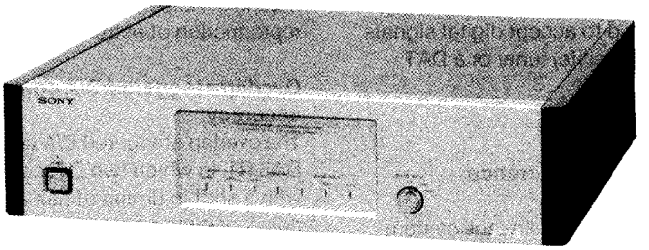
DAS-R1

SERVICE MANUAL

US Model
West Germany Model



SPECIFICATIONS

Digital input jack 1/2
(phono jack)
Input level: 0.5 Vp-p ±20%
Input impedance: 75 ohms

Twin Link connector
(Twin Link connector)
Wavelength: 800 nm
Diameter of optical fiber: 0.2 mm
(bi-directional)

Number of channels
2 (stereo)

D/A conversion 8 times 18-bit D/A conversion with noise shaping

Output level 2.5 Vrms (digital signal, MAX)

Frequency response
10 Hz - 20,000 Hz $^{+0}_{-0.5}$ dB
(when a digital signal having a sampling frequency of 44.1 kHz is input)

Total harmonic distortion
less than 0.0025% (at 1 kHz, Twin Link mode)
less than 0.005% (20 - 20,000 Hz, Twin Link mode)

Signal-to-noise ratio
more than 110 dB

Dynamic range more than 97 dB

Channel separation
more than 100 dB

General

Power requirements
US model: AC 120V, 60Hz
WG model: AC 220V, 50Hz

Power consumption
25 watts

Dimensions (w/h/d)
470 × 125 × 410 mm
(18⅝ × 5 × 16¼ inches)

Weight Approx. 17 kg
(37 lb)

Supplied accessories

Audio signal connecting cord (stereo) × 1
Coaxial digital connecting cord × 1

MICROFILM

D/A CONVERTER UNIT

SONY®

FEATURES

The DAS-R1 is a D/A Converter Unit to be used with the CDP-R1 CD Player Unit, and forms a separate-type CD Player System.
The DAS-R1 converts the digital signal picked up from the Compact Disc in the CDP-R1 into an analog (audio) signal. With this separate configuration, since the vibrations and noise generated in the servo and digital circuits required for the CD player can be completely separated from the analog circuits, extremely pure quality is obtained in the resulting sound. Also, the DAS-R1 is designed to accept digital signals from a DBS (Direct Broadcasting Satellite) tuner or a DAT (Digital Audio Tape) deck, etc.

Twin linkage system to reduce phase reference components loss

The Twin Linkage system is a bi-directional linkage system between the CD Player Unit and the D/A Converter Unit. In this system, a linkage to transmit the sync signal from the D/A Converter Unit to the CD Player Unit is added to the conventional data transmission linkage from the CD Player Unit to the D/A Converter Unit. With this system, since the crystal oscillator which is provided in the CD player of conventional systems can be located near the D/A converter section in the D/A converter unit, the fluctuation of the phase components output from the D/A converter unit is eliminated from the audio signal. As a result, stable and enriched reproduction sound is obtained.

Noise shaping for higher fidelity musical information

In the Compact Disc format, 16-bit data is picked up from the Compact Disc 44,100 times per second. The digital filter provided with the DAS-R1 incorporates an 8 times oversampling system which improves the resolution by 8 times over normal resolution. The operation results are processed to 18-bit accuracy and then converted to 16-bit data, with no loss of high-resolution musical information, by means of noise shaping circuitry. This results in the reproduction of extremely high resolution sound.

Overlap staggered D/A conversion with extreme accuracy

The overlap staggered D/A converter is the heart of the DAS-R1, in which two D/A converters per channel operate with a shift in timing of half a period. With this system, the noise, or distortion, components generated from both D/A converters are averaged and reduced, so that a harshless, warm tone is obtained.

Standard coaxial digital inputs

Two coaxial digital inputs (AUX1/AUX2), which conform to the Digital Audio Interface Format, are provided, so that the digital output signal transmitted from a DAT (Digital Audio Tape) deck or a CD player can be accepted. The DAS-R1 accommodates three types of sampling frequencies (32 kHz, 44.1 kHz and 48 kHz), and the corresponding one is automatically selected according to the input digital signals.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

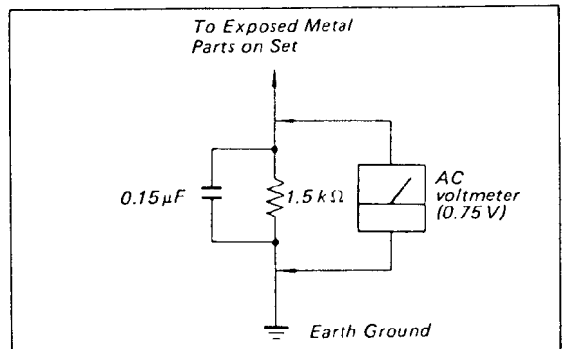
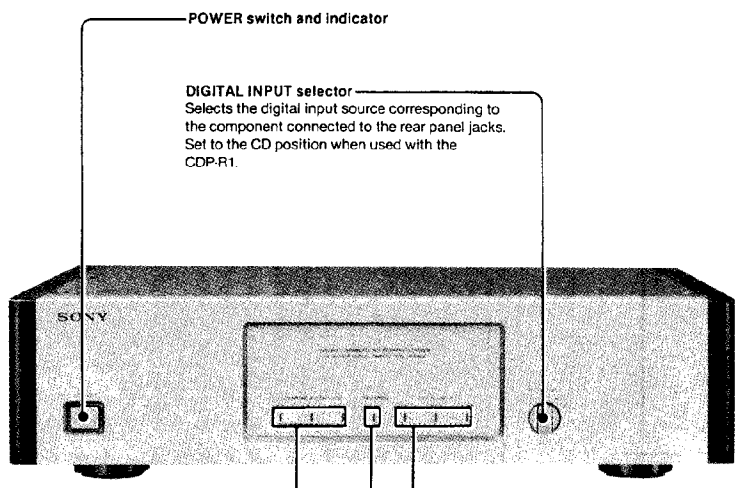


Fig. A. Using an AC voltmeter to check AC leakage.

1-1. LOCATION AND FUNCTION OF THE CONTROLS

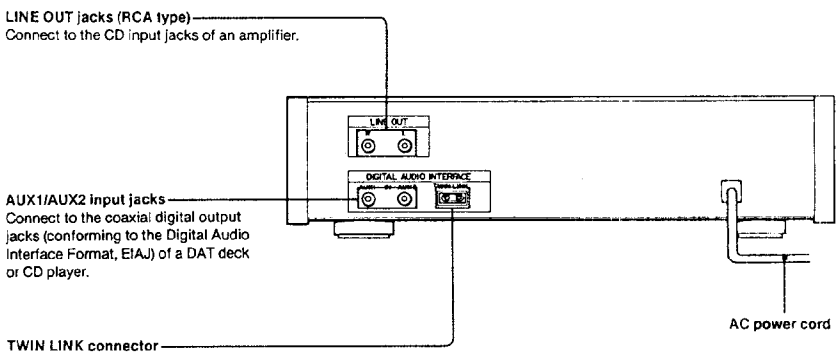


* The "44 kHz" indicator lights when the sampling frequency of the input digital signal is 44.1 kHz or 44.056 kHz

Note
The DAS-R1 is designed to accept the digital signals from a DBS (Direct Broadcasting Satellite) tuner which uses with PCM (digital) signals. (Only for DBS tuners providing a digital output jack which conforms to the EIAJ-format.)

1-2. CONNECTIONS

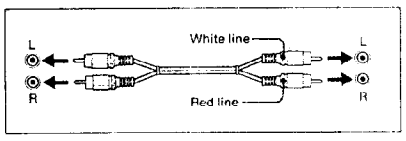
Rear Panel Connectors



Before Making Any Connections

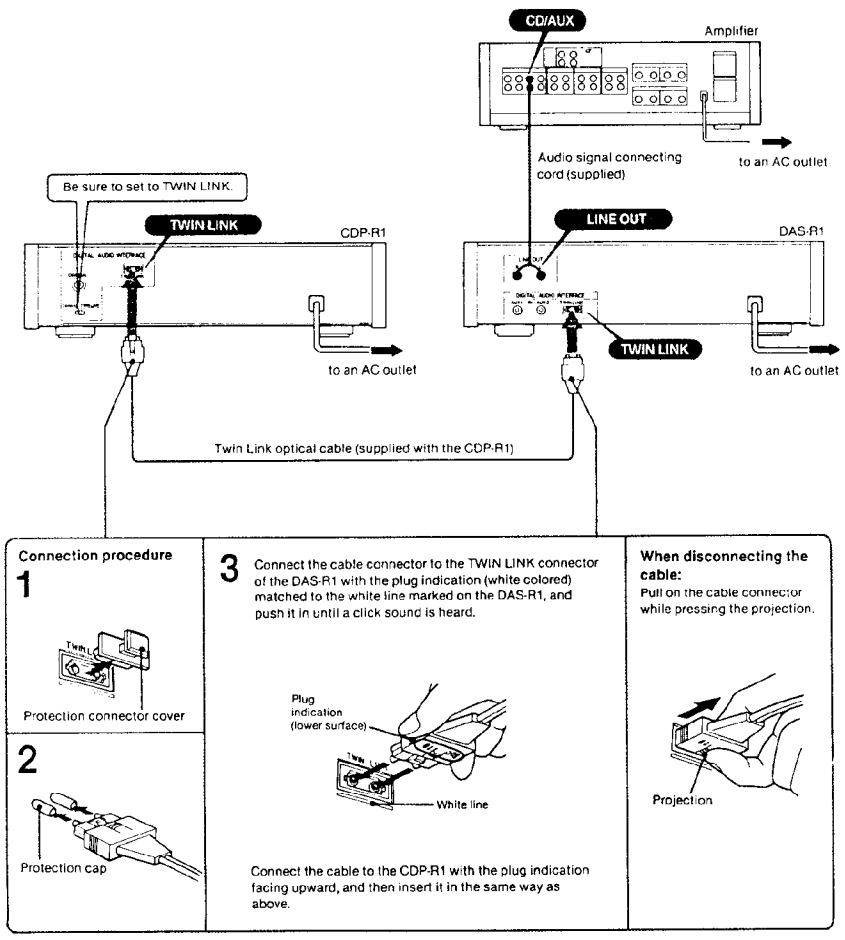
Precautions
- Do not place heavy material on the connection cords. Do not pull the cords forcibly.
- Select the installation place and mount this unit before making any connections. Before transporting the unit, be sure to disconnect all of the connecting cords.

Audio signal connecting cord
Connect the plug with the red line to the R (right) channel jack, and the plug with the white line to the L (left) channel jack.



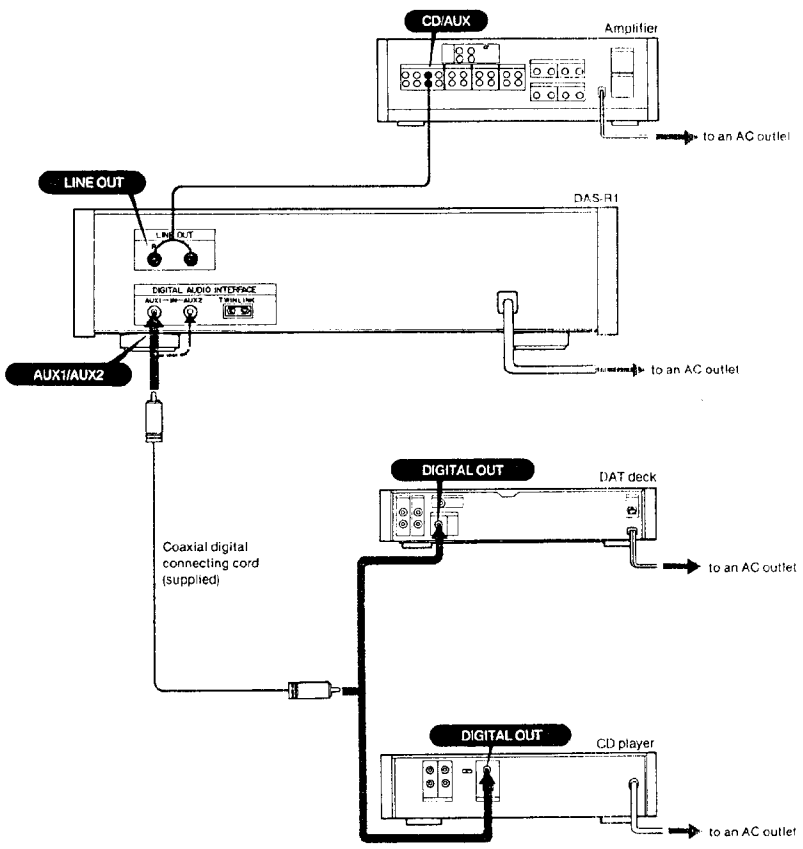
Connection to the CDP-R1

Use the Twin Link optical cable (supplied with the CDP-R1) to connect the CDP-R1 to the DAS-R1.
Before making this connection, be sure to turn the power to all components OFF.



Connection to Digital Components other than the CDP-R1

The DAS-R1 can also be used as an outboard D/A converter unit together with other digital components (such as an optional DAT deck or CD player).



1-3. TECHNICAL DESCRIPTION

D/A Master Clock ... Twin Optical Linkage

8 times oversampling errorless digital filter with 18-bit

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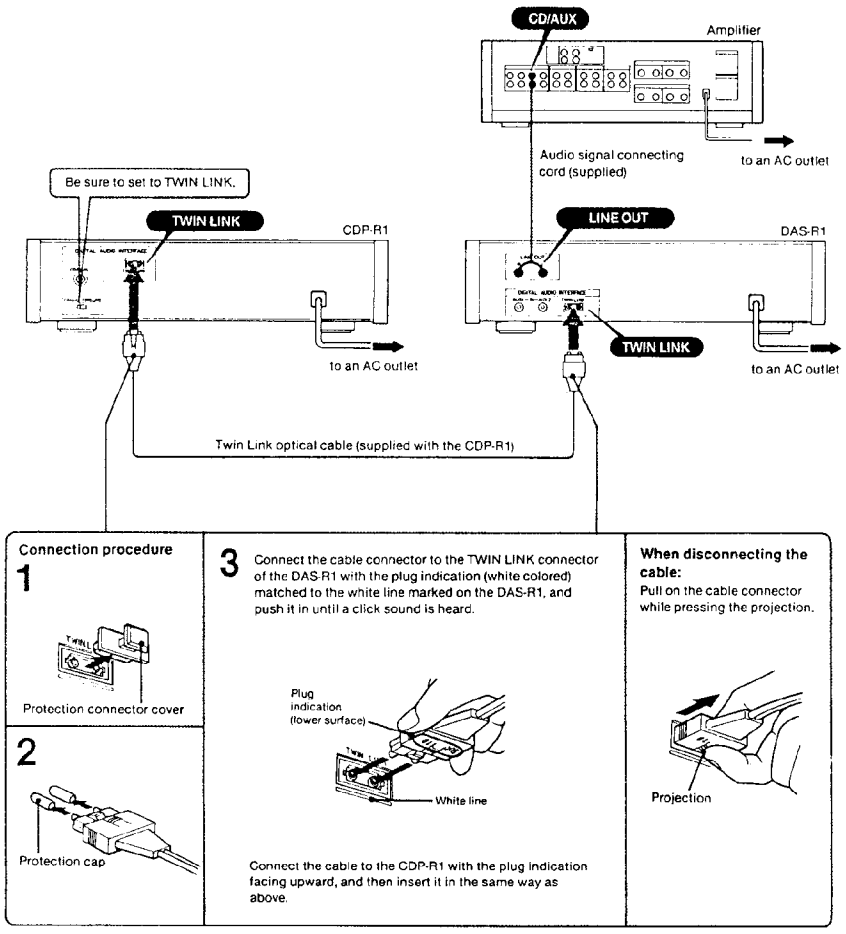
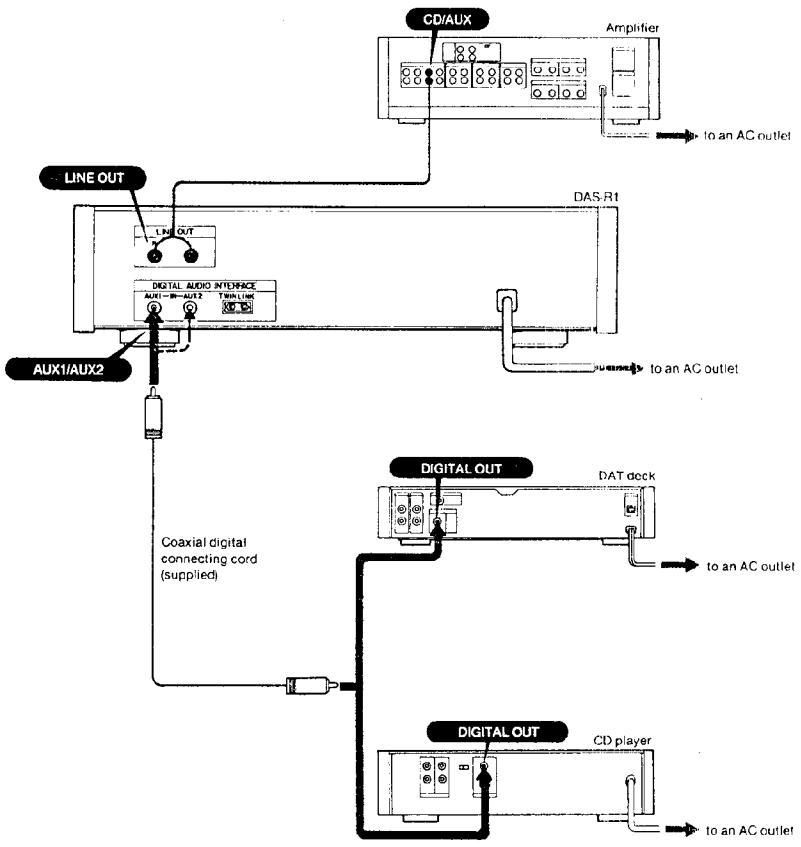
Before making this connection, be sure to turn the power to all components OFF.





1-3. TECHNICAL DESCRIPTION

D/A Master Clock — Twin Optical Linkage

The D/A conversion process plays a major role in determining the sound quality of a CD player. In a separate CD player system, isolating this D/A conversion process from servo and digital signal processing noise is very beneficial in terms of sound quality. The CDP-R1 and DAS-R1 are prime examples of perfect separation. In addition to the data transmission interface from the player to the converter, a clock interface from the converter to the player is provided. These two interfaces are interconnected with two separate fiber optic data transmission cables, a "twin optical linkage" configuration.

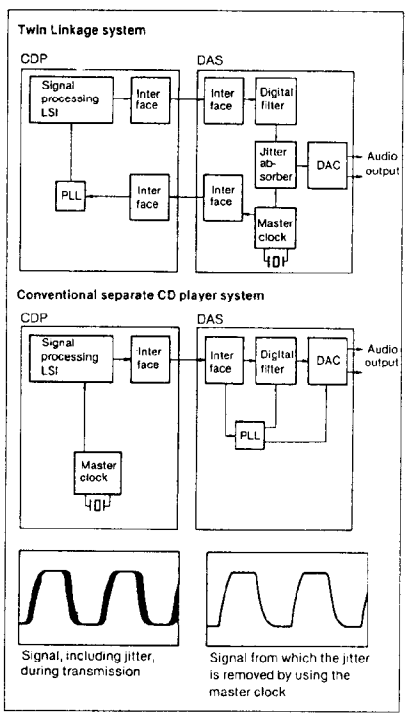
In conventional separate systems, the master clock is in the CD player. Both the data and clock signal are sent to the D/A converter, where the analog waveform is constructed on the time axis based on the clock signal. (Refer to right figure.)

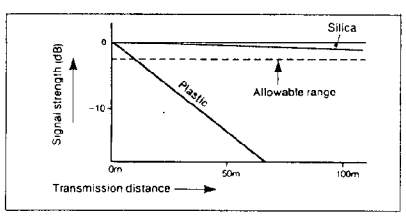
Since the data is digital information, there is no problem with waveform deformation or loss during transmission. However, a form of "jitter" can be generated from the clock signal, degrading sound purity.
Jitter is defined as a "flickering" on the time axis, and has some affect on waveform rise and recovery timing, manifesting in a sort of "back and forth" sound realization. If this occurs, the output waveform "jitters" back and forth, resulting in one form of phase distortion. In this connection, a single wavelength at the CD maximum frequency of 20,000 Hz is 50 μ sec. If this is analyzed at the same 16-bit quantization, it equals: 1/216(= 65,536) × 50 μ sec. = 0.75 nsec.
Thus, if jitter on this level occurs, it will affect sound quality. Generally speaking, digital data transfer by optical fiber has the advantage of electrical noise transmission being cut out. However, jitter on the order of a few nanoseconds is generated, and this value cannot be overlooked from the viewpoint of sound quality.
Making use of a quartz crystal oscillator, the master clock operates at extremely high precision, with jitter at the measurable limit of 0.1 nanoseconds, or 1/10,000,000,000th of a second. Keeping this precision in the signal sent to the D/A converter is a major factor in sound quality. Therefore, it is best to have the quartz crystal oscillation of the master clock in the D/A converter unit, sent directly to the D/A converter circuit.

This clock is also necessary in the CD player, so a special clock transmission circuit has been constructed, enabling the clock signal to be sent to the CD player from the D/A converter. Synchronizing the D/A operation with data pickup off the disc along the data line is called Twin Optical Linkage. This system prevents jitter from being mixed in with the audio output, dramatically reducing phase component flickering in the audio output signal for astonishingly realistic sound playback.

Silica Glass Optical Fiber

In the Twin optical Linkage configuration, the effects of jitter generation in the cable are markedly reduced, enabling the use of better devices with a higher standard of performance for better quality sound reproduction. The optical fiber used in the linkage is highly reliable plastic clad silica glass core optical fiber, with superb light transmission characteristics. The CDP-R1 is supplied with a 1 meter length of SOC-10 twin-link cable, which has a transmission capability of over 100 meters.



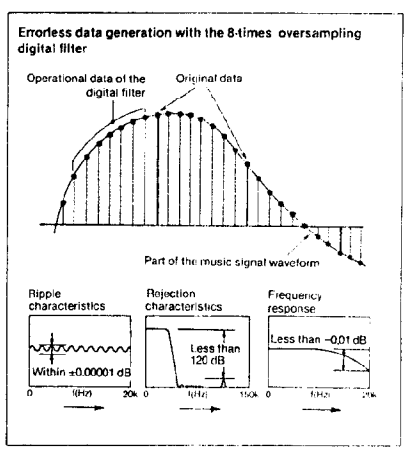


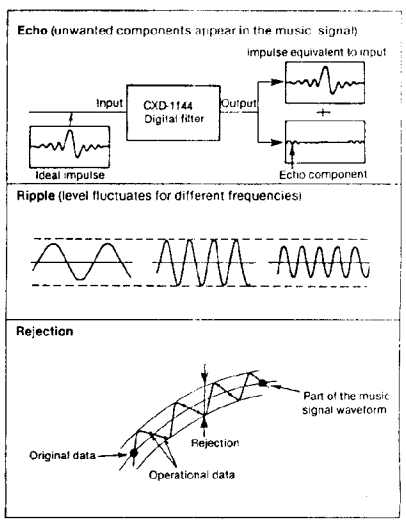
8 times oversampling errorless digital filter with 18-bit resolution

The digital data read by the CDP-R1 is transmitted through the data side of the twin optical linkage to the DAS-R1 at a data rate, as read from the CD, of 44,100 data per second. In the DAS-R1, this audio data is first sent to the CXD-1144 digital filter which has a data rate 8 times higher at 352,800 per second, thus performing 8 times oversampling, as right figure shows.
As a result, the quantity of data is increased, raising the information density of the analog output while reducing the load on the analog filter for an improvement in sound quality.
The quality and accuracy of a digital filter can be judged on the basis of three characteristics which are a by-product of its operation. They are ripple, echo, and rejection, and all three have a great bearing on the resulting sound quality.
In simple terms, each is a form of operational error. Therefore, the CXD-1144 digital filter has been designed for remarkably large scale operation capability, with some 293 stages in total, to greatly reduce the rate of error. The resulting ripple, echo, and rejection characteristics are impressive:

bandwidth ripple: within ±0.00001 dB
echo level: −124 dB or less
rejection: greater than 120 dB up to 150 kHz

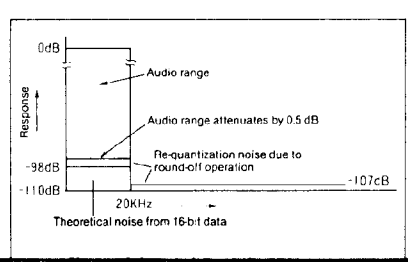
These group characteristics, when compared to the resolution of the 18-bit operation output values, are indeed sufficiently low enough for the digital filter to be considered virtually errorless in actual use.





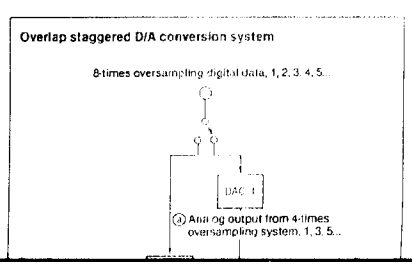
18-bit D/A Conversion with Noise Shaping —Noise shaping during 18-bit to 16-bit conversion to obtain 18-bit resolution—

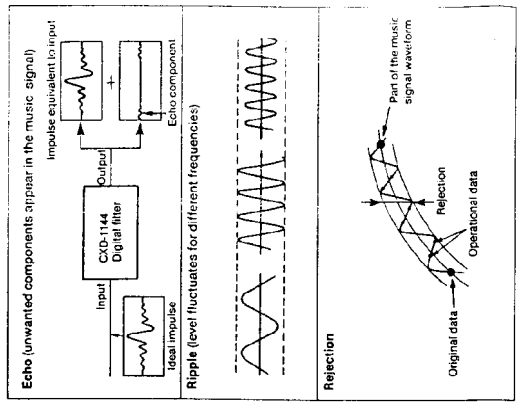
The CXD-1144 is an 18-bit output digital filter, which has a conversion result somewhat greater resolution than the 16-bit data recorded on a CD. That is, 16-bit output runs in the order of [0] [1] [2] [3]..., while 18-bit output runs like [0] [0.25] [0.5] [0.75] [1] [1.25]... and so on. The D/A converter of the DAS-R1 is a 16-bit input type, so 18-bit data must be converted into 16-bit with no loss of musical information. For this reason, the CXD-1329 noise shaper was developed.
In converting ordinary 18-bit to 16-bit, re-assigning [0.25] to [0], and [0.5] and [0.75] to [1] is simply rounding to the nearest place (counting 0.5 and over as "1" and discarding 0.4 or less), and it is

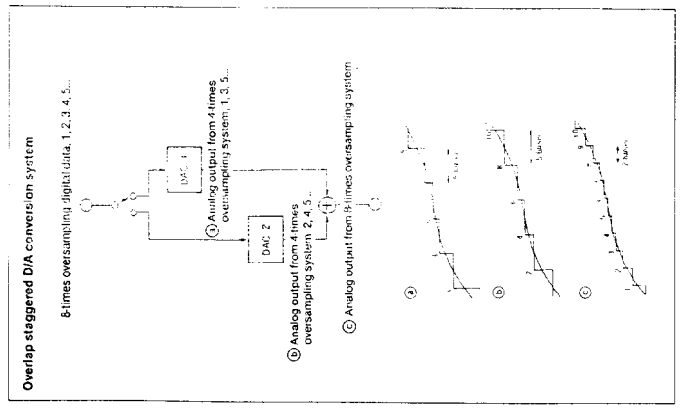


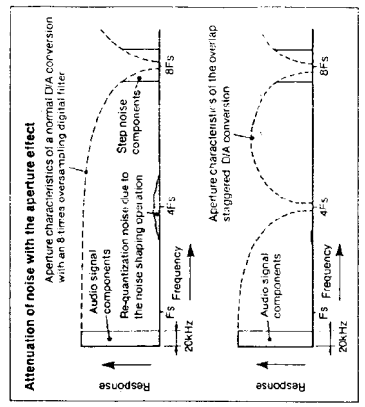
Overlap Staggered 8 Times D/A Conversion for distortion-free, low-noise signal reproduction

This system performs D/A conversion at four times normal speed, with two converters for per channel, each operates parallelly with a half cycle delayed timing. The 8 times oversampling data output from the digital filter is alternated between them to achieve a smooth, continuous output.
Namely, odd-numbered data is converted by DAC-1 and even-numbered data is converted by DAC-2. Each DAC operates at four times speed, and the sum of both output makes 8 times audio signal.
When the D/A converter on one side begins operation, the D/A converter on the other side has just finished first half of working time, so that both operate in an overlapping fashion, as right figure shows. The output obtained is the average value of the two









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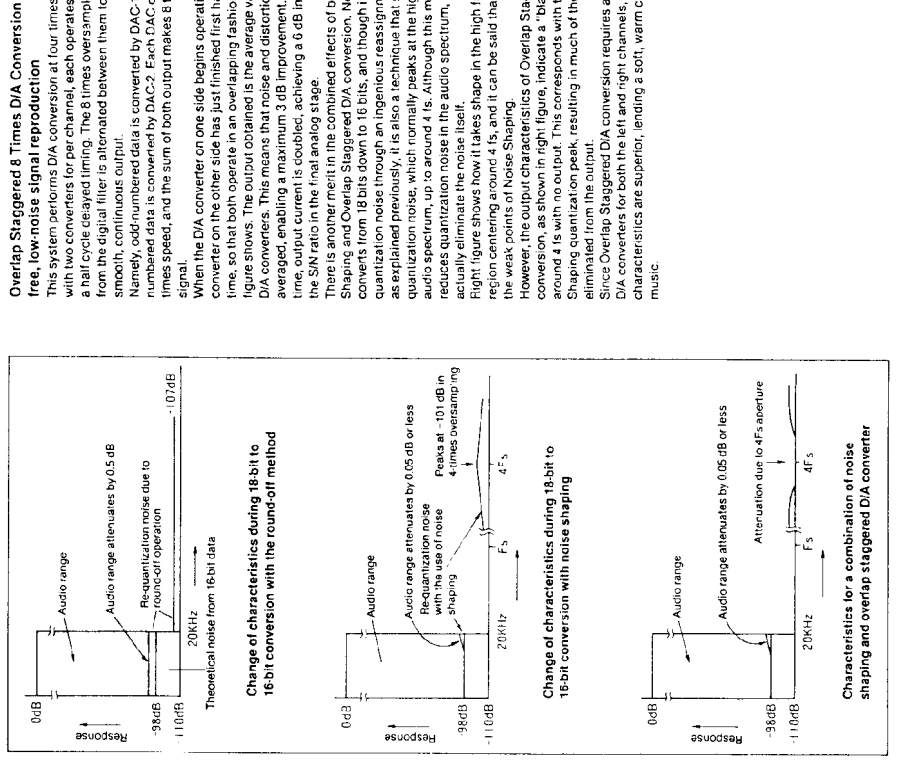
There is another merit in the combined effects of both Noise Shaping and Overlap Staggered D/A conversion. Noise Shaping converts from 18 bits down to 16 bits, and though it reduces quantization noise through an ingenious reassignment of values as explained previously, it is also a technique that shifts re-quantization noise, which normally peaks at the high end of the audio spectrum, up to around 4 fs. Although this markedly reduces quantization noise in the audio spectrum, it does not actually eliminate the noise itself.

Right figure shows how it takes shape in the high frequency region centering around 4 fs, and it can be said that this is one of the weak points of Noise Shaping.

However, the output characteristics of Overlap Staggered D/A conversion, as shown in right figure, indicate a "dark" interval around 4 fs with no output. This corresponds with the Noise Shaping quantization peak, resulting in much of the noise being eliminated from the output.

Since Overlap Staggered D/A conversion requires a total of four D/A converters for both the left and right channels, group characteristics are superior, lending a soft, warm character to the music.



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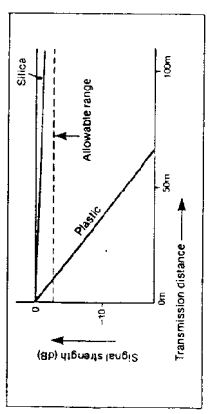
During noise shaping, the CXD-1329 operates in a way to reduce this effect. For example, if [0.25] data repeats four times, the CXD-1329 outputs [0] [0] [0] [1] to the D/A converter. This operation better preserves musical information by maintaining proper values for playback sound with a higher information density.



enough for the digital filter to be considered virtually errorless in actual use.

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SECTION 2
ELECTRICAL ADJUSTMENT

Master Clock OSC Adjustment (ANALOG BOARD)

Mode	CD (DIGITAL INPUT Switch)
Signal	No signal
Measurement point	TP (fig. 1)
Measurement equipment	Frequency counter
Adjustment elements	C203, 204, 205
Specified value	11.2896MHz±100Hz

Connect or disconnect C203, C204 and C205, so that the frequency becomes 11.2896MHz±100Hz.

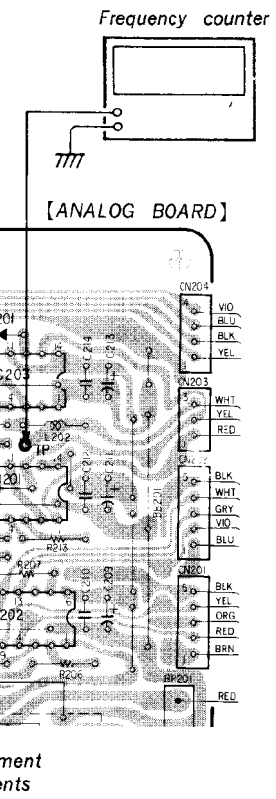


fig. 1

DAS-R1 DAS-R1

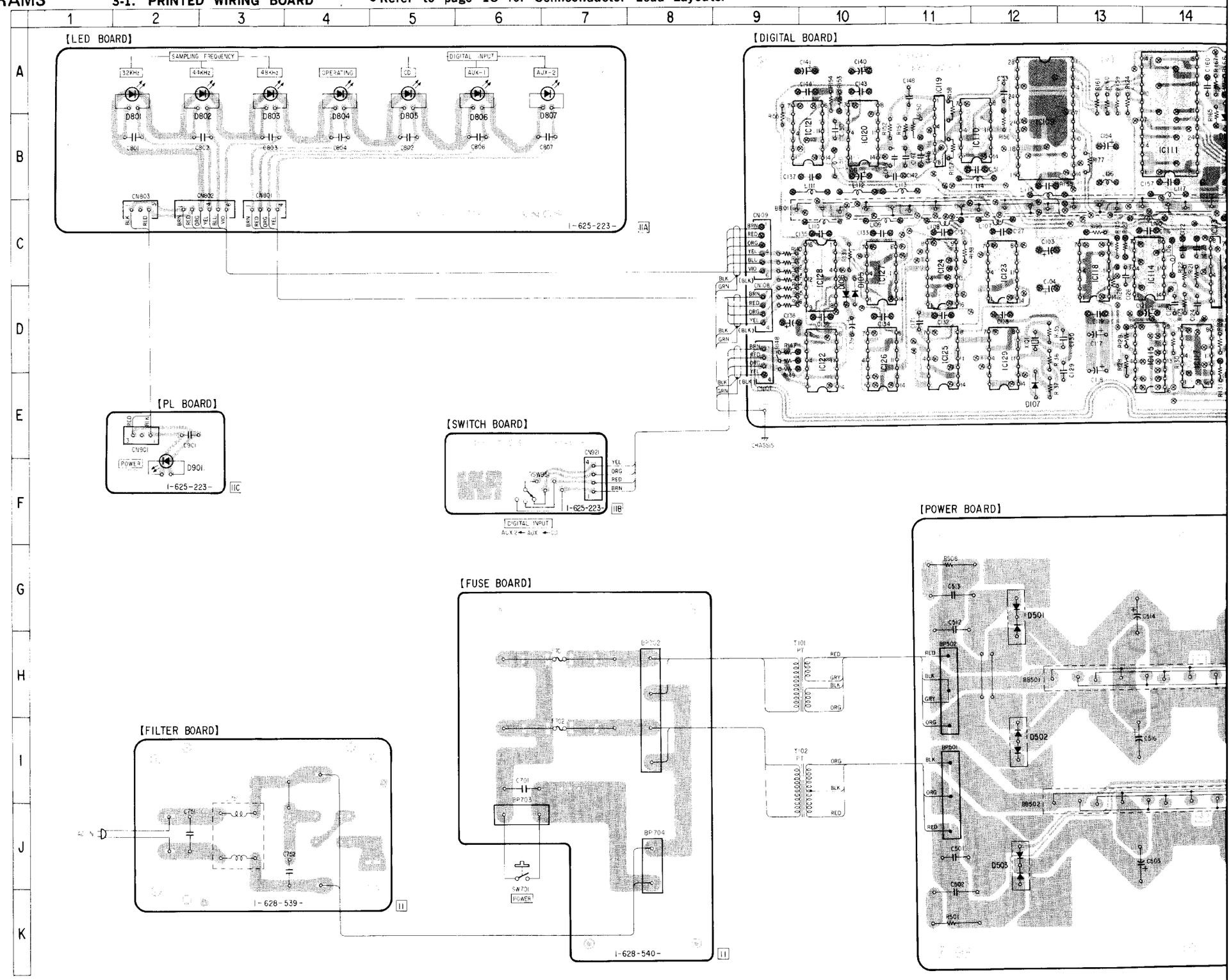
SECTION 3
DIAGRAMS

3-1. PRINTED WIRING BOARD

• Refer to page 18 for Semiconductor Lead Layouts.

• Semiconductor Location

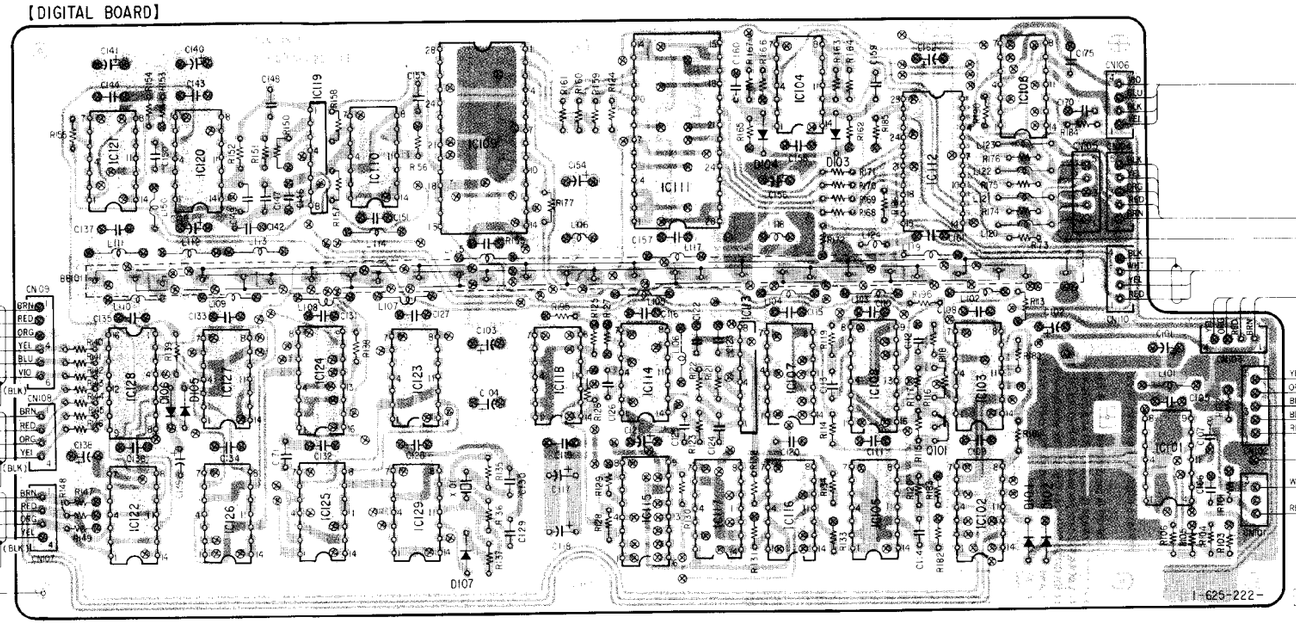
Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
D101	E-16	IC120	B-10	Q505	I-18
D102	E-17	IC121	B-10	Q506	I-17
D103	B-15	IC122	D-10	Q507	H-18
D104	B-14	IC123	C-12	Q508	H-17
D105	D-10	IC124	C-11	Q509	I-18
D106	D-10	IC125	D-11	Q510	I-17
D107	E-12	IC126	D-10	Q511	G-16
D201	B-33	IC127	C-10	Q512	I-16
D301	G-28	IC128	C-10	Q513	G-16
D302	G-25	IC129	D-12	Q514	G-16
D401	B-29	IC201	C-33	Q515	I-16
D402	B-25	IC202	D-33	Q516	I-16
D501	G-12	IC203	B-33	Q517	K-17
D502	I-12	IC204	B-31	Q518	K-16
D503	J-12	IC205	B-31		
D504	K-16	IC206	B-24		
D505	J-16	IC208	F-34		
D506	H-16	IC209	F-33		
D507	I-16	IC301	F-31		
D508	H-16	IC302	E-29		
D509	I-16	IC303	E-29		
D510	G-16	IC304	E-28		
D511	I-16	IC401	C-31		
D801	A-2	IC402	D-29		
D802	A-3	IC403	D-29		
D803	A-3	IC404	C-28		
D804	A-4	IC501	K-18		
D805	A-5	IC502	J-19		
D806	A-6	IC503	K-18		
D807	A-7				
D901	F-2	Q101	D-16		
		Q201	B-30		
IC101	D-17	Q202	B-31		
IC102	D-16	Q301	E-27		
IC103	C-16	Q302	G-28		
IC104	A-15	Q303	G-27		
IC105	D-15	Q304	G-27		
IC106	A-16	Q305	E-26		
IC107	C-15	Q306	F-26		
IC108	C-15	Q307	F-27		
IC109	B-12	Q401	C-27		
IC110	B-12	Q402	B-28		
IC111	B-14	Q403	B-27		
IC112	B-16	Q404	B-27		
IC113	C-14	Q405	C-26		
IC114	C-14	Q406	B-26		
IC115	D-14	Q407	C-27		
IC116	D-15	Q501	G-19		
IC117	D-14	Q502	I-19		
IC118	C-18	Q503	G-18		
IC119	B-11	Q504	G-17		



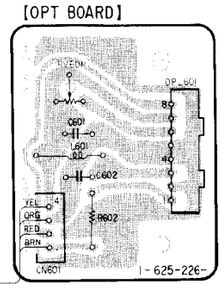
Semiconductor Lead Layouts.

7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

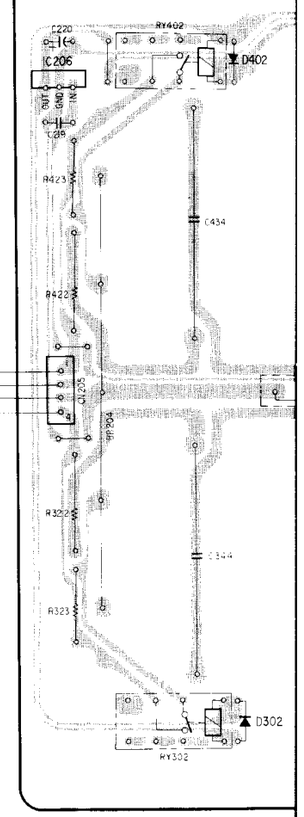
【DIGITAL BOARD】



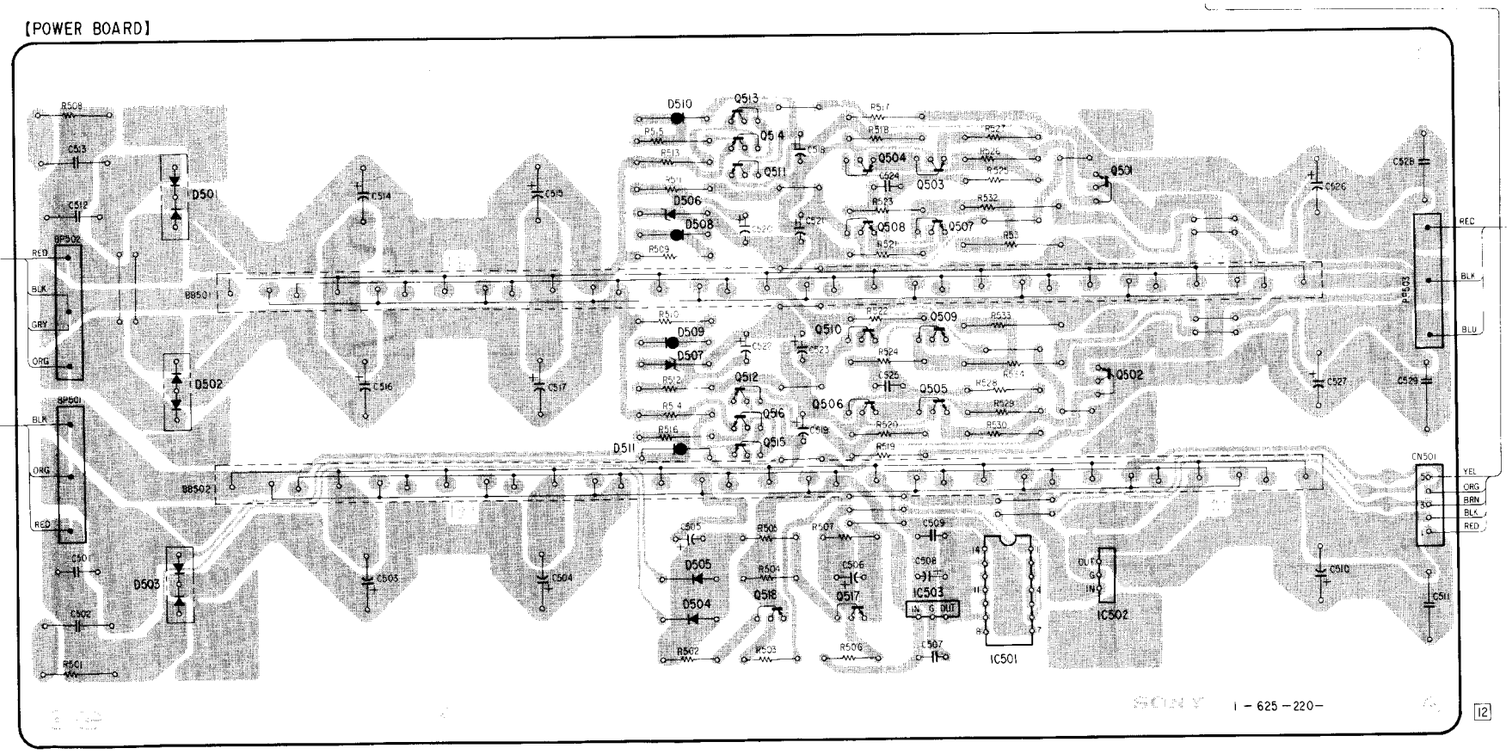
【OPT BOARD】

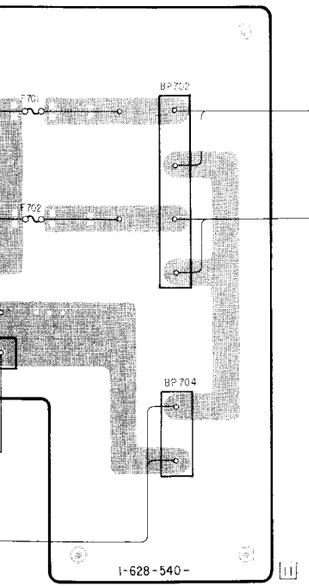


【ANALOG BOARD】



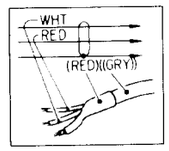
【POWER BOARD】





Note on Printed Wiring Board :

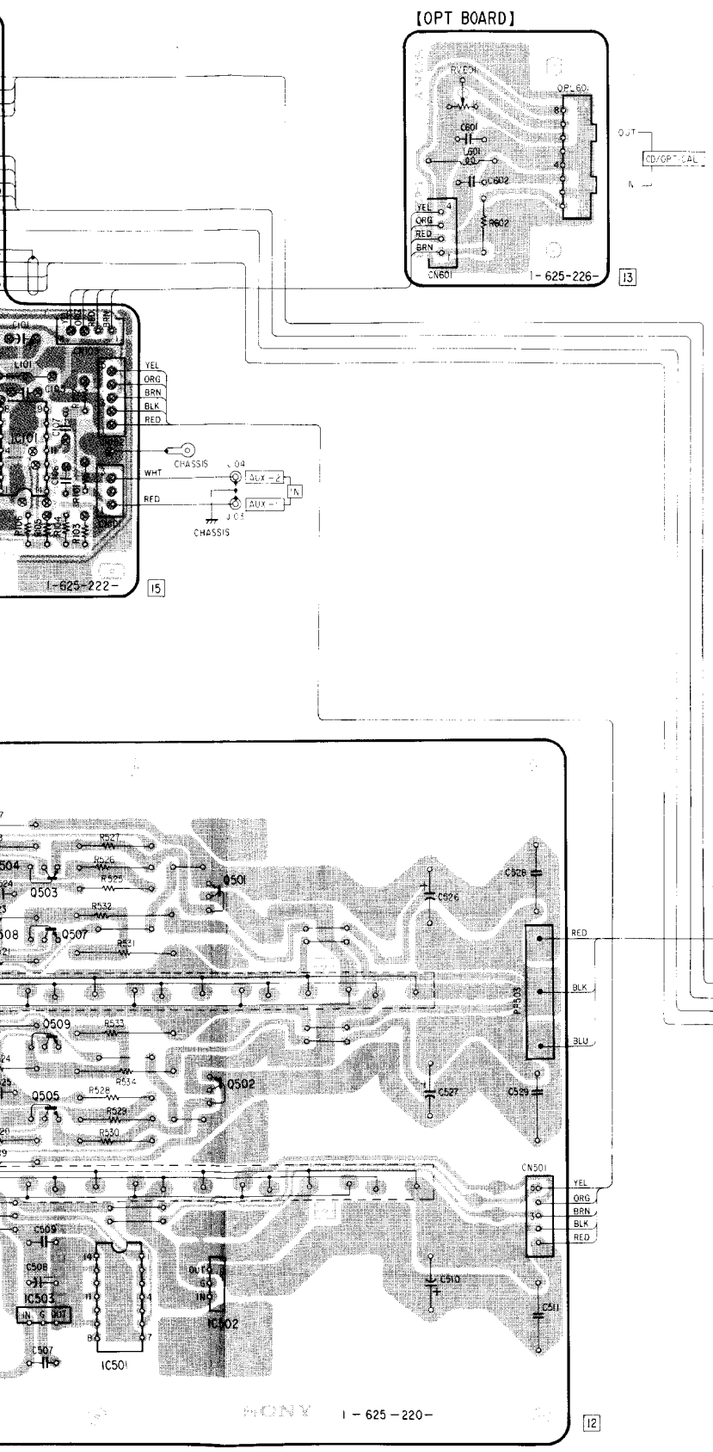
- Color code or sleeving over the e

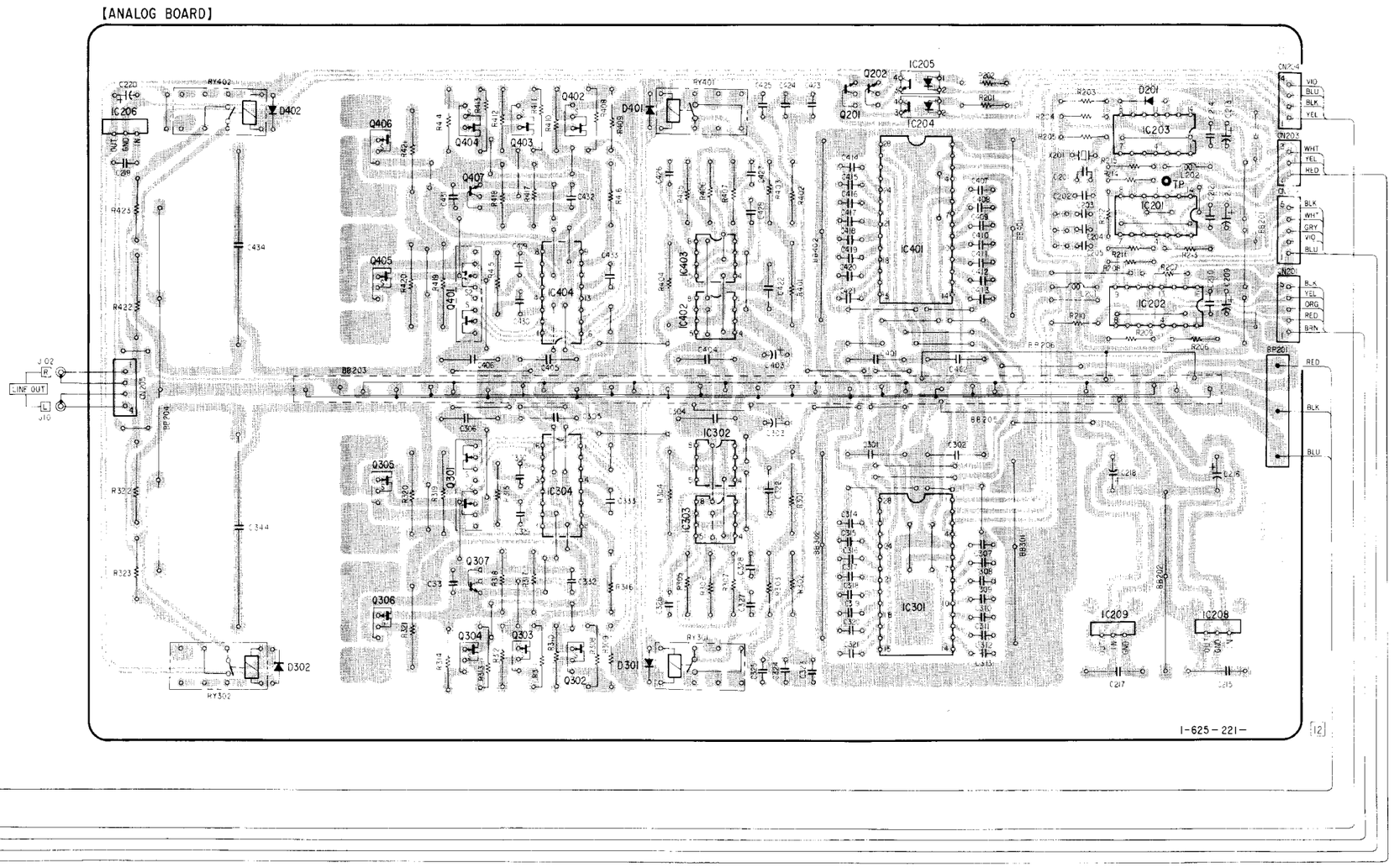


- ○—— : parts extracted from the
- ●—— : parts extracted from the
- ⊗ : Through hole.
- ▒▒ : Pattern on the side whic
- Pattern of the compone

* WG model: West Gemany mo

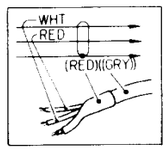
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35





Note on Printed Wiring Board :

- Color code or sleeving over the end of the jacket.



- ○—— : parts extracted from the component side.
- ●—— : parts extracted from the conductor side.
- ⊗ : Through hole.
- ▒▒ : Pattern on the side which is seen.
- ▒▒ : Pattern of the component side.

* WG model: West Gemany model

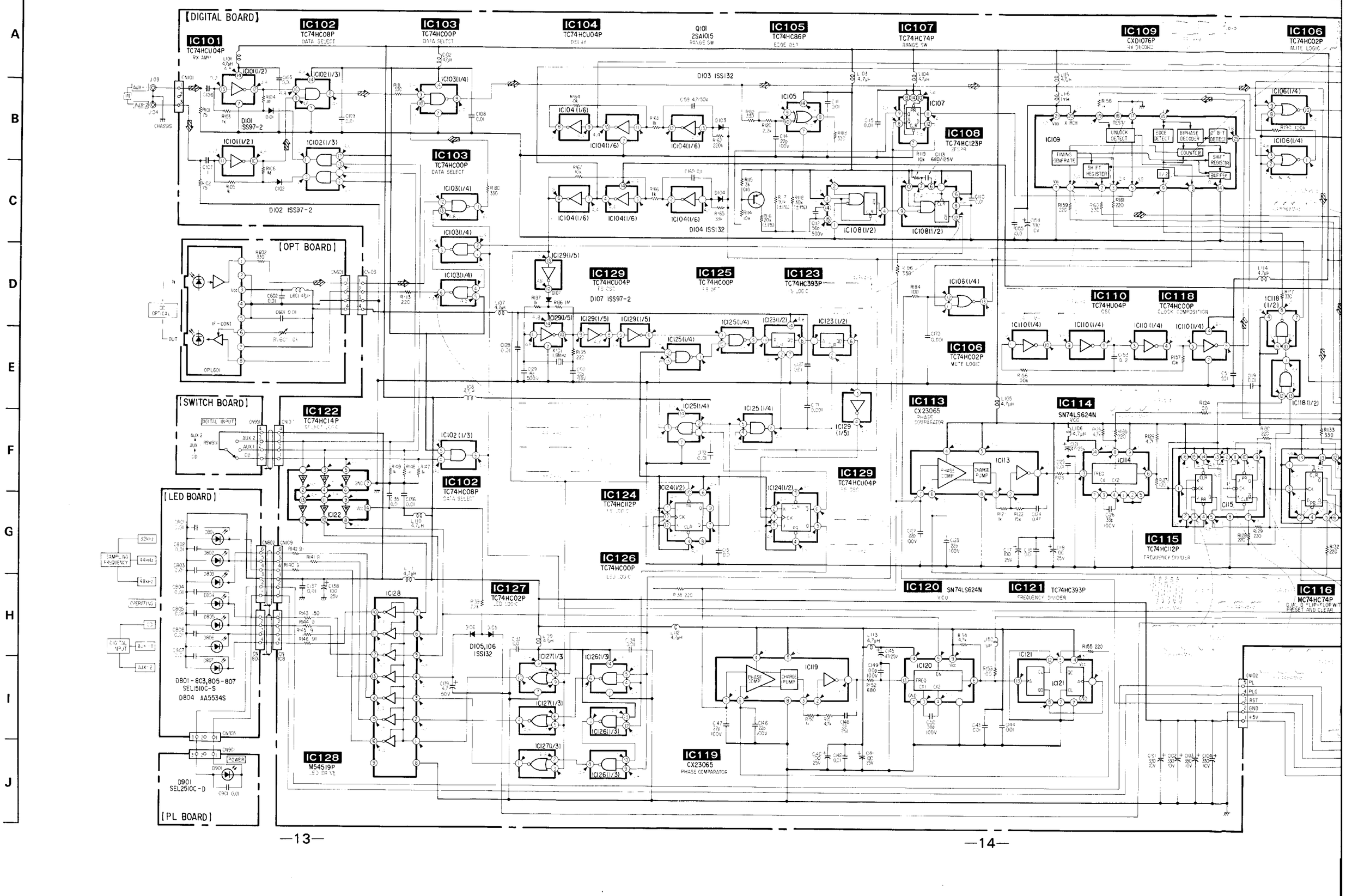
Note on Schematic Diagram :

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- Switch

Ref. No.	Switch	Position
SW701	POWER	ON
RSW951	DIGITAL INPUT	CD

- ▬▬ : B+ bus.
- ▬ ▬ : B− bus.
- ▭ : adjustment for repair.
  CD player (CDP-R1,etc) with digital output is required for measurement of this set.
- Play back any compact disc, receive the digital signal.
- Voltages are taken with a VOM (50 kΩ/V).
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in playback mode by using oscilloscope.
- ⇨ : CD signal pass
- ⇨ : L-CH signal pass
- ⇨ : R-CH signal pass
- WG model: West Gemany model

3-2. SCHEMATIC DIAGRAM



10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

[ANALOG BOARD]

IC107 TC74HC74P RANGE SW

IC108 TC74HC123P

IC108(1/2)

IC109 CXD1076P FX DECORD

IC106 TC74HC02P MUTE LOGIC

IC106(1/4)

IC112 CXD1329S CONVERTER

IC106 TC74HC02P MUTE LOGIC

IC111 CXD1144AP DIGITAL FILTER

IC110 TC74HU04P OSC

IC118 TC74HC00P CLOCK COMPOSITION

IC118(1/2)

IC123 TC74HC393P

IC123(1/2)

IC129 TC74HCU04P

IC129(1/5)

IC113 CX23065 PHASE COMPARATOR

IC114 SN74LS624N VCO

IC115 TC74HC112P FREQUENCY DIVIDER

IC116 MC74HC74P DUAL D FLIP-FLOP WITH PRESET AND CLEAR

IC117 TC74HC393P FREQUENCY DIVIDER

IC120 SN74LS624N VCO

IC121 TC74HC393P FREQUENCY DIVIDER

IC202 TC74HC175P DUAL D FLIP-FLOP WITH PRESET AND CLEAR

IC201 TC74HC00P CLOCK SELECT

IC203 TC74HCU04P

IC203(1/4)

IC204 PC817 ISOLATION

IC205 PC817 ISOLATION

Q201,202 2SD774K RELAY DRIVE

IC301 TDA1541A-S1 D/A CONVERTER

IC302 LF356H-K I-V CONVERTER

IC401 TDA1541A-S1 D/A CONVERTER

IC402 LF356H-K I-V CONVERTER

IC206 M5F7812 +12V REG

IC208 M5F7805 +5V REG

IC209 M5F7905 -5V REG

Q501 2SC2275A Q503,504 REG + OUT

Q502 2SA985A Q505,506 REG - OUT

Q518 2SB1013 LED DRIVE

Q517 2SC2458-GR DELAY

IC503 M5F78M05 +5V REG

IC501 TC74HC14P RESET PULSE

D504,505 10DF2

D503 CI6P20F

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

A B C D E F G H I J

[ANALOG BOARD]

IC202 TC74HC175P DUAL D FLIP-FLOP WITH PRESET AND CLEAR

IC201 TC74HC00P CLOCK SELECT

IC203 TC74HCU04P OSC

D201 ISS97-2

IC204 PC817 ISOLATION

IC205 PC817 ISOLATION

Q201,202 2SD774K RELAY DRIVE

IC301 TDA1541A-S1 D/A CONVERTER

IC302 LF356H-K I/V CONVERTER

D301 ISS132

IC303 AD712JN L.P.F

Q301 2SK244 INPUT BUFFER

IC304 M5240PS BUFFER

Q307 2SC3514 CONSTANT VOLTAGE

Q303,304 2 2SK241GR CONSTANT CURRENT

Q305 2SK213 CURRENT BOOST

Q302 2SK241GR CONSTANT CURRENT

Q306 2SJ76 CURRENT BOOST

D302 ISS132

IC401 TDA1541A-S1 D/A CONVERTER

IC402 LF356H-K I/V CONVERTER

D401 ISS132

IC403 AD712JN L.P.F

Q401 2SK244 INPUT BUFFER

IC404 M5240PS BUFFER

Q407 2SC3514 CONSTANT VOLTAGE

Q403,404 2SK241GR CONSTANT CURRENT

Q405 2SK213 CURRENT BOOST

Q402 2SK241GR CONSTANT CURRENT

Q406 2SJ76 CURRENT BOOST

D402 ISS132

IC206 M5F7812 +12V REG

IC208 M5F7805 +5V REG

IC209 M5F7905 -5V REG

IC502 M5F7805 +5V REG

IC503 M5F78M05 +5V REG

IC501 TC74HC14P RESET PULSE

Q501 2SC2275A Q503,504 2SA1383 Q507,508 2SC3514 D508,510 10YDI.3 Q511 2SD666 Q513,514 2SB646

REG + OUT ERROR AMP ERROR AMP VOLTAGE DET CONSTANT CURRENT

D506 EQB01-07

Q502 2SA985A Q505,506 2SC3514 Q509,510 2SA1383 Q512 2SB646 Q515,516 2SD666

REG - OUT ERROR AMP ERROR AMP VOLTAGE DET CONSTANT CURRENT

D507 EQB01-07 D509,511 10YDI.3

Q517 2SC2458-GR DELAY

Q518 2SB1013 LED DRIVE

D501 C16P20F D502 C16P20FR D503 C16P20F D504,505 10DF2

[POWER BOARD]

[FUSE BOARD]

[FILTER BOARD]

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

DAS-R1 DAS-R1

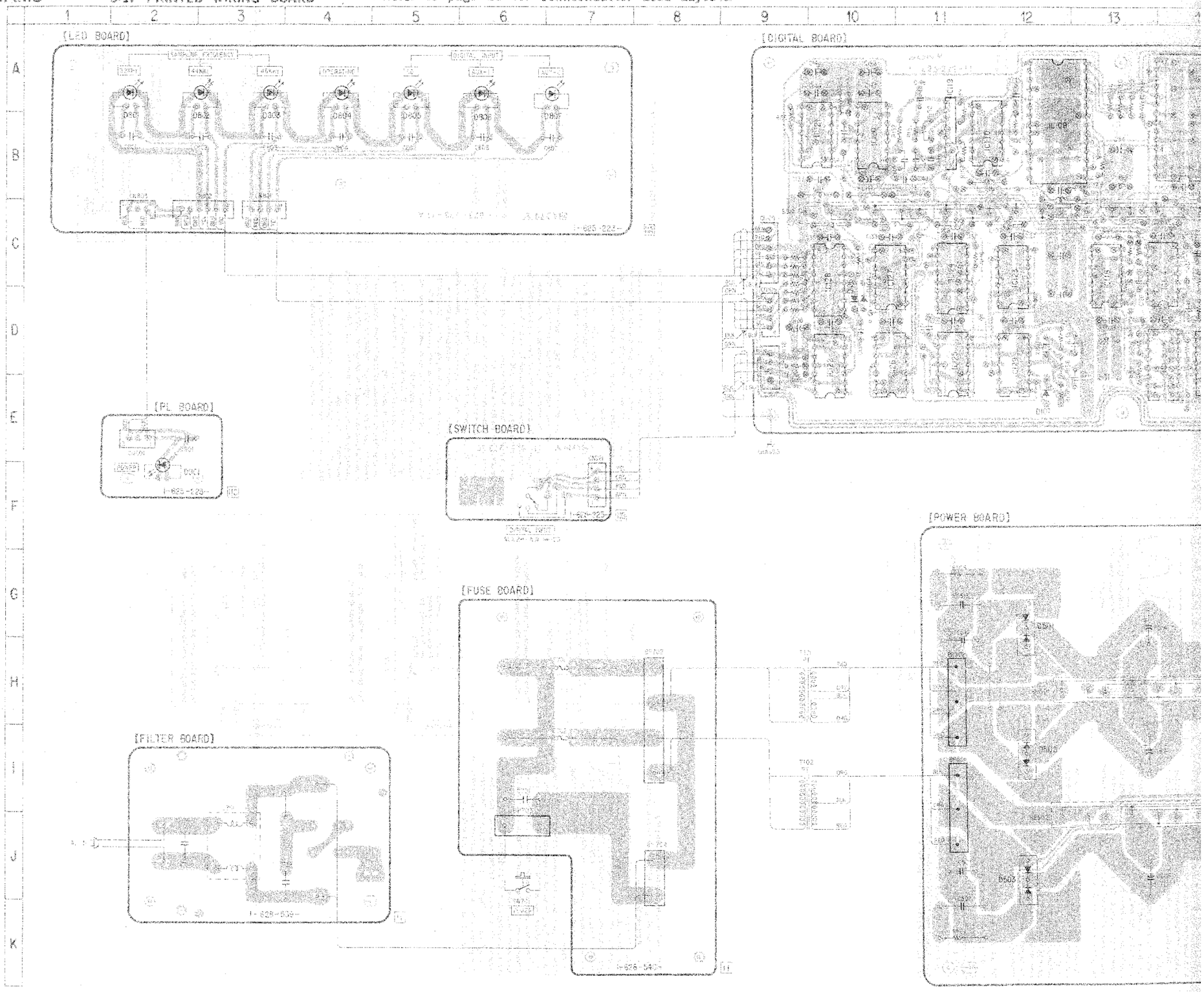
SECTION 3
DIAGRAMS

3-1. PRINTED WIRING BOARD

• Refer to page 18 for Semiconductor Lead Layouts.

• Semiconductor Location

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
D101	E-16	IC120	B-10	Q505	I-18
D102	E-17	IC121	B-10	Q506	I-17
D103	B-15	IC122	D-10	Q507	H-18
D104	B-14	IC123	C-12	Q508	H-17
D105	D-10	IC124	C-11	Q509	I-18
D106	D-10	IC125	D-11	Q510	I-17
D107	E-12	IC126	D-10	Q511	G-16
D201	B-33	IC127	C-10	Q512	I-16
D301	G-28	IC128	C-10	Q513	G-16
D302	G-25	IC129	D-12	Q514	G-16
D401	B-29	IC201	C-33	Q515	I-16
D402	B-25	IC202	D-33	Q516	I-16
D501	G-12	IC203	B-33	Q517	K-17
D502	I-12	IC204	B-31	Q518	K-16
D503	J-12	IC205	B-31		
D504	K-16	IC206	B-24		
D505	J-16	IC208	F-34		
D506	H-16	IC209	F-33		
D507	I-16	IC301	F-31		
D508	H-16	IC302	E-29		
D509	I-16	IC303	E-29		
D510	G-16	IC304	E-28		
D511	I-16	IC401	C-31		
D801	A-2	IC402	D-29		
D802	A-3	IC403	D-29		
D803	A-3	IC404	C-28		
D804	A-4	IC501	K-18		
D805	A-5	IC502	J-19		
D806	A-6	IC503	K-18		
D807	A-7				
D901	F-2	Q101	D-16		
		Q201	B-30		
IC101	D-17	Q202	B-31		
IC102	D-16	Q301	E-27		
IC103	C-16	Q302	G-28		
IC104	A-15	Q303	G-27		
IC105	D-15	Q304	G-27		
IC106	A-16	Q305	E-26		
IC107	C-15	Q306	F-26		
IC108	C-15	Q307	F-27		
IC109	B-12	Q401	C-27		
IC110	B-12	Q402	B-28		
IC111	B-14	Q403	B-27		
IC112	B-16	Q404	B-27		
IC113	C-14	Q405	C-26		
IC114	C-14	Q406	B-26		
IC115	D-14	Q407	C-27		
IC116	D-15	Q501	G-19		
IC117	D-14	Q502	I-19		
IC118	C-18	Q503	G-18		
IC119	B-11	Q504	G-17		



DAS-R1 DAS-R1

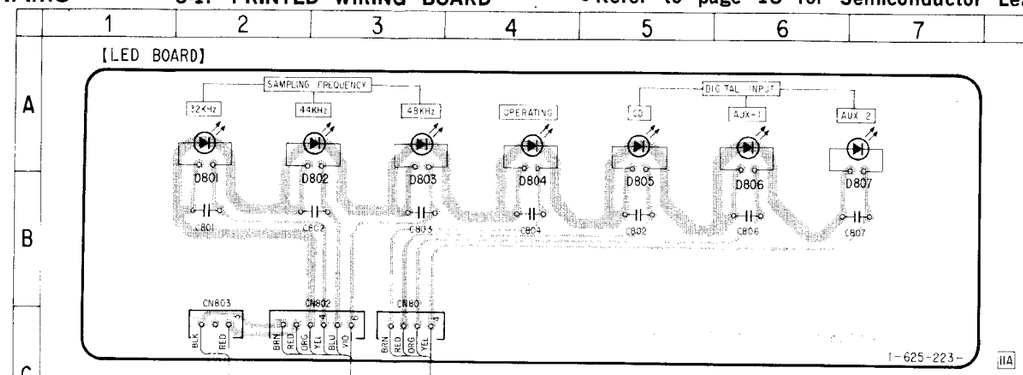
SECTION 3
DIAGRAMS

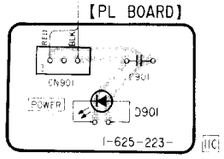
3-1. PRINTED WIRING BOARD

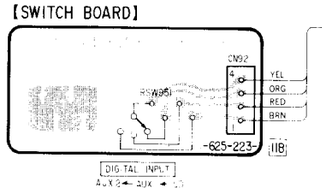
• Refer to page 18 for Semiconductor Lead Layouts.

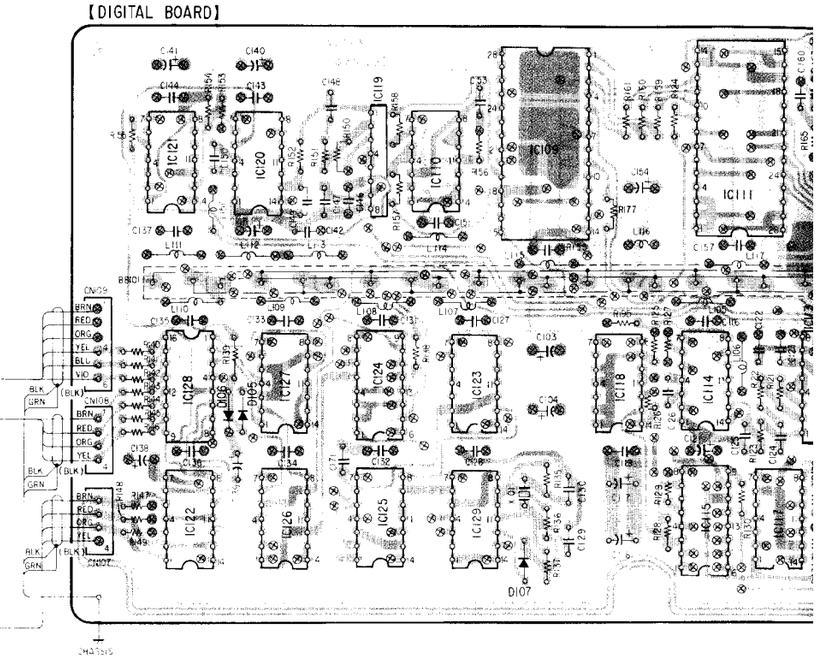
• **Semiconductor Location**

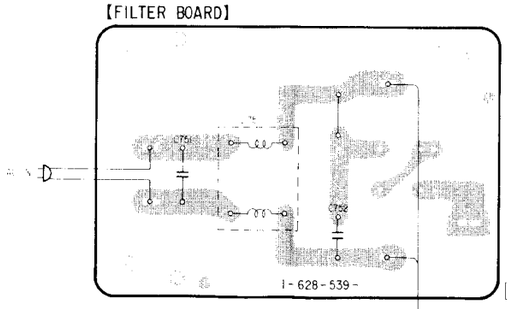
Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
D101	E-16	IC120	B-10	Q505	I-18
D102	E-17	IC121	B-10	Q506	I-17
D103	B-15	IC122	D-10	Q507	H-18
D104	B-14	IC123	C-12	Q508	H-17
D105	D-10	IC124	C-11	Q509	I-18
D106	D-10	IC125	D-11	Q510	I-17
D107	E-12	IC126	D-10	Q511	G-16
D201	B-33	IC127	C-10	Q512	I-16
D301	G-28	IC128	C-10	Q513	G-16
D302	G-25	IC129	D-12	Q514	G-16
D401	B-29	IC201	C-33	Q515	I-16
D402	B-25	IC202	D-33	Q516	I-16
D501	G-12	IC203	B-33	Q517	K-17
D502	I-12	IC204	B-31	Q518	K-16
D503	J-12	IC205	B-31		
D504	K-16	IC206	B-24		
D505	J-16	IC208	F-34		
D506	H-16	IC209	F-33		
D507	I-16	IC301	F-31		
D508	H-16	IC302	E-29		
D509	I-16	IC303	E-29		
D510	G-16	IC304	E-28		
D511	I-16	IC401	C-31		
D801	A-2	IC402	D-29		
D802	A-3	IC403	D-29		
D803	A-3	IC404	C-28		
D804	A-4	IC501	K-18		
D805	A-5	IC502	J-19		
D806	A-6	IC503	K-18		
D807	A-7				
D901	F-2	Q101	D-16		
		Q201	B-30		
IC101	D-17	Q202	B-31		
IC102	D-16	Q301	E-27		
IC103	C-16	Q302	G-28		
IC104	A-15	Q303	G-27		
IC105	D-15	Q304	G-27		
IC106	A-16	Q305	E-26		
IC107	C-15	Q306	F-26		
IC108	C-15	Q307	F-27		
IC109	B-12	Q401	C-27		
IC110	B-12	Q402	B-28		
IC111	B-14	Q403	B-27		
IC112	B-16	Q404	B-27		
IC113	C-14	Q405	C-26		
IC114	C-14	Q406	B-26		
IC115	D-14	Q407	C-27		
IC116	D-15	Q501	G-19		
IC117	D-14	Q502	I-19		
IC118	C-18	Q503	G-18		
IC119	B-11	Q504	G-17		

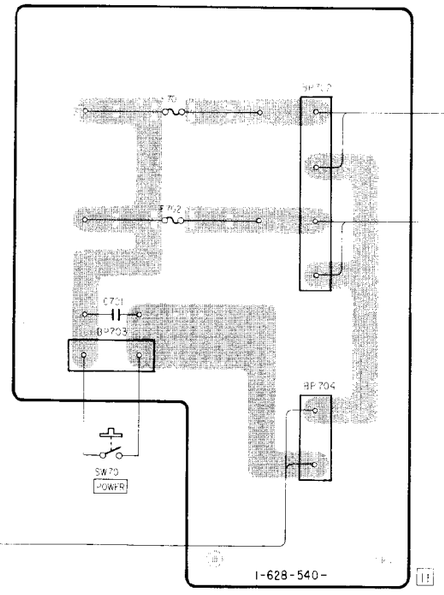


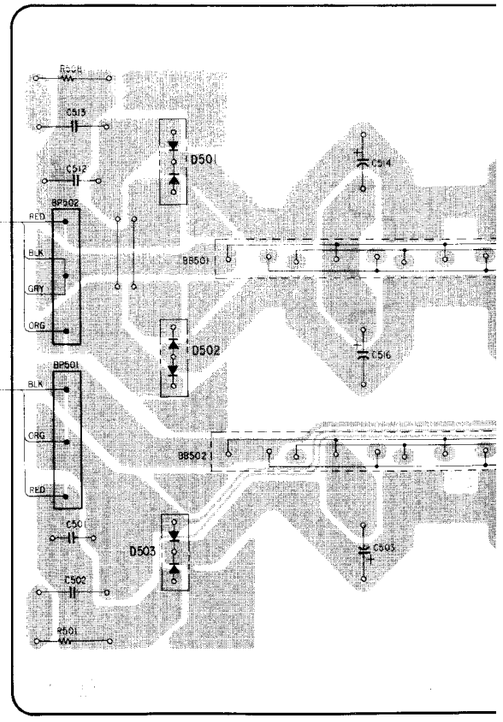












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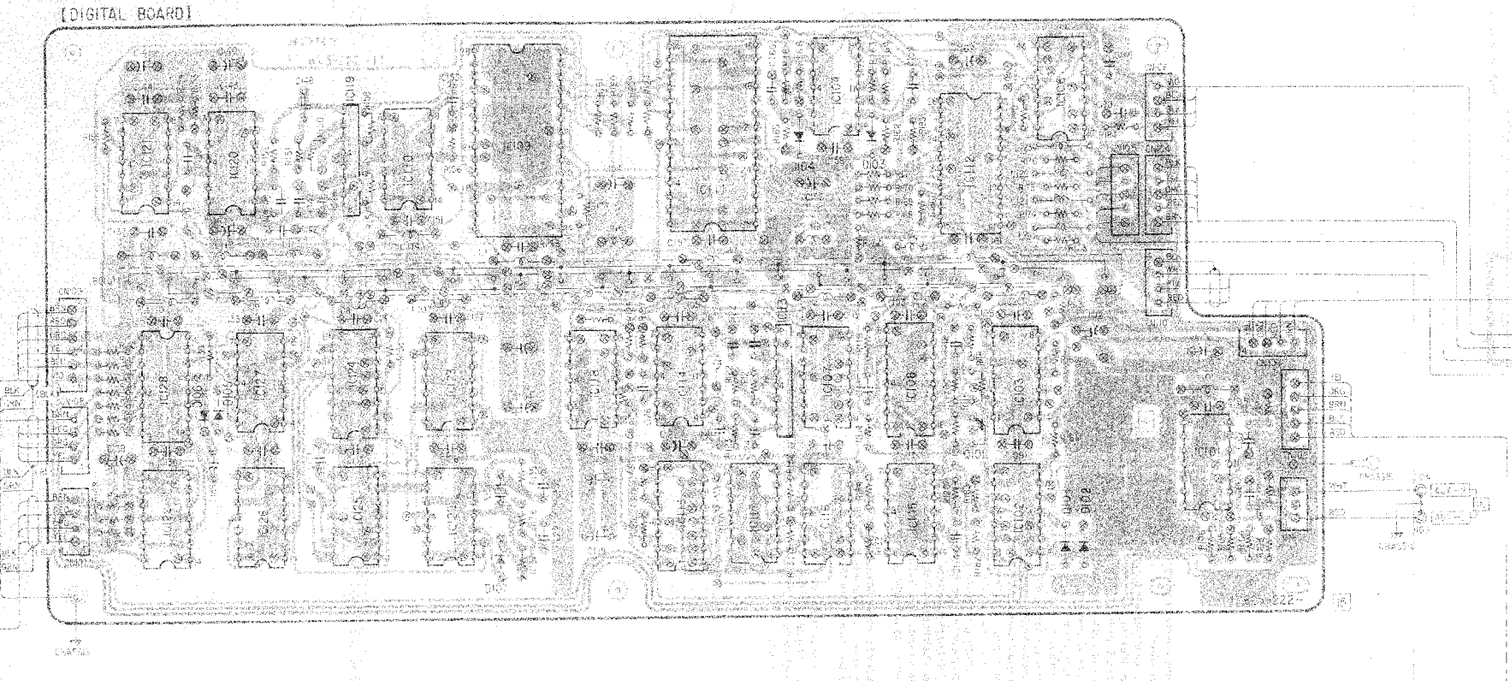
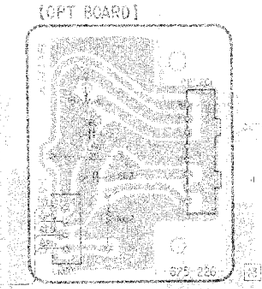
s.

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

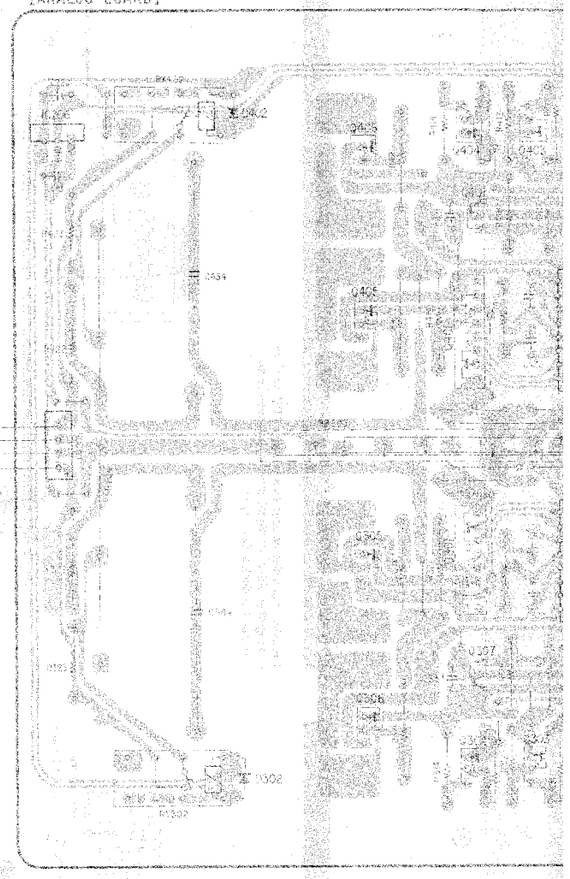
[DIGITAL BOARD]



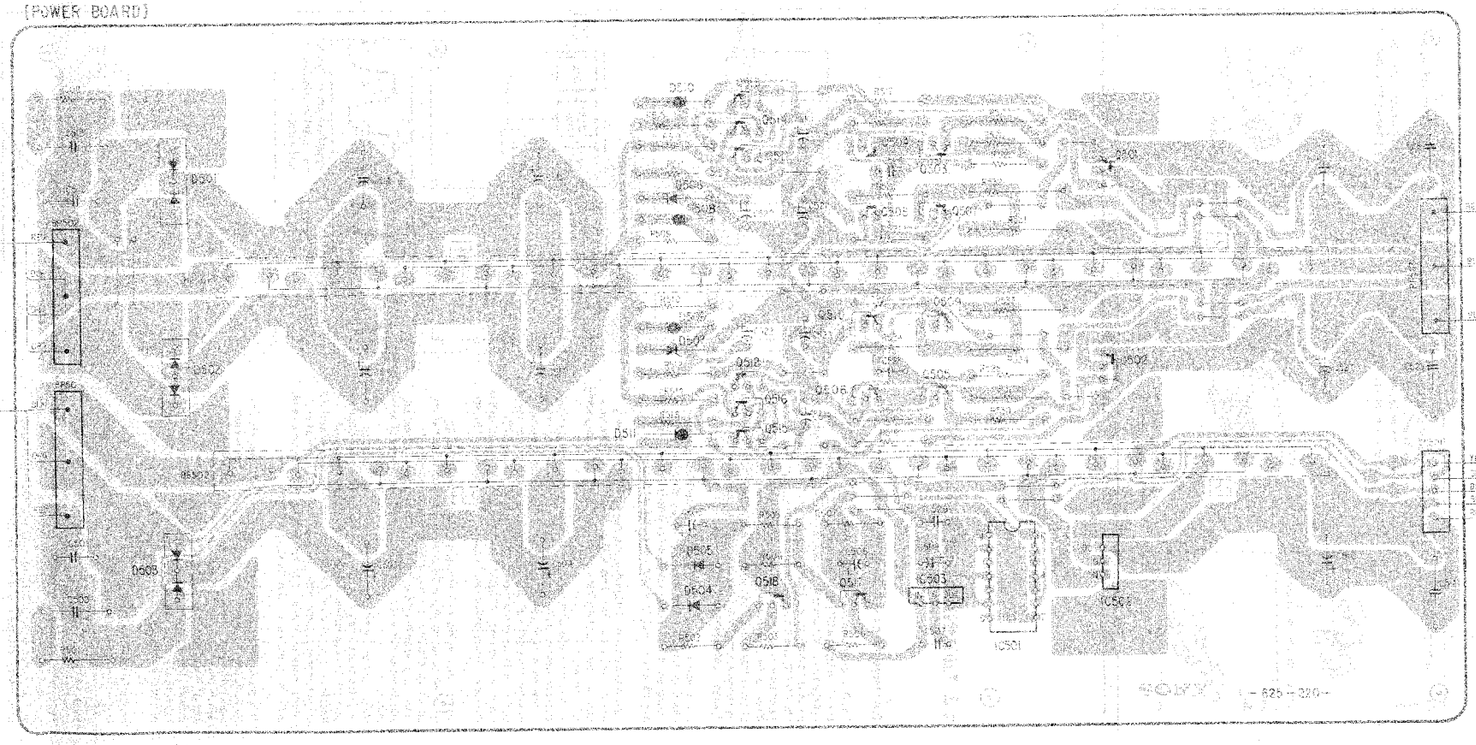
[OPT BOARD]



[ANALOG BOARD]

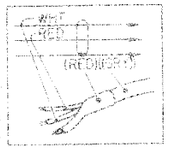


[POWER BOARD]



Note on Printed Wiring Board :

* Color code of sleeving over the end of the jacket.



* ○—— : parts extracted from the component side.
* ●—— : parts extracted from the conductor side.
* ⊗ : Through hole.
* : Pattern on the side which is seen.
* : Pattern of the opposite side.

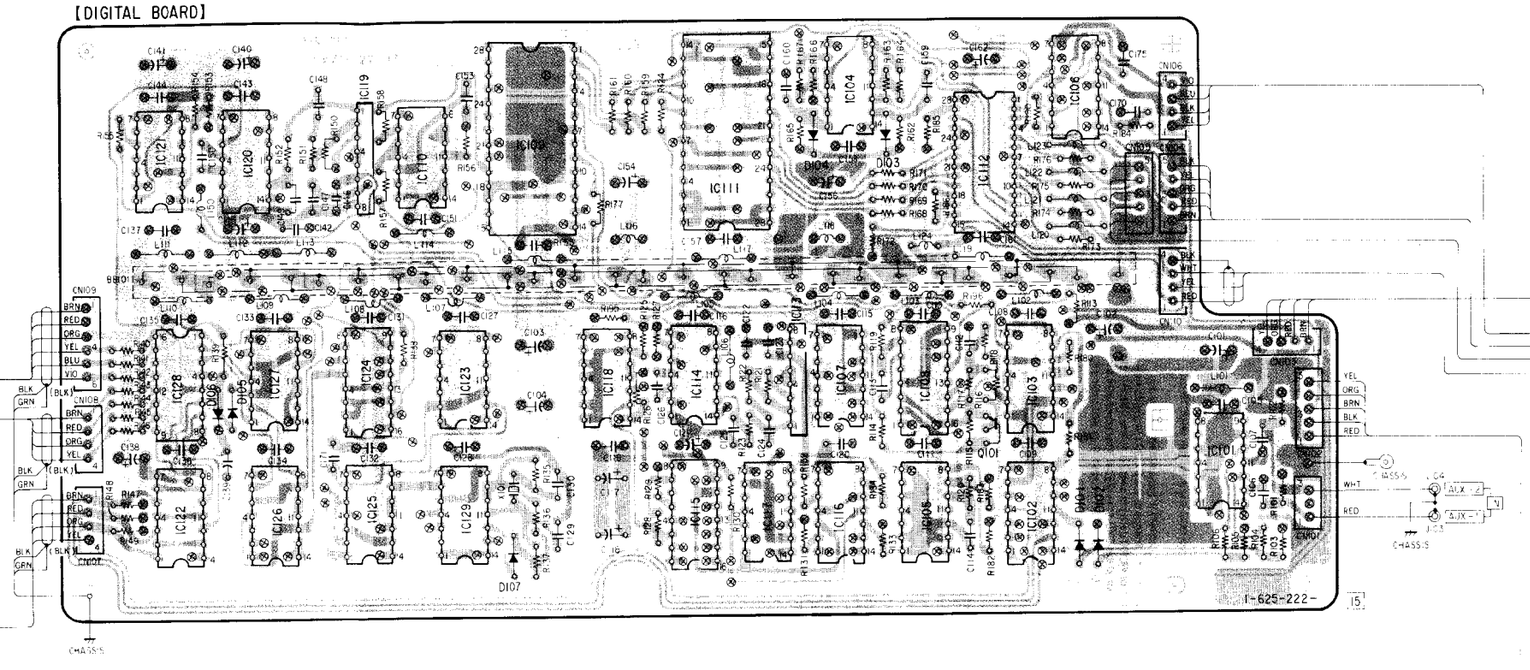
* W/G model : West Germany model

DAS-R1 DAS

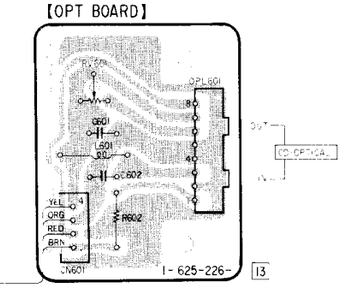
uts.

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

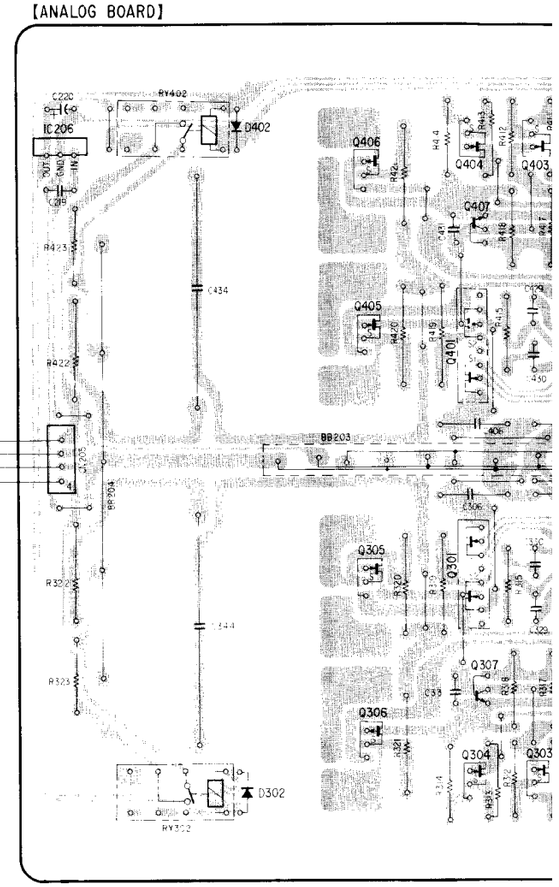
【DIGITAL BOARD】



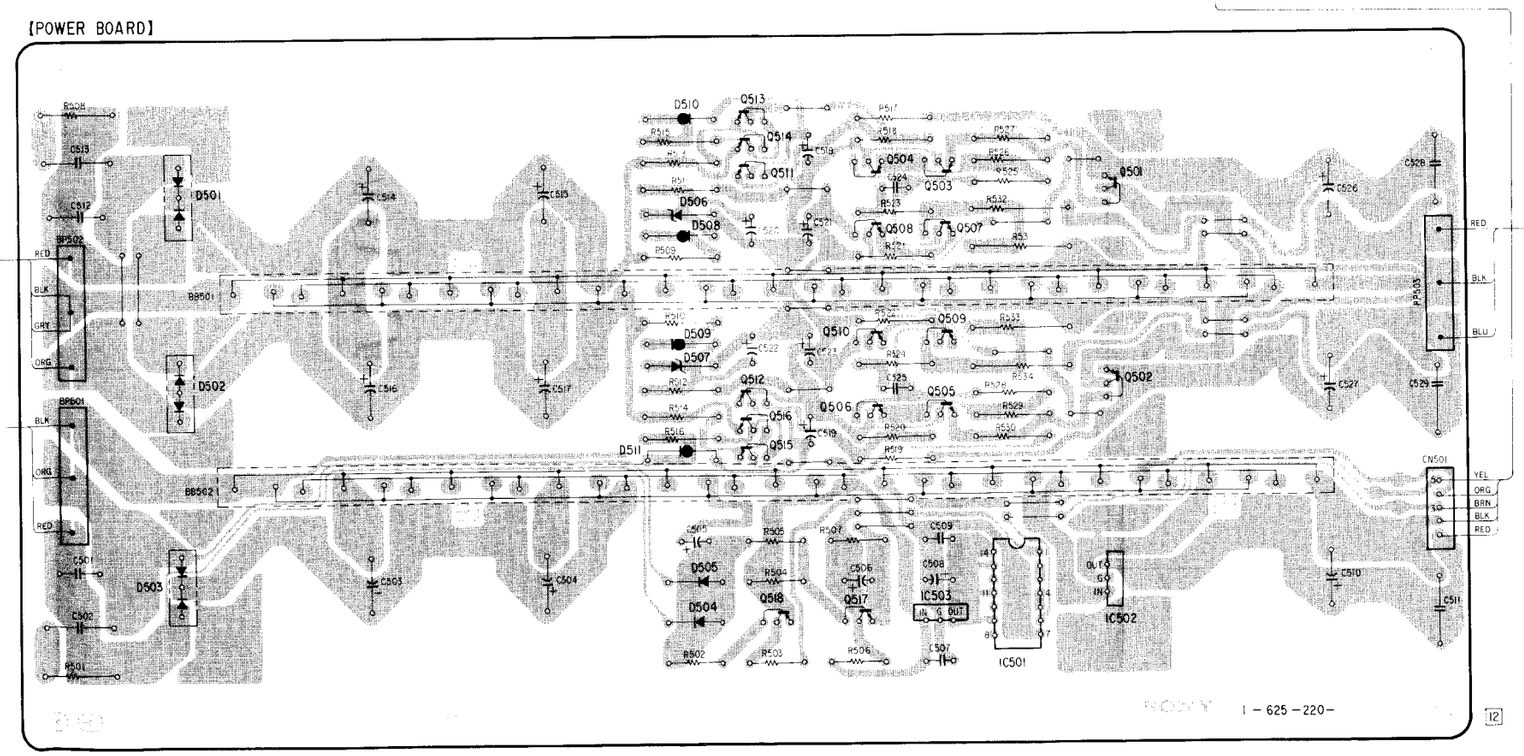
【OPT BOARD】



【ANALOG BOARD】

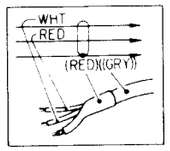


【POWER BOARD】



Note on Printed Wiring Board :

- Color code or sleeving over the end of the jacket.



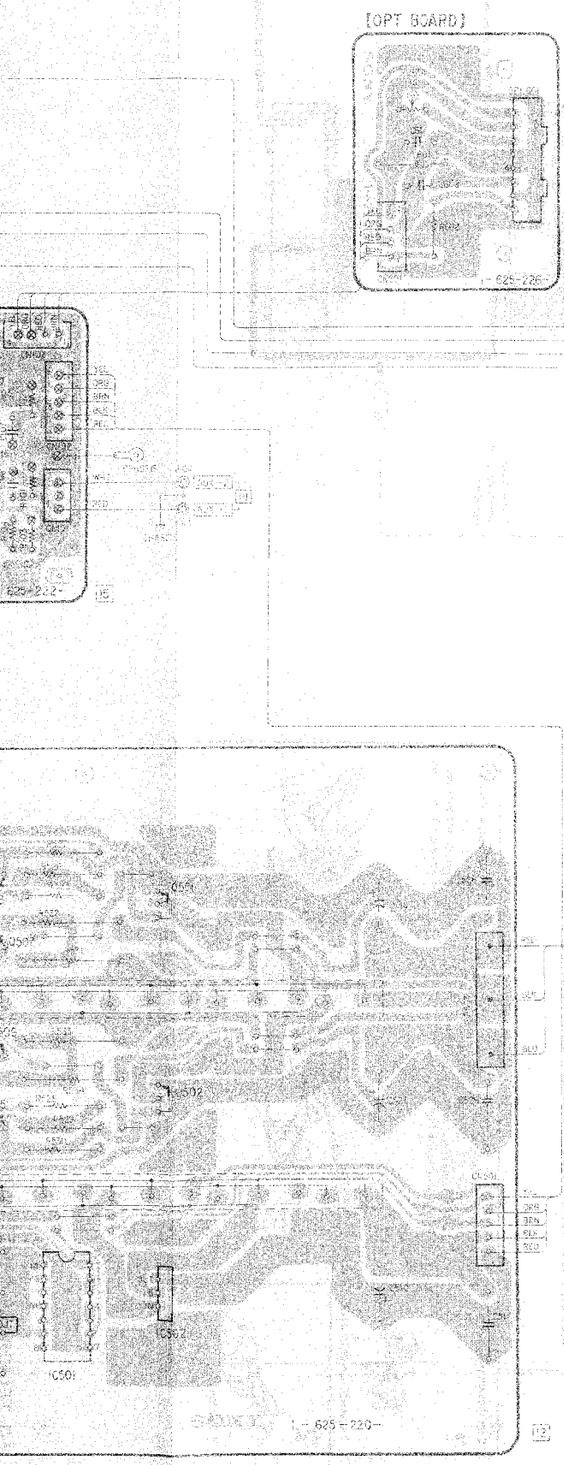
- ○—— : parts extracted from the component side.
- ●—— : parts extracted from the conductor side.
- ⊗ : Through hole.
- ▨ : Pattern on the side which is seen.
- ▩ : Pattern on the component side.

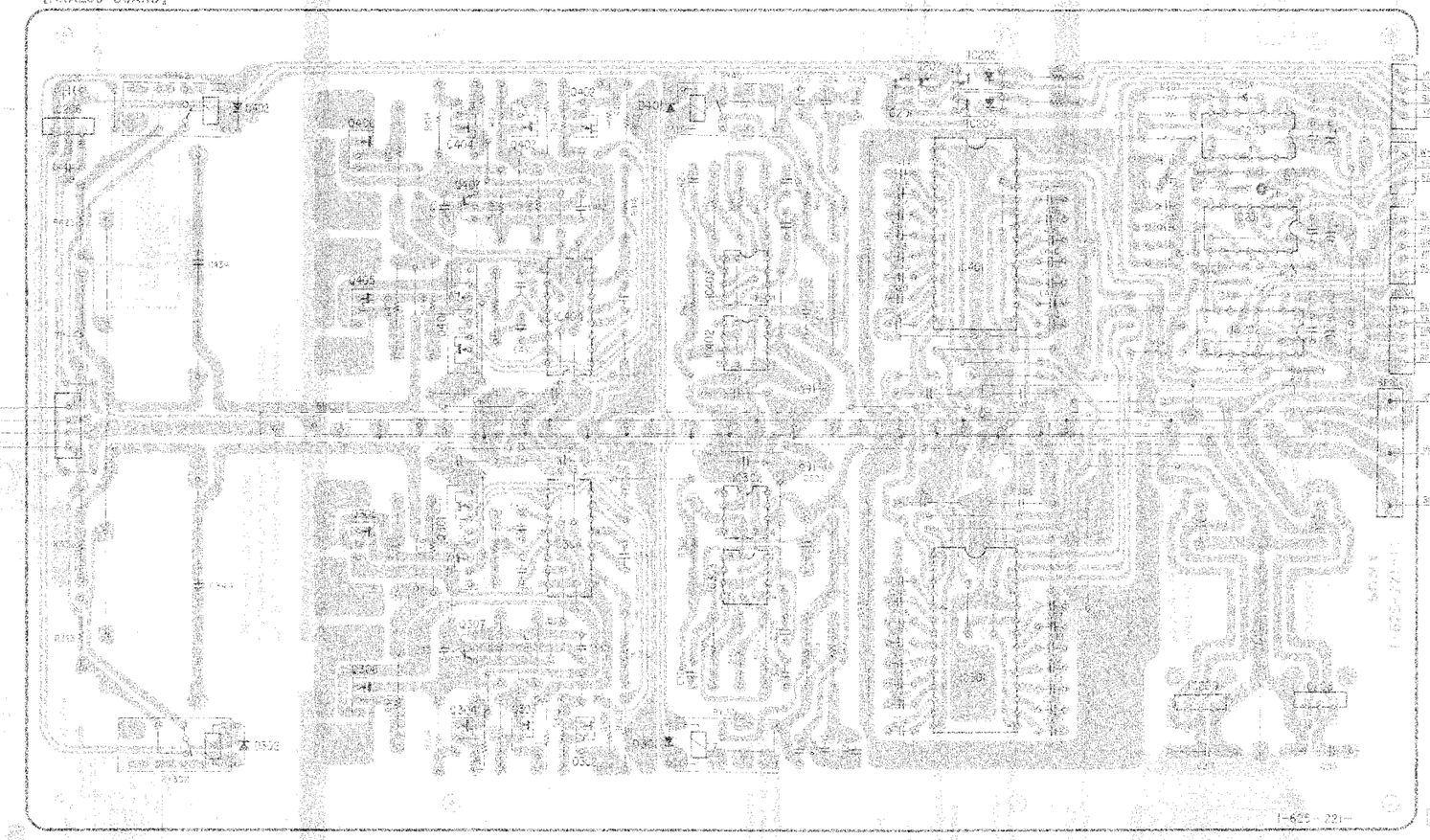
* WG model: West Germany model

18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

[OPT BOARD]

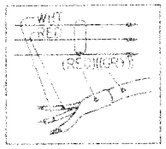
[ANALOG BOARD]





Note on Printed Wiring Board :

- Color code or sleeving over the end of the jacket.



- o—— : parts extracted from the component side.
- ●—— : parts extracted from the conductor side.
- ⊗ : Through hole.
- : Pattern on the side which is seen.
- : Pattern of the component side.

* WG model : West Germany model

Note on Schematic Diagram :

- All capacitors are in μF unless otherwise noted. pF : μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- Switch

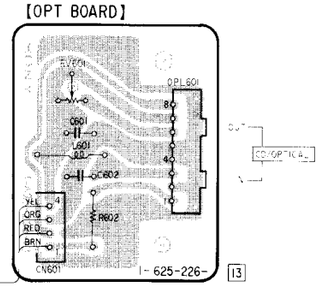
Ref. No.	Switch	Position
SW701	POWER	ON
RSW951	DIGITAL INPUT	CD

- : B+ line.
- : B− line.
- : adjustment for repair.
  SD player (CDP-R1,etc) with digital output is required for measurement of this set.
- Play back any compact disc, receive the digital signal.
- Voltages are taken with a VOM (20 kΩ/V).
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in playback mode by using oscilloscope.
- : CD signal pass
- : L-CH signal pass
- : R-CH signal pass

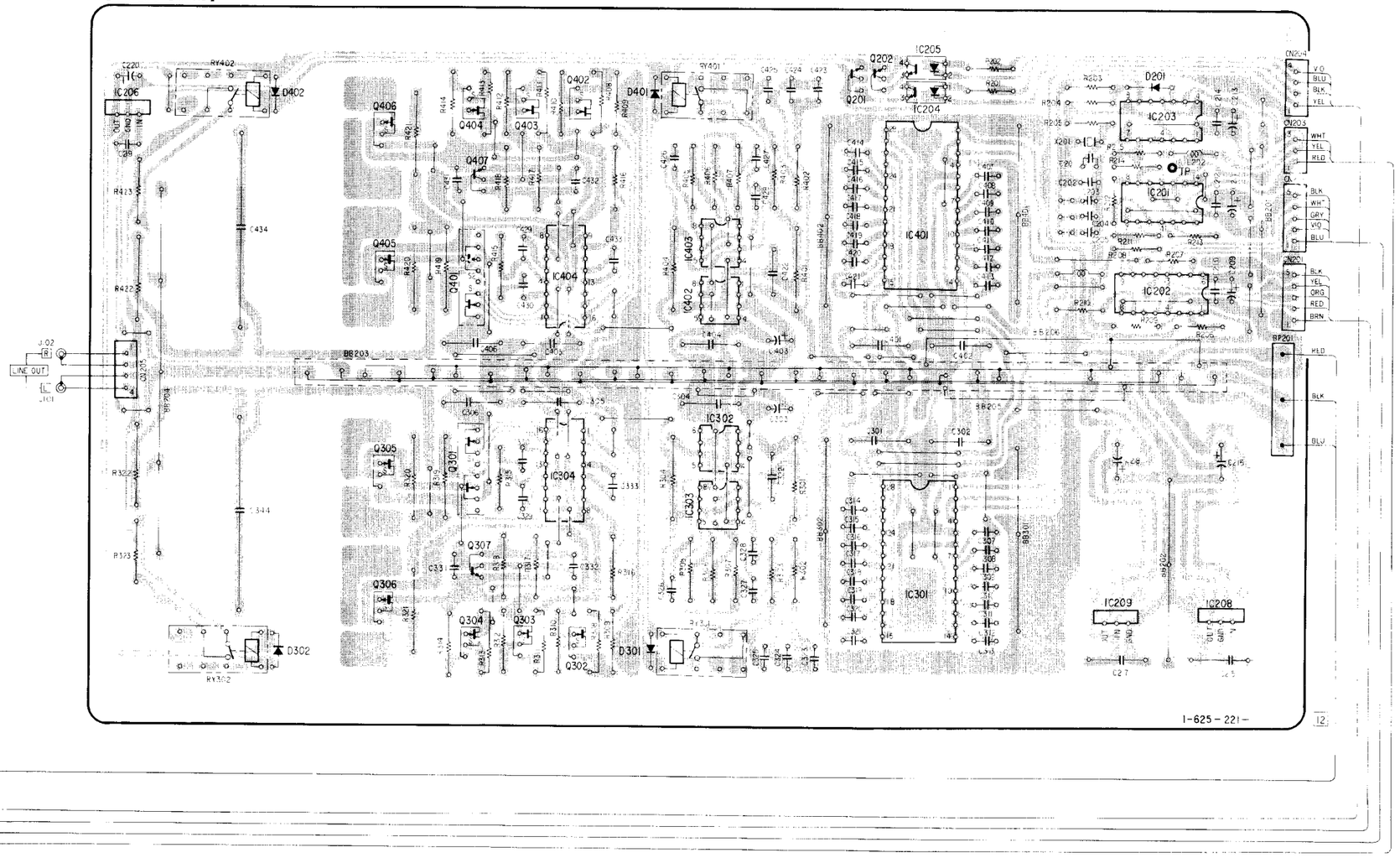
* WG model : West Germany model

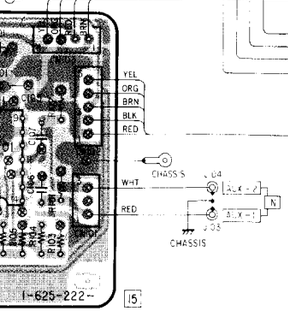
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

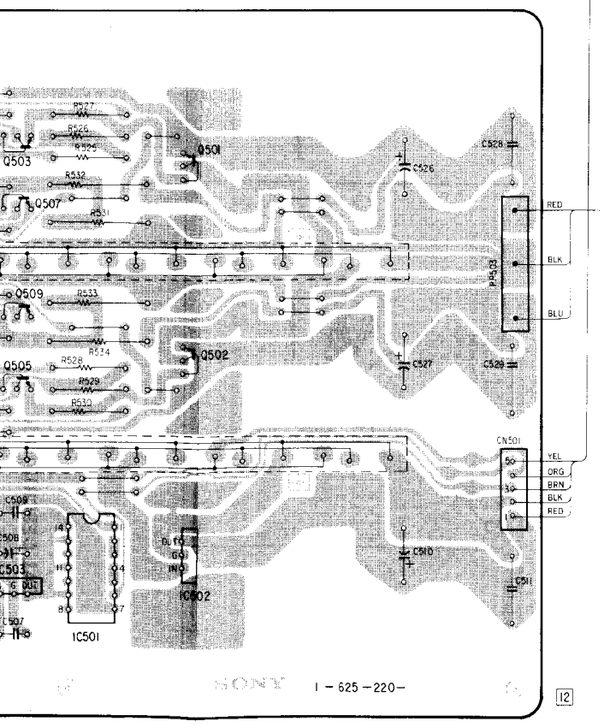
【OPT BOARD】



【ANALOG BOARD】

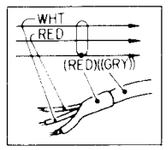






Note on Printed Wiring Board :

- Color code or sleeving over the end of the jacket.



- ○—— : parts extracted from the component side.
- ●—— : parts extracted from the conductor side.
- ⊗ : Through hole.
- ▨ : Pattern on the side which is seen.
- * : Pattern of the component side

*WG model: West Germany model

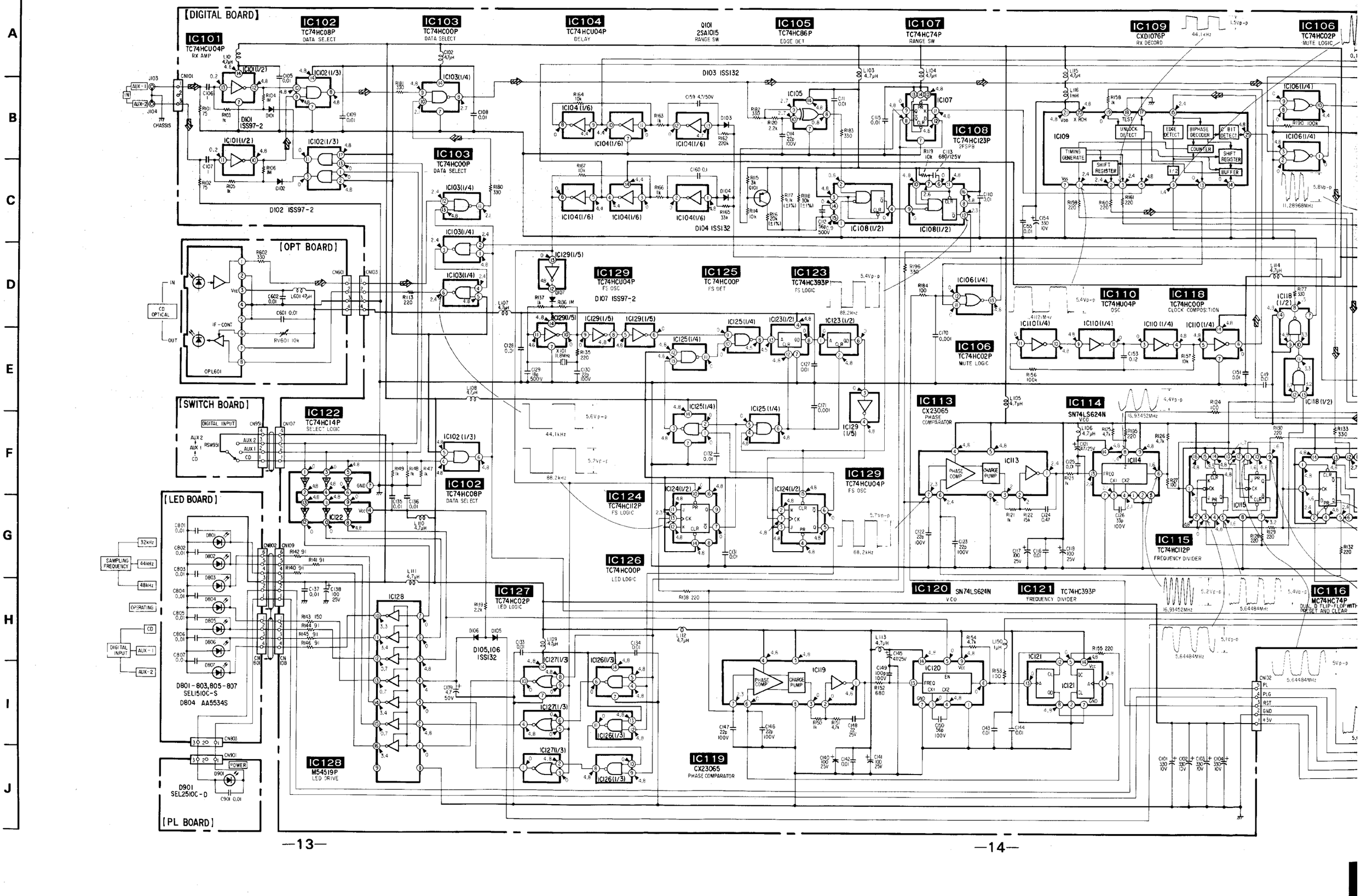
Note on Schematic Diagram :

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- Switch

Ref. No.	Switch	Position
SW701	POWER	ON
RSW951	DIGITAL INPUT	CD

- ▬▬ : B+ bus.
- ▬ ▬ : B− bus.
- ▭ : adjustment for repair.
  CD player (CDP-R1,etc) with digital output is required for measurement of this set.
- Play back any compact disc, receive the digital signal.
- Voltages are taken with a VOM (50 kΩ/V).
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in playback mode by using oscilloscope.
- ⇨ : CD signal pass
- ⇨ : L-CH signal pass
- ⇨ : R-CH signal pass
- WG model: West Germany model

3-2. SCHEMATIC DIAGRAM



10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

IC105 TC74HC86P EDGE DET

IC107 TC74HC74P RANGE SW

IC108 TC74HC123P 2FSPB

IC123 TC74HC393P FS LOGIC

IC129 TC74HCU04P FS OSC

IC109 CXD1076P RX DECORD

IC106 TC74HC02P MUTE LOGIC

IC112 CXD1329S CONVERTER

IC111 CXD1144AP DIGITAL FILTER

IC110 TC74HU04P OSC

IC118 TC74HC00P CLOCK COMPOSITION

IC113 CX23065 PHASE COMPARATOR

IC114 SN74LS624N VCO

IC115 TC74HC112P FREQUENCY DIVIDER

IC116 MC74HC74P DUAL D FLIP-FLOP WITH PRESET AND CLEAR

IC117 TC74HC393P FREQUENCY DIVIDER

IC120 SN74LS624N VCO

IC121 TC74HC393P FREQUENCY DIVIDER

IC119 CHARGE PUMP

[ANALOG BOARD]

IC202 TC74HC175P DUAL D FLIP-FLOP WITH PRESET AND CLEAR

IC201 TC74HC00P CLOCK SELECT

IC203 TC74HCU04P OSC

IC204 PC817 ISOLATION

IC205 PC817 ISOLATION

Q201, 202 2SD774K RELAY DRIVE

IC301 TDA1541A-S1 D/A CONVERTER

IC401 TDA1541A-S1 D/A CONVERTER

IC206 M5F7812 +12V REG

IC208 M5F7805 +5V REG

IC209 M5F7905 -5V REG

Q501 2SC2275A REG + OUT

Q502 2SA985A REG - OUT

Q518 2SB1013 LED DRIVE

Q517 2SC2458-GR DELAY

IC502 M5F7805 +5V REG

IC503 M5F78M05 +5V REG

IC501 TC74HC14P RESET PULSE

D503 C16P20F

D504,505 10DF2

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

A B C D E F G H I J

[ANALOG BOARD]

IC202 TC74HC175P DUAL D FLIP-FLOP WITH PRESET AND CLEAR

IC201 TC74HC00P CLOCK SELECT

IC203 TC74HCU04P OSC

IC204 PC817 ISOLATION

IC205 PC817 ISOLATION

IC206 M5F7812 +12V REG

IC208 M5F7805 +5V REG

IC209 M5F7905 -5V REG

IC301 TDA1541A-S1 D/A CONVERTER

IC302 LF356H-K I-V CONVERTER

IC303 AD712JN L.P.F

IC304 M5240PS BUFFER

IC401 TDA1541A-S1 D/A CONVERTER

IC402 LF356H-K I-V CONVERTER

IC403 AD712JN L.P.F

IC404 M5240PS BUFFER

IC501 TC74HC14P RESET PULSE

IC502 M5F7805 +5V REG

IC503 M5F78M05 +5V REG

Q201,202 2SD774K RELAY DRIVE

Q301 2SK244 INPUT BUFFER

Q302 2SK241GR CONSTANT CURRENT

Q303,304 2SK241GR CONSTANT CURRENT

Q305 2SK213 CURRENT BOOST

Q306 2SJ76 CURRENT BOOST

Q307 2SC3514 CONSTANT VOLTAGE

Q401 2SK244 INPUT BUFFER

Q402 2SK241GR CONSTANT CURRENT

Q403,404 2SK241GR CONSTANT CURRENT

Q405 2SK213 CURRENT BOOST

Q406 2SJ76 CURRENT BOOST

Q407 2SC3514 CONSTANT VOLTAGE

Q501 2SC2275A REG + OUT

Q502 2SA985A REG - OUT

Q503,504 2SA1383 ERROR AMP

Q505,506 2SC3514 ERROR AMP

Q507,508 2SC3514 ERROR AMP

Q509,510 2SA1383 ERROR AMP

Q511 2SD666 VOLTAGE DET

Q512 2SB646 VOLTAGE DET

Q513,514 2SB646 CONSTANT CURRENT

Q515,516 2SD666 CONSTANT CURRENT

Q517 2SC2458-GR DELAY

Q518 2SB1013 LED DRIVE

D301 ISS132

D302 ISS132

D401 ISS132

D402 ISS132

D501 C16P20F

D502 C16P20FR

D503 C16P20F

D504,505 ODF2

D506 EQB01-07

D507 EQB01-07

D509,511 10YD1.3

D508,510 10YD1.3

[POWER BOARD]

[FUSE BOARD]

[FILTER BOARD]

CN101 CN102 CN103 CN104 CN105 CN106 CN201 CN202 CN203 CN204 CN205 CN501

JI01 JI02

T101 PT T102 PT

SW701 POWER

F701 1A(U) T0.5A(W)

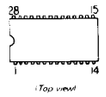
F702 0.8A(U) T0.4A(W)

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

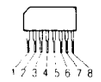
• Semiconductor Lead Layouts

AD712JN

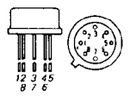
CXD1076P
CXD1144AP
CXD1329S
TDA1541A-S1



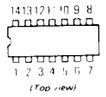
CX23065



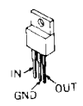
LF356H-K



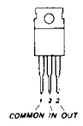
MC74HC74N
SN74LS624N
TC74HCU04P
TC74HC00P
TC74HC02P
TC74HC08P
TC74HC393P



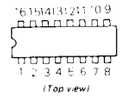
M5F78M05
M5F7805
M5F7812



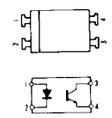
M5F7905



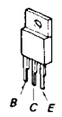
M5240PS
M54519P
TC74HC112P
TC74HC123P
TC74HC14P
TC74HC175P
TC74HC86P



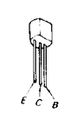
PC817



2SA985
2SA1383
2SC2275
2SC3514



2SA1015
2SB1013

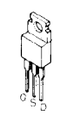


2SB646-B
2SD666-B

2SC2785

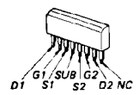
2SD774

2SJ76
2SK213

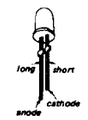


2SK241-GR

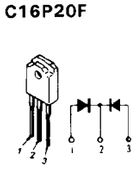
2SK244



AA5534S



C16P20F



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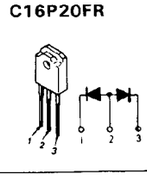
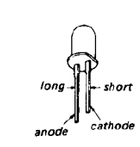
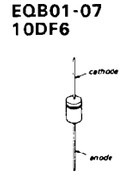


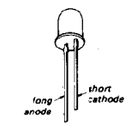
SEL1510C-S



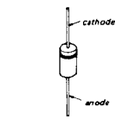
EQB01-07
10DF6



SEL2501C-D



1SS132
1SS97-2
10YD1.3-A



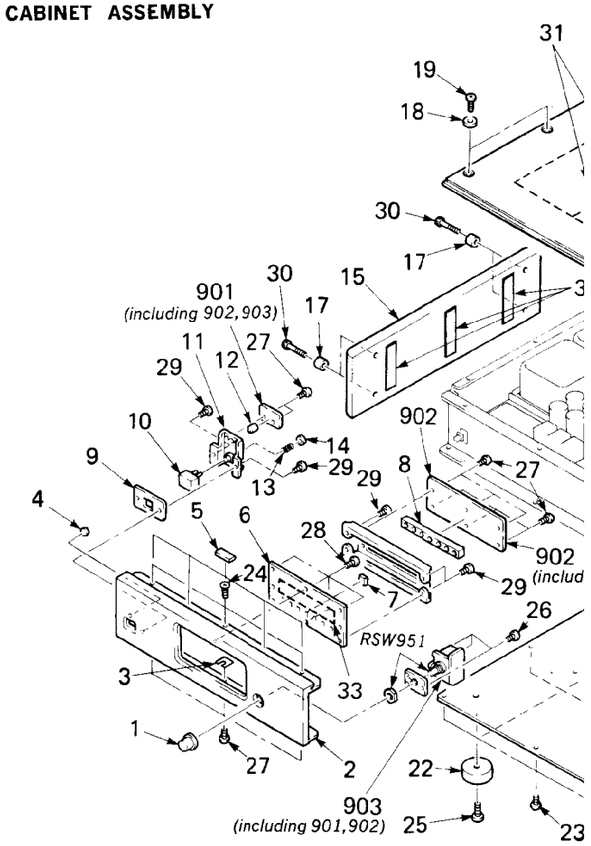
DAS-R1

SECTION 4
EXPLODED VIEW

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, part number suffix -XX and -X may be different from the parts specified for components used on the set.
- Color Indication of Appearance Parts
  Example:
  (RED) . . . KNOB, BALANCE
  ↑
  Cabinet's Color

4-1. CABINET ASSEMBLY



Ref.No	Part No.	Description	Remarks
1	4-924-256-01	KNOB (B) (DIGITAL INPUT)	
2	4-924-252-01	PANEL, FRONT	
3	3-544-028-11	SPACER	
4	4-924-233-01	INDICATOR	
5	9-911-840-XX	CUSHION, RUBBER	
6	4-924-253-01	PLATE (B), ORNAMENTAL	
7	*4-889-622-01	INDICATOR	
8	*4-924-254-01	HOLDER (B), LED	
9	*4-924-245-01	PLATE (E), ORNAMENTAL	
10	X-4924-201-1	KNOB (A) ASSY (POWER)	
11	*X-4924-202-1	BRACKET (E) ASSY	
12	*4-924-218-01	HOLDER (A), LED	
13	4-880-426-00	SPRING, COMPRESSION	
14	4-862-338-00	RING, STOPPER	
15	4-924-239-01	PLATE (LEFT), SIDE, ORNAMENTAL	
16	4-924-240-01	PLATE (RIGHT),SIDE, ORNAMENTAL	
17	4-924-241-01	ESCUTCHEON (B)	
18	4-924-237-01	ESCUTCHEON (A)	
19	4-924-242-01	SCREW (M3X6), FLAT HEAD	
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
901			
902			
903			
RSW95			

SECTION 4
EXPLODED VIEWS

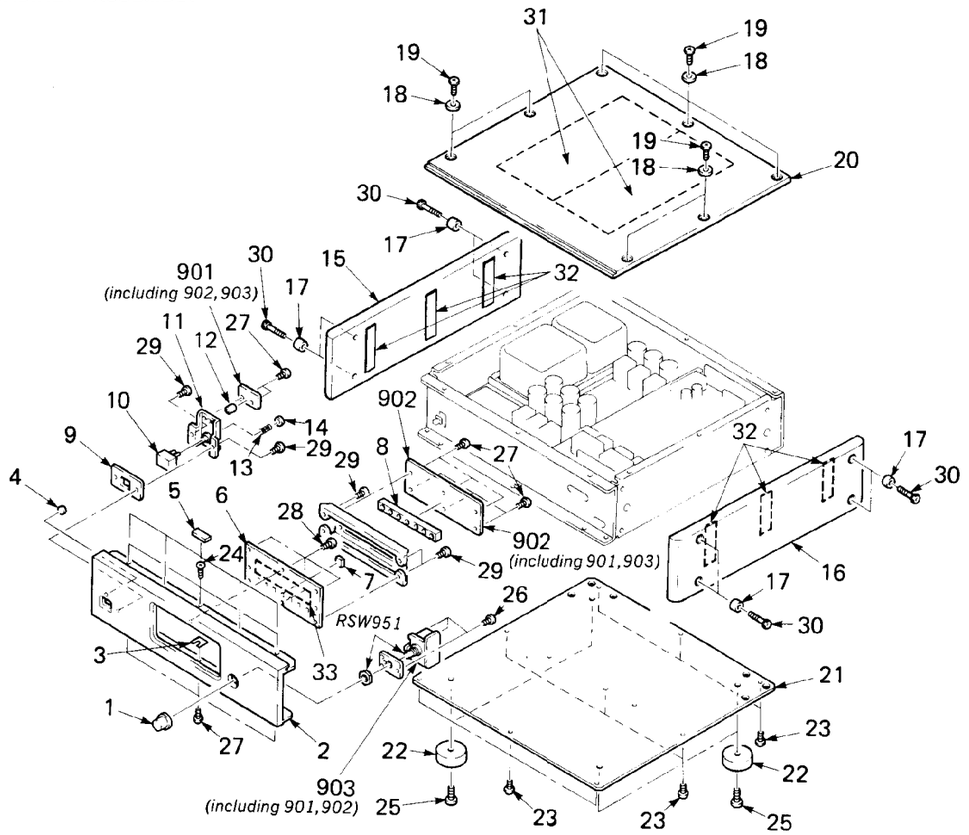
NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts
  Example:
  (RED) . . . KNOB, BALANCE (WHITE)
  ↑ ↑
  Cabinet's Color Parts Color

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

•WG model: West Gemany model

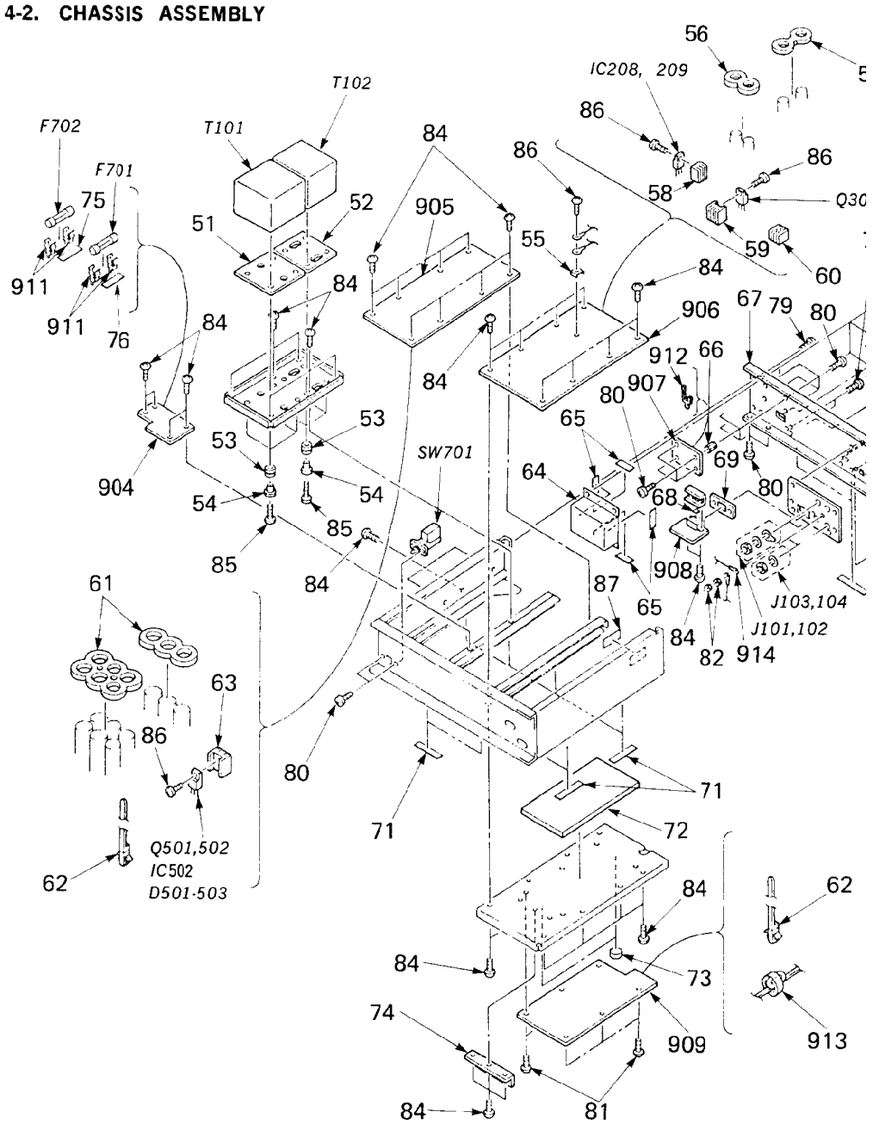
4-1. CABINET ASSEMBLY



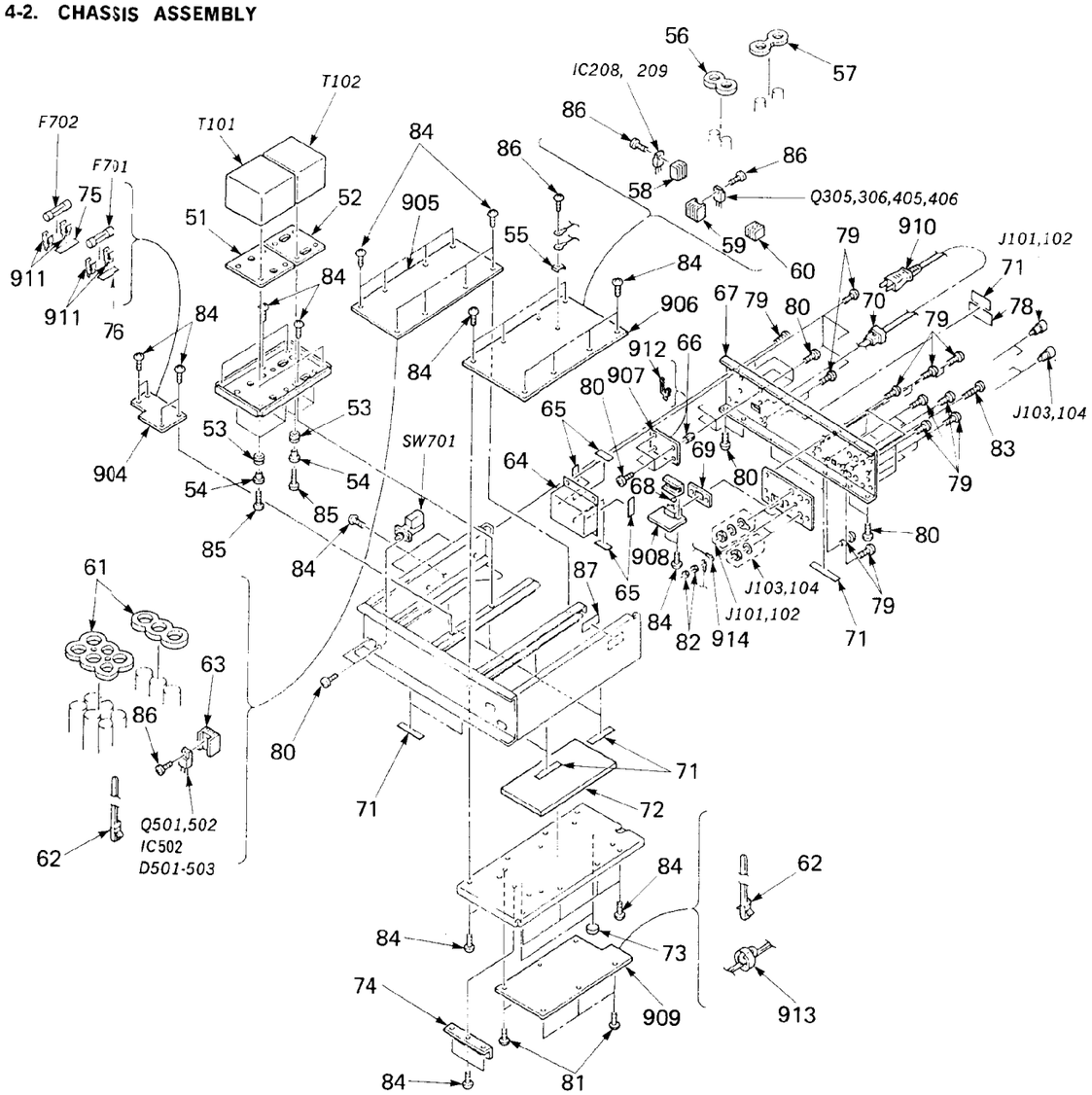
Ref.No	Part No.	Description	Remarks
1	4-924-256-01	KNOB (B) (DIGITAL INPUT)	
2	4-924-252-01	PANEL, FRONT	
3	3-544-028-11	SPACER	
4	4-924-233-01	INDICATOR	
5	9-911-840-XX	CUSHION, RUBBER	
6	4-924-253-01	PLATE (B), ORNAMENTAL	
7	*4-889-622-01	INDICATOR	
8	*4-924-254-01	HOLDER (B), LED	
9	*4-924-245-01	PLATE (E), ORNAMENTAL	
10	X-4924-201-1	KNOB (A) ASSY (POWER)	
11	*X-4924-202-1	BRACKET (E) ASSY	
12	*4-924-218-01	HOLDER (A), LED	
13	4-880-426-00	SPRING, COMPRESSION	
14	4-862-338-00	RING, STOPPER	
15	4-924-239-01	PLATE (LEFT), SIDE, ORNAMENTAL	
16	4-924-240-01	PLATE (RIGHT), SIDE, ORNAMENTAL	
17	4-924-241-01	ESCUTCHEON (B)	
18	4-924-237-01	ESCUTCHEON (A)	
19	4-924-242-01	SCREW (M3X6), FLAT HEAD	

Ref.No	Part No.	Description	Remarks
20	4-924-236-01	PANEL	
21	*4-924-238-11	PLATE, BOTTOM	
22	X-4924-207-1	FOOT ASSY	
23	3-703-685-21	SCREW (+BV 3X8)	
24	7-682-246-04	SCREW +K 3X5	
25	7-682-566-09	SCREW +B 4X20	
26	7-621-775-10	SCREW +P 2.6X4	
27	7-682-548-09	SCREW (3X8)	
28	7-682-545-04	SCREW +B 3X4	
29	7-682-546-09	SCREW +B 3X5	
30	7-683-425-04	BOLT, HEXAGON SOCKET 4X20	
31	*4-924-265-01	ABSORBENT (A), ACOUSTIC	
32	*4-923-409-01	SPACER	
33	*4-924-272-01	ABSORBENT (C), ACOUSTIC	
901	*1-625-223-11	PC BOARD, PL	
902	*1-625-223-11	PC BOARD, LED	
903	*1-625-223-11	PC BOARD, SWITCH	
RSW951	1-571-372-11	SWITCH, ROTARY (DIGITAL INPUT)	

4-2. CHASSIS ASSEMBLY



4-2. CHASSIS ASSEMBLY



Ref.No	Part No.	Description	Remarks
51	*4-924-209-01	CUSHION (A)	
52	*4-924-210-01	CUSHION (B)	
53	*4-888-798-00	BUSHING, RUBBER	
54	4-924-211-01	COLLAR	
55	4-924-264-01	TERMINAL, MOUNT	
56	*4-924-270-01	DAMPER (G)	
57	*4-924-269-01	DAMPER (F)	
58	*4-027-606-01	HEAT SINK (TO-220 TYPE)	
59	*4-363-146-00	HEAT SINK, V.OUT	
60	2-269-798-01	HEAT SINK, TO-39	
61	*4-924-268-01	DAMPER (E)	
62	3-704-208-01	BAND, BINDING	
63	*4-921-402-01	HEAT SINK	
64	*4-924-277-01	CASE, SHIELD	
65	*4-919-204-01	CUSHION (F), CHASSIS	
66	*4-924-280-01	BOSS (E)	
67	*4-924-278-01	PANEL (D), BACK	
68	9-911-863-XX	SPACER	
69	*4-924-226-01	PLATE (L), ORNAMENTAL	
70	4-916-783-01	BUSHING, CORD	
71	*4-923-409-01	SPACER	
72	*4-924-271-01	ABSORBENT (B), ACOUSTIC	
73	*4-924-267-01	DAMPER (C)	
74	*4-924-274-01	REINFORCEMENT	
75	*3-701-946-09	(US)....LABEL, FUSE (0.8A 250V)	
75	*3-701-948-10	(WG)....LABEL, FUSE (T400mA)	
76	*3-701-946-10	(US)....LABEL, FUSE (1A 250V)	
76	*3-701-948-11	(WG)....LABEL, FUSE (T500mA)	
77	3-703-845-01	(US)....LABEL (N) (U/C), MAIN CAUTION	
78	*4-924-283-01	(US)....LABEL, MODEL NUMBER (U2)	
78	*4-924-284-01	(WG)....LABEL, MODEL NUMBER	
79	3-703-685-21	SCREW (+BV 3X8)	
80	7-682-547-09	SCREW +B 3X6	
81	7-682-546-09	SCREW +B 3X5	
82	7-684-023-04	N 3, TYPE 2	
83	7-682-550-09	SCREW +B 3X12	
84	7-682-548-09	SCREW (3X8)	
85	7-682-563-09	SCREW +B 4X12	
86	7-682-148-15	SCREW, TR	
87	*3-701-030-00	LABEL, SERIAL NUMBER	
904	*1-628-540-11	PC BOARD, FUSE	
905	*A-4394-510-A	MOUNTED PCB, POWER	
906	*A-4385-325-A	MOUNTED PCB, ANALOG	
907	*1-628-539-11	PC BOARD, FILTER	
908	*1-625-226-11	PC BOARD, OPT	
909	*A-4382-364-A	MOUNTED PCB, DIGITAL	
910	⚠1-559-271-11	(WG).....CORD, POWER	
910	⚠1-559-479-11	(US) ....CORD, POWER	
911	1-533-183-11	(WG).....HOLDER, FUSE	
912	*1-535-476-11	TERMINAL	
913	1-543-140-00	CORE, RING	
914	1-559-812-12	LEAD (WITH TERMINAL)	
F701	⚠1-532-265-XX	(US).....FUSE, GLASS TUBE (1A)	
F701	⚠1-532-279-00	(WG).....FUSE, TIME-LAG (T500mA)	
F702	⚠1-532-066-00	(WG).....FUSE, TIME-LAG (T400mA)	
F702	⚠1-532-401-XX	(US).....FUSE, GLASS TUBE (0.8A)	
J101	1-507-918-00	JACK, PIN 1P (LINE OUT)	
J102	1-507-918-00	JACK, PIN 1P (LINE OUT)	
J103	1-565-064-11	JACK, PIN 1P (AUX1)	
J104	1-565-064-11	JACK, PIN 1P (AUX2)	
SW701	⚠1-571-250-11	SWITCH, PUSH (AC POWER)(1 KEY)	
T101	⚠1-449-427-11	(WG).....TRANSFORMER, POWER	
T101	⚠1-449-429-11	(US).....TRANSFORMER, POWER	
T102	⚠1-449-428-11	(WG).....TRANSFORMER, POWER	
T102	⚠1-449-430-11	(US).....TRANSFORMER, POWER	

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SECTION 5
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF: μF, PF: μμF.

RESISTORS
- All resistors are in ohms.
- F: nonflammable

COILS
- MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA...,
UPC...: μPC, UPD...: μPD...

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

- WG model: West Gemany model

Ref.No	Part No.	Description
901	*1-625-223-11	PC BOARD, PL
902	*1-625-223-11	PC BOARD, LED
903	*1-625-223-11	PC BOARD, SWITCH
904	*1-628-540-11	PC BOARD, FUSE
905	*A-4394-510-A	MOUNTED PCB, POWER
906	*A-4385-325-A	MOUNTED PCB, ANALOG
907	*1-628-539-11	PC BOARD, FILTER
908	*1-625-226-11	PC BOARD, OPT
909	*A-4382-364-A	MOUNTED PCB, DIGITAL
910	⚠1-559-479-11	(US)....CORD, POWER
910	⚠1-559-271-11	(WG)....CORD, POWER
911	1-553-183-11	(WG)....HOLDER, FUSE
912	*1-535-476-11	TERMINAL
913	1-543-140-00	CORE, RING
914	1-559-812-12	LEAD (WITH TERMINAL)
BB101	1-565-062-11	BAR, BUS
BB201	*1-566-959-11	BAR, BUS
BB202	*4-913-106-01	REINFORCEMENT (C), PWB
BB203	1-565-063-11	BAR, BUS
BB204	*4-908-951-01	REINFORCEMENT (B), PWB
BB205	*1-560-242-11	BUS BAR 3P
BB301	*4-913-106-01	REINFORCEMENT (C), PWB
BB302	*4-913-106-01	REINFORCEMENT (C), PWB
BB401	*4-913-106-01	REINFORCEMENT (C), PWB
BB402	*4-913-106-01	REINFORCEMENT (C), PWB
BB501	1-565-063-11	BAR, BUS
BB502	1-565-063-11	BAR, BUS
BP201	*1-535-140-00	BASE POST 22MM (10MM PITCH) 3P
BP501	*1-535-140-00	BASE POST 22MM (10MM PITCH) 3P
BP502	*1-535-140-00	BASE POST 22MM (10MM PITCH) 3P
BP503	*1-535-140-00	BASE POST 22MM (10MM PITCH) 3P
BP702	*1-535-141-00	BASE POST 22MM (10MM PITCH) 4P
BP703	*1-535-139-00	BASE POST 22MM (10MM PITCH) 2P
BP704	*1-535-139-00	BASE POST 22MM (10MM PITCH) 2P

CAPACITOR

C101	1-124-141-00	ELECT	330MF	20%	10V
C102	1-124-141-00	ELECT	330MF	20%	10V
C103	1-124-141-00	ELECT	330MF	20%	10V
C104	1-124-141-00	ELECT	330MF	20%	10V
C105	1-136-153-00	FILM	0.01MF	5%	50V
C106	1-136-177-00	FILM	1MF	5%	50V
C107	1-136-177-00	FILM	1MF	5%	50V
C108	1-136-153-00	FILM	0.01MF	5%	50V
C109	1-136-153-00	FILM	0.01MF	5%	50V
C110	1-136-153-00	FILM	0.01MF	5%	50V
C111	1-136-153-00	FILM	0.01MF	5%	50V
C112	1-109-667-11	MICA	56PF	1%	500V
C113	1-104-150-00	POLYSTYRENE	680PF	5%	125V
C114	1-107-210-00	MICA	22PF	5%	500V
C115	1-136-153-00	FILM	0.01MF	5%	50V
C116	1-136-153-00	FILM	0.01MF	5%	50V
C117	1-123-333-00	ELECT	100MF	20%	25V
C118	1-123-333-00	ELECT	100MF	20%	25V
C119	1-136-153-00	FILM	0.01MF	5%	50V
C120	1-136-153-00	FILM	0.01MF	5%	50V
C121	1-123-332-00	ELECT	47MF	20%	25V
C122	1-107-210-00	MICA	22PF	5%	500V
C123	1-107-210-00	MICA	22PF	5%	500V
C124	1-136-173-00	FILM	0.47MF	5%	50V
C125	1-136-153-00	FILM	0.01MF	5%	50V
C126	1-107-159-00	MICA	33PF	5%	500V
C127	1-136-153-00	FILM	0.01MF	5%	50V
C128	1-136-153-00	FILM	0.01MF	5%	50V
C129	1-107-208-00	MICA	18PF	5%	500V
C130	1-107-210-00	MICA	22PF	5%	500V
C131	1-136-153-00	FILM	0.01MF	5%	50V
C132	1-136-153-00	FILM	0.01MF	5%	50V
C133	1-136-153-00	FILM	0.01MF	5%	50V
C134	1-136-153-00	FILM	0.01MF	5%	50V
C135	1-136-153-00	FILM	0.01MF	5%	50V
C136	1-136-153-00	FILM	0.01MF	5%	50V
C137	1-136-153-00	FILM	0.01MF	5%	50V
C138	1-123-333-00	ELECT	100MF	20%	25V
C139	1-123-369-00	ELECT	4.7MF	20%	50V
C140	1-123-333-00	ELECT	100MF	20%	25V
C141	1-123-333-00	ELECT	100MF	20%	25V
C142	1-136-153-00	FILM	0.01MF	5%	50V
C143	1-136-153-00	FILM	0.01MF	5%	50V
C144	1-136-153-00	FILM	0.01MF	5%	50V
C145	1-123-332-00	ELECT	47MF	20%	25V
C146	1-107-210-00	MICA	22PF	5%	500V
C147	1-107-210-00	MICA	22PF	5%	500V
C148	1-124-282-00	ELECT	22MF	20%	25V
C149	1-107-169-00	MICA	100PF	5%	500V
C150	1-107-165-00	MICA	56PF	5%	500V
C151	1-136-153-00	FILM	0.01MF	5%	50V
C153	1-136-166-00	FILM	0.12MF	5%	50V
C154	1-124-141-00	ELECT	330MF	20%	10V
C155	1-136-153-00	FILM	0.01MF	5%	50V
C156	1-124-141-00	ELECT	330MF	20%	10V
C157	1-136-153-00	FILM	0.01MF	5%	50V
C158	1-136-153-00	FILM	0.01MF	5%	50V
C159	1-124-274-00	ELECT	4.7MF	20%	50V
C160	1-136-165-00	FILM	0.1MF	5%	50V
C161	1-136-153-00	FILM	0.01MF	5%	50V
C162	1-124-141-00	ELECT	330MF	20%	10V
C170	1-130-471-00	MYLAR	0.001MF	5%	50V
C171	1-130-471-00	MYLAR	0.001MF	5%	50V
C175	1-136-171-00	FILM	0.33MF	5%	50V
C201	1-109-808-11	MICA	22PF	2%	100V
C202	1-107-207-00	MICA	16PF	5%	100V
C203	1-109-823-11	MICA	4PF	0.5PF	100V

Ref.No	Part No.	Description			
C204	1-109-822-11	MICA	2PF	0.5PF	100V
C205	1-109-821-11	MICA	1PF	0.5PF	100V
C209	1-131-450-00	TANTALUM	1MF	20%	50V
C210	1-136-153-00	FILM	0.01MF	5%	50V
C211	1-131-450-00	TANTALUM	1MF	20%	50V
C212	1-136-153-00	FILM	0.01MF	5%	50V
C213	1-131-450-00	TANTALUM	1MF	20%	50V
C214	1-136-153-00	FILM	0.01MF	5%	50V
C215	1-136-580-11	FILM	0.47MF	10%	200V
C216	1-123-378-00	ELECT	1000MF	20%	63V
C217	1-136-580-11	FILM	0.47MF	10%	200V
C218	1-123-378-00	ELECT	1000MF	20%	63V
C219	1-136-177-00	FILM	1MF	5%	50V
C220	1-124-700-11	ELECT	330MF	20%	25V
C301	1-136-580-11	FILM	0.47MF	10%	200V
C302	1-136-580-11	FILM	0.47MF	10%	200V
C303	1-123-376-00	ELECT	330MF	20%	63V
C304	1-136-580-11	FILM	0.47MF	10%	200V
C305	1-136-580-11	FILM	0.47MF	10%	200V
C306	1-136-580-11	FILM	0.47MF	10%	200V
C307	1-136-165-00	FILM	0.1MF	5%	50V
C308	1-136-165-00	FILM	0.1MF	5%	50V
C309	1-136-165-00	FILM	0.1MF	5%	50V
C310	1-136-165-00	FILM	0.1MF	5%	50V
C311	1-136-165-00	FILM	0.1MF	5%	50V
C312	1-136-165-00	FILM	0.1MF	5%	50V
C313	1-136-165-00	FILM	0.1MF	5%	50V
C314	1-136-165-00	FILM	0.1MF	5%	50V
C315	1-136-165-00	FILM	0.1MF	5%	50V
C316	1-136-165-00	FILM	0.1MF	5%	50V
C317	1-136-165-00	FILM	0.1MF	5%	50V
C318	1-136-165-00	FILM	0.1MF	5%	50V
C319	1-136-165-00	FILM	0.1MF	5%	50V
C320	1-136-165-00	FILM	0.1MF	5%	50V
C321	1-104-244-00	POLYSTYRENE	430PF	5%	125V
C322	1-107-324-00	MICA	0.0039MF	2%	100V
C323	1-130-893-00	FILM	0.027MF	3%	100V
C324	1-136-230-00	FILM	0.0022MF	3%	100V
C325	1-130-955-00	FILM	0.01MF	3%	100V
C326	1-136-230-00	FILM	0.0022MF	3%	100V
C327	1-136-230-00	FILM	0.0022MF	3%	100V
C328	1-136-230-00	FILM	0.0022MF	3%	100V
C329	1-107-159-00	MICA	33PF	5%	500V
C330	1-136-250-11	FILM	0.001MF	3%	100V
C331	1-136-230-00	FILM	0.0022MF	3%	100V
C332	1-130-848-00	FILM	0.0082MF	3%	100V
C333	1-104-235-00	POLYSTYRENE	820PF	5%	125V
C334	1-136-471-11	FILM	6.8MF	10%	100V
C401	1-136-580-11	FILM	0.47MF	10%	200V
C402	1-136-580-11	FILM	0.47MF	10%	200V
C403	1-123-376-00	ELECT	330MF	20%	63V
C404	1-136-580-11	FILM	0.47MF	10%	200V
C405	1-136-580-11	FILM	0.47MF	10%	200V
C406	1-136-580-11	FILM	0.47MF	10%	200V
C407	1-136-165-00	FILM	0.1MF	5%	50V
C408	1-136-165-00	FILM	0.1MF	5%	50V
C409	1-136-165-00	FILM	0.1MF	5%	50V
C410	1-136-165-00	FILM	0.1MF	5%	50V
C411	1-136-165-00	FILM	0.1MF	5%	50V
C412	1-136-165-00	FILM	0.1MF	5%	50V
C413	1-136-165-00	FILM	0.1MF	5%	50V
C414	1-136-165-00	FILM	0.1MF	5%	50V
C415	1-136-165-00	FILM	0.1MF	5%	50V
C416	1-136-165-00	FILM	0.1MF	5%	50V
C417	1-136-165-00	FILM	0.1MF	5%	50V

Ref.No	Part No.	Description			
C418	1-136-165-00	FILM	0.1MF	5%	50V
C419	1-136-165-00	FILM	0.1MF	5%	50V
C420	1-136-165-00	FILM	0.1MF	5%	50V
C421	1-104-244-00	POLYSTYRENE	430PF	5%	125V
C422	1-107-324-00	MICA	0.0039MF	2%	100V
C423	1-130-893-00	FILM	0.027MF	3%	100V
C424	1-136-230-00	FILM	0.0022MF	3%	100V
C425	1-130-955-00	FILM	0.01MF	3%	100V
C426	1-136-230-00	FILM	0.0022MF	3%	100V
C427	1-136-230-00	FILM	0.0022MF	3%	100V
C428	1-136-230-00	FILM	0.0022MF	3%	100V
C429	1-107-159-00	MICA	33PF	5%	500V
C430	1-136-250-11	FILM	0.001MF	3%	100V
C431	1-136-230-00	FILM	0.0022MF	3%	100V
C432	1-130-848-00	FILM	0.0082MF	3%	100V
C433	1-104-235-00	POLYSTYRENE	820PF	5%	125V
C434	1-136-471-11	FILM	6.8MF	10%	100V
C501	1-130-857-00	FILM	0.047MF	5%	100V
C502	1-136-580-11	FILM	0.47MF	10%	200V
C503	1-125-510-11	ELECT	3300MF	20%	63V
C504	1-125-510-11	ELECT	3300MF	20%	63V
C505	1-123-381-00	ELECT	2.2MF	20%	50V
C506	1-124-748-11	ELECT	22MF	20%	100V
C507	1-136-173-00	FILM	0.47MF	5%	50V
C508	1-124-700-11	ELECT	330MF	20%	25V
C509	1-136-153-00	FILM	0.01MF	5%	50V
C510	1-125-509-11	ELECT	1800MF	20%	63V
C511	1-136-583-11	FILM	1MF	10%	200V
C512	1-130-321-00	FILM	0.1MF	5%	100V
C513	1-136-583-11	FILM	1MF	10%	200V
C514	1-125-510-11	ELECT	3300MF	20%	63V
C515	1-125-510-11	ELECT	3300MF	20%	63V
C516	1-125-510-11	ELECT	3300MF	20%	63V
C517	1-125-510-11	ELECT	3300MF	20%	63V
C518	1-124-918-11	ELECT	47MF	20%	63V
C519	1-124-918-11	ELECT	47MF	20%	63V
C520	1-124-918-11	ELECT	47MF	20%	63V
C521	1-124-748-11	ELECT	22MF	20%	100V
C522	1-124-918-11	ELECT	47MF	20%	63V
C523	1-124-748-11	ELECT	22MF	20%	100V
C524	1-107-206-00	MICA	15PF	5%	500V
C525	1-107-206-00	MICA	15PF	5%	500V
C526	1-125-509-11	ELECT	1800MF	20%	63V
C527	1-125-509-11	ELECT	1800MF	20%	63V
C528	1-136-583-11	FILM	1MF	10%	200V
C529	1-136-583-11	FILM	1MF	10%	200V
C601	1-136-153-00	FILM	0.01MF	5%	50V
C602	1-136-153-00	FILM	0.01MF	5%	50V
C701 ⚠	1-161-744-00	CERAMIC	0.01MF		400V
C751 ⚠	1-161-744-00	CERAMIC	0.01MF		400V
C752 ⚠	1-161-744-00	CERAMIC	0.01MF		400V
C801	1-136-153-00	FILM	0.01MF	5%	50V
C802	1-136-153-00	FILM	0.01MF	5%	50V
C803	1-136-153-00	FILM	0.01MF	5%	50V
C804	1-136-153-00	FILM	0.01MF	5%	50V
C805	1-136-153-00	FILM	0.01MF	5%	50V
C806	1-136-153-00	FILM	0.01MF	5%	50V
C807	1-136-153-00	FILM	0.01MF	5%	50V
C901	1-136-153-00	FILM	0.01MF	5%	50V
CN101	*1-564-505-11	PLUG, CONNECTOR 3P			
CN102	*1-564-508-11	PLUG, CONNECTOR 5P			
CN103	*1-564-507-11	PLUG, CONNECTOR 4P			
CN104	*1-564-508-11	PLUG, CONNECTOR 5P			
CN105	*1-564-508-11	PLUG, CONNECTOR 5P			
CN106	*1-564-507-11	PLUG, CONNECTOR 4P			

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No	Part No.	Description
CN107	*1-564-507-11	PLUG, CONNECTOR 4P
CN108	*1-564-507-11	PLUG, CONNECTOR 4P
CN109	*1-564-509-11	PLUG, CONNECTOR 6P
CN110	*1-564-507-11	PLUG, CONNECTOR 4P
CN201	*1-564-508-11	PLUG, CONNECTOR 5P
CN202	*1-564-508-11	PLUG, CONNECTOR 5P
CN203	*1-564-506-11	PLUG, CONNECTOR 3P
CN204	*1-564-507-11	PLUG, CONNECTOR 4P
CN205	*1-564-507-11	PLUG, CONNECTOR 4P
CN501	*1-564-508-11	PLUG, CONNECTOR 5P
CN601	*1-564-507-11	PLUG, CONNECTOR 4P
CN801	*1-564-519-11	PLUG, CONNECTOR 4P
CN802	*1-564-521-11	PLUG, CONNECTOR 6P
CN803	*1-564-518-11	PLUG, CONNECTOR 3P
CN901	*1-564-518-11	PLUG, CONNECTOR 3P
CN951	*1-564-507-11	PLUG, CONNECTOR 4P
D101	8-719-123-78	DIODE 1SS97-2
D102	8-719-123-78	DIODE 1SS97-2
D103	8-719-940-76	DIODE 1SS132
D104	8-719-940-76	DIODE 1SS132
D105	8-719-940-76	DIODE 1SS132
D106	8-719-940-76	DIODE 1SS132
D107	8-719-123-78	DIODE 1SS97-2
D201	8-719-123-78	DIODE 1SS97-2
D301	8-719-940-76	DIODE 1SS132
D302	8-719-940-76	DIODE 1SS132
D401	8-719-940-76	DIODE 1SS132
D402	8-719-940-76	DIODE 1SS132
D501	8-719-200-39	DIODE C16P20F
D502	8-719-200-40	DIODE C16P20FR
D503	8-719-200-39	DIODE C16P20F
D504	8-719-911-55	DIODE 10DF6
D505	8-719-911-55	DIODE 10DF6
D506	8-719-931-07	DIODE EQB01-07
D507	8-719-931-07	DIODE EQB01-07
D508	8-719-224-12	DIODE 10YD1.3A
D509	8-719-224-12	DIODE 10YD1.3A
D510	8-719-224-12	DIODE 10YD1.3A
D511	8-719-224-12	DIODE 10YD1.3A
D801	8-719-310-84	DIODE SEL1510C-S
D802	8-719-310-84	DIODE SEL1510C-S
D803	8-719-310-84	DIODE SEL1510C-S
D804	8-719-907-75	DIODE AA5534S
D805	8-719-310-84	DIODE SEL1510C-S
D806	8-719-310-84	DIODE SEL1510C-S
D807	8-719-310-84	DIODE SEL1510C-S
D901	8-719-303-84	DIODE SEL2510C-D
F701	⚠1-532-265-XX	(US)....FUSE, GLASS TUBE (1A)
F701	⚠1-532-279-00	(WG)....FUSE, TIME-LAG (T500mA)
F702	⚠1-532-066-00	(WG)....FUSE, TIME-LAG (T400mA)
F702	⚠1-532-401-XX	(US)....FUSE, GLASS TUBE (0.8A)
IC101	8-759-202-13	IC TC74HCU04P
IC102	8-759-202-14	IC TC74HC08P
IC103	8-759-202-11	IC TC74HC00P
IC104	8-759-202-13	IC TC74HCU04P
IC105	8-759-202-24	IC TC74HC86P
IC106	8-759-202-12	IC TC74HC02P
IC107	8-759-000-99	IC MC74HC74N
IC108	8-759-202-86	IC TC74HC123P
IC109	8-752-322-31	IC CXD1076P
IC110	8-759-202-13	IC TC74HCU04P
IC111	8-752-327-29	IC CXD1144AP
IC112	8-759-947-89	IC CXD1329S
IC113	8-759-918-71	IC CX23065

Ref.No	Part No.	Description
IC114	8-759-906-24	IC SN74LS624N
IC115	8-759-202-85	IC TC74HC112P
IC116	8-759-000-99	IC MC74HC74N
IC117	8-759-203-40	IC TC74HC393P
IC118	8-759-202-11	IC TC74HC00P
IC119	8-759-918-71	IC CX23065
IC120	8-759-906-24	IC SN74LS624N
IC121	8-759-203-40	IC TC74HC393P
IC122	8-759-202-17	IC TC74HC14P
IC123	8-759-203-40	IC TC74HC393P
IC124	8-759-202-85	IC TC74HC112P
IC125	8-759-202-11	IC TC74HC00P
IC126	8-759-202-11	IC TC74HC00P
IC127	8-759-202-12	IC TC74HC02P
IC128	8-759-645-19	IC M54519P
IC129	8-759-202-13	IC TC74HCU04P
IC201	8-759-202-11	IC TC74HC00P
IC202	8-759-203-01	IC TC74HC175P
IC203	8-759-202-13	IC TC74HCU04P
IC204	8-719-902-56	IC PC817
IC205	8-719-902-56	IC PC817
IC206	8-759-604-33	IC M5F7812
IC208	8-759-604-29	IC M5F7805
IC209	8-759-604-47	IC M5F7905
IC301	8-759-972-89	IC TDA1541A-S1
IC302	8-759-932-31	IC LF356H-K
IC303	8-759-971-80	IC AD712JN
IC304	8-759-603-97	IC M5240PS
IC401	8-759-972-89	IC TDA1541A-S1
IC402	8-759-932-31	IC LF356H-K
IC403	8-759-971-80	IC AD712JN
IC404	8-759-603-97	IC M5240PS
IC501	8-759-202-17	IC TC74HC14P
IC502	8-759-604-29	IC M5F7805
IC503	8-759-604-35	IC M5F78M05
J101	1-507-918-00	JACK, PIN 1P (LINE OUT)
J102	1-507-918-00	JACK, PIN 1P (LINE OUT)
J103	1-565-064-11	JACK, PIN 1P (AUX 1)
J104	1-565-064-11	JACK, PIN 1P (AUX 2)
L101	1-410-324-11	INDUCTOR 4.7UH
L102	1-410-324-11	INDUCTOR 4.7UH
L103	1-410-324-11	INDUCTOR 4.7UH
L104	1-410-324-11	INDUCTOR 4.7UH
L105	1-410-324-11	INDUCTOR 4.7UH
L106	1-410-324-11	INDUCTOR 4.7UH
L107	1-410-324-11	INDUCTOR 4.7UH
L108	1-410-324-11	INDUCTOR 4.7UH
L109	1-410-324-11	INDUCTOR 4.7UH
L110	1-410-324-11	INDUCTOR 4.7UH
L111	1-410-324-11	INDUCTOR 4.7UH
L112	1-410-324-11	INDUCTOR 4.7UH
L113	1-410-324-11	INDUCTOR 4.7UH
L114	1-410-324-11	INDUCTOR 4.7UH
L115	1-410-324-11	INDUCTOR 4.7UH
L116	1-408-912-11	INDUCTOR 1MMH
L117	1-410-324-11	INDUCTOR 4.7UH
L118	1-408-912-11	INDUCTOR 1MMH
L119	1-410-324-11	INDUCTOR 4.7UH
L120	1-410-513-11	INDUCTOR 22UH
L121	1-410-513-11	INDUCTOR 22UH
L122	1-410-513-11	INDUCTOR 22UH
L123	1-410-513-11	INDUCTOR 22UH
L124	1-410-628-11	COIL, CHOKE 200UH
L150	1-410-577-21	INDUCTOR 1UH

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No	Part No.	Description
L201	1-410-548-21	INDUCTOR 4.7UH
L202	1-410-548-21	INDUCTOR 4.7UH
L601	1-408-072-00	INDUCTOR 47UH
L751	⚠1-424-155-11	COIL, LINE FILTER
OPL601	1-464-907-11	I/O UNIT, LIGHT (CD OPTICAL IN/OUT)
Q101	8-729-201-52	TRANSISTOR 2SA1015
Q201	8-729-177-43	TRANSISTOR 2SD774
Q202	8-729-177-43	TRANSISTOR 2SD774
Q301	8-765-640-10	TRANSISTOR 2SK244
Q302	8-729-200-56	TRANSISTOR 2SK241GR
Q303	8-729-200-56	TRANSISTOR 2SK241GR
Q304	8-729-200-56	TRANSISTOR 2SK241GR
Q305	8-729-321-35	TRANSISTOR 2SK213
Q306	8-729-307-65	TRANSISTOR 2SJ76
Q307	8-729-104-18	TRANSISTOR 2SC3514
Q401	8-765-640-10	TRANSISTOR 2SK244
Q402	8-729-200-56	TRANSISTOR 2SK241GR
Q403	8-729-200-56	TRANSISTOR 2SK241GR
Q404	8-729-200-56	TRANSISTOR 2SK241GR
Q405	8-729-321-35	TRANSISTOR 2SK213
Q406	8-729-307-65	TRANSISTOR 2SJ76
Q407	8-729-104-18	TRANSISTOR 2SC3514
Q501	8-729-107-53	TRANSISTOR 2SC2275-P
Q502	8-729-118-53	TRANSISTOR 2SA985-P
Q503	8-729-104-91	TRANSISTOR 2SA1383
Q504	8-729-104-91	TRANSISTOR 2SA1383
Q505	8-729-104-18	TRANSISTOR 2SC3514
Q506	8-729-104-18	TRANSISTOR 2SC3514
Q507	8-729-104-18	TRANSISTOR 2SC3514
Q508	8-729-104-18	TRANSISTOR 2SC3514
Q509	8-729-104-91	TRANSISTOR 2SA1383
Q510	8-729-104-91	TRANSISTOR 2SA1383
Q511	8-729-366-61	TRANSISTOR 2SD666-B
Q512	8-729-364-61	TRANSISTOR 2SB646-B
Q513	8-729-364-61	TRANSISTOR 2SB646-B
Q514	8-729-364-61	TRANSISTOR 2SB646-B
Q515	8-729-366-61	TRANSISTOR 2SD666-B
Q516	8-729-366-61	TRANSISTOR 2SD666-B
Q517	8-729-178-54	TRANSISTOR 2SC2785
Q518	8-729-801-83	TRANSISTOR 2SB1013

RESISTOR

R101	1-259-401-11	CARBON	75	5%	1/6W
R102	1-259-401-11	CARBON	75	5%	1/6W
R103	1-259-428-11	CARBON	1K	5%	1/6W
R104	1-259-500-11	CARBON	1M	5%	1/6W
R105	1-259-428-11	CARBON	1K	5%	1/6W
R106	1-259-500-11	CARBON	1M	5%	1/6W
R113	1-259-412-11	CARBON	220	5%	1/6W
R114	1-259-452-11	CARBON	10K	5%	1/6W
R115	1-259-439-11	CARBON	3K	5%	1/6W
R116	1-215-452-00	METAL	20K	1%	1/6W
R117	1-215-444-00	METAL	9.1K	1%	1/6W
R118	1-215-456-00	METAL	30K	1%	1/6W
R119	1-259-452-11	CARBON	10K	5%	1/6W
R120	1-259-436-11	CARBON	2.2K	5%	1/6W
R121	1-259-428-11	CARBON	1K	5%	1/6W
R122	1-259-456-11	CARBON	15K	5%	1/6W
R123	1-259-428-11	CARBON	1K	5%	1/6W
R124	1-259-404-11	CARBON	100	5%	1/6W
R125	1-259-444-11	CARBON	4.7K	5%	1/6W
R126	1-259-444-11	CARBON	4.7K	5%	1/6W
R127	1-259-404-11	CARBON	100	5%	1/6W
R128	1-259-412-11	CARBON	220	5%	1/6W

Ref.No	Part No.	Description			
R129	1-259-412-11	CARBON	220	5%	1/6W
R130	1-259-412-11	CARBON	220	5%	1/6W
R131	1-259-412-11	CARBON	220	5%	1/6W
R132	1-259-412-11	CARBON	220	5%	1/6W
R133	1-259-416-11	CARBON	330	5%	1/6W
R134	1-259-416-11	CARBON	330	5%	1/6W
R135	1-259-412-11	CARBON	220	5%	1/6W
R136	1-259-500-11	CARBON	1M	5%	1/6W
R137	1-259-428-11	CARBON	1K	5%	1/6W
R138	1-259-412-11	CARBON	220	5%	1/6W
R139	1-259-436-11	CARBON	2.2K	5%	1/6W
R140	1-259-403-11	CARBON	91	5%	1/6W
R141	1-259-403-11	CARBON	91	5%	1/6W
R142	1-259-403-11	CARBON	91	5%	1/6W
R143	1-259-408-11	CARBON	150	5%	1/6W
R144	1-259-403-11	CARBON	91	5%	1/6W
R145	1-259-403-11	CARBON	91	5%	1/6W
R146	1-259-403-11	CARBON	91	5%	1/6W
R147	1-259-428-11	CARBON	1K	5%	1/6W
R148	1-259-428-11	CARBON	1K	5%	1/6W
R149	1-259-428-11	CARBON	1K	5%	1/6W
R150	1-259-428-11	CARBON	1K	5%	1/6W
R151	1-259-444-11	CARBON	4.7K	5%	1/6W
R152	1-259-424-11	CARBON	680	5%	1/6W
R153	1-259-404-11	CARBON	100	5%	1/6W
R154	1-259-444-11	CARBON	4.7K	5%	1/6W
R155	1-259-412-11	CARBON	220	5%	1/6W
R156	1-259-476-11	CARBON	100K	5%	1/6W
R157	1-259-452-11	CARBON	10K	5%	1/6W
R158	1-259-428-11	CARBON	1K	5%	1/6W
R159	1-259-412-11	CARBON	220	5%	1/6W
R160	1-259-412-11	CARBON	220	5%	1/6W
R161	1-259-412-11	CARBON	220	5%	1/6W
R162	1-259-484-11	CARBON	220K	5%	1/6W
R163	1-259-428-11	CARBON	1K	5%	1/6W
R164	1-259-452-11	CARBON	10K	5%	1/6W
R165	1-259-464-11	CARBON	33K	5%	1/6W
R166	1-259-428-11	CARBON	1K	5%	1/6W
R167	1-259-452-11	CARBON	10K	5%	1/6W
R168	1-259-412-11	CARBON	220	5%	1/6W
R169	1-259-412-11	CARBON	220	5%	1/6W
R170	1-259-412-11	CARBON	220	5%	1/6W
R171	1-259-412-11	CARBON	220	5%	1/6W
R172	1-259-412-11	CARBON	220	5%	1/6W
R173	1-259-428-11	CARBON	1K	5%	1/6W
R174	1-259-428-11	CARBON	1K	5%	1/6W
R175	1-259-428-11	CARBON	1K	5%	1/6W
R176	1-259-428-11	CARBON	1K	5%	1/6W
R177	1-259-416-11	CARBON	330	5%	1/6W
R180	1-259-416-11	CARBON	330	5%	1/6W
R181	1-259-416-11	CARBON	330	5%	1/6W
R182	1-259-416-11	CARBON	330	5%	1/6W
R183	1-259-416-11	CARBON	330	5%	1/6W
R184	1-259-404-11	CARBON	100	5%	1/6W
R185	1-259-428-11	CARBON	1K	5%	1/6W
R186	1-259-416-11	CARBON	330	5%	1/6W
R190	1-259-476-11	CARBON	100K	5%	1/6W
R195	1-259-412-11	CARBON	220	5%	1/6W
R196	1-259-416-11	CARBON	330	5%	1/6W
R201	1-247-706-11	CARBON	330	5%	1/4W
R202	1-247-706-11	CARBON	330	5%	1/4W
R203	1-247-721-11	CARBON	4.7K	1%	1/4W
R204	1-246-545-00	CARBON	1M	1%	1/4W
R205	1-247-704-11	CARBON	220	5%	1/4W
R206	1-247-713-11	CARBON	1K	5%	1/4W

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No	Part No.	Description				
R207	1-247-138-00	CARBON	2K	5%	1/4W	
R208	1-247-708-11	CARBON	470	5%	1/4W	
R209	1-247-713-11	CARBON	1K	5%	1/4W	
R210	1-247-138-00	CARBON	2K	5%	1/4W	
R211	1-247-706-11	CARBON	330	5%	1/4W	
R212	1-247-706-11	CARBON	330	5%	1/4W	
R213	1-247-706-11	CARBON	330	5%	1/4W	
R214	1-247-706-11	CARBON	330	5%	1/4W	
R215	1-249-556-11	CARBON	1.5K	5%	1/4W	
R301	1-259-675-11	CARBON	910	2%	1W	
R302	1-259-549-11	CARBON	560	1%	1/2W	
R303	1-259-627-11	CARBON	1M	1%	1/2W	
R304	1-259-681-11	CARBON	1.6K	2%	1W	
R305	1-259-560-11	CARBON	1.6K	1%	1/2W	
R306	1-259-560-11	CARBON	1.6K	1%	1/2W	
R307	1-259-560-11	CARBON	1.6K	1%	1/2W	
R308	1-259-579-11	CARBON	10K	1%	1/2W	
R309	1-259-579-11	CARBON	10K	1%	1/2W	
R310	1-259-555-11	CARBON	1K	1%	1/2W	
R311	1-259-539-11	CARBON	220	1%	1/2W	
R312	1-259-551-11	CARBON	680	1%	1/2W	
R313	1-259-551-11	CARBON	680	1%	1/2W	
R314	1-259-539-11	CARBON	220	1%	1/2W	
R315	1-259-541-11	CARBON	270	1%	1/2W	
R316	1-259-555-11	CARBON	1K	1%	1/2W	
R317	1-259-571-11	CARBON	4.7K	1%	1/2W	
R318	1-259-555-11	CARBON	1K	1%	1/2W	
R319	1-259-676-11	CARBON	1K	2%	1W	
R320	1-259-652-11	CARBON	100	2%	1W	
R321	1-259-652-11	CARBON	100	2%	1W	
R322	1-259-636-11	CARBON	22	2%	1W	
R323	1-259-619-11	CARBON	470K	1%	1/2W	
R401	1-259-675-11	CARBON	910	2%	1W	
R402	1-259-549-11	CARBON	560	1%	1/2W	
R403	1-259-627-11	CARBON	1M	1%	1/2W	
R404	1-259-681-11	CARBON	1.6K	2%	1W	
R405	1-259-560-11	CARBON	1.6K	1%	1/2W	
R406	1-259-560-11	CARBON	1.6K	1%	1/2W	
R407	1-259-560-11	CARBON	1.6K	1%	1/2W	
R408	1-259-579-11	CARBON	10K	1%	1/2W	
R409	1-259-579-11	CARBON	10K	1%	1/2W	
R410	1-259-555-11	CARBON	1K	1%	1/2W	
R411	1-259-539-11	CARBON	220	1%	1/2W	
R412	1-259-551-11	CARBON	680	1%	1/2W	
R413	1-259-551-11	CARBON	680	1%	1/2W	
R414	1-259-539-11	CARBON	220	1%	1/2W	
R415	1-259-541-11	CARBON	270	1%	1/2W	
R416	1-259-555-11	CARBON	1K	1%	1/2W	
R417	1-259-571-11	CARBON	4.7K	1%	1/2W	
R418	1-259-555-11	CARBON	1K	1%	1/2W	
R419	1-259-676-11	CARBON	1K	2%	1W	
R420	1-259-652-11	CARBON	100	2%	1W	
R421	1-259-652-11	CARBON	100	2%	1W	
R422	1-259-636-11	CARBON	22	2%	1W	
R423	1-259-619-11	CARBON	470K	1%	1/2W	
R501	⚠1-212-875-00	FUSIBLE	56	5%	1/4W	F
R502	1-249-598-11	CARBON	82K	5%	1/4W	
R503	1-247-708-11	CARBON	470	5%	1/4W	
R504	1-249-586-11	CARBON	27K	5%	1/4W	
R505	1-247-725-11	CARBON	10K	5%	1/4W	
R506	1-249-609-11	CARBON	240K	5%	1/4W	
R507	1-249-602-11	CARBON	120K	5%	1/4W	
R508	⚠1-212-865-00	FUSIBLE	22	5%	1/4W	F
R509	1-259-563-11	CARBON	2.2K	1%	1/2W	
R510	1-259-563-11	CARBON	2.2K	1%	1/2W	

Ref.No	Part No.	Description			
R511	1-259-571-11	CARBON	4.7K	1%	1/2W
R512	1-259-571-11	CARBON	4.7K	1%	1/2W
R513	1-259-525-11	CARBON	56	1%	1/2W
R514	1-259-525-11	CARBON	56	1%	1/2W
R515	1-259-555-11	CARBON	1K	1%	1/2W
R516	1-259-555-11	CARBON	1K	1%	1/2W
R517	1-259-579-11	CARBON	10K	1%	1/2W
R518	1-259-555-11	CARBON	1K	1%	1/2W
R519	1-259-579-11	CARBON	10K	1%	1/2W
R520	1-259-555-11	CARBON	1K	1%	1/2W
R521	1-259-559-11	CARBON	1.5K	1%	1/2W
R522	1-259-559-11	CARBON	1.5K	1%	1/2W
R523	1-259-555-11	CARBON	1K	1%	1/2W
R524	1-259-555-11	CARBON	1K	1%	1/2W
R525	1-259-541-11	CARBON	270	1%	1/2W
R526	1-259-565-11	CARBON	2.7K	1%	1/2W
R527	1-259-531-11	CARBON	100	1%	1/2W
R528	1-259-541-11	CARBON	270	1%	1/2W
R529	1-259-565-11	CARBON	2.7K	1%	1/2W
R530	1-259-531-11	CARBON	100	1%	1/2W
R531	1-259-676-11	CARBON	1K	2%	1W
R532	1-259-677-11	CARBON	1.1K	2%	1W
R533	1-259-676-11	CARBON	1K	2%	1W
R534	1-259-677-11	CARBON	1.1K	2%	1W
R602	1-249-540-11	CARBON	330	5%	1/4W

RSW951	1-571-372-11	SWITCH, ROTARY (DIGITAL INPUT)
RV601	1-224-252-XX	RES, ADJ, METAL GLAZE 10K
RY301	1-515-683-11	RELAY
RY302	1-515-683-11	RELAY
RY401	1-515-683-11	RELAY
RY402	1-515-683-11	RELAY
SW701	⚠1-571-250-11	SWITCH, PUSH (AC POWER) (1 KEY)
T101	⚠1-449-427-11	(WG)....TRANSFORMER, POWER
T101	⚠1-449-429-11	(US)....TRANSFORMER, POWER
T102	⚠1-449-428-11	(WG)....TRANSFORMER, POWER
T102	⚠1-449-430-11	(US)....TRANSFORMER, POWER
X101	1-567-975-11	VIBRATOR, CRYSTAL 11.8MHz
X201	1-567-972-11	VIBRATOR, CRYSTAL 11.2896MHz

ACCESSORY & PACKING MATERIAL

Part No.	Description	Remark
1-558-271-11	CORD, CONNECTION	
1-558-378-11	CORD, CONNECTION	
3-769-750-21	(US)....MANUAL, INSTRUCTION	
3-769-750-11	(WG)....MANUAL, INSTRUCTION	
4-915-880-01	SHEET, PROTECTION	
*4-924-262-01	CUSHION	
*4-924-276-01	INDIVIDUAL CARTON	

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.