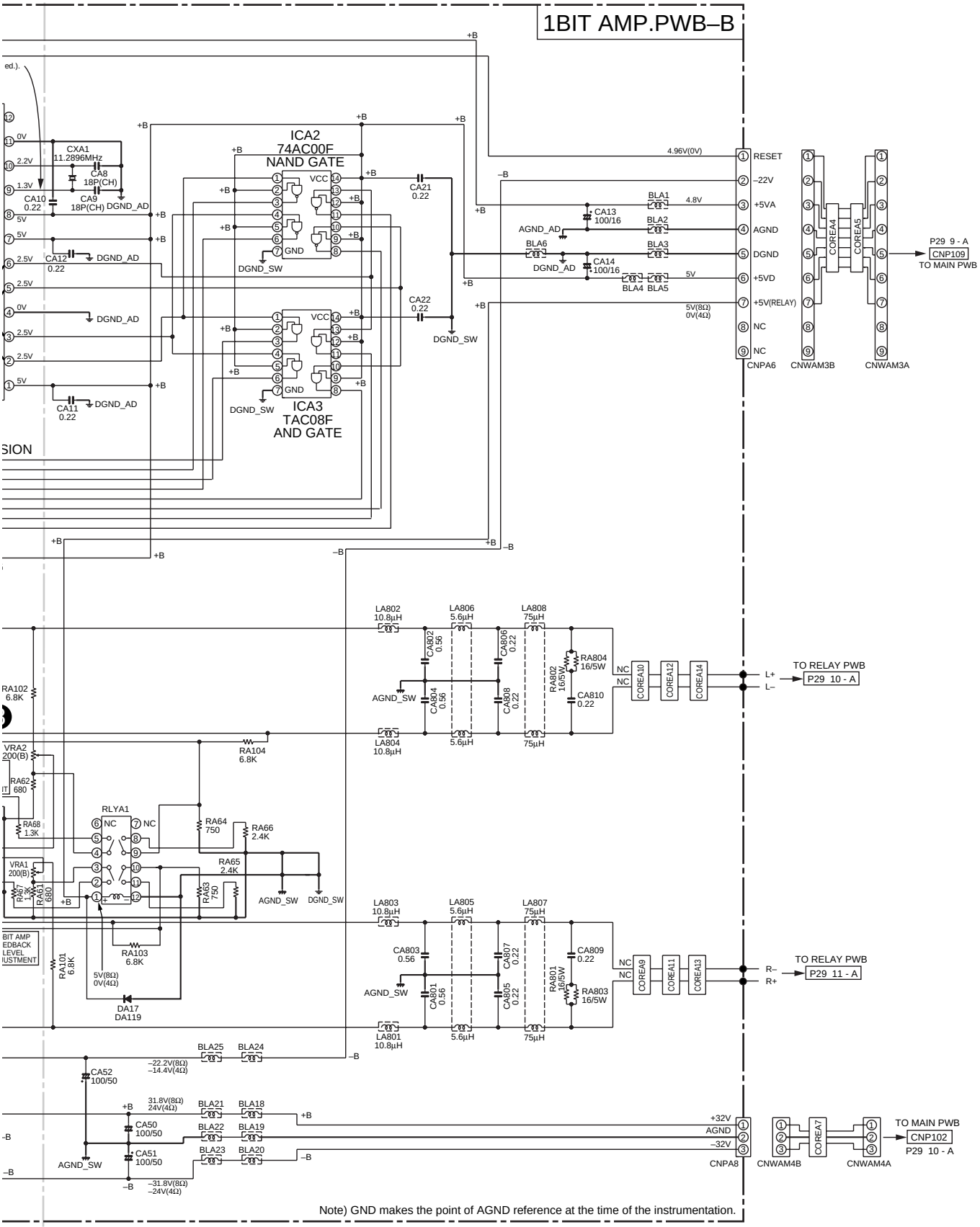


Figure 29 SCHEMATIC DIAGRAM (3/9)



• NOTES ON SCHEMATIC DIAGRAM can be found on page 26.

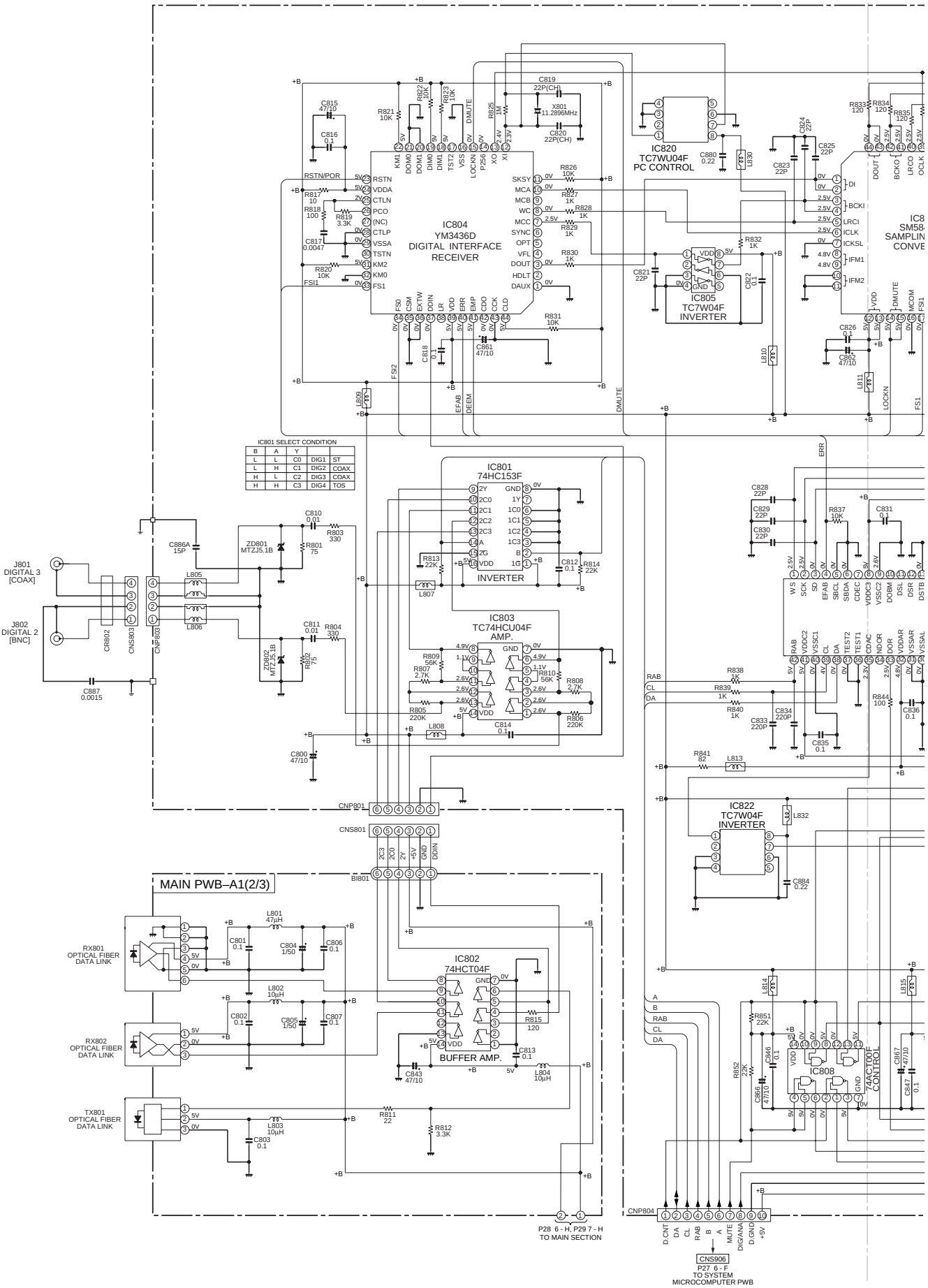
Figure 30 SCHEMATIC DIAGRAM (4/9)



• The numbers ❶ to ❽ are waveform numbers shown in page 50.

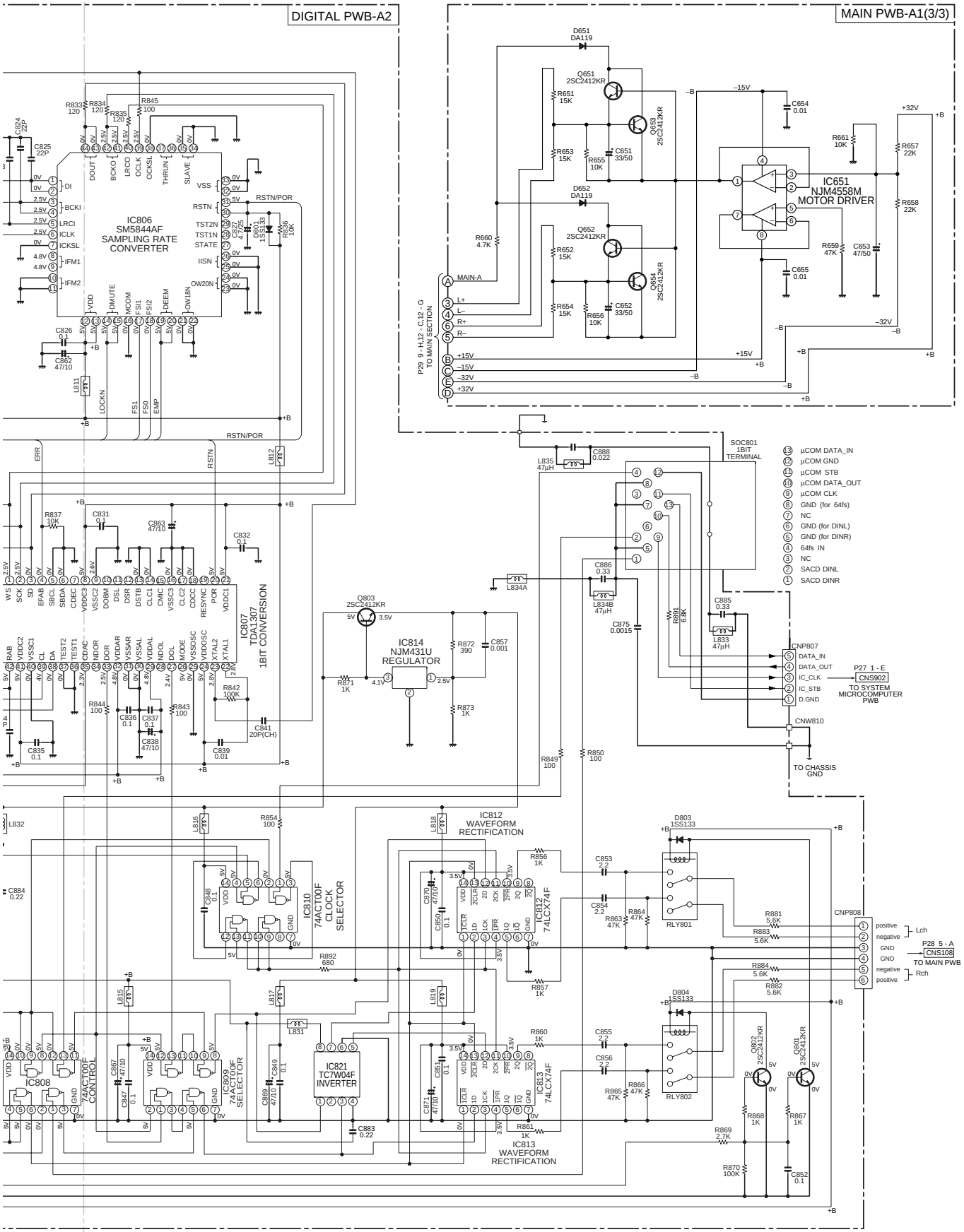
7	8	9	10	11	12

Figure 31 SCHEMATIC DIAGRAM (5/9)



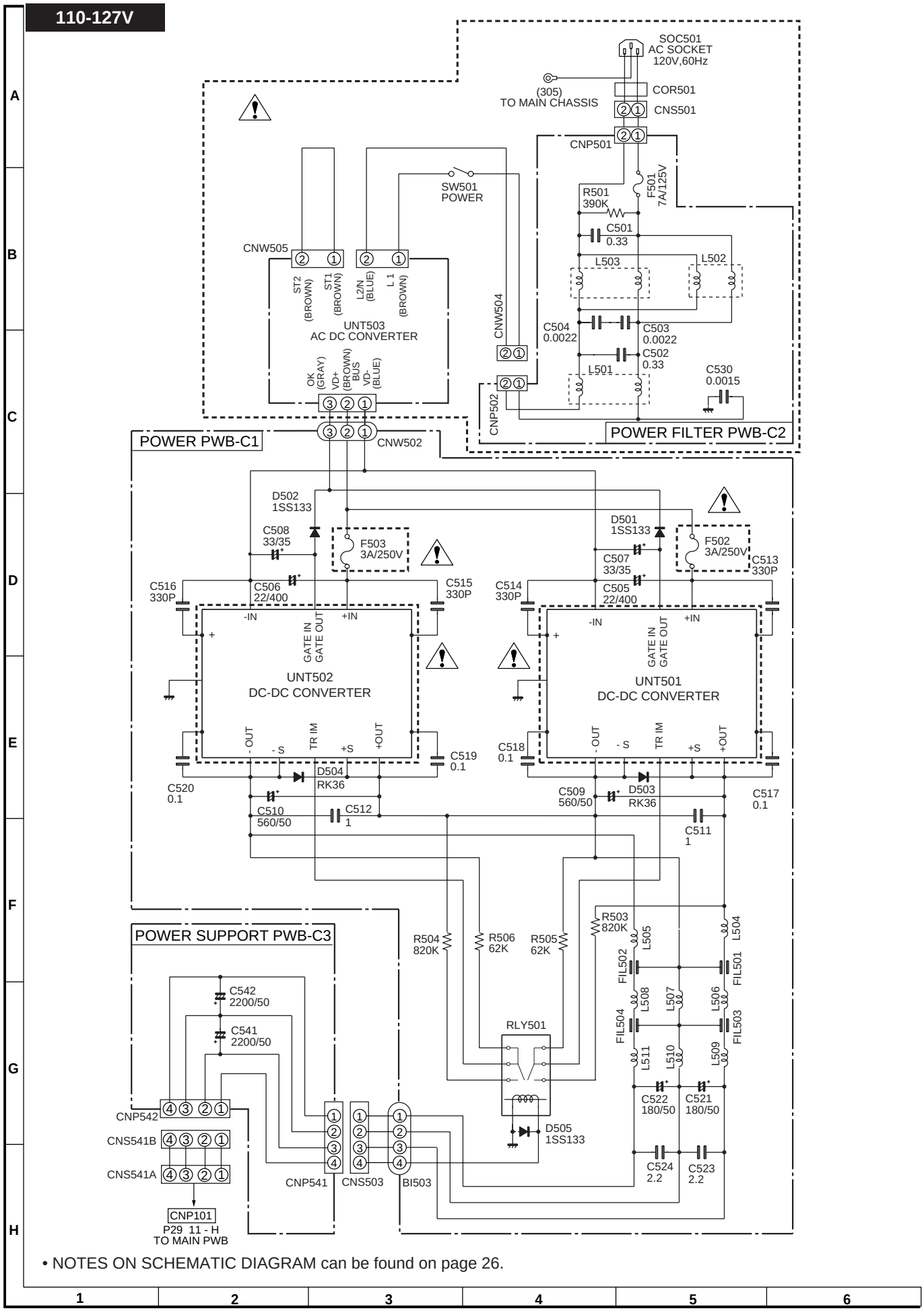
• NOTES ON SCHEMATIC DIAGRAM can be found on page 26.

Figure 32 SCHEMATIC DIAGRAM (6/9)



7	8	9	10	11	12

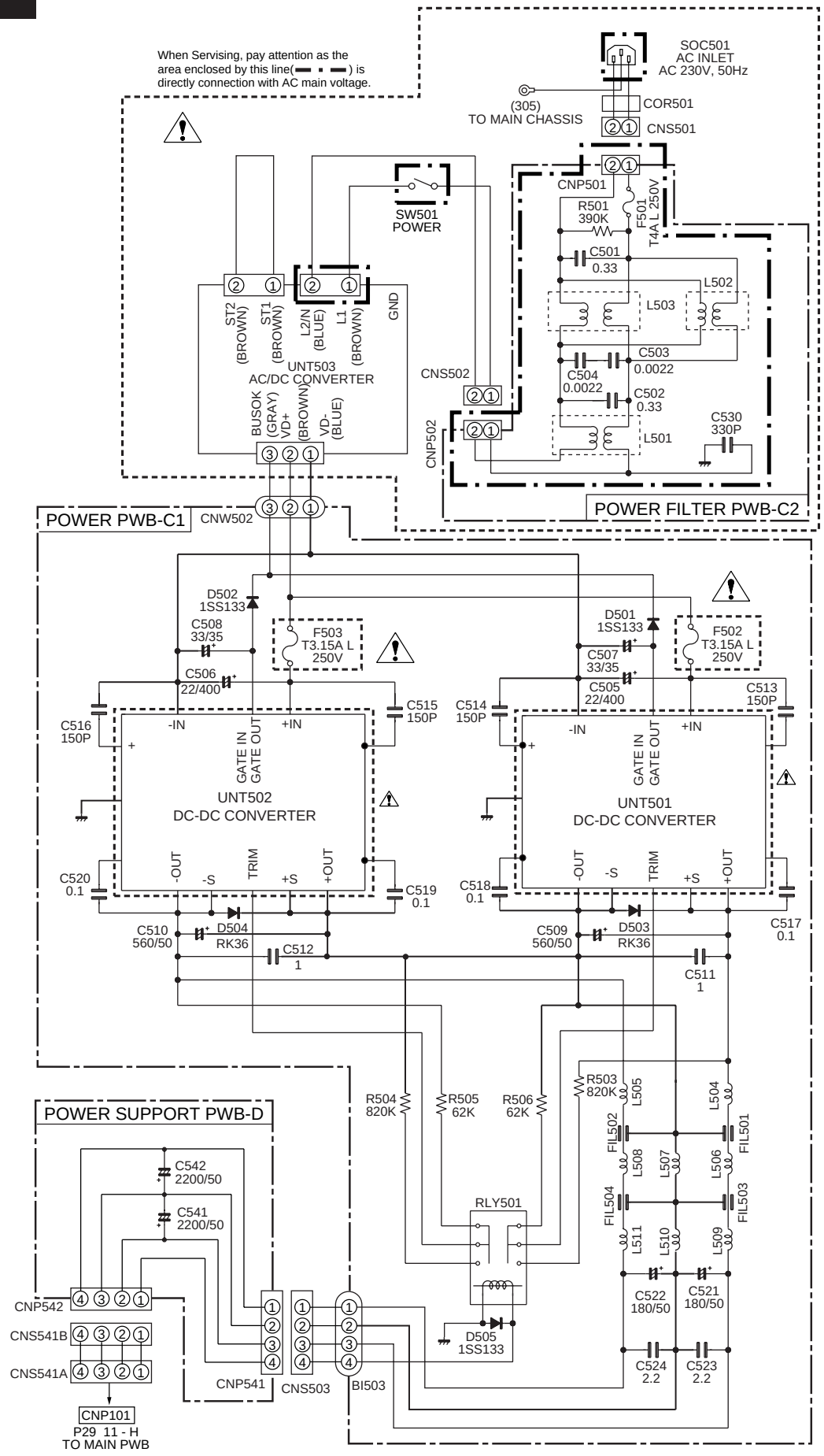
Figure 33 SCHEMATIC DIAGRAM (7/9)



• NOTES ON SCHEMATIC DIAGRAM can be found on page 26.

Figure 34 SCHEMATIC DIAGRAM (8/9)

220-240V



7	8	9	10	11	12

Figure 35 SCHEMATIC DIAGRAM (9/9)

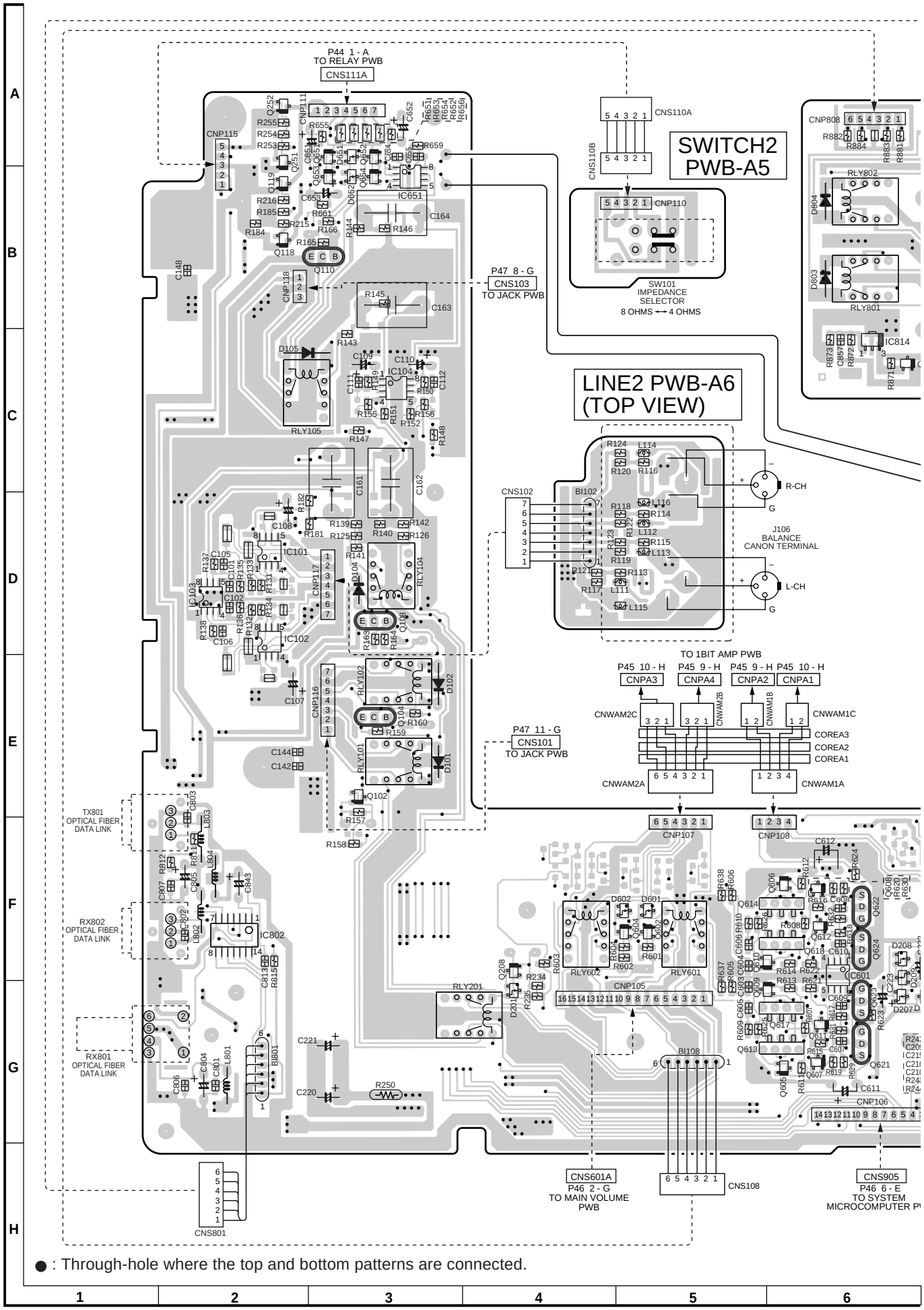
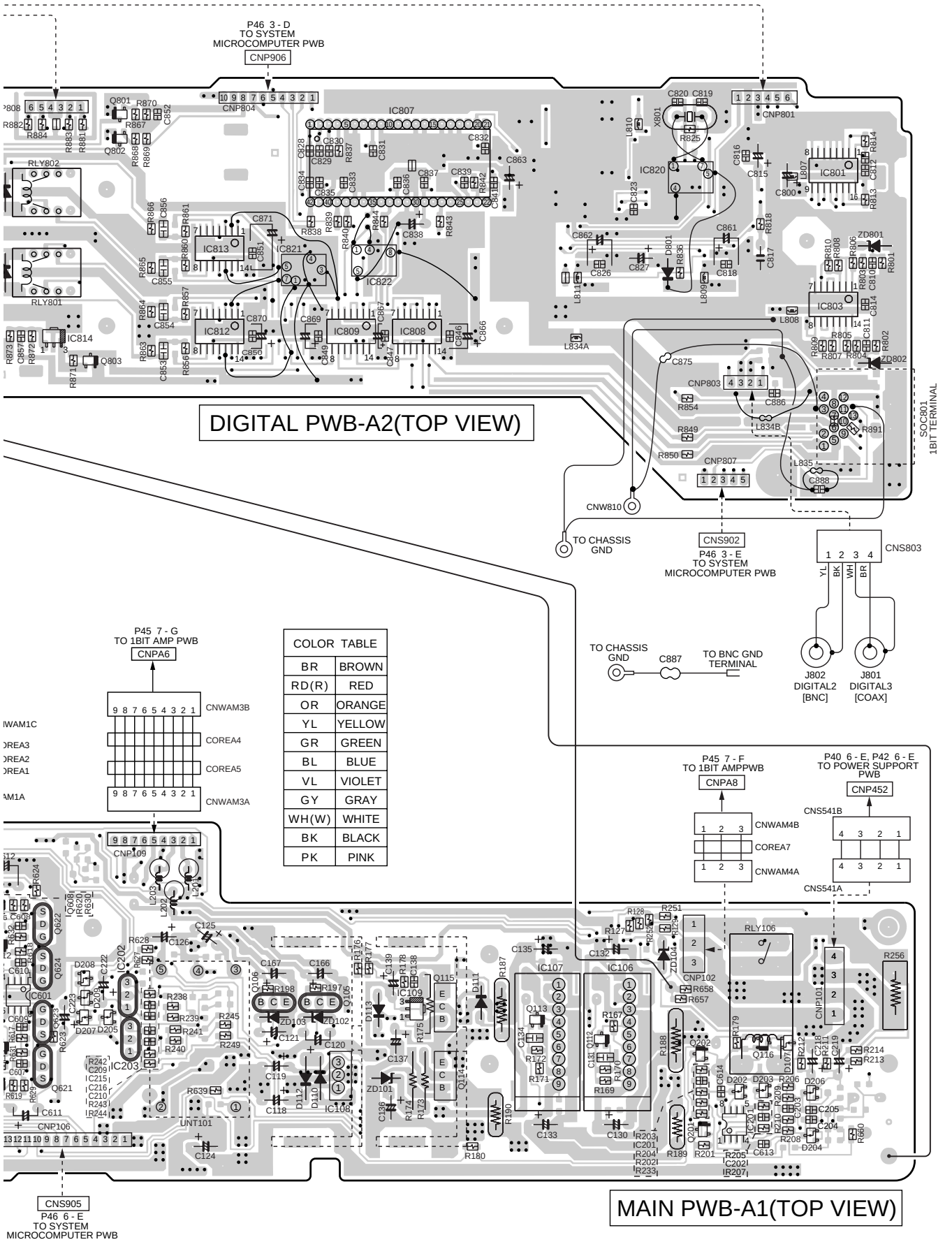


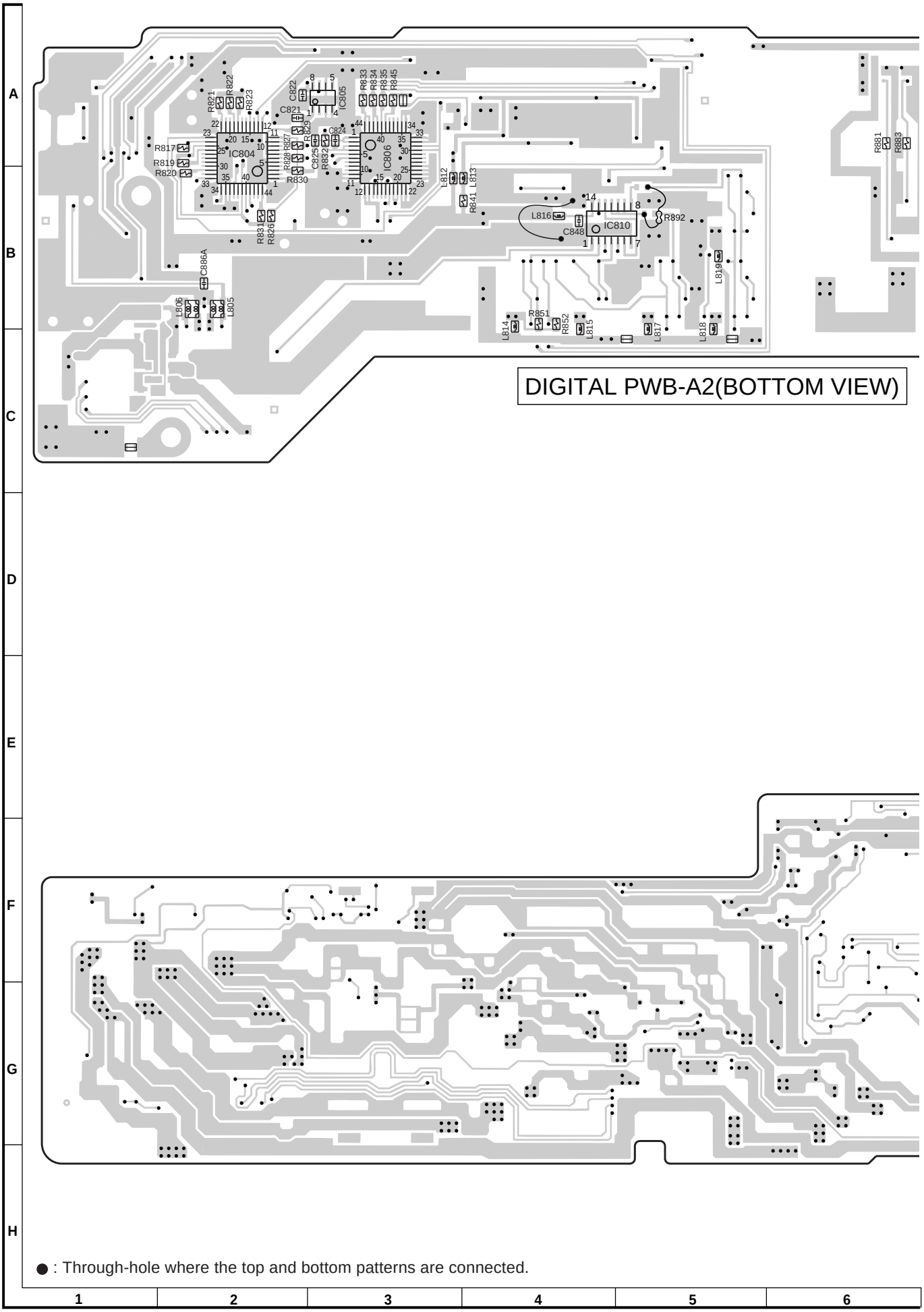
Figure 36 WIRING SIDE OF P.W.BOARD (1/14)



COLOR TABLE	
BR	BROWN
RD(R)	RED
OR	ORANGE
YL	YELLOW
GR	GREEN
BL	BLUE
VL	VIOLET
GY	GRAY
WH(W)	WHITE
BK	BLACK
PK	PINK

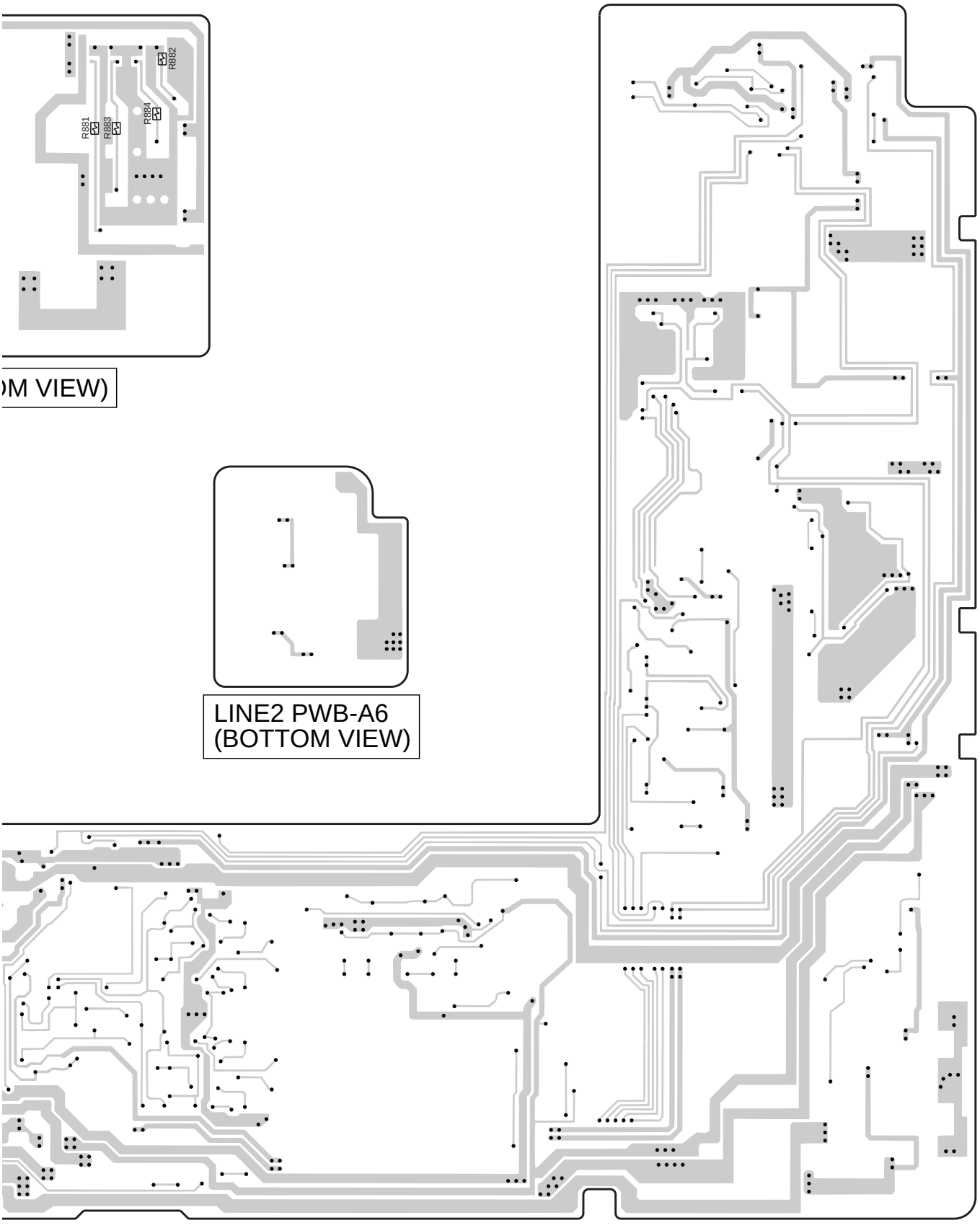
7	8	9	10	11	12

Figure 37 WIRING SIDE OF P.W.BOARD (2/14)



● : Through-hole where the top and bottom patterns are connected.

Figure 38 WIRING SIDE OF P.W.BOARD (3/14)



7	8	9	10	11	12

Figure 39 WIRING SIDE OF P.W.BOARD (4/14)

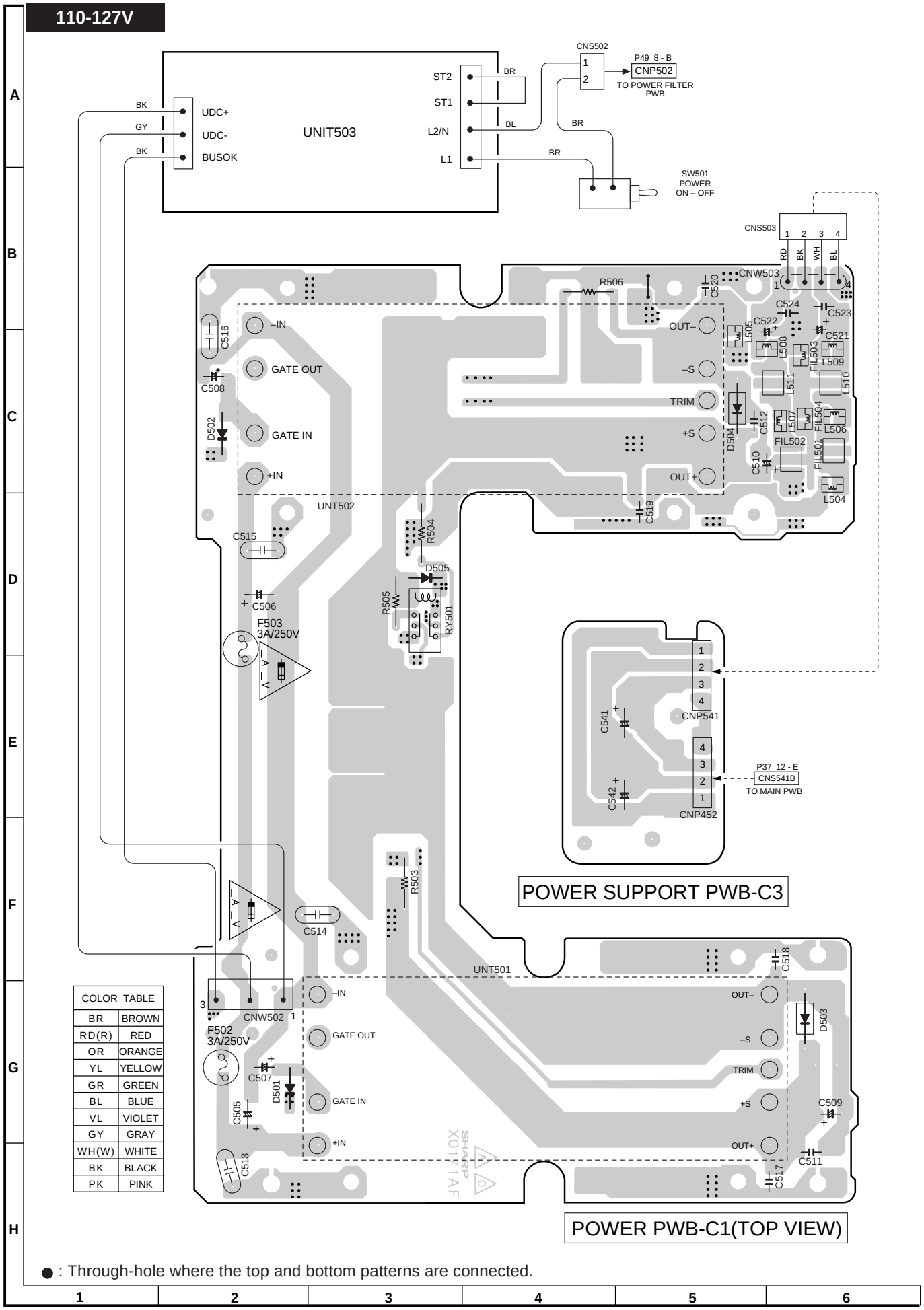
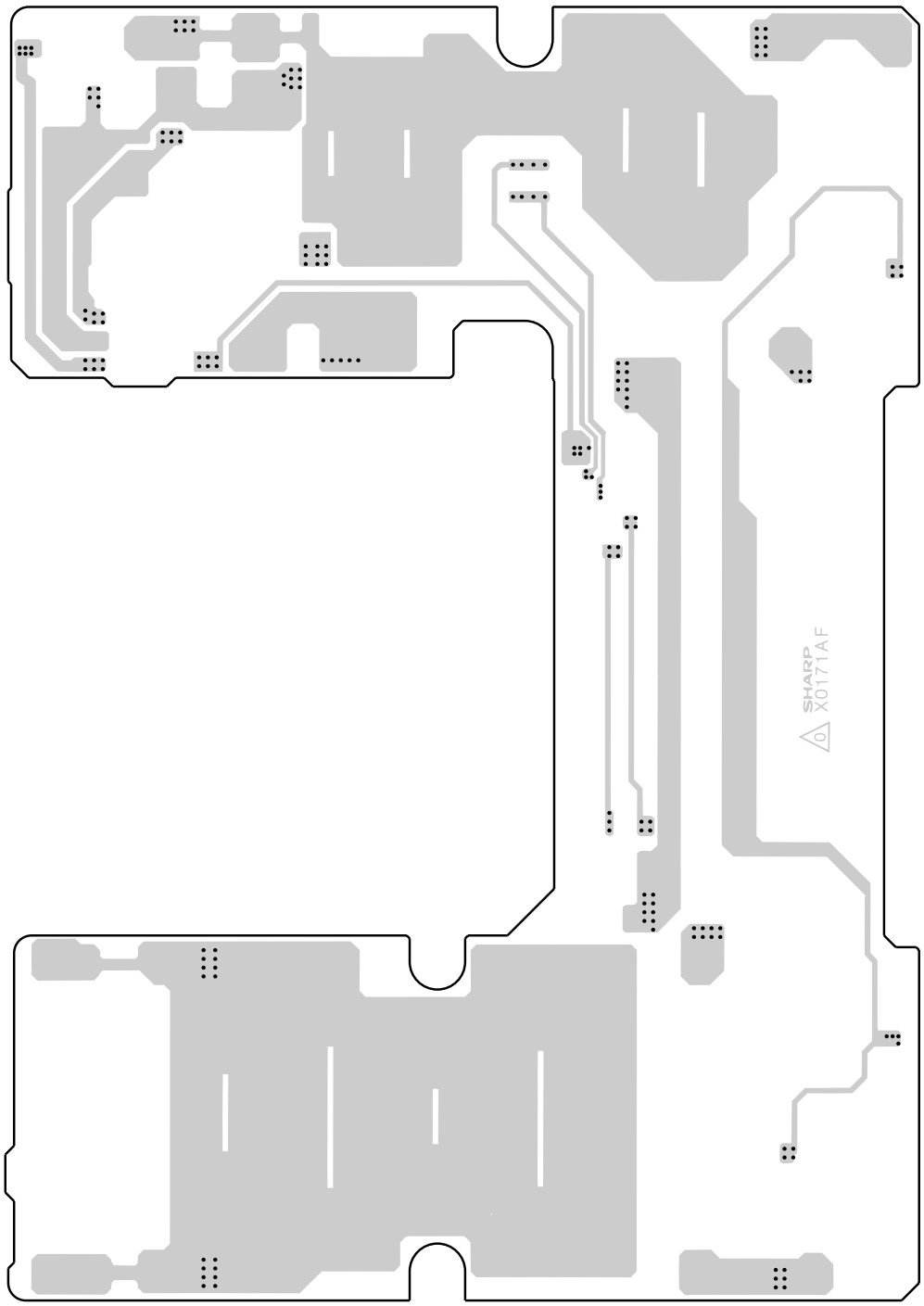


Figure 40 WIRING SIDE OF P.W.BOARD (5/14)



POWER PWB-C1(BOTTOM VIEW)

7	8	9	10	11	12

Figure 41 WIRING SIDE OF P.W.BOARD (6/14)

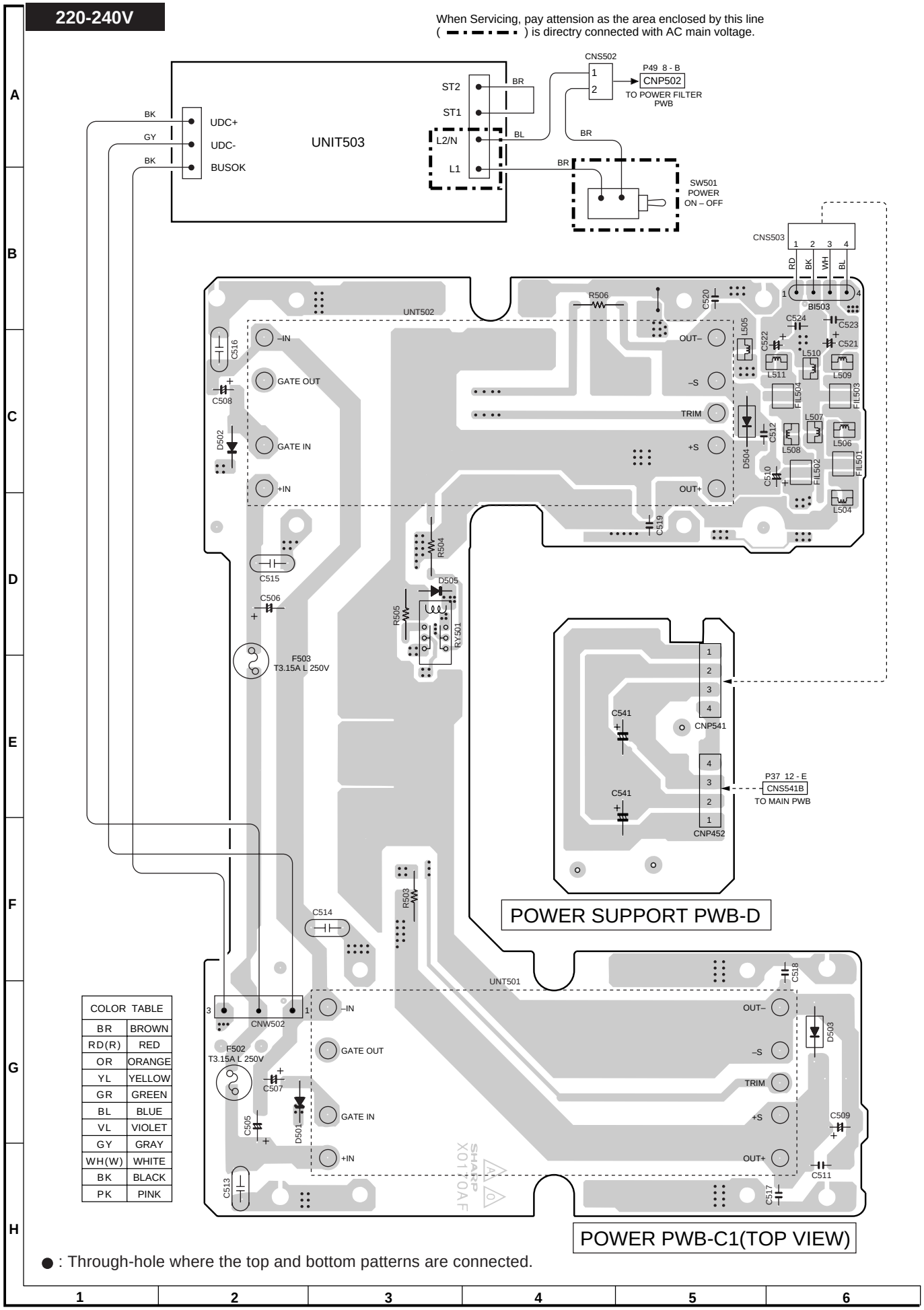
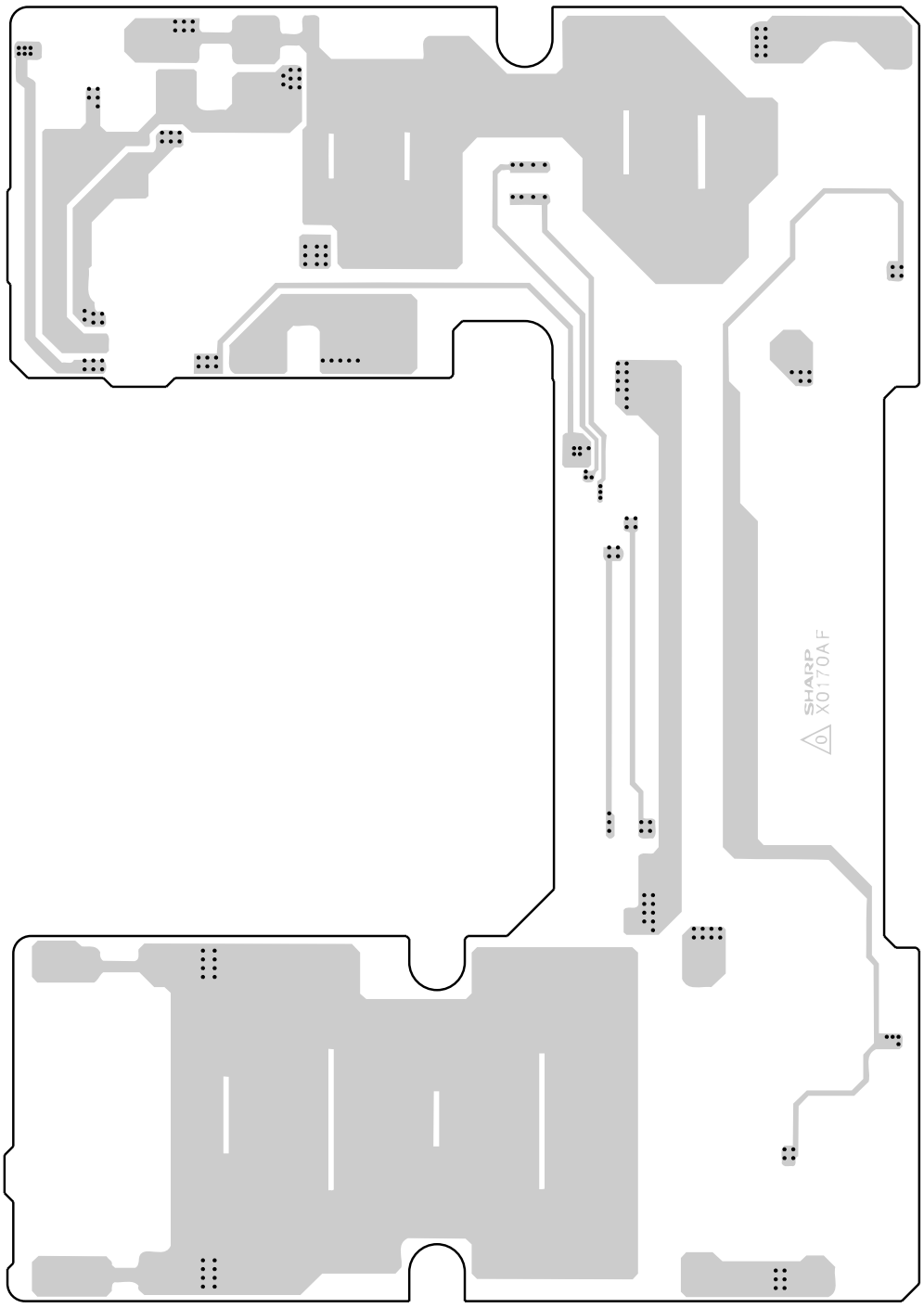


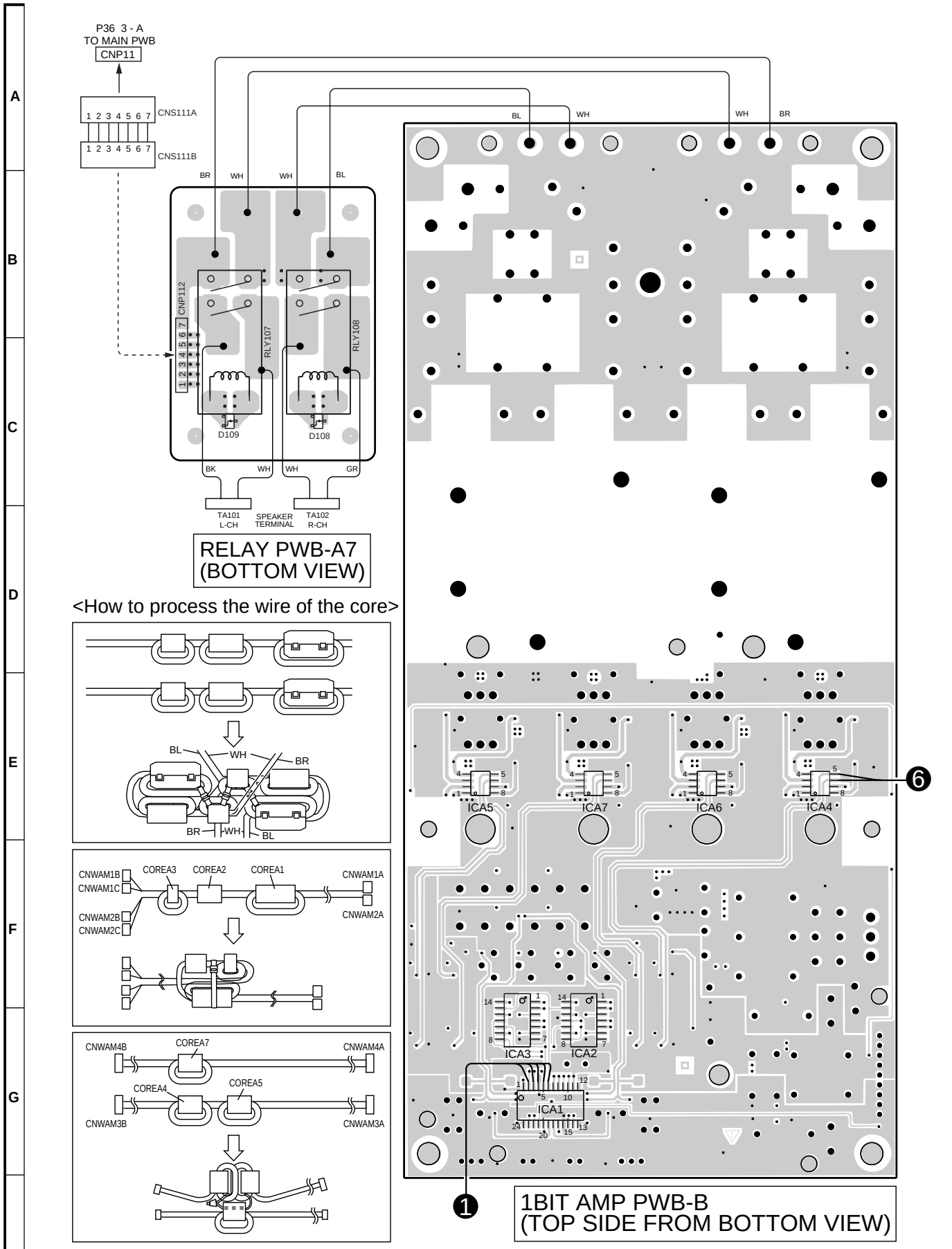
Figure 42 WIRING SIDE OF P.W.BOARD (7/14)



POWER PWB-C1(BOTTOM VIEW)

7	8	9	10	11	12

Figure 43 WIRING SIDE OF P.W.BOARD (8/14)

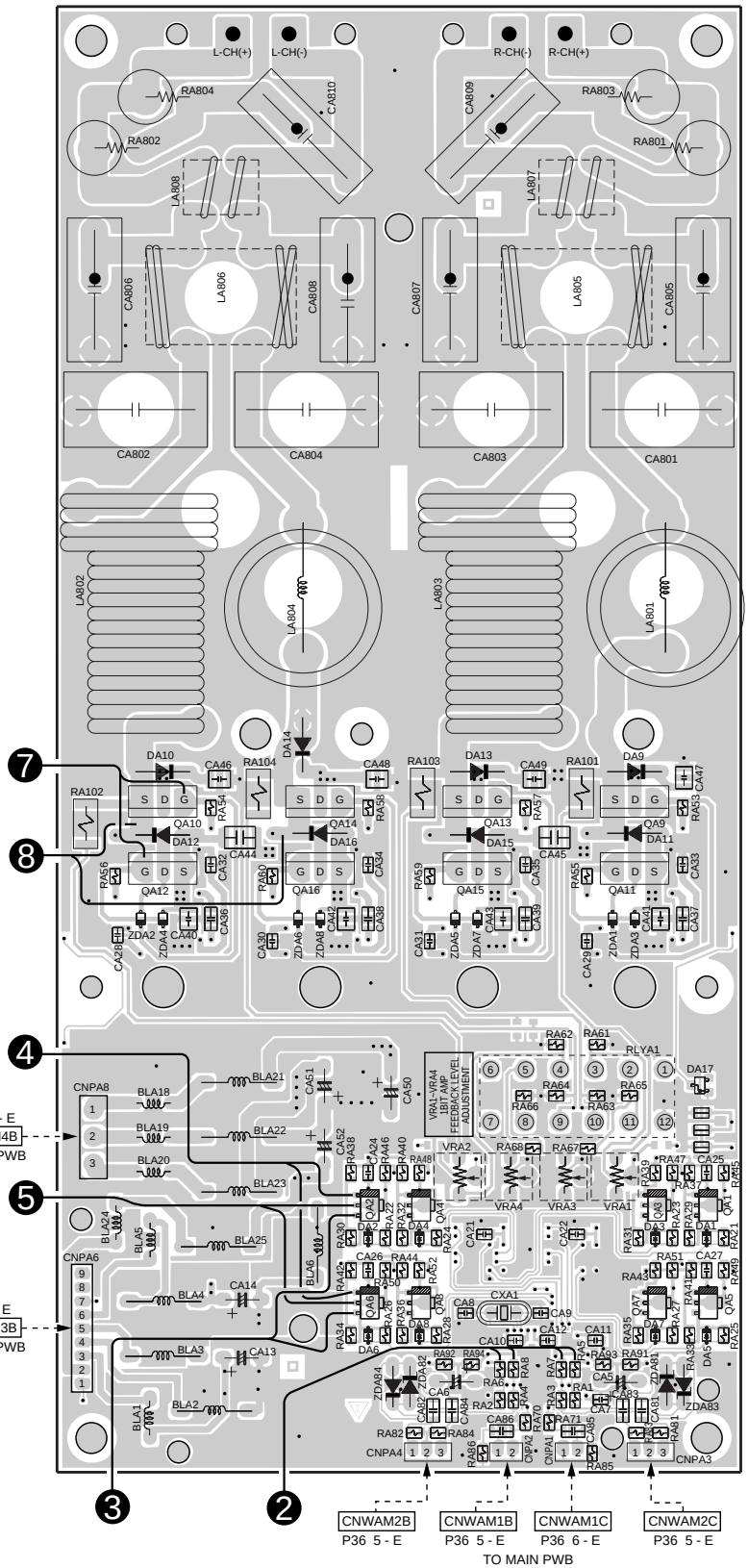


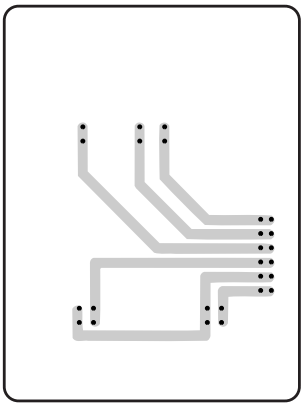
● : Through-hole where the top and bottom patterns are connected.

• The numbers ❶ to ❽ are waveform numbers shown in page 50.

Figure 44 WIRING SIDE OF P.W.BOARD (9/14)

1BIT AMP PWB-B
(BOTTOM SIDE FROM TOP VIEW)





RELAY PWB-A7
(TOP VIEW)

COLOR TABLE	
BR	BROWN
RD(R)	RED
OR	ORANGE
YL	YELLOW
GR	GREEN
BL	BLUE
VL	VIOLET
GY	GRAY
WH(W)	WHITE
BK	BLACK
PK	PINK

7	8	9	10	11	12

Figure 45 WIRING SIDE OF P.W.BOARD (10/14)

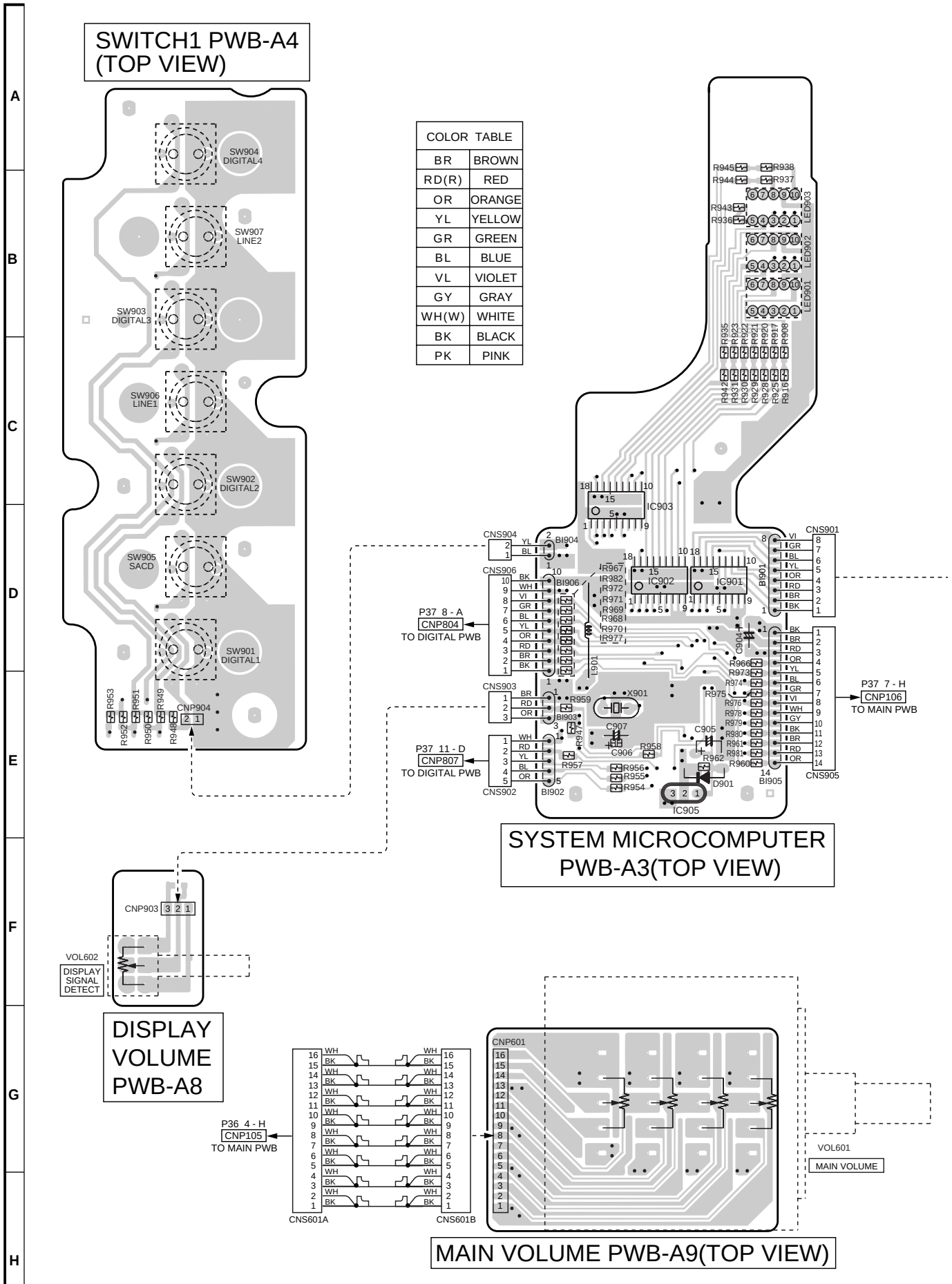
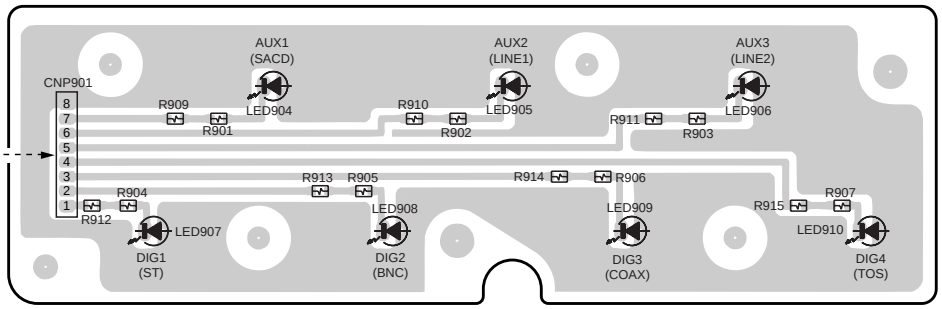
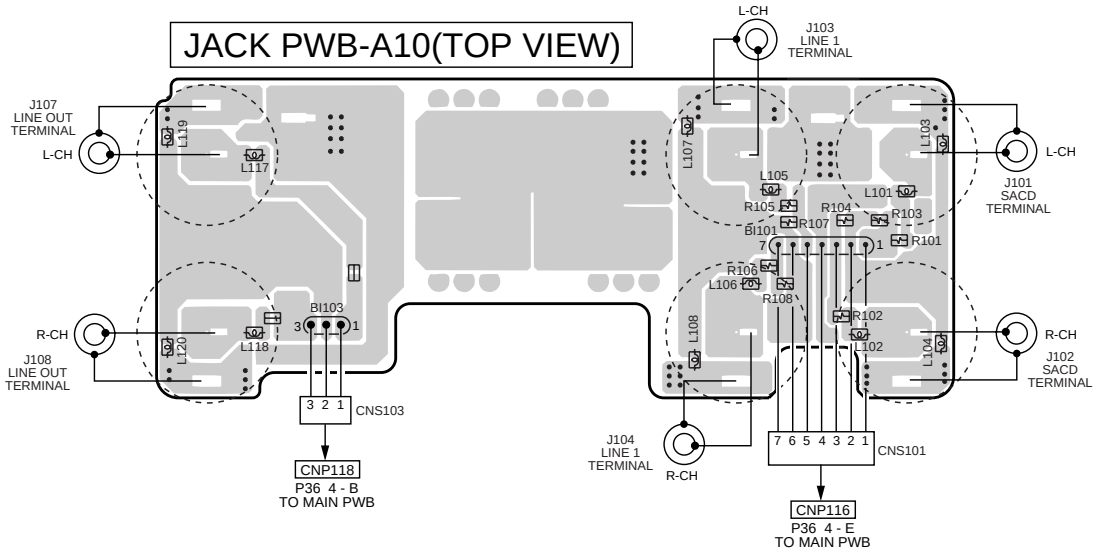


Figure 46 WIRING SIDE OF P.W.BOARD (11/14)



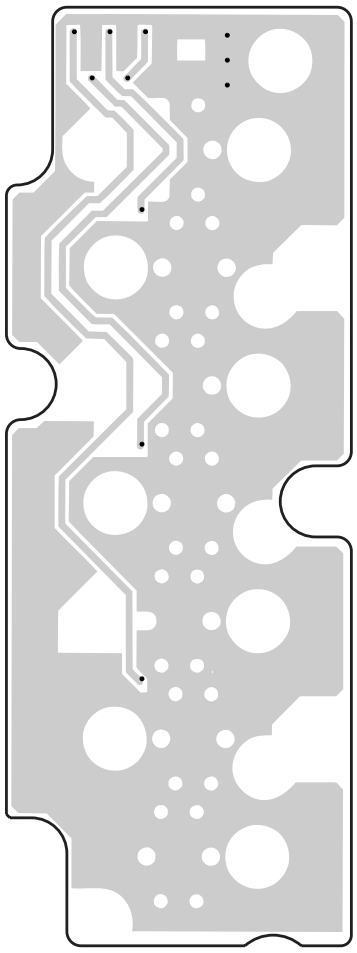
LED PWB-A11

JACK PWB-A10(TOP VIEW)

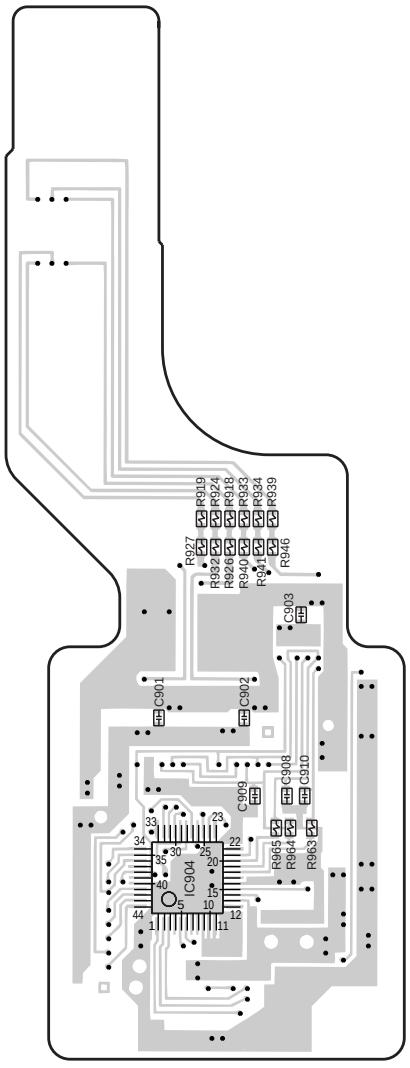


7	8	9	10	11	12

Figure 47 WIRING SIDE OF P.W.BOARD (12/14)

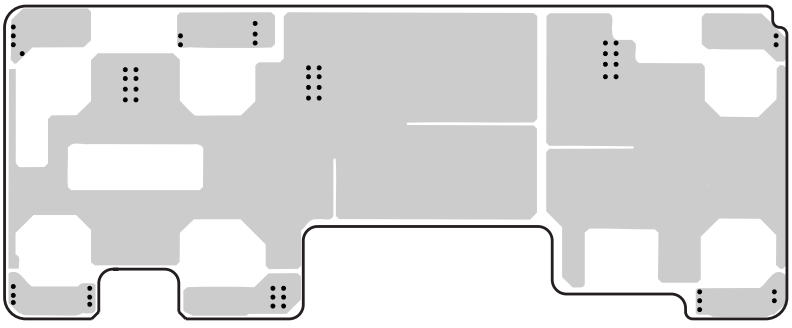


SWITCH1 PWB-A4
(BOTTOM VIEW)

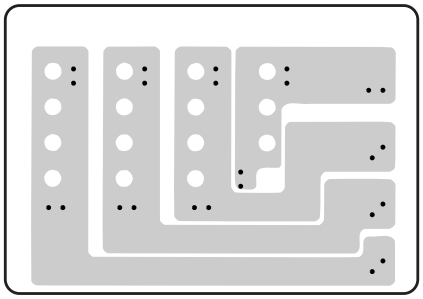


SYSTEM MICROCOMPUTER
PWB-A3(BOTTOM VIEW)

JACK PWB-A10(BOTTOM VIEW)



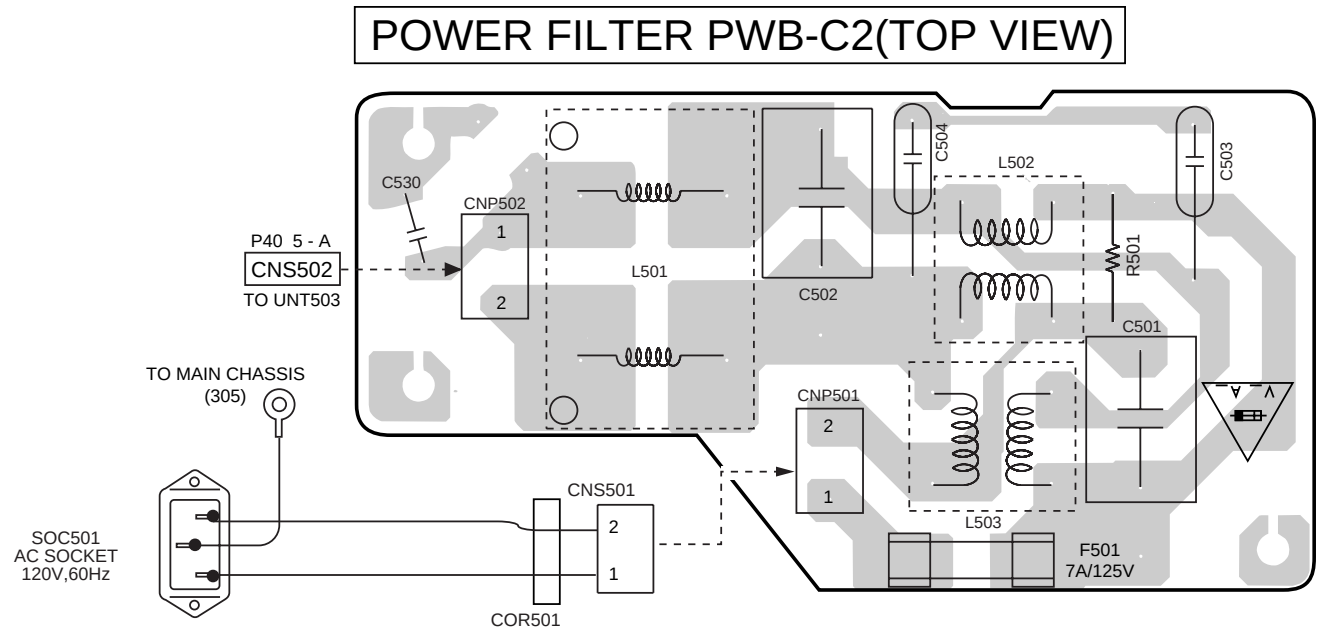
MAIN VOLUME
PWB-A9
(BOTTOM VIEW)



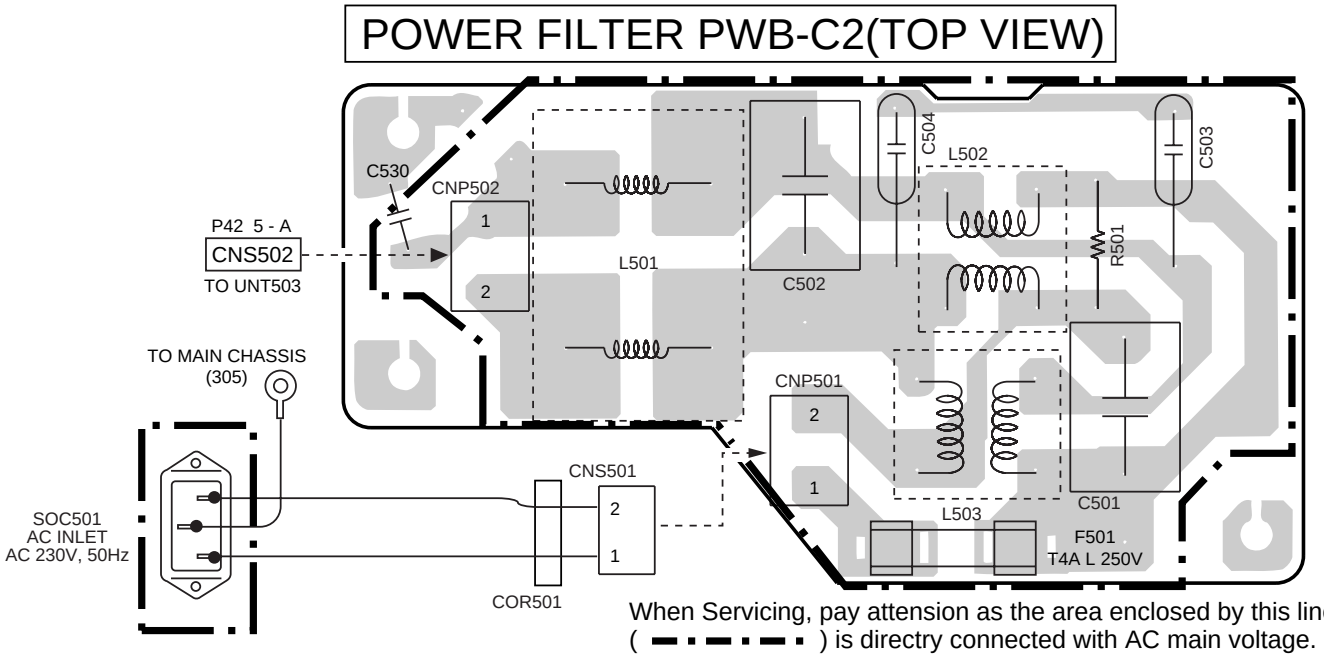
● : Through-hole where the top and bottom patterns are connected.

Figure 48 WIRING SIDE OF P.W.BOARD (13/14)

110-127V



220-240V



When Servicing, pay attension as the area enclosed by this line ( ) is directry connected with AC main voltage.

7	8	9	10	11	12

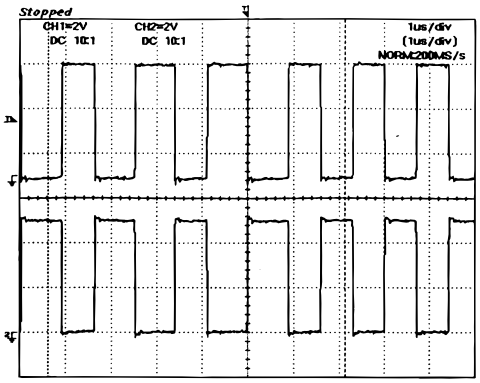
Figure 49 WIRING SIDE OF P.W.BOARD (14/14)

WAVEFORMS OF CD CIRCUIT

❶

• OUTR(+), OUTR(-)
• OUTL(+), OUTL(-)

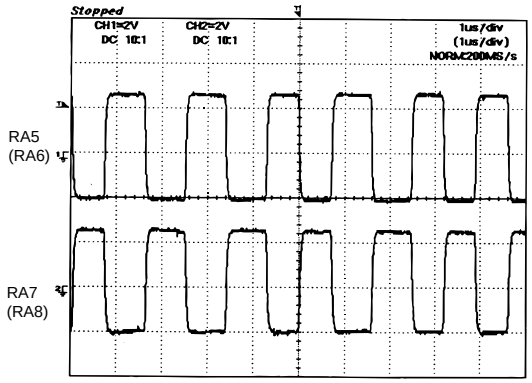
Observe each pair.



❷

• RA5, RA7
• RA6, RA8

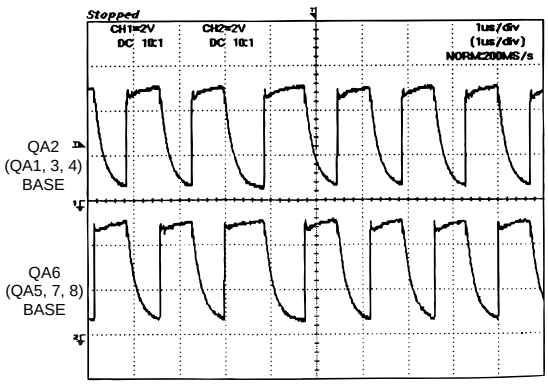
Observe each pair.



❸

• QA1, QA5
• QA2, QA6
• QA3, QA7
• QA4, QA8

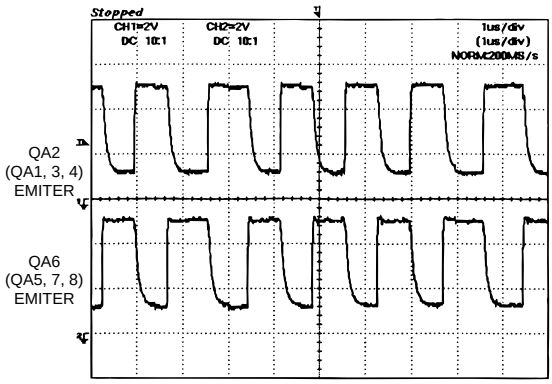
Observe each pair.



❹

• QA1, QA5
• QA2, QA6
• QA3, QA7
• QA4, QA8

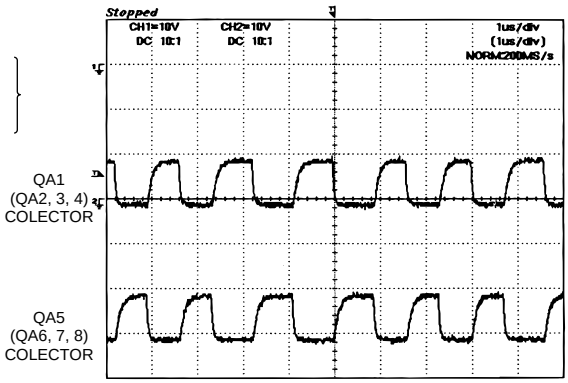
Observe each pair.



❺

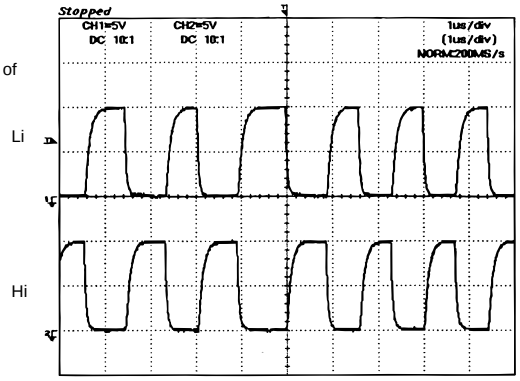
• QA1, QA5
• QA2, QA6
• QA3, QA7
• QA4, QA8

Observe each pair.



❻

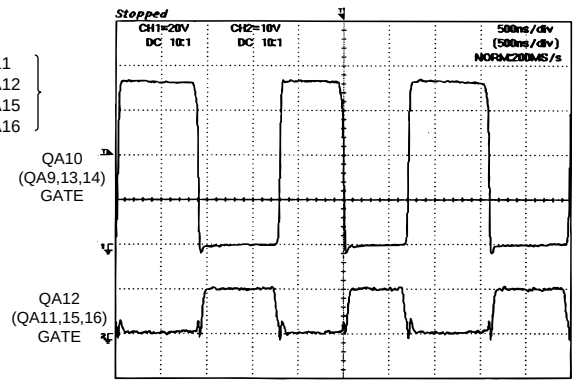
Observe Li and Hi of ICA4 to 7 of each.



❼

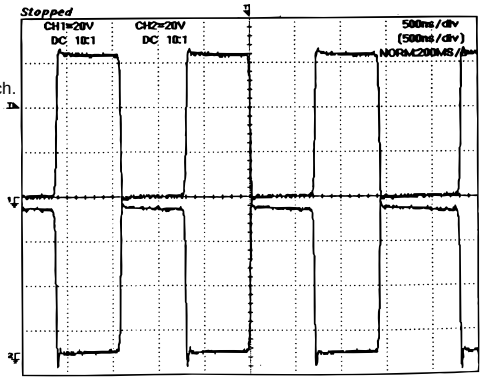
• QA9, QA11
• QA10, QA12
• QA13, QA15
• QA14, QA16

Observe each pair.



❽

Observe SW section of Lch and Rch of each.



Set -32V at GND for observation of ❻ to ❽.

TROUBLESHOOTING

• Power is not supplied. (LED does not come on and it does not sound.)

Does AC100V stand between Pins 1 and 2 of the power filter PWB connector CNP502?
- No → • Check the fuse F501. • Check the parts on the power filter PWB. • Check the wiring of the inlets SOC501 and CNS501.
- Yes ↓

Is AC100V supplied between the input L1/L2 of the rectification unit UNT503?
- No → • Check the wiring of the power switches SW501 and CNS502.
- Yes ↓

Is any normal voltage is output from the power PWB B1503/CNS503?
- No → • Check whether CNS502 is wired across ST1 and ST2 of the rectification unit or not. • Check the output voltage (OYT terminal) of UNT501 and UNT502. • Check the parts (L504 to L511, F502, FS503 and R503 to R506) on the power PWB. • Check the 1-bit amplification unit. (Try to disconnect CNWAM4 and CNWAM3.)
- Yes ↓

Is 5V supplied to Pin 13 of the microcomputer IC904?
- No → • Check IC107 output. • Check R189.
- Yes ↓

Is any oscillating waveform found at Pins 14 (OSC2) and 15 (OSC1)?
- No → • Check X901. • Check IC904.

• It neither sound at the analog nor digital input. (when power is supplied and LED is lit.)

Are the speaker relays RLY108 and RLY107 switched?
- No → • Check whether 12V is supplied to RLY107 and RLY108 or not. (Check the surroundings of Q251, Q252, R251 to R253.) • Check whether 12V is output from IC106 or not. • Check whether Q118 and Q119 are on or not. • Check the line Q118 and Q119 from Pin 41 of the microcomputer IC904.
- Yes ↓

Are they properly wired to the 1-bit amplifying unit? (CNWAM1, CNWAM2, CNWAM3, CNWAM4)
- Yes ↓

Is voltage properly supplied to 1-bit amplifier? (CNP102)
- No → • Check whether the proper voltage is output from the power PWB CNW503 or not. • Check whether RLY106 is activated or not. • Check whether Q116 is on or not. • Check the line Q116 from Pin 42 of the microcomputer IC904.
- Yes ↓

Is voltage properly supplied to 1-bit amplifier? (CNP109)
- No → • Check -22V (around Q115 and Q114). • Check 5V (around Q105 and Q106). • Check reset 5V. (Connection from Pin 21 of the microcomputer IC904.)
- Yes ↓

Is any signal output from the connectors CNP107 and CNP108 for 1-bit amplifier?
- No → • Check CNS601A/B and main volume, VOL601. • Check the IC107 output voltage which is supplied to drive the relay. • Check the relays RLY601 and RLY602 and drive circuit.
- Yes ↓

Check the inside of the 1-bit amplifying unit.

• It does not sound at the analog input (Line 1 and Line 2) alone.

Is any signal input to CNP116 or CNP117?
- No → Check the wiring from the input terminal to CNP116 and CNP117.
- Yes ↓

Does it not sound on both Line 1 and Line 2?
- No → Check the wiring from RLY101, RLY102, RLY104 and the relays to the microcomputer IC904.
- Yes ↓

Is 5V supplied to drive the relays (RLY101, RLY102 and RLY104)?
- No → Check IC107.
- Yes ↓

Is any signal supplied to the analog line amplifying units Q613, Q614, Q617 and Q618?
- No → Check the wiring from RLY201, RLY601, RLY602 and the relays to the microcomputer IC904.
- Yes ↓

Is any signal output from the analog line amplifying units?
- No → Check the line amplifying circuit.
- Yes ↓

Is any signal output from CNP108?
- Yes ↓

Check the wiring to 1-bit amplifying unit, and 1-bit amplifying unit.

• It does not sound on the digital input alone.

• It does not sound on Digitals 1 to 4 at all.

Is 5V supplied to Pin 3 of CNP801?
- No → Check IC108.
- Yes ↓

Is any digital signal output from Pin 9 of IC801?
- No → Check IC801.
- Yes ↓

Is any digital signal output from Pin 4 of IC802?
- No → Check the wiring of CNP801 and CNS801. Check IC802.
- Yes ↓

Is any digital signal input to P37 of IC804?
- No → Check the wiring of CNP801 and CNS801.
- Yes ↓

Is any digital signal from IC804 to IC806? (DATA, MC-, WC, MCC)
- No → Check IC804 and IC805.
- Yes ↓

Is any digital signal supplied from IC806 to IC807?
- No → Check IC806.
- Yes ↓

Is any initial setting signal supplied from Pins 38, 39 and 42 of IC807?
- No → Check the wiring from Pins 38, 39 and 42 of IC807 to the microcomputer IC904.
- Yes ↓

To next page

From the front page

Is any 1-bit signal from Pins 27 and 33 of IC807 output to RLY801?
No → Check IC808, IC809, IC811, IC812 and IC813.
Yes

Does RLY801 and RLY802 operate?
No → Check the operation of Q801 and Q802 and the wiring of each to the microcomputer IC904.
Yes

Check the wiring from B1108/CNS108 to CNP107 and 1-bit amplifying unit.

• It does not sound at DIGITAL1 or DIGITAL4 alone.

Is any digital signal output from Pin 8 or 10 of IC802?
No → Check RX801, RX802 and IC802.
Yes

Is any digital signal output from Pin 9 of IC801?
No → Check IC801 and input A, B terminal logic.

• It does not sound at DIGITAL2 or DIGITAL3 alone.

Is any digital signal output from Pin 8 or 6 of IC803?
No → Check CNS803.
Check the wiring from CNS803 to IC803.
Yes

Is any digital signal output to Pin 9 of IC801?
No → Check IC801 and input A, B terminal logic.

• 1-bit amplifying section check (Signal is output from CNP107 and CNP108 but it does not sound.)

Is any signal output form Pins 2, 3, 5 and 6 of ICA1? (Fig. 54-1)
No → Check the waveform of the input pin, ICA1, voltage supplied to ICA1 and ICA1 oscillating circuit.
Yes

Are the waveforms of QA1 to QA8 proper? (Fig. 54-2, Fig. 54-3, Fig. 54-4)
No → Check ICA2, ICA3, QA1 to QA7.
Yes

Are the waveforms of ICA4 to ICA7 proper? (Fig. 54-5)
No → Check ICA4 to ICA7.
Yes

Are the waveforms of QA9 to QA16 proper? (Fig. 54-6, Fig. 54-7)
No → Check RA53 to FA60 and QA9 to QA16.
Yes

Is any signal output from CNWAM6 and CNWAM7?
No → Check LA802 to LA808.
Check the soldering.
Yes

Check the surrounding of the relay PWB.

• 1-bit amplifying section check (power trouble/protector activation)

Don't the protector activate together with drop of voltage ±32V if CNWAM4 and CNWAM3 are disconnected?
→ No → Recheck the main body section.

↓ Yes

Does the oscillating circuit operate? Check Pin 9.
→ No → Replace ICA1. Check CXA1 crystal and CA8, CA9.

↓ Yes

Check ICA4 to ICA7, CA36 to CA39, QA9 to QA16 and RA53 to RA60.

* When protection is activated, even if the function is switched, switching is not possible. Moreover, the volume is not variable, and the volume indicator does not change. It is released when the power switch is turned off.

❶
• OUTR(+), OUTR(-)
• OUTL(+), OUTL(-)
Observe each pair.

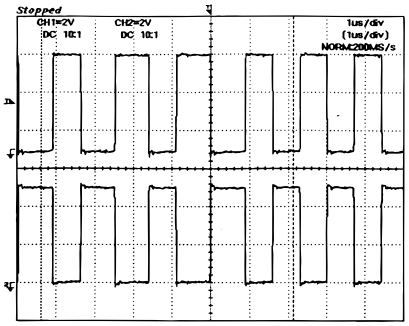


Figure 54-1

❸
• QA1, QA5
• QA2, QA6
• QA3, QA7
• QA4, QA8
Observe each pair.

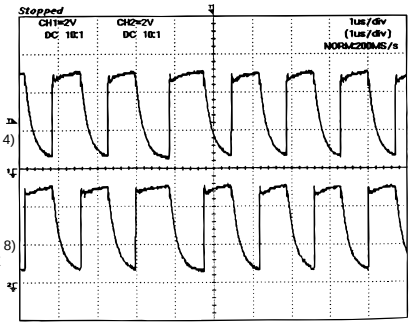


Figure 54-2

❹
• QA1, QA5
• QA2, QA6
• QA3, QA7
• QA4, QA8
Observe each pair.

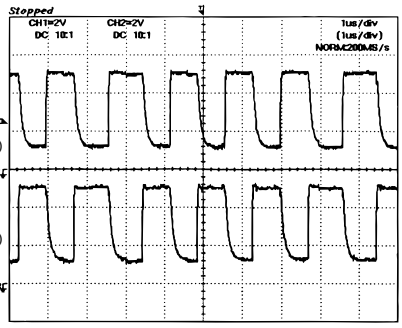


Figure 54-3

❺
• QA1, QA5
• QA2, QA6
• QA3, QA7
• QA4, QA8
Observe each pair.

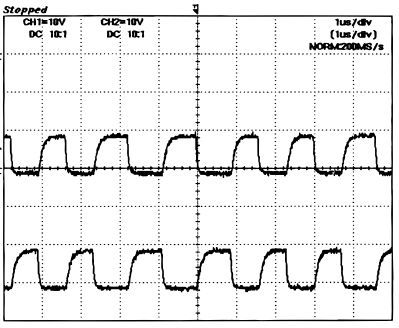


Figure 54-4

❻
Observe Li and Hi of ICA4 to 7 of each.

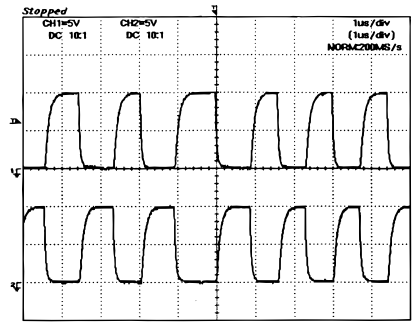


Figure 54-5

❼
• QA9, QA11
• QA10, QA12
• QA13, QA15
• QA14, QA16
Observe each pair.

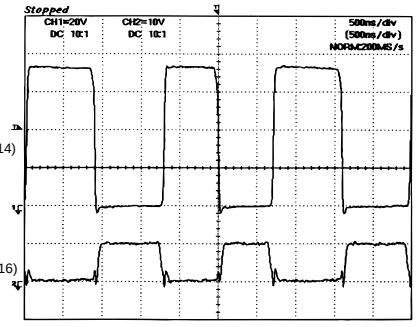


Figure 54-6

❽
Observe SW section of Lch and Rch of each.

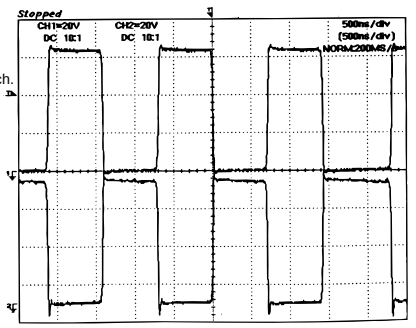


Figure 54-7

FUNCTION TABLE OF IC

IC804 VHiYM3436D/-1: Digital Interface Receiver (YM3436D)

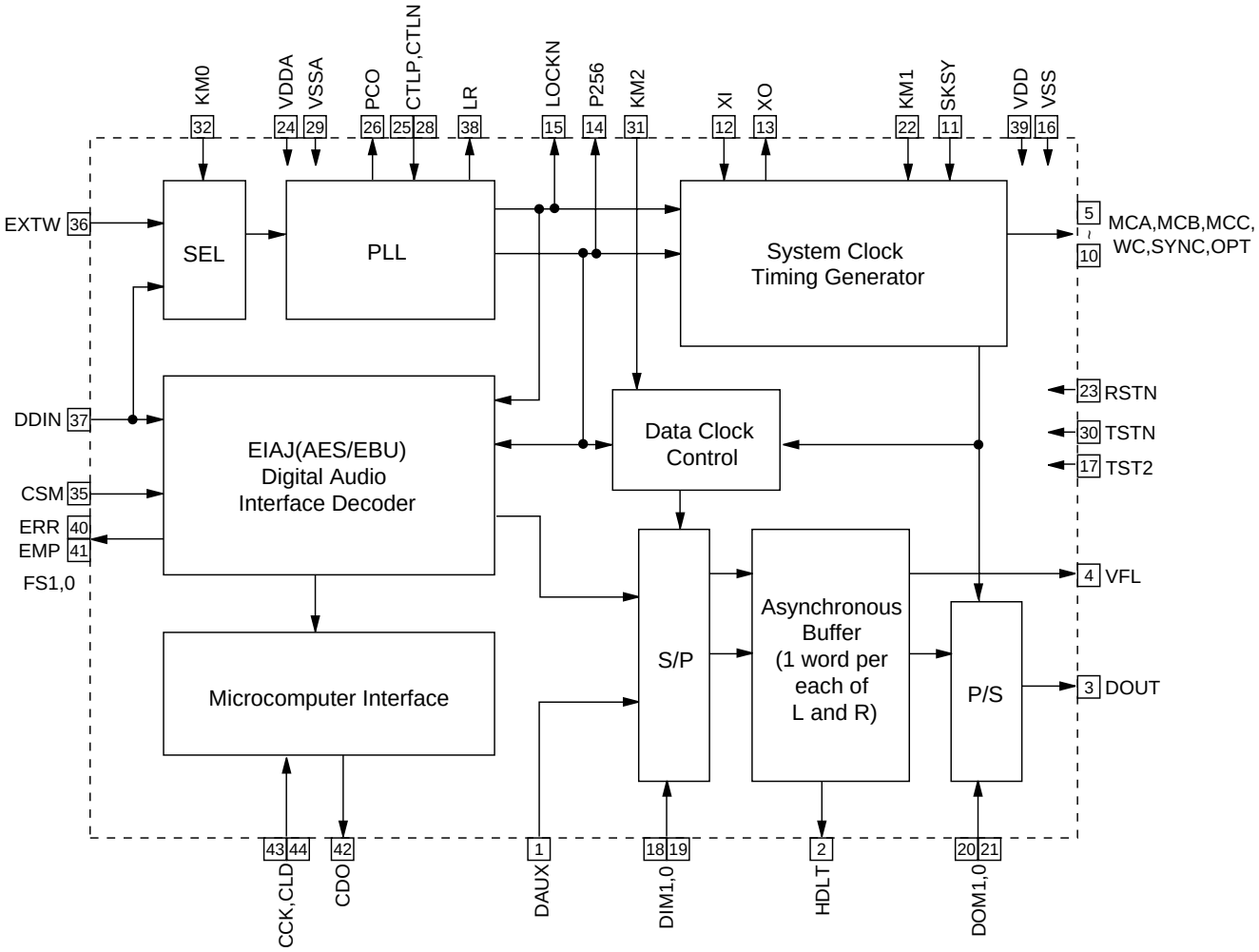
• Outline

YM3436D(DIR2) is a LSI which receives and demodulate the digital/audio/interface/format signals which comply with EIAJ CP-340 and AES/EBU. Keeping the features of the existing YM3623B(DIR), it is designed to not only strengthen the external synchronization, error process and other functions but also be more general for the channel status, user data output and other general applications.

Pin No.	Port Name	Input/Output	Function
1	DAUX	Input	Audio data auxiliary input
2*	HDLT	Output	Asynchronous buffer operation flag output
3	DOUT	Output	Audio data output
4*	VFL	Output	Validity flag output
5*	OPT	Output	Synchronous signal output (fs) for DAC
6*	SYNC	Output	Synchronous signal output (fs) for DSP
7	MCC	Output	Bit clock output (64fs)
8	WC	Output	Word clock output (fs)
9*	MCB	Output	Bit clock output (128fs)
10	MCA	Output	Bit clock output (256fs)
11	SKSY	Input	Clock synchronizing control input
12	XI	Input	Quartz oscillator connection, or external clock input (256fs)
13	XO	Output	Quartz oscillator connection
14*	P256	Output	VCO clock output (When clocked, 256fs)
15	LOCKN	Output	PLL lock flag output ('L': Clocked, 'H': Unlocked)
16	VSS	—	Grand (logic system)
17*	TST2	Output	LSI test terminal (As usual, don't connect it.)
18	DIM1	Input	Data input mode selection 1
19	DIM0	Input	Data input mode selection 0
20	DOM1	Input	Data output mode selection 1
21	DOM0	Input	Data output mode selection 0
22	KM1	Input	Clock mode selection 1 ('H': PLL auto switch, 'L': XI fixed)
23	RSTN	Input	System reset input (active low)
24	VDDA	—	+5V power supply (VCO system. Externally connect it to VDD.)
25	CTLN	Input	VCO control input
26	PCO	Output	PLL phase comparative output
27*	N.C.	—	Not used
28	CTLP	Input	VCO adjustment input (As usual, connect it to VSSA.)
29	VSSA	—	Grand (VCO system. Externally connect it to VSS.)
30*	TSTN	Input	LSI test terminal (As usual, it is not connected.)
31	KM2	Input	Clock mode selection 2 ('H": PLL synchronization, 'L': XI synchronization)
32	KM0	Input	Clock mode selection 0 ('H': EXTW input, 'L': DDIN input)
33	FS1	Output	Sampling frequency code output 1/channel status output
34	FS0	Output	Sampling frequency code output 0/user data output
35	CSM	Input	Channel status, user data output method selection
36	EXTW	Input	External synchronizing auxiliary input, Word clock
37	DDIN	Input	EIAJ(AES/EBU) digital audio interface signal input
38*	LR	Output	PLL word clock output (When locked, fs)
39	VDD	—	+5V power (logic system)
40	ERR	Output	Data error flag output
41	EMP	Output	Emphasis control code output/block start synchronizing signal output
42*	CDO	Output	Microcomputer interface data output
43	CCK	Input	Microcomputer interface clock input
44	CLD	Input	Microcomputer interface load input

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC804 VHiYM3436D/-1: Digital Interface Receiver (YM3436D)



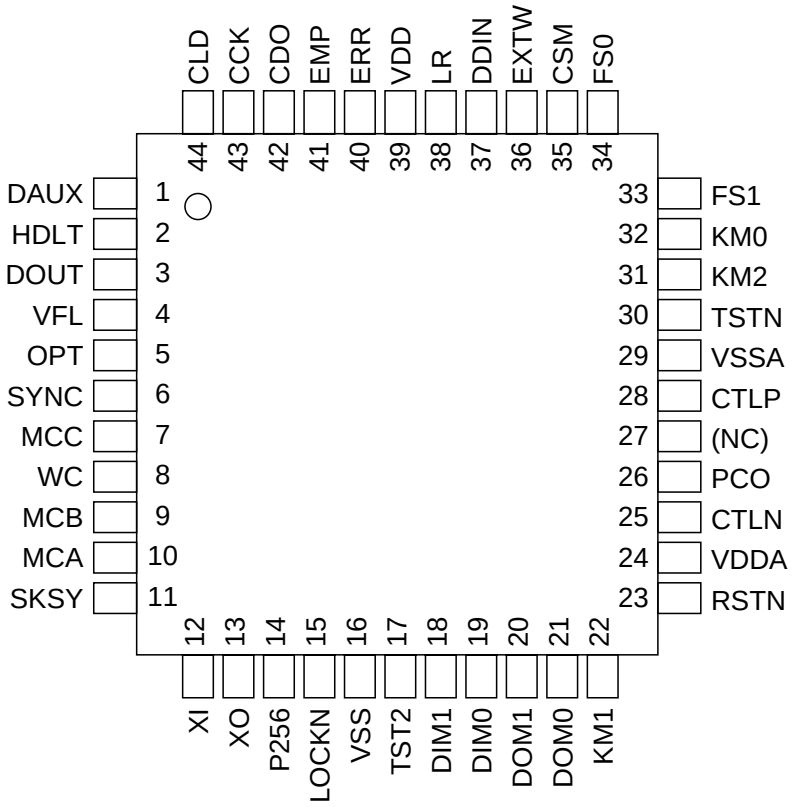


Figure 56 BLOCK DIAGRAM OF IC

IC806 VHiSM5844AF-1: Sampling Rate Converter (SM5844AF) (1/2)

• Outline

SM5844AF is a special LSI for sampling rate converter, having a function to asynchronously covert the sample rate of the digital audio signal. The input/output interface correspond to the input data of 16/20-bit word length and the output data of 16/18/20-bit word length. Moreover, it integrates the digital de-emphasis filter, digital attenuator and other functions.
The package is a 44-pin QFP type, and the LSI is excellent in the cost performance.

<table>
<tr><th>Pin No.</th><th>Port Name</th><th>Input/Output</th><th>Function</th></tr>
<tr><td>1, 2</td><td>DI</td><td>Input with pull-up resistor</td><td>Input data</td></tr>
<tr><td>3, 4</td><td>BCKI</td><td>Input with pull-up resistor</td><td>Bit clock on the input side</td></tr>
<tr><td>5</td><td>LRCI</td><td>Input with pull-up resistor</td><td>Word clock on the input side</td></tr>
<tr><td>6</td><td>ICLK</td><td>Input</td><td>System clock input on the input side</td></tr>
<tr><td>7</td><td>ICKSL</td><td>Input with pull-up resistor</td><td>System clock on the input side (ICLK) selection. H:384fsi, L: 256fsi</td></tr>
<tr><td>8*, 9*</td><td>IFM1</td><td>Input with pull-up resistor</td><td rowspan="2">Input format setting at IFM1 and IFM2
<table>
<tr><th>IFM1 Terminal</th><th>IFM2 Terminal</th><th>Word Length</th><th>Data Sequence</th><th>Data Position</th></tr>
<tr><td>L</td><td>L</td><td>16 Bit</td><td rowspan="3">MSB first</td><td rowspan="2">Backward packing</td></tr>
<tr><td>L</td><td>H</td><td rowspan="3">20 Bit</td></tr>
<tr><td>H</td><td>L</td><td>Forward packing</td></tr>
<tr><td>H</td><td>H</td><td>LSB first</td><td>Backward packing</td></tr>
</table></td></tr>
<tr><td>10, 11</td><td>IFM2</td><td>Input with pull-up resistor</td></tr>
<tr><td>12, 13</td><td>VDD</td><td>—</td><td>Power supply terminal (5V)</td></tr>
<tr><td>14, 15</td><td>DMUTE</td><td>Input with pull-up resistor</td><td>(Direct) mute</td></tr>
<tr><td>16</td><td>MCOM</td><td>Input with pull-up resistor</td><td>Function switch of 17 to 20 pins</td></tr>
<tr><td>17</td><td>MDT/FSI1</td><td>Input with pull-up resistor</td><td>In case of MCOM=H, Microcomputer data input: MDT
In case of MCOM=L, De-emphasis frequency setting: FSI1</td></tr>
<tr><td>18</td><td>MCK/FSI2</td><td>Input with pull-up resistor</td><td>In case of MCOM=H, Bit-clock for microcomputer data input: MCK
In case of MCOM=L, De-emphasis frequency setting :FSI2
Input sample frequency setting (for de-emphasis)
<table>
<tr><th>fsi</th><th>FSI1</th><th>FSI2</th></tr>
<tr><td>32.0 kHz</td><td>H</td><td>H</td></tr>
<tr><td>44.1 kHz</td><td>X</td><td>L</td></tr>
<tr><td>48.0 kHz</td><td>L</td><td>H</td></tr>
</table></td></tr>
<tr><td>19, 20</td><td>MLEN/DEEM</td><td>Input with pull-up resistor</td><td>In case of MCOM=H, Microcomputer data word latch clock: MLEN
In case of MCOM=L, De-emphasis ON/OFF control: DEEM</td></tr>
<tr><td>21, 22</td><td>OW18N</td><td>Input with pull-up resistor</td><td rowspan="2">Output format setting with OW18N, OW20N
Time of IISN=H (normal mode)
<table>
<tr><th colspan="2">Output Format</th><th>OW20N</th><th>OW18N</th></tr>
<tr><td>16 Bit</td><td rowspan="3">Backward packing</td><td>H</td><td>H</td></tr>
<tr><td>18 Bit</td><td>H</td><td>L</td></tr>
<tr><td rowspan="2">20 Bit</td><td>L</td><td>H</td></tr>
<tr><td>Forward packing</td><td>L</td><td>L</td></tr>
</table>
Time of IISN=L (IIS mode)
<table>
<tr><th colspan="2">Output Format</th><th>OW20N</th><th>OW18N</th></tr>
<tr><td>16 Bit</td><td rowspan="3">IIS Mode
Forward packing</td><td>H</td><td>H</td></tr>
<tr><td>18 Bit</td><td>H</td><td>L</td></tr>
<tr><td rowspan="2">20 Bit</td><td>L</td><td>H</td></tr>
<tr><td>L</td><td>L</td></tr>
</table></td></tr>
<tr><td>23, 24</td><td>OW20N</td><td>Input with pull-up resistor</td></tr>
<tr><td>25, 26</td><td>IISN</td><td>Input with pull-up resistor</td><td>IIS output mode selection. H: Normal mode, L: IIS mode</td></tr>
<tr><td>27*</td><td>STATE</td><td>Output</td><td>Output to express the internal operational state (for operation check)</td></tr>
<tr><td>28*</td><td>TST1N</td><td>Input with pull-up resistor</td><td>Control of output dither. H: Dither OFF, L: Dither ON</td></tr>
<tr><td>29*</td><td>TST2N</td><td>Input with pull-up resistor</td><td>Test terminal. Set at H.</td></tr>
<tr><td>30, 31</td><td>RSTN</td><td>Input with pull-up resistor</td><td>Reset terminal</td></tr>
<tr><td>32, 33</td><td>Vss</td><td>—</td><td>GND terminal (0V)</td></tr>
</table>

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC806 VHiSM5844AF-1: Sampling Rate Converter (SM5844AF) (2/2)

Pin No.	Port Name	Input/Output	Function
34, 35	SLAVE	Input with pull-up resistor	Mode setting of BCKO, LRCO terminal. H: Output terminal is selected. (Slave mode) L: Input terminal is selected. (Master mode)
36*,37*	THRUN	Input with pull-up resistor	Through mode setting of DOUT H: Normal mode, L: Through mode
38	OCKSL	Input with pull-up resistor	System clock on the output side (OCLK) selection. H: 384fs, L: 256fs
39	OCLK	Input	Output system clock input
40	LRCO	Input/Output	Word clock output/input on the output side (fso) Output/input mode is set from the slave terminal.
41, 42	BCKO	Input/Output	Bit clock output/input on the output side Output/input mode is set from the slave terminal.
43, 44	DOUT	Output	Data output

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

Note 1: "fsi" means the word clock (LRCI) on the input side, and "fso" means the work clock (LRCO) on the output side.

Note 2: When H level is set, "open" is also applicable.

Note 3: When the terminal of plural terminal Nos. for the same terminal name is used, it does not matter whether either or both terminals are connected.

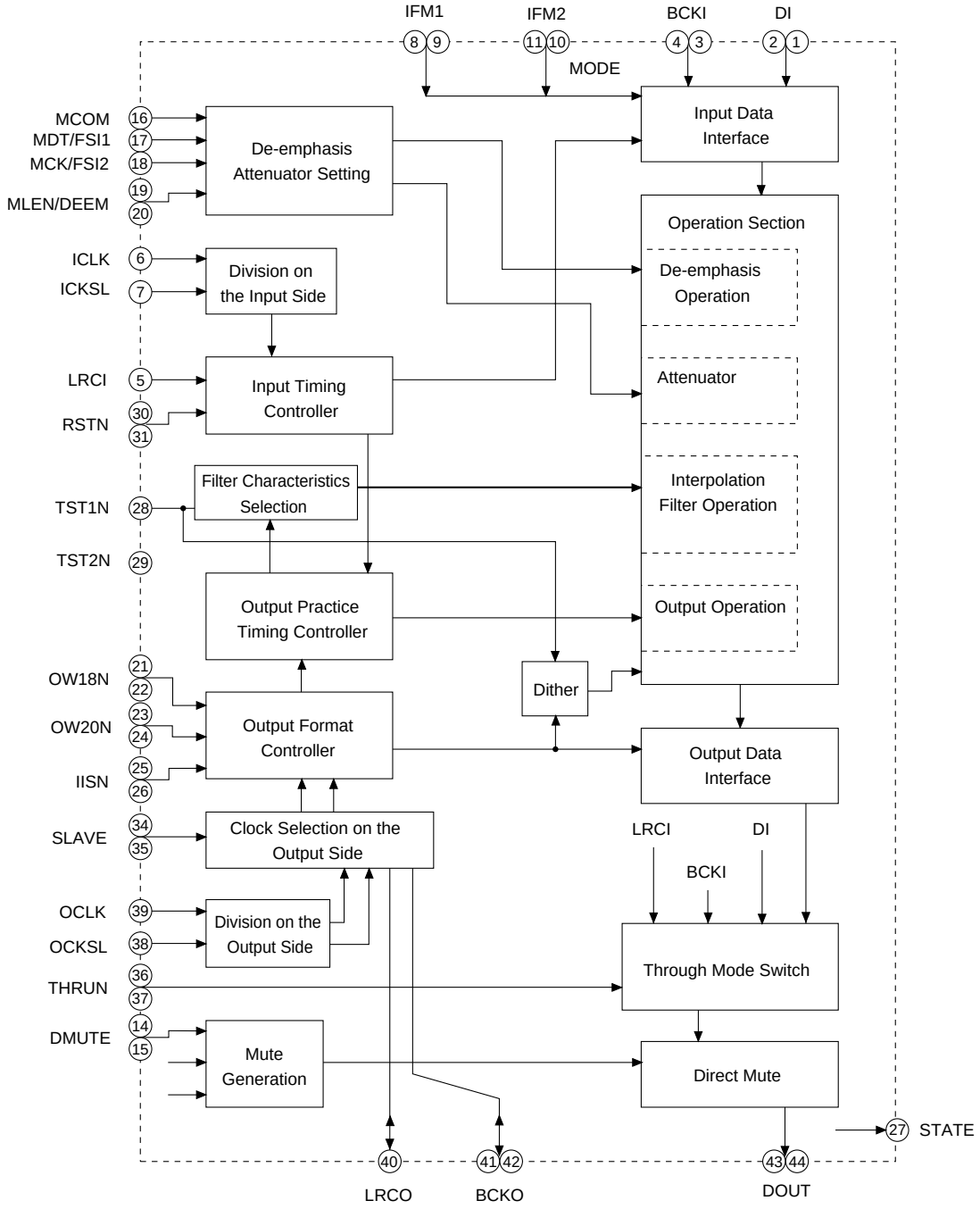


Figure 58 BLOCK DIAGRAM OF IC

IC807 VHiTDA1307/-1: 1-Bit Conversion (TDA1307) (1/2)

• Outline

The TDA1307 is an advanced oversampling digital filter employing bitstream conversion technology, which has been designed for use in premium performance digital audio applications. Audio data is input to the TDA1307 through its multiple-format interface. Any of the four formats (IIS, Sony 16, 18 or 20-bit) are acceptable. By using a highly accurate audio data processing structure, including 8 times oversampling digital filtering and up to 4th order noise shaping, a high quality bitstream is produced which, when used in the recommended combination with the TDA1547 bitstream DAC, provides the optimum in dynamic range and signal-to-noise performance. With the TDA1307, a high degree of versatility is achieved by a multitude of functional features and their easy accessibility; error concealment functions, audio peak data information and an advanced patented digital fade function are accessible through a simple microprocessor command interface, which also provides access to various integrated system settings and functions.

Pin No.	Port Name	Input/Output	Function
1	WS	Input	Word select input to data interface
2	SCK	Input	Clock input to data interface
3	SD	Input	Data input to interface
4	EFAB	Input (Note 1)	Error flag: (active HIGH) input from decoder chip indicating unreliable data
5	SBCL	Input	Subcode clock: a 10-bit burst clock (typ. 2.8224 MHz) input which synchronizes the subcode data
6	SBDA	Input	Subcode data: a 10-bit burst of data, including flags and sync bits, serially input once per frame, clocked by burst clock input SBCL
7*	CDEC	Output	Decoder clock output: frequency division programmable by means of pins 14 (CLC1) and 17 (CLC2) to output 192, 256, 384 or768 times fs
8	V_{DD3}	—	Positive supply 3
9	V_{SS2}	—	Ground 2
10*	DOBM	Output	Digital audio output: this output contains digital audio samples which have received interpolation, attenuation and muting plus subcode data. Transmission is in biphase-mark code.
11*	DSL	Output	Digital silence detected (active LOW) on left channel
12*	DSR	Output	Digital silence detected (active LOW) on right channel
13	DSTB	Input (Note 2)	DOBM standby mode enforce pin (active HIGH)
14	CLC1	Input	Application mode programming pin for CDEC (pin 7) frequency division
15*	CMIC	Output	Clock output, provided to be used as running clock by microprocessor (in master mode only), output 96fs
16	V_{SS3}	—	Ground 3
17	CLC2	Input	Application mode programming pin for CDEC (pin 7) frequency division
18	CDCC	Input	Master/Slave mode selection pin
19*	RESYNC	Output	Resynchronization: out-of-lock indication from data input section (active HIGH)
20	POR	Input (Note 2)	Power-on reset (active LOW)
21	V_{DD1}	—	Supply voltage 1
22	XTAL1	Input	Crystal oscillator terminal: local crystal oscillator sense
23	XTAL2	Output	Crystal oscillator output: drive output to crystal or forced input in slave mode
24	V_{DDOSC}	—	Positive supply connection to crystal oscillator circuitry
25	V_{SSOSC}	—	Ground connection to crystal oscillator circuitry
26*	MODE	Input (Note 2)	Evaluation mode programming pin (active LOW); in normal operation, this pin should be left open-circuit or connected to the positive supply
27	DOL	Output	Data output left channel to bitstream DAC TDA1547
28*	NDOL	Output	Complementary data output left channel to TDA1547
29	V_{DDAL}	—	Positive supply connection to output data driving circuitry, left channel
30	V_{SSAL}	—	Ground connection to output data driving circuitry, left channel
31	V_{SSAR}	—	Ground connection to output data driving circuitry, right channel
32	V_{DDAR}	—	Positive supply connection to output data driving circuitry, right channel
33	DOR	Output	Data output right channel to TDA1547
34*	NDOR	Output	Complementary data output right channel to TDA1547
35	CDAC	Output	Clock output to bistream DAC TDA1547
36, 37	TEST1, TEST2	Input (Note 1)	Test mode input. In normal operation this pin should be connected to ground
38	DA	Input/Output (Note 2)	Bidirectional data line intended for control data from the microprocessor and peak data from the TDA1307

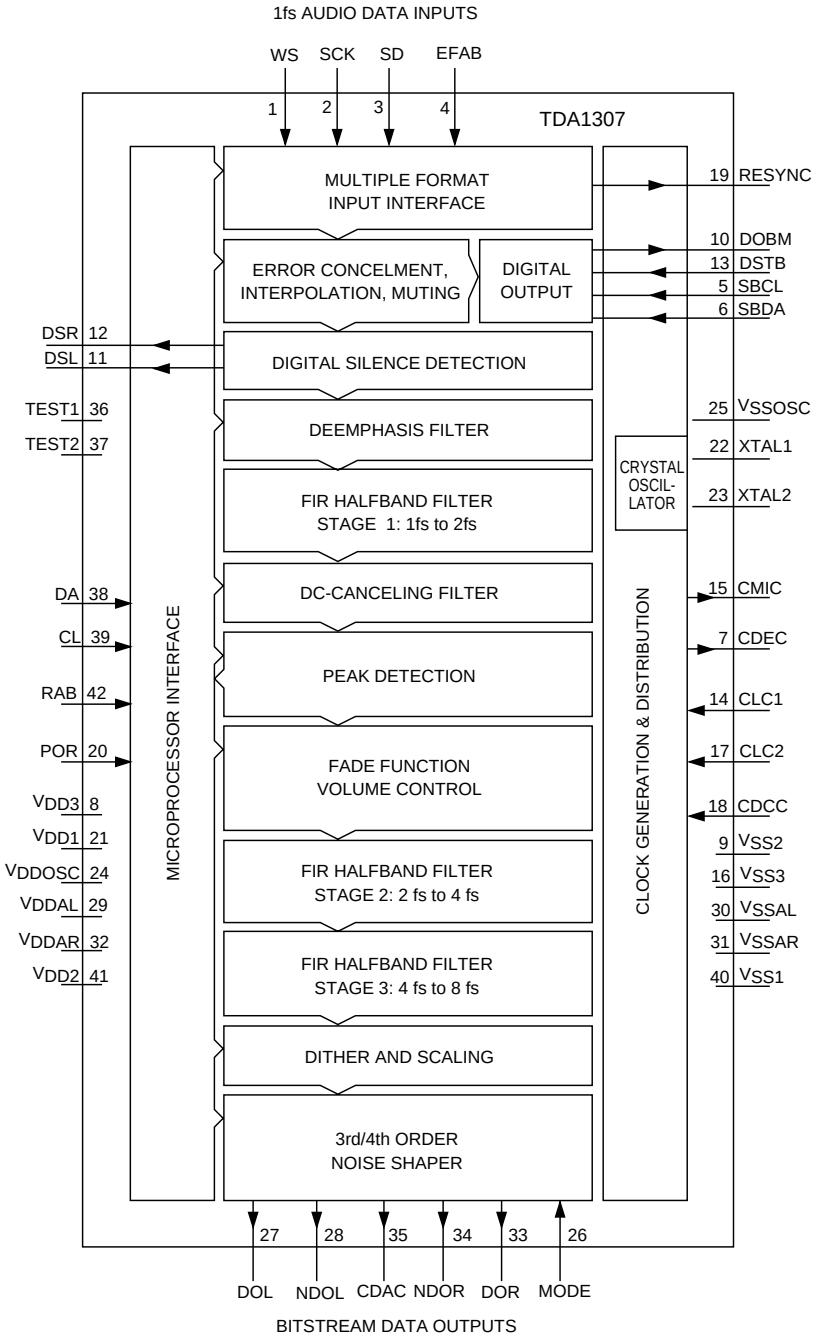
In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC807 VHiTDA1307/-1: 1-Bit Conversion (TDA1307) (2/2)

Pin No.	Port Name	Input/Output	Function
39	CL	Input (Note 2)	Clock input, to be generated by the microprocessor
40	V_{SS1}	—	Ground 1
41	V_{DD2}	—	Supply voltage 2
42	RAB	Input (Note 2)	Command/peak data request line

Notes

1. These pins are configured as internal pull-down.
2. These pins are configured as internal pull-up.



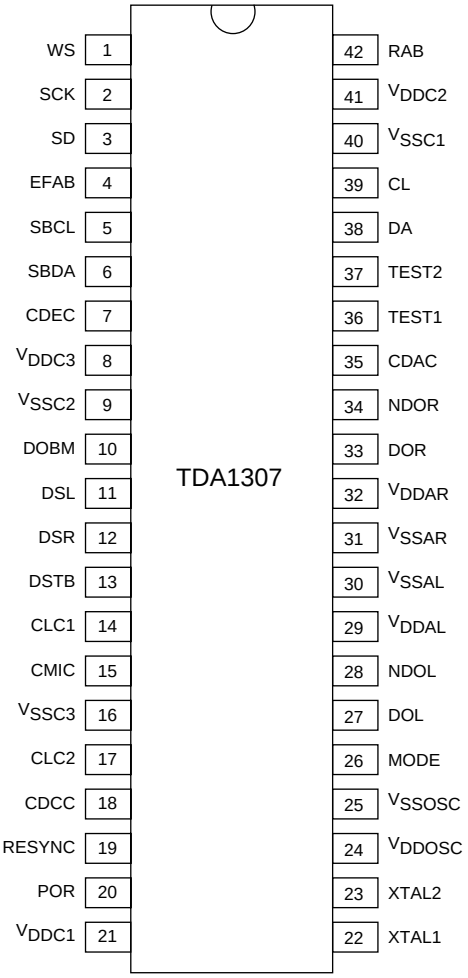


Figure 60 BLOCK DIAGRAM OF IC

IC901~IC903 VHiBU2114F+-1: LED Driver (BU2114F)

• Outline

It is the low power consuming CMOSIC which has the latch in the 8-bit shift register and can asynchronously latch the data latched in the shift register. Since the output (O1 to O8) is the open drain output (Since the protective diode is not provided, the voltage of VDD or more to max. 7V is applicable, and the drive is possible at 36mA per output up to the total output of 150mA. (Static operation mode)

Pin No.	Port Name	Input/Output	Function
1	SIN	Input	Serial data input terminal
2	CK	Input	Shift clock of shift register
3	LATCH	Input	When the terminal is turned to "L", the latch output is held. Moreover, the latch output also varies as the shift register output varies when it is "H".
4*	SOUT	Output	Output of shift register of the final step
5	EN	Input	Enable terminal of O1 to O8 When the terminal is "L", the latch output appears as it is. However, the output Qn is "L" when the latch output is "H", and Qn is "hi-Z" when the latch output is "L".
6	RST	Input	Shift register, latch reset
7 - 9	GND	—	0V Power supply
10	O8	Output	Latch output at 8th step of shift register
11	O7	Output	Latch output at 7th step of shift register
12	O6	Output	Latch output at 6th step of shift register
13	O5	Output	Latch output at 5th step of shift register
14	O4	Output	Latch output at 4th step of shift register
15	O3	Output	Latch output at 3rd step of shift register
16	O2	Output	Latch output at 2nd step of shift register
17	O1	Output	Latch output at 1st step of shift register
18	VDD	—	+VDD power supply

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

Note) Output of O1 to O8 is an open-drain type, and when the output of the shift register is "H", the output becomes the level "L".

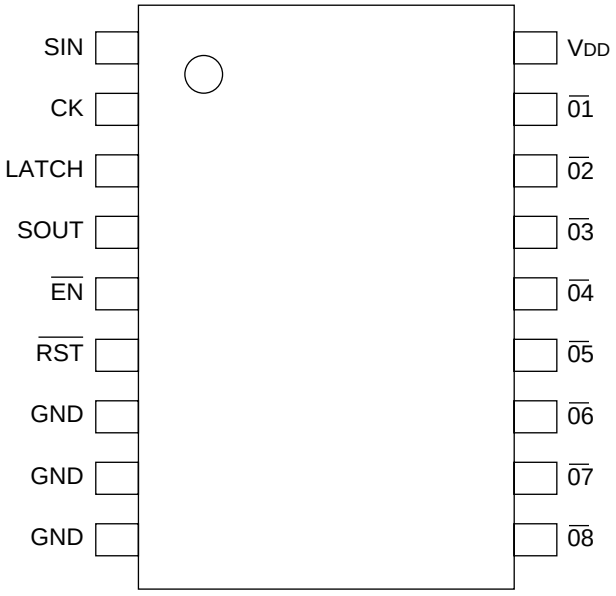


Figure 61 BLOCK DIAGRAM OF IC

IC904 RH-iX2816AFZZ: System Microcomputer (IX2816AF)

Pin No.	Port Name	Terminal Name	Input/Output	Function
1	LED3, P83	DATA_IN	Input	External IC communication input
2	LED2, P82	DATA_OUT	Output	External IC communication output
3	LED1, P81	IC_CLK	Input	External IC communication clock
4	LED0, P80	—	Input	Not used
5	AN0, PA0	KEY	Input	Key input. A/D input. VER.1
6	AN1, PA1	VOL DIS	Input	A/D input to display VOL value
7	AN2, PA2	KEYA	Input	Key input. A/D input. VER.2
8	AN3, PA3	KEYB	Input	Key input. A/D input. VER.2
9	AN4, PA4	KEYC	Input	Key input. A/D input. VER.2
10-12	AN5, PA5-AN7, PA7	—	Input	Not used
13	VDD	VDD	—	Power supply
14	OSC2	OSC2	Output	Oscillator
15	OSC1	OSC1	Input	Oscillator
16	VSS	VSS	—	Power supply
17*	NC	—	—	Not used
18	TXD, SBD0, P00	SDATA	Outout	Output to serial/parallel converter for LED display. DATA
19	RXD, SBI0, P01	SLATCH	Outout	Output to serial/parallel converter for LED display. Latch output
20	SBT0, P02	SCLK	Output	Output to serial/parallel converter for LED display. Clock output
21	BUZZER, P06	IC_RESET	Output	Reset output to external IC
22*	RMOUT, P10	AUD MUTE	Output	Output for AUDIO MUTE
23*	P11	CL_CONT	Output	Clock control between external IC and IC
24	P12, TMIO2	DCLK	Output	Setting output to D/A. Clock output
25	P13, TMIO3	DLATCH	Output	Setting output to D/A. Latch output
26	P14, TMIO4	DDATA	Input/Output	Setting output to D/A. Data input/output
27	P20, IRQ0	PROTECT	Input	PROTECT signal detection input
28	P21, IRQ1, SENS	P-IN	Input	Warning input
29	P22, IRQ2	IC_STB	Input	External IC communication strobe
30	P60	DIG_B	Output	Digital input switch B Switch of digital input is controlled with DIG_A and B.
31	P61	DIG_A	Output	Digital input switch A
32	P62	DIG_MUTE	Output	Output for digital mute
33	P63	AUX3	Output	Input relay of AUX3 is switched.
34	P64	AUX2	Output	Input relay of AUX2 is switched.
35	P65	AUX1	Output	Input relay of AUX1 is switched.
36	P66	AMP DIG	Output	Input (digital, analog) to AMP is switched.
37*	P67	AMP ANA	Output	Input (digital, analog) to AMP is switched.
38	P70	DIG_C	Output	Digital input switch C Switch of digital input accompanied to AUX1 is controlled.
39	P27, NRST	RESET	Input	Reset
40	MMOD	TEST	—	TEST
41	P87, LED7	SP_RLY	Output	ON/OFF of speaker relay
42	P86, LED6	POWER	Output	Control terminal of power supply
43	P85, LED5	LINE_MUTE	Output	Line mute for recording
44	P84, LED4	WAR_OUT	Output	Warning output

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC904 RH-iX2816AFZZ: System Microcomputer (IX2816AF)

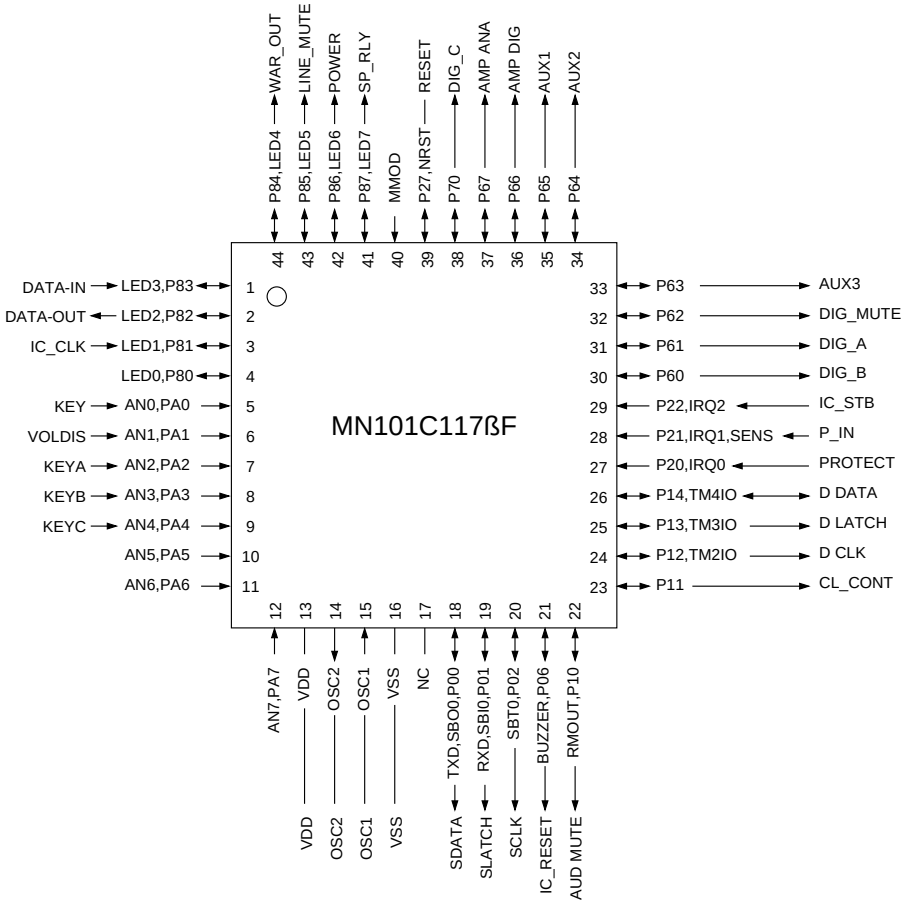


Figure 63-1 BLOCK DIAGRAM OF IC

ICA4~ICA7 VHiHiP2100/-1: FET Driver (HIP2100)

Pin No.	Terminal Name	Function
1	VDD	Positive Supply to lower gate drivers. De-couple this pin to Vss (pin 7). Bootstrap diode connected to HB (pin 2).
2	HB	High-Side Bootstrap supply. External bootstrap capacitor is required. Connect positive side of bootstrap capacitor to this pin. Bootstrap diode is on-chip.
3	MO	High-Side Output. Connect to gate of High-Side power MOSFET.
4	HS	High-Side Source connection. Connect to source of High-Side power MOSFET. Connect negative side of bootstrap capacitor to this pin.
5	HI	High-Side input.
6	LI	Low-Side input.
7	Vss	Chip negative supply, generally will be ground.
8	LO	Low-Side Output. Connect to gate of Low-Side power MOSFET.

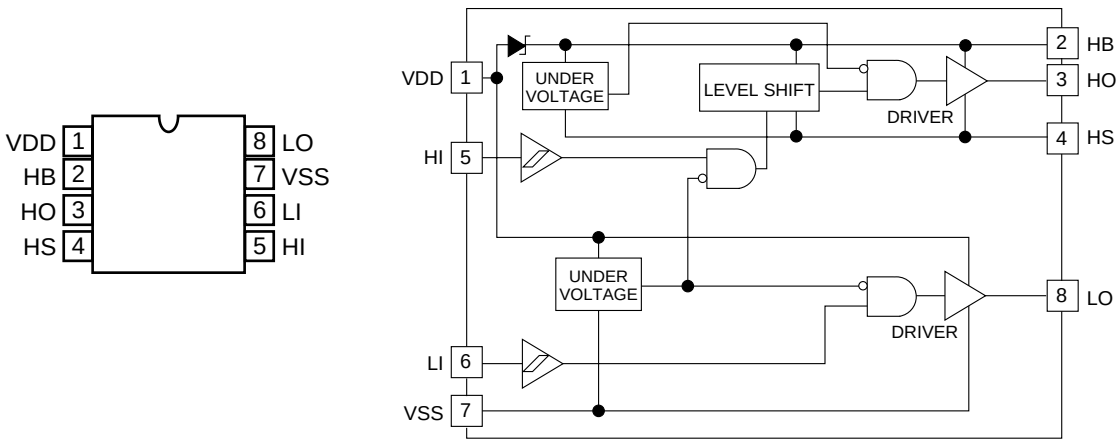


Figure 63-2 BLOCK DIAGRAM OF IC

ICA1 RH-iX2815AFZZ: 7TH ORDER MODULATION CONVERSION LSI (IX2815AF)

Pin No.	Port Name	Input/Output	Function
1	VDDR	—	R channel digital output section power terminal
2	OUTR (+)	Output	R channel forward output terminal
3	OUTR (–)	Output	R channel reverse output terminal
4	GNDD	—	Digital output section ground terminal
5	OUTL (–)	Output	L channel reverse output terminal
6	OUTL (+)	Output	L channel forward output terminal
7	VDDL	—	L channel digital output section power terminal
8	VDDX	—	Oscillation section power terminal
9	XI	Input	Quartz oscillator connection terminal. Clock necessary for the system is generated.
10	XO	Output	Quartz oscillator connection terminal. Clock necessary for the system is generated.
11	GNDX	—	Oscillation section ground terminal
12*	MCK	Output	System clock output terminal
13	TEST	Input	Test terminal. As usual, it is used at "L".
14	NFL1 (+)	Input	L channel forward signal feedback input terminal
15	NFL2 (–)	Input	L channel reverse signal feedback input terminal
16	GNDA	—	Analog ground terminal for AD converter
17	Lch IN	Input	L channel analog input terminal
18	Lch Vref	—	Reference voltage terminal for L channel
19	Rch Vref	—	Reference voltage terminal for R channel
20	Rch IN	Input	R channel analog input terminal
21	RESET	Input	Reset terminal. It is reset with "L".
22	NFR2 (–)	Input	R channel reverse signal feedback input terminal
23	NFR1 (+)	Input	R channel forward signal feedback input terminal
24	VDDA	—	Analog current terminal for AD converter

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

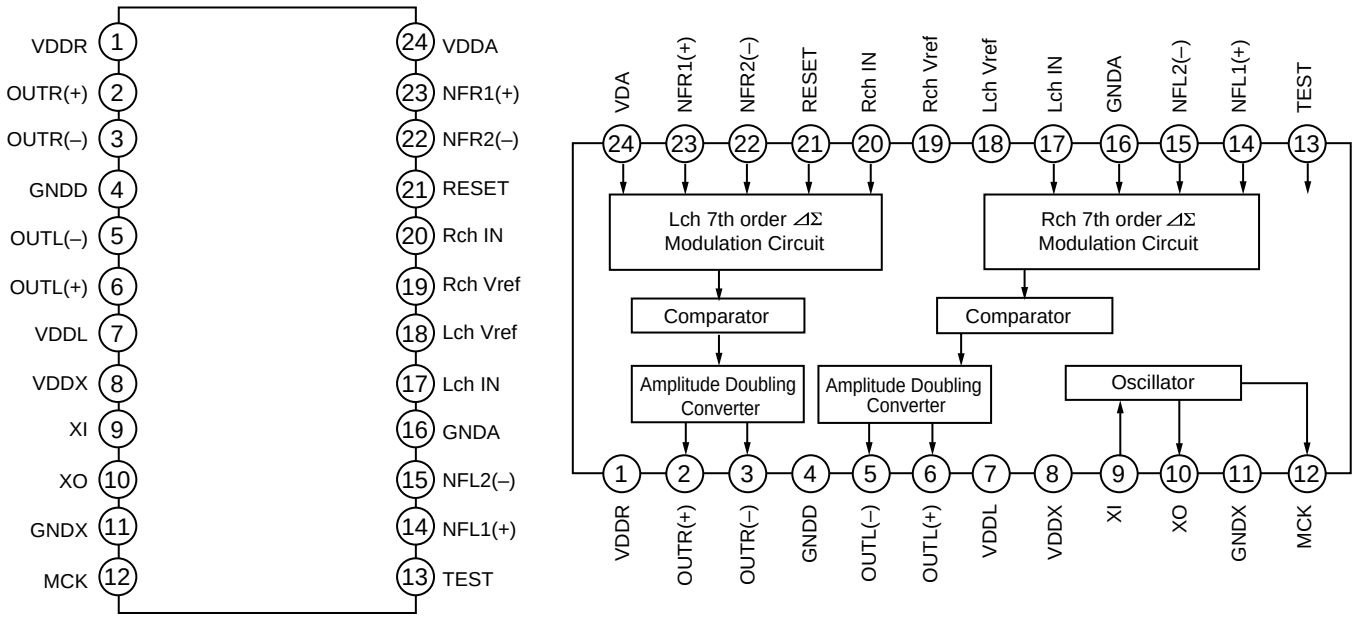


Figure 64 BLOCK DIAGRAM OF IC

SHARP PARTS GUIDE

MODEL SM-SX100

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. No.
3. PART NO.
4. DESCRIPTION

★ MARK: SPARE PARTS-DELIVERY SECTION

For U.S.A. only

Contact your nearest SHARP Parts Distributor to order.

For location of SHARP Parts Distributor,
Please call Toll-Free;
1-800-BE-SHARP

Explanation of capacitors/resistors parts codes

Capacitors

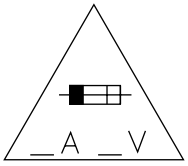
VCC ..... Ceramic type
VCK..... Ceramic type
VCT..... Semiconductor type
VC • • MF ..... Cylindrical type (without lead wire)
VC • • MN..... Cylindrical type (without lead wire)
VC • • TV..... Square type (without lead wire)
VC • • TQ ..... Square type (without lead wire)
VC • • CY ..... Square type (without lead wire)
VC • • CZ ..... Square type (without lead wire)
VC • • • • • • • • • J .. The 13th character represents capacity difference.
("J" ±5%, "K" ±10%, "M" ±20%, "N" ±30%,
"C" ±0.25 pF, "D" ±0.5 pF, "Z" +80-20%.)

If there are no indications for the electrolytic capacitors, error is ±20%.

Resistors

VRD ..... Carbon-film type
VRS..... Carbon-film type
VRN ..... Metal-film type
VR • • MF ..... Cylindrical type (without lead wire)
VR • • MN..... Cylindrical type (without lead wire)
VR • • TV..... Square type (without lead wire)
VR • • TQ ..... Square type (without lead wire)
VR • • CY ..... Square type (without lead wire)
VR • • CZ ..... Square type (without lead wire)
VR • • • • • • • • • J .. The 13th character represents error.
("J" ±5%, "F" ±1%, "D" ±0.5%.)

If there are no indications for other parts, the resistors are ±5% carbon-film type.



CAUTION:FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE F501 7A, 125V / F502, 503 3A, 250V FUSES

ATTENTION:POUR ASSURER UNE LONGUE PROTECTION CONTRE UN INCENDIE, REMPLACER SEULEMENT PAR UN FUSIBLE DE TYPE F501 7A, 125V / F502, 503 3A, 250V

NOTE:
Parts marked with "⚠" are important for maintaining the safety of the set.
Be sure to replace parts with specified ones for maintaining the safety and performance of the set.

NO.	PARTS CODE	★	PRICE RANK	DESCRIPTION
INTEGRATED CIRCUITS				
IC101~104	RH-IX2838AFZZ	J	AP	Analog Amp.,IX2838AF [110-127V]
IC101~104	VHIOPA2134/-1	J	AS	Analog Amp.,OPA2134 [220-240V]
IC106	VHIBP5022//-1	J	AT	DC/DC Converter,BP5022
IC107	VHIBP5021//-1	J	AT	DC/DC Converter,BP5021
IC108	VHIBA178M05T1	J	AF	+5V Regulator,BA178M05T
IC109	VHINJM431U/-1	J	AE	Regulator,NJM431U
IC201	VHINJM4558M-1	J	AC	Motor Driver,NJM4558M
IC202	VHIM5279L05-1	J	AF	Voltage Regulator,IM5279L05
IC203	VHIM5278L05-1	J	AE	Voltage Regulator,M5278L05
IC601	RH-IX2838AFZZ	J	AP	Analog Amp.,IX2838AF [110-127V]
IC601	VHIOPA2134/-1	J	AS	Analog Amp.,OPA2134 [220-240V]
IC651	VHINJM4558M-1	J	AC	Motor Driver,NJM4558M
IC801	VHI74HC153F-1	J	AH	Inverter,74HC153F
IC802	VHI74HCT04F-1	J	AE	Buffer Amp.,74HCT04F
IC803	VHITC74HCU04F	J	AF	Amp.,TC74HCU04F
IC804	VHIYM3436D/-1	J	BA	Digital Interface Receiver, YM3436D
IC805	VHITC7W04F/-1	J	AD	Inverter,TC7W04F
IC806	VHISM5844AF-1	J	BF	Sampling Rate Converter, SM5844AF
IC807	VHITDA1307/-1	J	BS	1Bit Conversion,TDA1307
IC808	VHI74ACT00F-1	J	AE	Control,74ACT00F
IC809	VHI74ACT00F-1	J	AE	Selector,74ACT00F
IC810	VHI74ACT00F-1	J	AE	Clock Selector,74ACT00F
IC812,813	VHI74LCX74F-1	J	AF	Waveform Rectification, 74LCX74F
IC814	VHINJM431U/-1	J	AE	Regulator,NJM431U
IC820	VHITC7WU04F-1	J	AD	PC Controll,TC7WU04F
IC821,822	VHITC7W04F/-1	J	AD	Inverter,TC7WU04F
IC901~903	VHIBU2114F+-1	J	AL	LED Driver,BU2114F
IC904	RH-IX2816AFZZ	J	AZ	System Microcomputer, IX2816AF
IC905	VHIPST9119+-1	J	AE	Reset,PST9119
ICA1	RH-IX2815AFZZ	J	AV	7th Order Modulation Conversion LSI,IX2815AF
ICA2	VHI74AC00F/-1	J	AE	NAND Gate,74AC00F
ICA3	VHITAC08F//-1	J	AE	AND Gate,TAC08F
ICA4~7	VHIHIP2100/-1	J	AQ	FET Driver,HIP2100
TRANSISTORS				
Q102	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q104	VS2SC1740SR-1	J	AB	Silicon,NPN,2SC1740 SR
Q105,106	VS2SC3242-F-1	J	AC	Silicon,NPN,2SC3242 F
Q108	VS2SC1740SR-1	J	AB	Silicon,NPN,2SC1740 SR
Q110	VS2SC1740SR-1	J	AB	Silicon,NPN,2SC1740 SR
Q112,113	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q114,115	VS2SD2394F/-1	J	AE	Silicon,NPN,2SD2394 F
Q116	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q118,119	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q201	VS2SA1037KR-1	J	AB	Silicon,PNP,2SA1037 KR
Q202	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q208	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q251	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q252	VS2SA1037KR-1	J	AB	Silicon,PNP,2SA1037 KR
Q602	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q604	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q605~608	VS2SA1036KR-1	J	AC	Silicon,PNP,2SA1036 KR
Q609~612	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q613,614	VS2SK389BL+-1	J	AH	FET,2SK389 BL
Q617,618	VS2SJ109BL+-1	J	AM	FET,2SJ109 BL
Q621,622	VS2SK170-BL-1	J	AD	FET,2SK170-BL
Q623,624	VS2SJ74BL++-1	J	AG	FET,2SJ74 BL
Q651~654	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
Q801~803	VS2SC2412KR-1	J	AB	Silicon,NPN,2SC2412 KR
QA1~8	VS2SA1483//-1	J	AM	Silicon,PNP,2SA1483
QA9~16	VHIIRF530//-1	J	AK	FET,IRF530
DIODES				
D101,102	VHD1SS133//-1	J	AA	Silicon,1SS133
D104,105	VHD1SS133//-1	J	AA	Silicon,1SS133
D107~109	VHDDA119///-1	J	AA	Silicon,DA119
D110~113	VHD11ES1///-1	J	AB	Silicon,11ES1
D201~209	VHDDA119///-1	J	AA	Silicon,DA119
D501,502	VHD1SS133//-1	J	AA	Silicon,1SS133
D503,504	VHDRK36++++-1	J	AE	FET,DRK36
D505	VHD1SS133//-1	J	AA	Silicon,1SS133
D601,602	VHDDA119///-1	J	AA	Silicon,DA119
D651,652	VHDDA119///-1	J	AA	Silicon,DA119
D801	VHD1SS133//-1	J	AA	Silicon,1SS133
D803,804	VHD1SS133//-1	J	AA	Silicon,1SS133
D901	VHD1SS133//-1	J	AA	Silicon,1SS133
DA1~8	VHD1SS355//-1	J	AB	Silicon,1SS355
DA9~16	VHDSM1XP2//-1	J	AD	Silicon,SM1XP2
DA17	VHDDA119///-1	J	AA	Silicon,DA119
LED901~903	VHPGL9BC030-1	J	BA	LED,White,GL9BC030
LED904~910	VHPLNG91LCF-1	J	AN	LED,White,LNG91LCF
ZD101	VHEMTZJ220C-1	J	AB	Zener,22V,MTZJ22C
ZD102,103	VHEMTZJ5R6B-1	J	AD	Zener,5.6V,MTZJ5.6B
ZD104	VHEHZ5BLL//-1	J	AC	Zener,5V,HZ5BLL
ZD801,802	VHEMTZJ5R1B-1	J	AC	Zener,5.1V,MTZJ5.1B
ZDA1~8	VHEHZU12B3+-1	J	AB	Zener,12V,HZU12B3
ZDA81~84	RH-EX0155CEZZ	J	AB	Zener,6.9V,HZ7A3
FILTERS				
FIL501~504	RFILN0010AFZZ	J	AR	1.5 µF,50V,Chip 3 Terminal Capacitor
COILS				
L101~108	RCILC0371AFZZ	J	AC	Line Filter
L111~120	RCILC0371AFZZ	J	AC	Line Filter
L201~203	VP-CH221K0000	J	AB	220 µH,Noise Filter
⚠L501	RCILZ0317AFZZ	J	AR	Line Filter
⚠L502,503	RCILZ0318AFZZ	J	AF	Line Filter
L504~511	RCILZ0319AFZZ	J	AD	120 ohms at 100MHz
L801	VP-DH470K0000	J	AB	47 µH,Choke
L802~804	VP-DH100K0000	J	AB	10 µH,Choke
L805,806	RFILN2023SCZA	J		Line Filter,Digital Signal
L807~819	RCILC0371AFZZ	J	AC	Line Filter,DC Power
L830,831	RCILC0371AFZZ	J	AC	Line Filter,DC Power
L833	VP-DH470K0000	J	AB	47 µH,Choke
L834A	RCILC0371AFZZ	J	AC	Line Filter
L834B	VP-DH470K0000	J	AB	47 µH,Choke
L835	VP-DH470K0000	J	AB	47 µH,Choke
L901	VP-DH220K0000	J	AB	22 µH,Choke
LA801	RCILZ0326AFZZ	J	AU	10.8 µH
LA802,803	RCILZ0327AFZZ	J	AU	10.8 µH
LA804	RCILZ0326AFZZ	J	AU	10.8 µH
LA805,806	RCILZ0323AFZZ	J	AV	5.6 µH
LA807,808	RCILZ0325AFZZ	J	AR	75 µH
VARIABLE RESISTORS				
VOL601	RVR-A0265AFZZ	J		20 kohms 20%,Semi-VR, A Curve [Main Volume]
VOL602	RVR-A0266AFZZ	J	BD	Semi-VR,Display Signal Detect
VRA1,2	RVR-M1583AFZZ	J	AE	200 ohms (B),Semi-VR [Feedback Level Adjustment]
VRA3,4	RVR-M1611AFZZ	J	AE	1 kohm (B),Semi-VR [Feedback Level Adjustment]
VIBRATORS				
CXA1	RCRSB0354AFZZ	J	AS	Crystal,11.2896 MHz
X801	RCRSB0353AFZZ	J	AK	Crystal,11.2896 MHz
X901	RCRM-0202AFZZ	J	AD	Ceramic,8.00 MHz
THERMISTOR				
⚠R187,188	RH-QX1070AFZZ	J	AH	Posistor,4.7 ohms
⚠R189,190	RH-QX1069AFZZ	J	AG	Posistor,6.2 ohms
⚠R250	RH-QX1071AFZZ	J	AE	Posistor,15 ohms
CAPACITORS				
C101,102	VCKYTV1HB101K	J	AA	100 pF,50V
C105,106	VCKYTV1HB101K	J	AA	100 pF,50V
C107~110	RC-EZ1701AFZZ	J	AF	10 µF,25V,Electrolytic
C111,112	VCKYTV1HB101K	J	AA	100 pF,50V
C118,119	RC-EZ1701AFZZ	J	AF	10 µF,25V,Electrolytic
C120,121	VCEA4U1AN107M	J	AC	100 µF,10V,Electrolytic
C124	RC-EZ1689AFZZ	J	AD	100 µF,50V,Electrolytic
C125,126	RC-EZ1699AFZZ	J	AK	47 µF,20V,Electrolytic
C130	RC-EZ1689AFZZ	J	AD	100 µF,50V,Electrolytic
C131	VCKYTQ1CF105Z	J	AC	1 µF,16V

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C132	RC-EZ1687AFZZ	J	AN	270 µF,16V,Electrolytic
C133	RC-EZ1689AFZZ	J	AD	100 µF,50V,Electrolytic
C134	VCKYTQ1CF105Z	J	AC	1 µF,16V
C135	RC-EZ1687AFZZ	J	AN	270 µF,16V,Electrolytic
C136,137	VCEA4U1HN476M	J	AC	47 µF,50V,Electrolytic
C138	VCKYTV1HB102K	J	AA	0.001 µF,50V
C139	VCEA4U1EN476M	J	AC	47 µF,50V,Electrolytic
C142	VCKYTV1HB102K	J	AA	0.001 µF,50V
C144	VCKYTV1HB102K	J	AA	0.001 µF,50V
C148	VCKYTV1HB102K	J	AA	0.001 µF,50V
C161~164	VCFYSU2CA225K	J	AM	2.2 µF,160V
C166,167	VCEA4U1AN107M	J	AC	100 µF,10V,Electrolytic
C201~205	VCKYTV1HB103K	J	AA	0.01 µF,50V
C209,210	VCKYTV1HB103K	J	AA	0.01 µF,50V
C215,216	VCKYTV1HB103K	J	AA	0.01 µF,50V
C218,219	RC-GZA476AF1E	J	AB	47 µF,25V,Electrolytic
C220	VCEAZV1AJ108M	J	AC	1000 µF,10V,Electrolytic
C221	VCEAZV1AJ477M	J	AC	470 µF,10V,Electrolytic
C222,223	RC-GZA107AF1A	J	AB	100 µF,10V,Electrolytic
⚠ C501,502	RC-KZ1247AFZZ	J	AG	0.33 µF,250V,Plastics Film
⚠ C503,504	RC-KZ110EAFZZ	J	AC	0.0022 µF,250V
C505,506	RC-EZ1694AFZZ	J	AS	22 µF,400V,Electrolytic
C507,508	RC-EZ1696AFZZ	J	AC	33 µF,35V,Electrolytic
C509,510	RC-EZ1697AFZZ	J	AE	560 µF,50V,Electrolytic
C511,512	RC-KZ1249AFZZ	J	AF	1 µF,Film
C513~516	RC-KZ0086GEZZ	J	AC	330 pF,250V [110-127V]
C513~516	RC-KZ112EAFZZ	J	AC	150 pF,250V [220-240V]
C517~520	RC-KZ1256AFZZ	J	AE	0.1 µF,Film
C521,522	RC-EZ1695AFZZ	J	AD	180 µF,50V,Electrolytic
C523,524	RC-KZ1257AFZZ	J	AH	2.2 µF,Film
⚠ C530	RC-KZ0086GEZZ	J	AC	330 pF,250V [220-240V]
⚠ C530	RC-KZ111EAFZZ	J	AC	0.0015 µF,250V [110-127V]
C541,542	VCEA4U1HN228M	J		2200 µF,50V
C603,604	VCCCTV1HH470J	J	AA	47 pF (CH),50V
C605,606	VCKYTV1HB472K	J	AA	0.0047 µF,50V
C607,608	VCCSTV1HL221J	J	AA	220 pF,50V
C609,610	VCKYTV1HB472K	J	AA	0.0047 µF,50V
C611,612	RC-EZ1701AFZZ	J	AF	10 µF,25V,Electrolytic
C613,614	VCKYTV1HB103K	J	AA	0.01 µF,50V
C651,652	VCE9GV1HW336M	J	AD	33 µF,50V,N.P.
C653	VCE9GV1HW476M	J	AE	47 µF,50V,N.P.
C654,655	VCKYTV1HB103K	J	AA	0.01 µF,50V
C800	RC-EZ1686AFZZ	J	AG	47 µF,10V,Electrolytic
C801~803	VCKYTV1EB104K	J	AA	0.1 µF,25V
C804,805	RC-GZA105AF1H	J	AB	1 µF,50V,Electrolytic
C806,807	VCKYTV1EB104K	J	AA	0.1 µF,25V
C810,811	VCKYTV1EB103K	J	AA	0.01 µF,25V
C812~814	VCKYTV1EB104K	J	AA	0.1 µF,25V
C815	RC-EZ1686AFZZ	J	AG	47 µF,10V,Electrolytic
C816	VCKYTV1EB104K	J	AA	0.1 µF,25V
C817	VCQPKU2AA472J	J	AC	0.0047 µF,100V
C818	VCKYTV1EB104K	J	AA	0.1 µF,25V
C819,820	VCCCTV1HH220J	J	AA	22 pF (CH),50V
C821	VCCSTV1HL220J	J	AA	22 pF,50V
C822	VCKYTV1EB104K	J	AA	0.1 µF,25V
C823~825	VCCSTV1HL220J	J	AA	22 pF,50V
C826	VCKYTV1EB104K	J	AA	0.1 µF,25V
C827	RC-GZA475AF1E	J	AB	4.7 µF,25V,Electrolytic
C828~830	VCCSTV1HL220J	J	AA	22 pF,50V
C831,832	VCKYTV1EB104K	J	AA	0.1 µF,25V
C833,834	VCCSTV1HL221J	J	AA	220 pF,50V
C835~837	VCKYTV1EB104K	J	AA	0.1 µF,25V
C838	RC-EZ1686AFZZ	J	AG	47 µF,10V,Electrolytic
C839	VCKYTV1EB103K	J	AA	0.01 µF,25V
C841	VCCCTV1HH200J	J	AA	20 pF (CH),50V
C843	RC-EZ1686AFZZ	J	AG	47 µF,10V,Electrolytic
C846~852	VCKYTV1EB104K	J	AA	0.1 µF,25V
C853~856	RC-KZ1218AFZZ	J	AD	2.2 µF,10V
C857	VCKYTV1HB102K	J	AA	0.001 µF,50V
C861~863	RC-EZ1686AFZZ	J	AG	47 µF,10V,Electrolytic
C866,867	RC-EZ1686AFZZ	J	AG	47 µF,10V,Electrolytic
C869~871	RC-EZ1686AFZZ	J	AG	47 µF,10V,Electrolytic
C875	VCKYBT1HB152K	J		0.0015 µF,50V
C880	VCKYTV1EB224K	J		0.22 µF,25V
C883,884	VCKYTV1EB224K	J		0.22 µF,25V
C886	VCKYTV1CB334K	J	AC	0.33 µF,16V [110-127V]
or				
C886	VCKYTV1EB334K	J		0.33 µF,25V [220-240V]
C886A	VCCSBT1HL150J	J		15 pF,50V
C887	VCKYBT1HB152K	J		0.0015 µF,50V
C888	VCTYBT1EF223Z	J		0.022 µF,25V
C901~903	VCKYTV1EB104K	J	AA	0.1 µF,25V
C904	RC-EZ1692AFZZ	J	AC	47 µF,10V,Electrolytic
C905	RC-EZ1685AFZZ	J	AC	10 µF,16V,Electrolytic
C906	VCKYTV1EB104K	J	AA	0.1 µF,25V
C907	RC-EZ1685AFZZ	J	AC	10 µF,16V,Electrolytic
C908~910	VCCSTV1HL221J	J	AA	220 pF,50V
CA5,6	RC-EZ0467CEZZ	J	AF	10 µF,16V,Electrolytic
CA7	VCKYTV1CF224Z	J	AB	0.22 µF,16V
CA8,9	VCCCTV1HH180J	J	AA	18 pF (CH),50V
CA10~12	VCKYTV1CF224Z	J	AB	0.22 µF,16V
CA13,14	RC-EZ1700AFZZ	J	AK	100 µF,16V,Electrolytic
CA21,22	RC-KZ1254AFZZ	J	AD	0.22 µF,50V,Ceramic
CA24~35	RC-KZ1254AFZZ	J	AD	0.22 µF,50V,Ceramic
CA36~39	RC-KZ1255AFZZ	J	AD	0.22 µF,100V,Ceramic
CA40~43	RC-KZ1252AFZZ	J	AE	1 µF,50V,Ceramic
CA44,45	RC-KZ1253AFZZ	J	AF	1 µF,100V,Ceramic
CA46~49	RC-KZ1252AFZZ	J	AE	1 µF,50V,Ceramic
CA50	RC-EZ1698AFZZ	J	AD	100 µF,50V,Electrolytic
CA51,52	VCEAVA1HN107M	J	AC	100 µF,50V,Electrolytic
CA81~86	RC-KZ1218AFZZ	J	AD	2.2 µF,10V
CA801~804	RC-FZ1136AFZZ	J	AW	0.56 µF,160V.DC
CA805~810	RC-FZ1137AFZZ	J	AE	0.22 µF,250V.DC

RESISTORS

	VRS-CY1JB000J	J	AA	0 ohm,Jumper,0.8×1.55mm,Green
	VRS-TQ2BB000J	J	AA	0 ohm,Jumper,1.55×3.1mm,Green
	VRS-TV2AB000J	J	AA	0 ohm,Jumper,1.25×2mm,Green
R101,102	VRN-TV2AS332D	J	AA	3.3 kohms,1/10W
R103,104	VRN-TV2AS564D	J	AA	560 kohms,1/10W
R105,106	VRN-TV2AS332D	J	AA	3.3 kohms,1/10W
R107,108	VRN-TV2AS564D	J	AA	560 kohms,1/10W
R113~116	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R117~120	VRN-TV2AS564D	J	AA	560 kohms,1/10W
R121~124	VRN-TV2AS152D	J	AA	1.5 kohms,1/10W
R125,126	VRN-TV2AS822D	J	AA	8.2 kohms,1/10W
R127,128	VRN-TV2AS223D	J	AA	22 kohms,1/10W
R129	VRN-TV2AS682D	J	AA	6.8 kohms,1/10W
R131~138	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R139,140	VRN-TV2AS564D	J	AA	560 kohms,1/10W
R141,142	VRN-TV2AS682D	J	AA	6.8 kohms,1/10W
R143,144	VRN-TV2AS101D	J	AA	100 ohm,1/10W
R145,146	VRN-TV2AS564D	J	AA	560 kohms,1/10W
R147,148	VRN-TV2AQ100D	J	AA	10 ohm,1/10W
R149,150	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R151,152	VRN-TV2AS152D	J	AA	1.5 kohms,1/10W
R155~157	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R158	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R159	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R160	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R163	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R164	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R165	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R166	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R167	VRN-TV2AS474D	J	AA	470 kohms,1/10W
R169	VRN-TV2AS474D	J	AA	470 kohms,1/10W
R170	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R171	VRN-TV2AS474D	J	AA	470 kohms,1/10W
R172	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R173	VRD-ST2EE122J	J	AA	1.2 kohms,1/4W
R174	VRD-ST2EE101J	J	AA	100 ohm,1/4W
R175	VRD-ST2EE102J	J	AA	1 kohm,1/4W
R176,177	VRN-TV2AS152D	J	AA	1.5 kohms,1/10W
R178	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R179	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R180	VRN-TV2AS272D	J	AA	2.7 kohms,1/10W
R181,182	VRN-TV2AQ100D	J	AA	10 ohm,1/10W
R184	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R185	VRN-TV2AS272D	J	AA	2.7 kohms,1/10W
R197,198	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R201	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R202	VRN-TV2AS473D	J	AA	47 kohms,1/10W
R203	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R204,205	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R206	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R207	VRN-TV2AS473D	J	AA	47 kohms,1/10W
R208,209	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R210	VRN-TV2AS473D	J	AA	47 kohms,1/10W
R211,212	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R213,214	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R215,216	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R233,234	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R235	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W

NO.	PARTS CODE	★	PRICE RANK	DESCRIPTION
R238~241	VRN-TV2AS271D	J	AA	270 ohms,1/10W
R242,243	VRN-TV2AS152D	J	AA	1.5 kohms,1/10W
R244	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R245	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R249	VRN-TV2AS681D	J	AA	680 ohms,1/10W
R251	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R252	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R253	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R254	VRN-TV2AS222D	J	AA	2.2 kohms,1/10W
R255	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R256	VRF-GF3HB0R1J	J	AD	0.1 ohms,5W
⚠ R501	VRD-HT2HY394J	J	AA	390 kohms,1/2W
R503,504	VRD-ST2EE824J	J	AA	820 kohms,1/4W
R505,506	VRD-ST2EE623J	J	AA	62 kohms,1/4W
R601	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R602	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R603	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R604	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R605,606	VRN-TV2AS101D	J	AA	100 ohm,1/10W
R607,608	VRN-TV2AS391D	J	AA	390 ohms,1/10W
R609,610	VRN-TV2AS105D	J	AA	1 Mohm,1/10W
R611~614	VRN-TV2AS391D	J	AA	390 ohms,1/10W
R615,616	VRN-TV2AS821D	J	AA	820 ohms,1/10W
R617,618	VRN-TV2AS105D	J	AA	1 Mohm,1/10W
R619~622	VRN-TV2AS221D	J	AA	220 ohms,1/10W
R623,624	VRN-TV2AS822D	J	AA	8.2 kohms,1/10W
R625,626	VRN-TV2AS181D	J	AA	180 ohms,1/10W
R627,628	VRN-TV2AQ100D	J	AA	10 ohm,1/10W
R629~632	VRN-TV2AS153D	J	AA	15 kohms,1/10W
R637,638	VRN-TV2AS273D	J	AA	27 kohms,1/10W
R639	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R651~654	VRS-TQ2BB153J	J	AA	15 kohms,1/8W
R655,656	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R657,658	VRN-TV2AS223D	J	AA	22 kohms,1/10W
R659	VRN-TV2AS473D	J	AA	47 kohms,1/10W
R660	VRN-TV2AS472D	J	AA	4.7 kohms,1/10W
R661	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R801,802	VRN-TV2AQ750D	J	AA	75 kohms,1/10W
R803,804	VRN-TV2AS331D	J	AA	330 ohms,1/10W
R805,806	VRN-TV2AS224D	J	AA	220 kohms,1/10W
R807,808	VRN-TV2AS272D	J	AA	2.7 kohms,1/10W
R809,810	VRN-TV2AS563D	J	AA	56 kohms,1/10W
R811	VRN-TV2AQ220D	J	AA	22 ohms,1/10W
R812	VRN-TV2AS332D	J	AA	3.3 kohms,1/10W
R813,814	VRN-TV2AS223D	J	AA	22 kohms,1/10W
R815	VRN-TV2AS121D	J	AA	120 ohms,1/10W
R817	VRN-TV2AQ100D	J	AA	10 ohm,1/10W
R818	VRN-TV2AS101D	J	AA	100 ohm,1/10W
R819	VRN-TV2AS332D	J	AA	3.3 kohms,1/10W
R820~823	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R825	VRN-TV2AS105D	J	AA	1 Mohm,1/10W
R826	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R827~830	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R831	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R832	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R833~835	VRN-TV2AS121D	J	AA	120 ohms,1/10W
R836,837	VRN-TV2AS103D	J	AA	10 kohm,1/10W
R838~840	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R841	VRN-TV2AQ820D	J	AA	82 ohms,1/10W
R842	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R843~845	VRN-TV2AS101D	J	AA	100 ohm,1/10W
R849,850	VRN-TV2AS101D	J	AA	100 ohm,1/10W
R851,852	VRN-TV2AS223D	J	AA	22 kohms,1/10W
R854	VRN-TV2AS101D	J	AA	100 ohm,1/10W
R856~867	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R860,861	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R863~866	VRN-TV2AS473D	J	AA	47 kohms,1/10W
R867,868	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R869	VRN-TV2AS272D	J	AA	2.7 kohms,1/10W
R870	VRN-TV2AS104D	J	AA	100 kohm,1/10W
R871	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R872	VRN-TV2AS391D	J	AA	390 ohms,1/10W
R873	VRN-TV2AS102D	J	AA	1 kohm,1/10W
R881~884	VRN-TV2AS562D	J	AA	5.6 kohms,1/10W
R891	VRN-TV2AS682D	J	AA	6.8 kohms,1/10W
R892	VRN-TV2AS681D	J	AA	680 ohms,1/10W
R901~907	VRS-TV2AB101J	J	AA	100 ohm,1/10W
R908	VRS-TV2AB680J	J	AA	68 ohms,1/10W
R909~915	VRS-TV2AB101J	J	AA	100 ohm,1/10W
R916~946	VRS-TV2AB680J	J	AA	68 ohms,1/10W
R947	VRS-TV2AB103J	J	AA	10 kohm,1/10W
R948	VRS-TV2AB152J	J	AA	1.5 kohms,1/10W
R949	VRS-TV2AB222J	J	AA	2.2 kohms,1/10W
R950	VRS-TV2AB392J	J	AA	3.9 kohms,1/10W
R951	VRS-TV2AB562J	J	AA	5.6 kohms,1/10W
R952	VRS-TV2AB123J	J	AA	12 kohms,1/10W
R953	VRS-TV2AB393J	J	AA	39 kohms,1/10W
R954~961	VRS-TV2AB102J	J	AA	1 kohm,1/10W
R962	VRS-TV2AB103J	J	AA	10 kohm,1/10W
R963~982	VRS-TV2AB102J	J	AA	1 kohm,1/10W
RA1~4	VRN-TV2AS103D	J	AA	10 kohm,1/10W
RA5~8	VRN-TV2AS753D	J	AA	75 kohms,1/10W
RA21~28	VRN-TV2AS822D	J	AA	8.2 kohms,1/10W
RA29~36	VRN-TV2AS473D	J	AA	47 kohms,1/10W
RA37~44	VRN-TV2AS391D	J	AA	390 ohms,1/10W
RA45~52	VRN-TV2AS102D	J	AA	1 kohm,1/10W
RA53~60	VRN-TV2AQ100D	J	AA	10 ohm,1/10W
RA61,62	VRN-TV2AS681D	J	AA	680 ohms,1/10W
RA63,64	VRN-TV2AS751D	J	AA	750 ohms,1/10W
RA65,66	VRN-TV2AS242D	J	AA	2.4 kohms,1/10W
RA67,68	VRN-TV2AS132D	J	AA	1.3 kohms,1/10W
RA70,71	VRN-TV2AS203D	J	AA	20 kohms,1/10W
RA81~86	VRN-TV2AS104D	J	AA	100 kohm,1/10W
RA91~94	VRN-TV2AS682D	J	AA	6.8 kohms,1/10W
RA101~104	RR-DZ1126AFZZ	J	AC	6.8 kohms,4W
RA801~804	RR-WZ1101AFZZ	J	AS	16 ohms,5W,5%

OTHER CIRCUITRY PARTS

BI101/CNS101	QCNWN6826AFZZ	J	AV	Connector Ass'y,7/7Pin
BI102/CNS102	QCNWN6830AFZZ	J	AW	Connector Ass'y,7/7Pin
BI103/CNS103	QCNWN6827AFZZ	J	AV	Connector Ass'y,3/3Pin
BI108/CNS108	QCNWN6788AFZZ	J	AP	Connector Ass'y,6/6Pin
BI503/CNS503	QCNWN6775AFZZ	J	AQ	Connector Ass'y,4/4Pin
BI801/CNS801	QCNWN6787AFZZ	J	AP	Connector Ass'y,6/6Pin
BI901/CNS901	QCNWN6782AFZZ	J	AP	Connector Ass'y,8/8Pin
BI902/CNS902	QCNWN6876AFZZ	J	AM	Connector Ass'y,5/5Pin
BI903/CNS903	QCNWN6783AFZZ	J	AL	Connector Ass'y,3/3Pin
BI904/CNS904	QCNWN6785AFZZ	J	AK	Connector Ass'y,2/2Pin
BI905/CNS905	QCNWN6780AFZZ	J	AU	Connector Ass'y,14/14Pin
BI906/CNS906	QCNWN6781AFZZ	J	AS	Connector Ass'y,10/10Pin
BLA1	RCORF0087AFZZ	J	AC	Core
BLA2~4	RCORF6692RCZZ	J	AE	Core
BLA5	RCORF0087AFZZ	J	AC	Core
BLA6	RCORF6692RCZZ	J	AE	Core
BLA18~20	RCORF0087AFZZ	J	AC	Core
BLA21~23	RCORF6692RCZZ	J	AE	Core
BLA24	RCORF0087AFZZ	J	AC	Core
BLA25	RCORF6692RCZZ	J	AE	Core
CNP101	QCNCMA11DAFZZ	J	AH	Plug,4Pin
CNP102	QCNCMA11CAFZZ	J	AG	Plug,3Pin
CNP105	QCNCM705RAFZZ	J	AD	Plug,16Pin
CNP106	QCNCMA08PAFZZ	J	AQ	Plug,14Pin
CNP107	QCNCMA08FAFZZ	J	AH	Plug,6Pin
CNP108	QCNCMA08DAFZZ	J	AG	Plug,4Pin
CNP109	QCNCMA08JAFZZ	J	AM	Plug,9Pin
CNP110	QCNCMA08EAFZZ	J	AH	Plug,5Pin
CNP111,112	QCNCM705GAFZZ	J	AB	Plug,7Pin
CNP115	QCNCMA08EAFZZ	J	AH	Plug,5Pin
CNP116,117	QCNCMA08GAFZZ	J	AK	Plug,7Pin
CNP118	QCNCMA08CAFZZ	J	AG	Plug,3Pin
CNP452	QCNCM623DAF02	J		Plug,4Pin
⚠ CNP501,502	QCNCMA15BAFZZ	J	AG	Plug,2Pin
CNP541	QCNCM623DAFZZ	J	AB	Plug,4Pin
CNP601	QCNCM705RAFZZ	J	AD	Plug,16Pin
CNP801	QCNCMA08FAFZZ	J	AH	Plug,6Pin
CNP803	QCNCM705DAFZZ	J	AB	Plug,4Pin
CNP804	QCNCM705KAFZZ	J	AC	Plug,10Pin
CNP807	QCNCMA08EAFZZ	J	AH	Plug,5Pin
CNP808	QCNCMA08FAFZZ	J	AH	Plug,6Pin
CNP901	QCNCM704HAFZZ	J	AC	Plug,8Pin
CNP903	QCNCMA08CAFZZ	J	AG	Plug,3Pin
CNP904	QCNCM704BAFZZ	J	AA	Plug,2Pin
CNPA1,2	QCNCMA08BAFZZ	J	AF	Plug,2Pin
CNPA3,4	QCNCMA08CAFZZ	J	AG	Plug,3Pin
CNPA6	QCNCMA08JAFZZ	J	AM	Plug,9Pin
CNS110A/B	QCNWN6797AFZZ	J	AM	Connector Ass'y,5/5Pin
CNS111A/B	QCNWN6801AFZZ	J	AN	Connector Ass'y,7/7Pin
⚠ CNS501	QCNWN6773AFZZ	J	AM	Connector Ass'y,2Pin
⚠ CNS502	QCNWN6839AFZZ	J	AP	Connector Ass'y,2Pin
CNS541A/B	QCNWN6880AFZZ	J		Connector Ass'y,4/4Pin
CNS601A/B	QCNWN6779AFZZ	J	AY	Connector Ass'y,16/16Pin
CNS803	QCNWN6873AFZZ	J	AM	Connector Ass'y,4Pin
CNW502	QCNWN6805AFZZ	J	AP	Connector Ass'y,3Pin [220-240V]

NO.	PARTS CODE	★	PRICE RANK	DESCRIPTION
CNW502	QCNWN6893AFZZ	J		Connector Ass'y,3Pin [110-127V]
CNW504A,B	QCNWN6774AFZZ	J	AS	Connector Ass'y,2Pin
CNW810	QCNWN6879AFZZ	J		Lug Wire
CNWAM1A/B/C	QCNWN6790AFZZ	J	AS	Connector Ass'y,4/2/2Pin
CNWAM2A/B/C	QCNWN6789AFZZ	J	AS	Connector Ass'y,6/3/3Pin
CNWAM3A/B	QCNWN6777AFZZ	J	AX	Connector Ass'y,9/9Pin
CNWAM4A/B	QCNWN6776AFZZ	J	AR	Connector Ass'y,3/3Pin
⚠ COR501	RCORF0119AFZZ	J	AL	Core
⚠ F501	QFS-B702EAFNI	J		Fuse,7A/125V [110-127V]
⚠ F501	QFS-C402KAFNI	J	AM	Fuse,T4A L 250V [220-240V]
⚠ F502,503	QFS-F322BAFNY	J	AE	Fuse,T3.15A L 250V [220-240V]
⚠ F502,503	QFS-L302AAFNZ	J		Fuse,3A/250V [110-127V]
J101,102	QJAKE0211AFZZ	J	BC	Terminal,SACD
J103,104	QJAKE0211AFZZ	J	BC	Terminal,LINE 1
J106	QJAKE0212AFZZ	J	BG	Terminal,Canon Balance
J107,108	QJAKE0211AFZZ	J	BC	Terminal,LINE OUT
J801	QJAKE0211AFZZ	J	BC	Terminal,DIGITAL 3
J802	QSOCZ9166AFZZ	J	AX	Terminal,DIGITAL 2
RLY101,102	RRLYZ0180AFZZ	J	AN	Relay
RLY104,105	RRLYZ0180AFZZ	J	AN	Relay
RLY106	RRLYD0119AFZZ	J	AN	Relay
RLY107,108	RRLYD0118AFZZ	J	AM	Relay
RLY201	RRLYZ0180AFZZ	J	AN	Relay
RLY501	RRLYD0121AFZZ	J	AN	Relay
RLY601,602	RRLYZ0180AFZZ	J	AN	Relay
RLY801,802	RRLYZ0180AFZZ	J	AN	Relay
RLYA1	RRLYD0120AFZZ	J	BB	Relay
RX801	VHPTORX102/-1	J	BL	Optical Fiber Data Link,1, TORX102
RX802	VHPGP1F32R/-1	J	AP	Optical Fiber Data Link,4, GP1F32R
⚠ SOC501	QSOCA2214AFZZ	J	AH	AC Inlet
SOC801	QSOCD1302AFZZ	J	AK	Terminal,1Bit
SW101	QSW-S0954AFZZ	J	AH	Switch,Slide Type [IMPEDANCE SELECTOR]
⚠ SW501	QSW-P9235AFZZ	J	AH	Switch,Push Type [POWER]
SW901	QSW-K0235AFZZ	J	AD	Switch,Key Type [DIGITAL 1]
SW902	QSW-K0235AFZZ	J	AD	Switch,Key Type [DIGITAL 2]
SW903	QSW-K0235AFZZ	J	AD	Switch,Key Type [DIGITAL 3]
SW904	QSW-K0235AFZZ	J	AD	Switch,Key Type [DIGITAL 4]
SW905	QSW-K0235AFZZ	J	AD	Switch,Key Type [SACD]
SW906	QSW-K0235AFZZ	J	AD	Switch,Key Type [LINE 1]
SW907	QSW-K0235AFZZ	J	AD	Switch,Key Type [LINE 2]
TA101,102	QTANA9012AFZZ	J	BV	Terminal,Speaker
TX801	VHPGP1F32T/-1	J	AP	Optical Fiber Data Link, GP1F32T
UNT101	RUNTZ0739AFZZ	J	BM	DC/DC Converter
⚠ UNT501,502	RUNTZ0735AFZZ	J		DC/DC Converter
⚠ UNT503	RUNTZ0749AFZZ	J		AC/DC Converter

CABINET PARTS

201	GCOVA3130AFSA	J		Side Panel,Left [Green]
201	GCOVA3130AFSB	J		Side Panel,Left [Blue]
201	GCOVA3130AFSD	J		Side Panel,Left [Black]
202	GCOVA3131AFSA	J		Side Panel,Right [Green]
202	GCOVA3131AFSB	J		Side Panel,Right [Blue]
202	GCOVA3131AFSD	J		Side Panel,Right [Black]
203	GCOVA3132AFSA	J	BM	Side Panel,Left,Sub
204	GCOVA3133AFSA	J	BM	Side Panel,Right,Sub
205	GCOVA3134AFSA	J	BF	Net,Top Panel Heat
206	GITAR0317AFSA	J	BR	Panel,Terminal
207	GITAT0069AFSA	J		Top Panel,A
208	GITAT0070AFSA	J	BV	Top Panel,B
209	GITAU0052AFSA	J		Bottom Panel
210	GITAU0053AFSA	J	BA	Bottom Panel,Sub
211	GLEGM0102AFSA	J	AZ	Leg,Rear
212	HDECZ0187AFSA	J	AX	Decoration,Selector Knob
213	HPNLC3699AFSA	J		Front Panel
214	HPNLH1537AFSA	J	BS	Panel,Display
215	JKNBB0105AFSA	J	BM	Knob,Volume
216	JKNBM1196AFSA	J	BK	Knob,Power
217	JKNBZ2209AFSA	J	AE	Knob,Selector
218	LANGF1626AFFW	J	AU	Bracket,Power Heat Sink
219	LANGJ0165AFFQ	J	AV	Bracket,Speaker Terminal
220	LANGK0962AFF1	J	BL	Bracket,Front Panel
221	LANGK0964AFF1	J	BF	Bracket,Main Volume
222	LANGK0967AFFW	J	AX	Bracket,Amp Coil
223	LANGK0968AFFW	J	AX	Bracket,FET PWB
224	LANGK0969AFFW	J	AX	Bracket,FET Block
225	LANGK0970AFFW	J	AY	Bracket,ST Terminal
226	LANGK0977AFF1	J	AX	Bracket,1Bit Terminal
227	LANGQ1217AFFQ	J	AV	Bracket,Erase A
228	LANGQ1218AFFQ	J	AW	Bracket,Erase B
229	LANGT1968AFFW	J	AT	Bracket,Power Switch
230	LANGT1971AFF1	J	BD	Bracket,Connect A
231	LANGT1972AFF1	J	BE	Bracket,Connect B
232	LANGZ0366AFFW	J	AQ	Bracket,Volume Protection
233	LBNDJ2003SCZZ	J	AA	Nylon Band,100mm
234	LBSHZ0110AFZZ	J	AC	Edge Saddle
235	LCHSM0947AFF1	J	BU	Main Chassis
236	LHLDW1009ACZZ	J	AB	Clamper,Line Process
237	LHLDW1156AFZZ	J	AA	Nylon Band,142mm
238	LHLDW1169AFZZ	J	AB	Nylon Band,Holder Type
239	LHLDZ1776AF00	J	AC	Holder,LED
240	LHLDZ9218AFZZ	J	AD	Holder,PWB
241	MJNT-3061AFZZ	J	BD	Volume Joint Coupling
242	NSFTT1018AFZZ	J	AM	Shaft,Volume Connect
243	PCUSS0773AF00	J	AF	Cushion,Power Switch
244	PCUSS0775AF00	J	AF	Cushion,Bottom Panel
245	PCUSS0778AF00	J	AF	Cushion
246	PFLT-1155AF00	J	AF	Felt
247	PRDAR0775AF00	J	AW	Heat Sink,Power
248	PRDAR0777AF00	J	BA	Heat Sink,1Bit Amp.
249	PRDAR0780AFZZ	J	AZ	Brock,FET Heat
250	PRDAR0784AFFW	J	BA	Heat Sink
251	PSHEG0200AFZZ	J	AN	Sheet,Power Switch Heat
252	PSHEP0392AF0T	J	AF	Sheet,Selector Keep
253	PSHEP0398AFSA	J	AG	Sheet,Selector Diffusion
254	PSHEP0401AFZZ	J	AK	Sheet,Insulator A
255	PSHEP0402AFZZ	J	AL	Sheet,Insulator B
256	PSHEP0403AFZZ	J	AY	Sheet,Insulator C
257	PSHEP0405AFZZ	J	AG	Sheet,Insulator D
258	PSHEP0406AFZZ	J	AH	Sheet,Insulator E
259	PSHEP0407AFZZ	J	AM	Sheet,Insulator F
260	PSHEZ1121AFZZ	J	AR	Sheet,FET Heat
261	PSHEZ1122AFZZ	J	AK	Sheet,1Bit Amp Heat
262	PSHEZ1133AF0T	J	AE	Sheet,Preventive Vibration A
263	PSHEZ1134AF0T	J	AG	Sheet,Preventive Vibration B
264	PSLDM3755AFFN	J	BR	Shield,1Bit Amp,Top
265	PSLDM3757AFZZ	J	BR	Shield,1Bit Amp,
266	PSLDM3758AFZZ	J	BS	Shield,1Bit Amp,Bottom
267	PSLDM3759AFF1	J	BS	Bottom Panel,Power Shield
268	PSLDM3760AFFN	J	BQ	Shield,Power A
269	PSLDM3761AFFN	J	BM	Shield,Power B
270	PSLDM3762AFFN	J	BM	Shield,Power C
271	PSLDM3763AFFN	J	AX	Shield,Power D
272	PSLDM3769AFF1	J	BE	Shield,Panel,AC Power
274	PSPAB0205AFFN	J	AE	Hexagon Boss,h9mm
275	PSPAB0206AFFN	J	AE	Hexagon Boss,h6mm
276	PSPAB0208AFFN	J	AE	Hexagon Spacer,h20mm
277	PSPAB0212AFFN	J	AD	Hexagon Spacer,h8mm
278	PSPAB0213AFFN	J	AD	Hexagon Spacer,h14mm
279	PSPAB0215AFFN	J	AE	Hexagon Spacer,h5mm
280	PSPAB0216AFFN	J	AE	Hexagon Spacer,h16mm
281	PSPAB0217AFFW	J	AD	PWB Spacer A
282	PSPAB0218AFFW	J	AD	PWB Spacer B
283	PSPAB0219AFFN	J	AD	Hexagon Boss,h10mm
284	PSPAB0222AFFN	J	AF	Hexagon Spacer,h28mm
285	PSPAS0272AFZZ	J	AD	Spacer,Power Knob
286	PSPAS0273AFZZ	J	AD	Spacer,Selector
287	PSPAZ0578AFZZ	J	AD	Stopper,Volume Knob
288	PSPAZ0579AFZZ	J	AD	Spacer,FET
289	PSPAZ0585AFZZ	J	AD	Spacer,1Bit Amp.
290	PSPAZ0589AFZZ	J	AD	PWB Spacer,h3.5mm
291	PSPAZ0590AFZZ	J	AC	PWB Spacer,h5mm
292	PSPAZ0591AFZZ	J	AC	PWB Spacer,h10mm
293	PSPAZ0595AFZZ	J	AC	PWB Spacer,h14mm
⚠ 294	QFSHD2051AFZZ	J	AA	Holder,Fuse
295	DSPC-3143AFA0	J		Label,Specifications [Except for Europe/Switzerland/ U.K./Singapore/Hong Kong/ U.S.A./Canada]
295	DSPC-3143AFE0	J		Label,Specifications [For U.K./Singapore]
295	DSPC-3143AFH0	J		Label,Specifications [For Europe/Switzerland]
295	DSPC-3143AFW0	J		Label,Specifications [For Hong Kong]
295	DSPC-3147AFU0	J		Label,Specification [For U.S.A./Canada]
296	PCUSG0702AFZZ	J	AG	Cushion,Amp.
297	PCUSG0701AFZZ	J	AF	Cushion,Top Panel
298	PSHEF0273AFZZ	J	AF	Sheet,Spacer A

NO.	PARTS CODE	★	PRICE RANK	DESCRIPTION
299	PSHEF0274AFZZ	J	AF	Sheet,Spacer B
300	PSPAG0268AFZZ	J	AF	Cushion,Spacer
301	PFLT-1165AFZZ	J	AF	Felt
302	PSPAZ0596AFZZ	J	AD	PWB Spacer C
303	TLABZ2606AFZZ	J		Label,Earth
304	PFLT-1164AF00	J	AE	Felt
305	QCNWN6807AFZZ	J	AC	Lug Wire
306	LANGZ0372AFF1	J	AX	Bracket,Core Process
307	LHLDW1075AFZZ	J	AA	Nylon Band,60mm
308	RCORF0119AFZZ	J	AL	Core
309	RCORF0123AFZZ	J	AL	Core
310	QCNWN6806AFZZ	J	AH	Lug Wire
311	RCORF0120AFZZ	J	AH	Core
312	RCORF0121AFZZ	J	AE	Core
314	PSPAZ0600AFZZ	J	AD	Hexagon Spacer,h8mm
317	PSHEP0414AFZZ	J	AN	Sheet,Insulator J
318	PSHEP0415AFZZ	J	AM	Sheet,Insulator K
319	PSHEP0416AFZZ	J	AK	Sheet,Insulator L
320	PSHEP0417AFZZ	J	AL	Sheet,Insulator M
321	LANGZ0376AFFW	J	AX	Bracket,Protection
322	LANGZ0377AFFW	J	AW	Bracket,Protection E
323	LANGZ0373AFFW	J	AW	Bracket,Protection A
324	LANGZ0374AFFW	J	AX	Bracket,Protection B
325	LANGZ0375AFFW	J	AR	Bracket,Protection C
326	PSHEZ1162AFZZ	J	AN	Sheet,Shield
327	PSHEP0422AFZZ	J		Sheet,Insulator N
601	LX-BZ0993AFF0	J	AD	Screw,ø4×12mm
602	LX-BZ1002AFF1	J	AB	Screw,ø3×6mm
603	LX-JZ0161AFF1	J	AA	Screw,ø3×6mm
605	LX-JZ0162AFF1	J	AC	Screw,ø3×10mm
606	LX-JZ0168AFFD	J	AA	Screw,ø2.6×4mm
607	LX-JZ0033AFFF	J	AA	Screw,ø3×8mm
608	LX-WZ7110AFZZ	J	AC	Washer,ø8×ø3.2×1mm
609	LX-WZ9302AFZZ	J	AB	Washer,ø1×ø2.5×0.25mm
610	XBBSD26P05000	J	AA	Screw,ø2.6×5mm
611	XBBSD30P10J00	J	AA	Screw,ø3×10mm
612	XBBSF30P06J00	J	AA	Screw,ø3×6mm
613	XBBSF30P12000	J	AA	Screw,ø3×12mm
614	XBBS126P05000	J	AC	Screw,ø2.6×6mm
615	XBBS130P06J00	J	AB	Screw,ø3×6mm
616	XBPSD26P40000	J	AC	Screw,ø2.6×4mm
617	XJBSD26P06000	J	AA	Screw,ø2.6×6mm
618	XJBSD30P06000	J	AA	Screw,ø3×6mm
619	XJBSD30P16000	J	AA	Screw,ø3×16mm
620	XJBSF30P06000	J	AA	Screw,ø3×6mm
621	XJBSF30P08000	J	AA	Screw,ø3×8mm
622	XJBSN30P12000	J	AA	Screw,ø3×12mm
623	XJBSN30P20000	J	AA	Screw,ø3×20mm
624	XJBS130P08J00	J	AC	Screw,ø3×8mm
625	XJBSF26P08000	J	AA	Screw,ø2.6×8mm
627	XJPS126P06000	J	AA	Screw,ø2.6×6mm
628	XJSSD30P08000	J	AA	Screw,ø3×8mm
629	XWHSD27-05060	J	AA	Washer,ø2.7×ø6×0.5mm
630	XWHS132-10080	J	AB	Washer,ø3.2×ø8×1mm
631	XWSSD26-06000	J	AA	Washer,ø2.6×0.6mm
632	XWSSF30-07000	J	AA	Washer,ø3.2×0.7mm
633	XWSS126-06000	J	AC	Washer,ø2.6×0.6mm
634	XXWSF30L03000	J	AC	Screw,ø3×3mm
635	XXWSF30L08000	J		Screw,ø3×8mm
636	XBPSD30P10000	J	AA	Screw,ø3×10mm
638	LX-JZ0162AFFF	J	AC	Screw,ø3×10mm
639	LX-BZ0161AFF1	J		Screw,ø3×6mm
640	XHBSD40P06000	J	AA	Screw,ø4×6mm
641	XWVSD43-05000	J	AB	Washer,ø4.3×0.5mm
644	XJPSN30P25000	J	AC	Screw,ø3×25mm
645	XEBSD30P14000	J	AA	Screw,ø3×14mm
646	XBPRZ30P10XT0	J	AD	Screw,ø3×10mm
648	LX-WZ9306AFZZ	J		Washer,ø3.2×ø10×0.33mm

ACCESSORIES/PACKING PARTS

	GDAI-3053AFFC	J	BA	Leg Base,Front
	GDAI-3054AFFC	J	BA	Leg Base,Rear
	GLEGG0124AF00	J	AK	Sheet,Leg
	PSHEP0410AFZZ	J	AB	Sheet,Leg Protect
	PSPAS0278AFZZ	J	AE	Spacer,Speaker Terminal
⚠	QACCB0113AFZZ	J	AY	AC Power Supply Cord [For U.K./Singapore]
⚠	QACCB0114AFZZ	J	AY	AC Power Supply Cord [For Hong Kong]
⚠	QACCD0130AFZZ	J	AX	AC Power Supply Cord [For U.S.A./Canada]
⚠	QACCE0106AFZZ	J	AW	AC Power Supply Cord [Except for U.K./Singapore/ Hong Kong/Switzerland/U.S.A./ Canada]
⚠	QACCS0103AFZZ	J		AC Power Supply Cord [For Switzerland]
	SPAKA2740AFZZ	J	BM	Packing Add.,Bottom
	SPAKA2741AFZZ	J	BM	Packing Add.,Top
	SPAKC7033AFZZ	J	AX	Packing Case
	SPAKZ0534AFZZ	J	AL	Packing Sheet
	SPAKZ0542AFZZ	J	AN	Sheet,Packing
	SPAKZ0544AFZZ	J	AF	Protect Sheet,Unit
	SPAKZ0558AFZZ	J		Pad,Partition
	SSAKA2343QCZZ	J	AC	Polyethylene Bag,Accessories
	SSAKH0327AFZZ	J	AF	Sheet,Unit
	TCAUS0279AFZZ	J		Caution,HOT [For U.K./Europe/Switzerland Only]
	TGANE1220AFZZ	J	AB	Warranty Card [For Australia/New Zealand]
	TGANE1231AFZZ	J		Warranty Card [For U.K. Only]
	TGANE1232AFZZ	J		Warranty Card [For U.S.A.]
	TINSM0160AFSA	J	AY	Operation Manual
	TLABG0527AFZZ	J	AC	Label,Hong Kong [For Hong Kong Only]
	TLABS0513AFZZ	J		Label,UL [For U.S.A./Canada Only]

P.W.B. ASSEMBLY (Not Replacement Item)

PWB-A1~11	DCEKL0783AF03	J	—	Main/Digital/System Microcomputer/Switch1/Switch2/Line2/ Relay/Display Volume/Main Volume/Jack/LED (Combined Ass'y) [220-240V]
PWB-A1~11	DCEKL0783AF06	J	—	Main/Digital/System Microcomputer/Switch1/Switch2/Line2/ Relay/Display Volume/Main Volume/Jack/LED (Combined Ass'y) [110-127V]
PWB-B	DCEKM0387AF03	J	—	1Bit Amp. [220-240V]
PWB-B	DCEKM0387AF09	J	—	1Bit Amp. [110-127V]
PWB-C1~3	DCEKA0322AF03	J	—	Power/Power Filter/Power Support (Combined Ass'y) [110-127V]
PWB-C1,2	DCEKA0321AF03	J	—	Power/Power Filter (Combined Ass'y) [220-240V]
PWB-D	QPWBX0180AFZZ	J		Power Support (PWB Only) [220-240V Only]

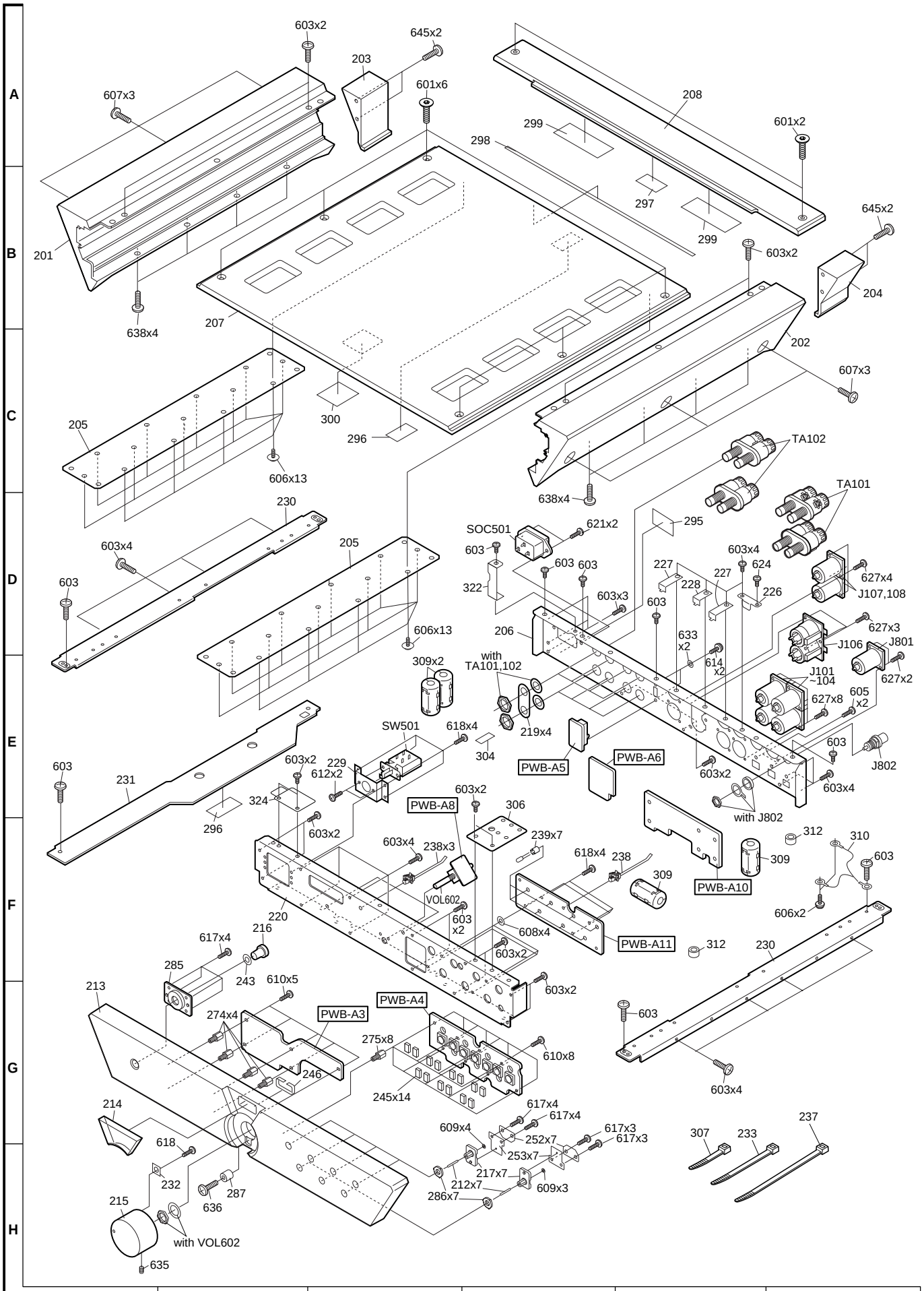


Figure 6 CABINET EXPLODED VIEW (1/3)

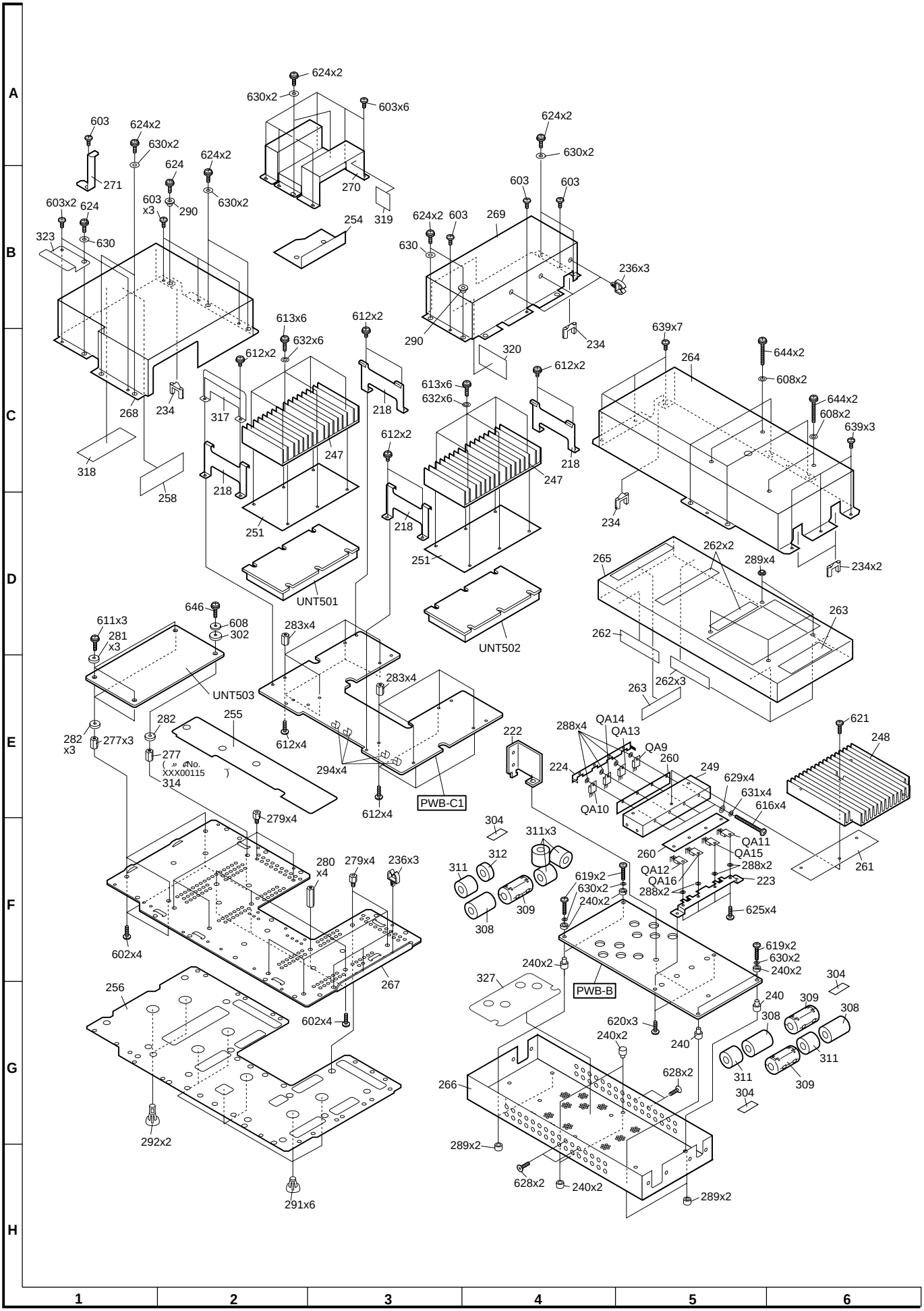


Figure 7 CABINET EXPLODED VIEW (2/3)

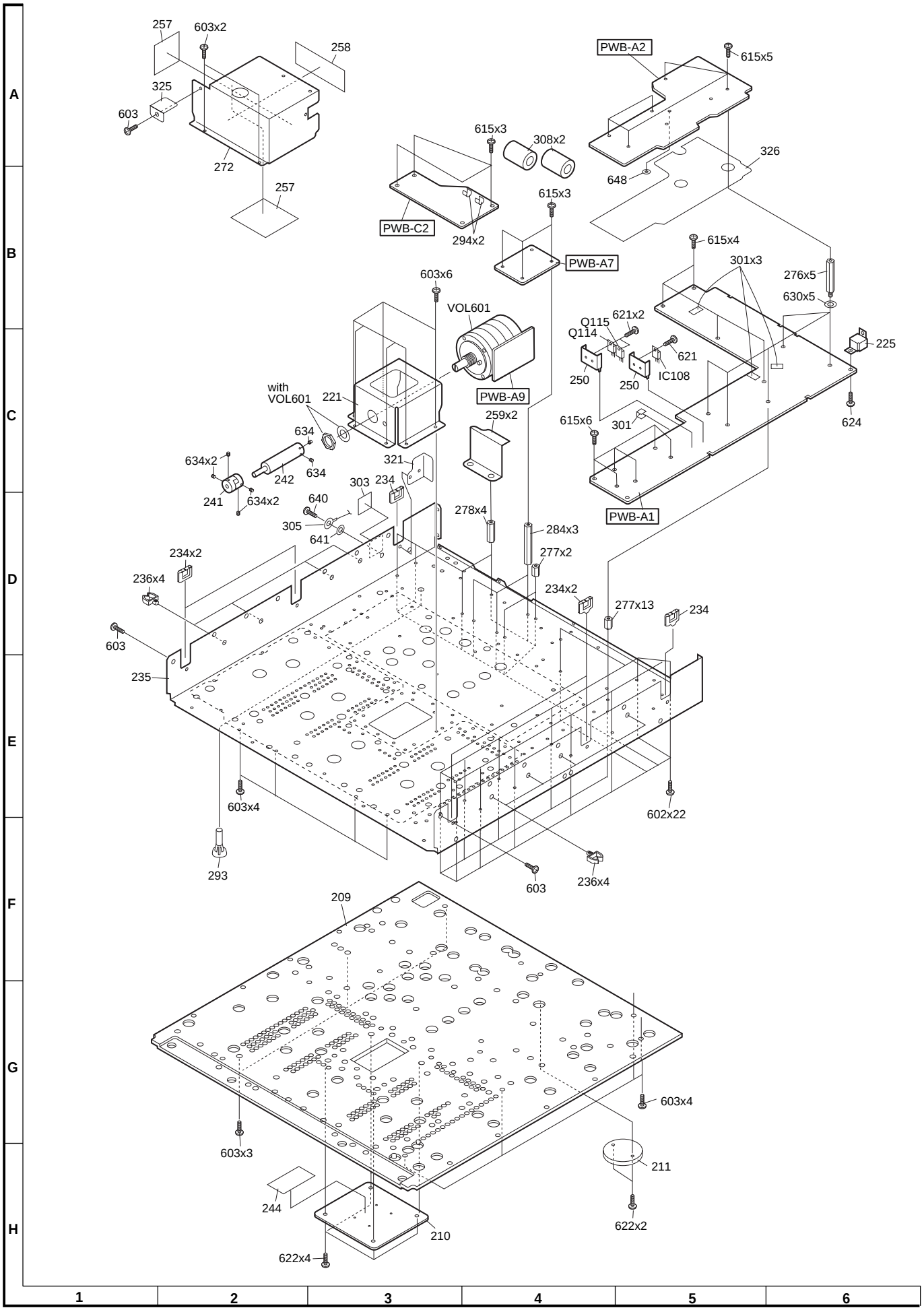
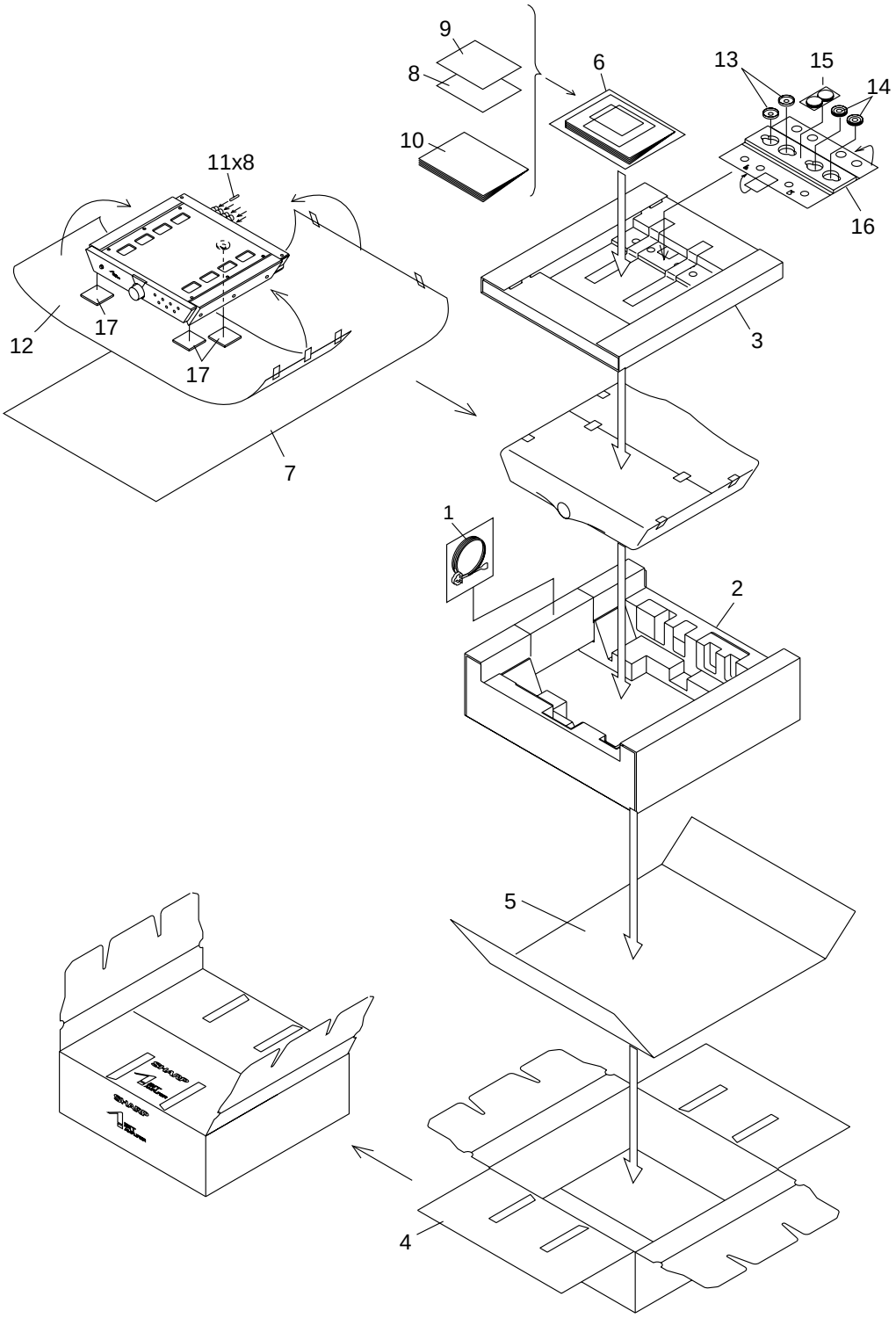


Figure 8 CABINET EXPLODED VIEW (3/3)

PACKING METHOD (FOR U.K. ONLY)

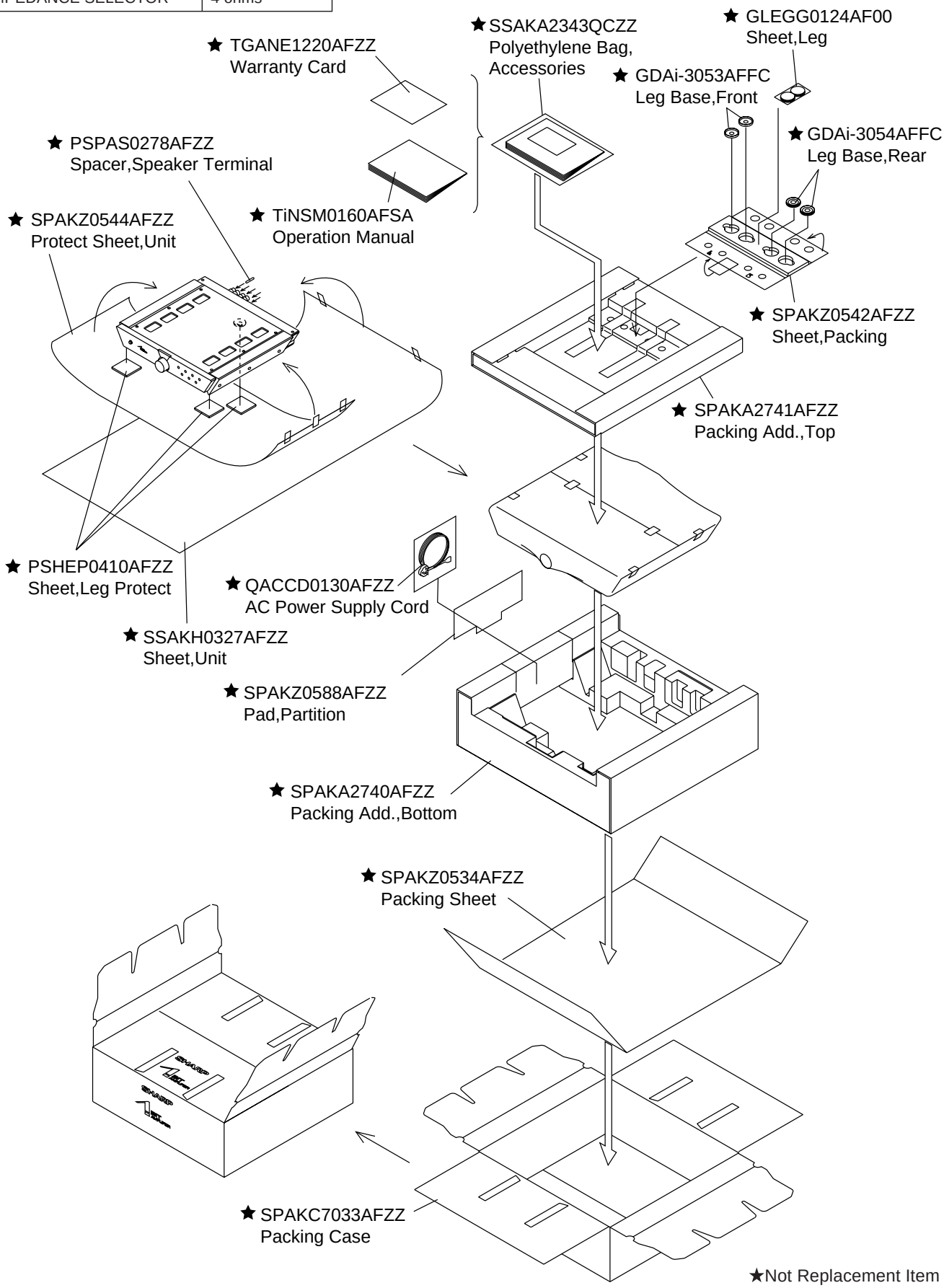
Setting position of switches and knobs	
VOLUME	MIN
IMPEDANCE SELECTOR	4 ohms

1. AC Power Supply Cord	QACCB0113AFZZ	10. Operation Manual	TiNSM0160AFSA
2. Packing Add., Bottom	SPAKA2740AFZZ	11. Spacer, Speaker Terminal	PSPAS0278AFZZ
3. Packing Add., Top	SPAKA2741AFZZ	12. Protect Sheet, Unit	SPAKZ0544AFZZ
4. Packing Case	SPAKC7033AFZZ	13. Leg Base, Front	GDAi-3053AFFC
5. Packing Sheet	SPAKZ0534AFZZ	14. Leg Base, Rear	GDAi-3054AFFC
6. Polyethylene Bag, Accessories	SSAKA2343QCZZ	15. Sheet, Leg	GLEGG0124AF00
7. Sheet, Unit	SSAKH0327AFZZ	16. Sheet, Packing	SPAKZ0542AFZZ
8. Caution HOT	TCAUS0279AFZZ	17. Sheet, Leg Protect	PSHEP0410AFZZ
9. Warranty Card	TGANE1231AFZZ		



PACKING OF THE SET (FOR U.S.A. ONLY)

Setting position of switches and knobs	
VOLUME	MIN
IMPEDANCE SELECTOR	4 ohms



★Not Replacement Item

SHARP

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