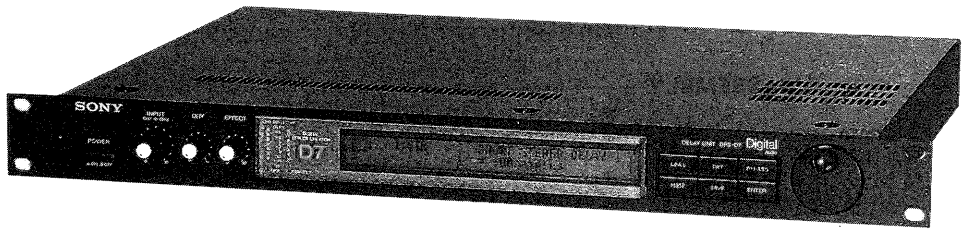
DPS-D7

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
E Model



SPECIFICATIONS

A/D Converter	18 bit oversampling Stereo A/D converter
D/A Converter	Pulse D/A converter
Sampling Freq.	48 kHz

Input

Connector type	Reference input level	MAX. input level	Input Impedance	Circuitry type
XLR-3-31 equivalent	+4 dBs	+24 dBs	10 kΩ	Balanced
Phone jack	−10 dBs	+10 dBs	50 kΩ	Unbalanced

XLR-3-31 equivalent connector
(1 : GND 2 : HOT 3 : COLD)

Output

Connector type	Reference output level	MAX. output level	Output Impedance	Circuitry type
XLR-3-32 equivalent	+4 dBs	+24 dBs	Min. 600 Ω	Balanced
Phone jack	−10 dBs	+10 dBs	Min. 10 kΩ	Unbalanced

XLR-3-32 equivalent connector
(1 : GND 2 : HOT 3 : COLD)

General

Frequency response	10 – 22 kHz $^{+0}_{-1.0}$ dB
Signal-to-noise ratio	more than 94 dB
Dynamic range	more than 94 dB
Total harmonic distortion	less than 0.0035% (1 kHz)
A/D, D/A delay time	approx. 2.3 msec
Memory	
Preset memory	100 effects
User memory	maximum of 256 effects
Power requirement	USA and Canadian model 120 V AC, 60 Hz UK model 240 V AC, 50/60 Hz, adjustable with a voltage selector Continental European model 230 V AC, 50/60 Hz, adjustable with a voltage selector
Power consumption	28 W
Dimensions	Approx. 482 × 44 × 320 mm ($19 \times 1^3/_4 \times 12^5/_8$ inches) (excluding projections) (h/w/d)
Weight	4.8 kg (10 lb 10 oz)

Design and specifications are subject to change without notice.

Note:
This appliance conforms with EEC Directive 87/308/EEC regarding interference suppression.

使用時は添付資料も参照のこと
Refer to the additional documents

DIGITAL DELAY UNIT

SONY®

TABLE OF CONTENTS

Section	Title	Page
	Specification	1
1.	GENERAL	3
2.	LIST OF IC TERMINALS	6
3.	DISASSEMBLY	12
4.	ADJUSTMENT	12
5.	DIAGRAMS	
5-1.	Block Diagram	13
5-2.	Printed Wiring Boards	17
5-3.	Schematic Diagram (1)	21
5-4.	Schematic Diagram (2)	25
5-5.	IC Block Diagrams	29
6.	EXPLODED VIEW	32
7.	ELECTRICAL PARTS LIST	34

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SECTION 1
GENERAL

This section is extracted from instruction manual.

Overview of the DPS-D7

The DPS-D7 is a digital delay unit equipped entirely with Sony's digital and audio technology at its highest level of sophistication which was released before with the Digital Reverberator, DRE-2000 and MU-R201 and has received much praise.

Quality-conscious design – A/D and D/A high performance converter
The DPS-D7 converts the incoming analog signal to a digital signal, passes it through various effects, then re-converts it to an analog singnal before output. The determinant to the sound quality is the conversion mechanism that adopts the 18-bit oversampling stereo A/D converter and the pulse D/A converter of 49,152 MHz. These account for highly accurate, less deteriorated effects.

User-friendly and comfortable operation
The large size backlit LCD of 40 characters by 2 lines makes it possible to proceed with smooth operation while viewing the operating condition in real time. Moreover, the LCD display incorporates an on-line manual (in English) which displays information required for operation.

Abundant preset memory settings
The unit has a hundred variations of the effects created by musicians, sound mixers and acoustic engineers around the world in its preset memory. This will help you select and replay immediately the desired effects for a particular purpose.

Sound creation of any kind
The EDIT function allows you to modify the presets or to create some individual effects. Besides the preset memory for a hundred effects, the unit has a so-called user memory where you can save up to 256 effects you are going to create. Using this memory allows more varicolored play of effects.

Wide range of effects
The DPS-D7 is equipped with 7 types of algorithms in the Delay block; Stereo delay, Feedback delay, Double delay, Tap delay, Long tap delay, Panpot tap delay and Multi-delay. In addition, it is provided with the Equalizer block and the Auto panner block.
By using these blocks and algorithms, the DPS-D7 can create the wide range of effects which no other existing delay unit can achieve.

Remote control
The remote commander (not supplied) makes it possible to remotely control the unit.

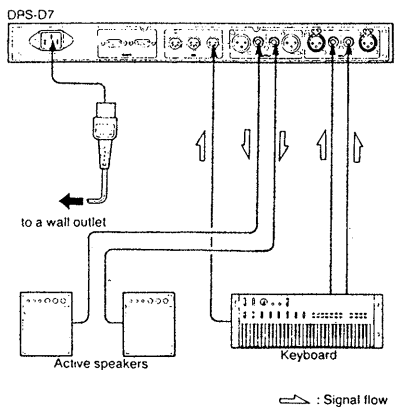
2 types of I/O connectors are provided
The DPS-D7 has XLR connectors (balanced-type) and phone jacks so that it can be connected to instruments, recording equipment or PA (public address) equipment.

Linkage with MIDI equipment
The MIDI device incorporated in the DPS-D7 can receive program change signals from another MIDI equipment connected so that the DPS-D7 can be controlled by the MIDI equipment connected. Thus it can function as an effector when connected to digital instruments. In addition, controls from PC's or MIDI sequencers are very helpful for composition.

Hooking Up a System

Turn all the power off before making connections, and connect the AC power cord last.

Fundamental Connections as an Effector

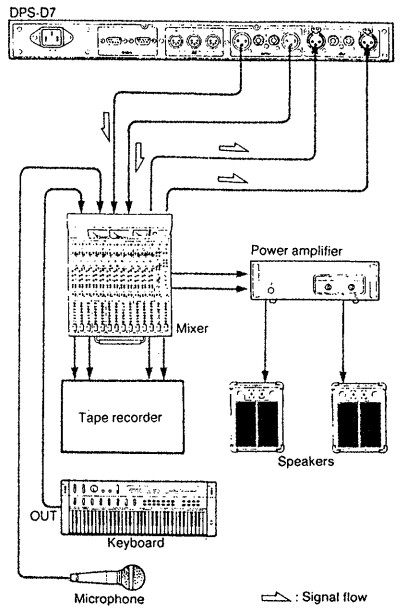


1. Connect a keyboard to the INPUT jacks, or the MIDI IN connector.
2. Connect active speakers to the OUTPUT jacks.
3. Insert the AC power cord firmly into the AC IN jack.
4. Connect the AC power cord to a wall outlet.

For models equipped with a voltage selector
Check to confirm that the voltage selector is set to the local power line voltage. If not, set the selector to the correct poisition before connecting the AC power cord to a wall outlet.

Notes:
- Be sure to insert the plugs firmly into the jacks. Loose connection may cause hum and noise.
- Leave a little slack in the connecting cord to allow for inadvertent shock or vibration.
- Connect the AC power cord last.
- Connections with some equipment of which the output capacity is very high may result in sound distortion. When this happens, turn the INPUT control to lower the input level, or turn down the output level of the equipment connected to the DPS-D7.

Fundamental Connections for Recording

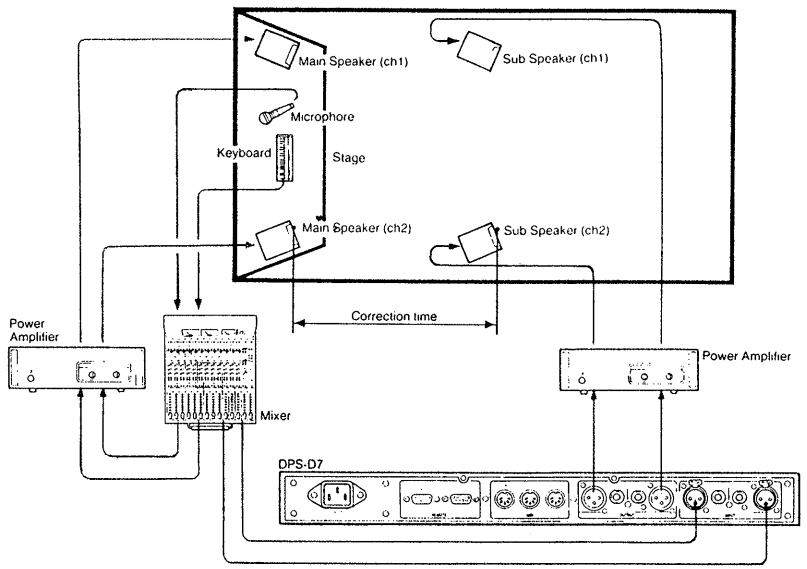


Notes:
- If only one channel is used, connect it to the INPUT CH1 and set the input mode in the System block to "mono".
See page 25.
This allows you to obtain the same result as you do when the mode is set to "stereo" and the same signal is input both to the INPUT CH1 and INPUT CH2.
- Be sure to input the signal with the reference level of +4 dB to the XLR-3-31 connector.
- Since the reference level of phone jack is set at − 10 dB, any input signal exceeding the maximum input level of + 10 dB causes clipping to the amplifier located before the input volume and sound may be distorted.
- An optional remote commander RM-DPS7 can be connected to the REMOTE IN connector to remotely control this unit.

Connections with PA facilities

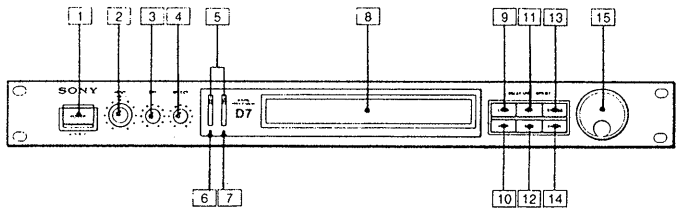
When PA facilities are used in a wide hall, sounds coming from the main speakers and the sub speakers do not reach any one point at the same time. The sound image generated may sound unfocused and unnatural. A delay unit delays the sound from a set of the speakers closer to the listener to correct the time lag between the two sets of the speakers.

This makes the sound image exist where players are standing. In particular the unit allows you to select the "meter" as a unit to express the delay time. Therefore you can simply input the distance between the two sets of speakers (main and sub) for calculation of the correction time.



Identifying the Parts

Front panel



1 POWER switch
Turns the unit on and off. When the power is on, the back light of the display window illuminates and the last indication appears. For a few seconds after switching on, the sound being input will be directly output since the bypass function works.

2 INPUT control
Adjusts the input levels of two channels independently. The outside knob controls channel 1 and the inside knob controls channel 2. Since they are linked with each other, hold whichever you do not use to adjust for one channel only.

3 DRY (original sound) control
Adjusts the output level of the source signal which is clear of any effect. Using this control in conjunction with the EFFECT control can adjust the balance between the source signal and the effect signal when mixing them. To output only the effect signal, set the control to "0".

4 EFFECT control
Adjust the output level of the effect signal. Using this control in conjunction with the DRY control can adjust the balance between the source signal and the effect signal when mixing them.

5 Input level meter
Indicates input level for both channels independently. Adjusts the INPUT control so that 0 dB is lit when the signal of the reference level is input. 0 dB means a head room of 20 dB. When the signal exceeds this head room, "OVER" illuminates.
This meter does not work when the BYPASS button is pressed.

6 MIDI indicator
Illuminates when the unit receives the MIDI program change signal or control change signal.

7 REMOTE indicator
Illuminates when the unit receives the signal from an optional remote commander.

8 Display window
A display of 40 characters by 2 lines on which names of called memory, parameter values and/or messages are indicated. Displayed indication is easy to read in a dark hall or a studio due to the back lighting.

9 LOAD button
Press the button to call up the memory.

10 HELP button
Press the button to display information or messages necessary to proceed with operation.

11 EDIT button
Press the button to change parameter values in the memory.

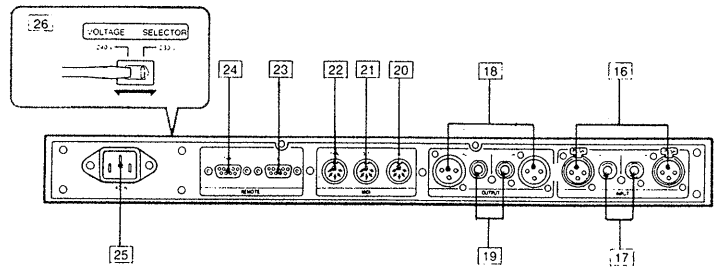
12 SAVE button
Press the button to save the effects individually created in the user memory.

13 BYPASS button
Press the button to output the input signal directly.

14 ENTER button
Press the button every time you have finished selecting or setting parameters.

15 Operating dial
Selects preset numbers and/or sets parameters.

Rear panel



16 INPUT CH1/CH2 terminal (XLR-3-31 connector)
Balanced-type terminals for input of ch1 and ch2.

17 INPUT CH1/CH2 terminal (Phone jack)
Phone jacks for input of ch1 and ch2.

18 OUTPUT CH1/CH2 terminal (XLR-3-32 connector)
Balanced-type terminals for output of ch1 and ch2

19 OUTPUT CH1/CH2 terminal (Phone jack)
Phone jacks for output of ch1 and ch2.
When both XLR connectors and phone jacks are used, the equipment connected to the phone jacks will be given a priority.

20 MIDI IN terminal (DIN 5-pin)
Input terminal for the MIDI signal. A commercially available MIDI cable can be connected between this terminal and a MIDI OUT (or THRU) terminal of another MIDI equipment.

21 MIDI OUT terminal (DIN 5-pin)
Outputs the MIDI signal generated in this unit.

22 MIDI THRU terminal (DIN 5-pin)
This terminal directly outputs the MIDI signal received from the MIDI IN terminal. A commercially available MIDI cable can be connected between this terminal and a MIDI IN terminal of another MIDI equipment.

23 REMOTE IN terminal (D-Sub 9-pin)
The terminal to which an optional remote commander is connected. The remote commander enables you to remotely control the unit.

24 REMOTE THRU terminal (D-Sub 9 pin)
This terminal directly outputs the signal received from an optional commander through the REMOTE IN terminal. This terminal should be connected to a REMOTE IN terminal of any effector of the DPS series.

25 AC IN jack
Use the supplied power cord to plug in a power outlet.

26 AC voltage selector
(for UK and European model)
Set the selector to the correct position before connecting the AC power cord to a wall outlet.

SECTION 2
LIST OF IC TERMINALS

IC510 CXD2903Q

Terminal No.	Terminal Name	I/O	Description
1	VDD		+5V
2	NC	open	
3	VSS		GND
4	XRD	IN	$\overline{RD}$ input
5	XAS	IN	$\overline{AS}$ input
6	RXRY	OUT	RXRDY plug of remote controller
7	XWAT	OUT	$\overline{WAIT}$ output
8	CKϕ	IN	ϕ clock input
9	PRES	OUT	Output of positive logic reset
10	XTIM	OUT	$\overline{\text{Chip select}}$ to clock IC
11	XES6	OUT	Optional $\overline{\text{chip select}}$
12	XES7	OUT	Optional $\overline{\text{chip select}}$
13	RIIN	IN	Data input from remote controller
14	RTIN	IN	Data input from remote controller thru
15	RIOT	OUT	Data output to remote controller
16	NC	open	
17	REA	IN	Input of rotary encoder
18	REB	IN	Input of rotary encoder
19	BCKO	OUT	Clock output of baud rate generator
20	BCKI	IN	Baud rate clock input of remote controller I/F
21	VSS		GND
22	NC	open	
23	VDD		+5V
24	NC	open	
25	NC	open	
26	SDAT	OUT	Data output to DPS
27	SCK	OUT	Data transmission clock to DPS
28	LTϕ	OUT	Output port DPS for data latch
29	LT1	OUT	Output port DPS for data latch
30	LT2	OUT	Output port DPS for data latch
31	NC	open	
32	VDD		+5V
33	NC	open	
34	PRAM	OUT	Chip select positive logic for SRAM
35	XRAM	OUT	Chip select negative logic for SRAM
36	A19	IN	Address input
37	A18	IN	
38	A17	IN	
39	A16	IN	
40	NC	open	
41	NC	open	
42	VDD		+5V
43	NC	open	
44	VSS		GND
45	A15	IN	Address input
46	A12	IN	Address input

IC510 CXD2903Q

Terminal No.	Terminal Name	I/O	Description
47	A14	IN	Address input
48	NC	open	
49	A13	IN	Address input
50	A6	IN	Address input
51	A8	IN	Address input
52	A5	IN	Address input
53	A9	IN	Address input
54	A4	IN	Address input
55	A11	IN	Address input
56	A3	IN	Address input
57	A2	IN	Address input
58	A10	IN	Address input
59	A1	IN	Address input
60	XROM	OUT	ROM $\overline{\text{chip select}}$
61	A0	IN	Address input
62	VSS		GND
63	NC	open	
64	VDD		+5V
65	NC	open	
66	D7	I/O	Data bus
67	D0	I/O	Data bus
68	D6	I/O	Data bus
69	D1	I/O	Data bus
70	D5	I/O	Data bus
71	D2	I/O	Data bus
72	D4	I/O	Data bus
73	D3	I/O	Data bus
74	NC	open	
75	LCDE	OUT	Output E-clock of LCD controller
76	XRES	IN	$\overline{\text{Reset}}$ input
77	XWR	IN	$\overline{\text{WR}}$ input
78	NC	open	
79	NC	open	
80	NC	open	

IC305 CXD1144BP

Terminal No.	Terminal Name	I/O	Description
1	TEST1	I	Testing terminal. Fix this terminal to "L" level in normal usage
2	TEST2	I	Testing terminal. Fix this terminal to "L" level in normal usage
3	TEST3	I	Testing terminal. Fix this terminal to "L" level in normal usage
4	MUTE	I	Effective at time of "H" which makes output value "0"
5	SOFT	I	ON/OFF of soft muting. Mute at time of "H"
6	INAF	O	Output "H" when releasing input/output synchronization
7	INIT	I	Re-synchronization at time of starting up of real sigal
8	V_{DD}	—	+Power (+5V)
9	XIN	I	Master CLK input (f=384fs)
10	BCK	I	BCK input
11	DATA	I	Serial data input (complementary of 2)
12	LRCK	I	LRCK input
13	IN$\overline{16}$/18	I	Assignment of input data word length, "H" : 18 bit, "L" : 16 bit
14	DPOL	I	This terminal inverses the polarity of input data. Effective at time of "H".
15	OUT$\overline{16}$/18	I	Assignment of output data word length, "H" : 18 bit, "L" : 16 bit
16	TEST4	I	Testing terminal. Fix this terminal to "H" level in normal usage
17	$\overline{SONY}$/I²S	I	Assignment of output format, "H" : I²S "L" : SONY
18	MODE2	I	Assignment of ADPT, "H" : 8Fs "L" : EMP Note 1
19	LE/$\overline{WS}$	O	LE output (SONY mode) /WS output (I²S mode)
20	DATAR	O	RCH serial data output (complementary of 2)
21	GND	—	
22	GND	—	
23	DATAL	O	LCH serial data output (complementary of 2)
24	BCKO	O	BCK output
25	LRCKO	O	LRCK output
26	APT/WS	O	APT output, (SONY mode) /WS output (I²S mode)
27	MODE1	I	Assignment of ADPT, "H" : 8Fs "L" : EMP Note 1
28	ADPT	I	ON/OFF of ADPT. Turn ON at time of "H"

LCD1 Terminal Connecting Diagram

Terminal No.	Terminal Name	Contents	Connection
1	V_{SS}	Earth electrical potential	GND 0V
2	V_{DD}	Power for logic circuit	Apply +5V
3	V_O	Contrast adjusting power	Adjust the contrast by applying 0−5V
4	RS	Register select	Various control signal inputs
5	R/W	Lead light	
6	E	Enable	
7	DB_0	Data input/output LSB	Data bus line • DB_7 is combination use for busy flag output • DB_{0-3} are not used when connecting with 4 bit parallel output micro−computer.
8	DB_1	Data input/output 2 bit	
9	DB_2	Data input/output 3 bit	
10	DB_3	Data input/output 4 bit	
11	DB_4	Data input/output 5 bit	
12	DB_5	Data input/output 6 bit	
13	DB_6	Data input/output 7 bit	
14	DB_7	Data input/output MSB	
15	V_{LED}	LED back light power (+)	Apply 5V voltage for LED back light to the interval between both terminals
16	V_{LSS}	LED back light power (−)	

◎IC501 Digital Audio Signal Processing LSI CXD1160AP

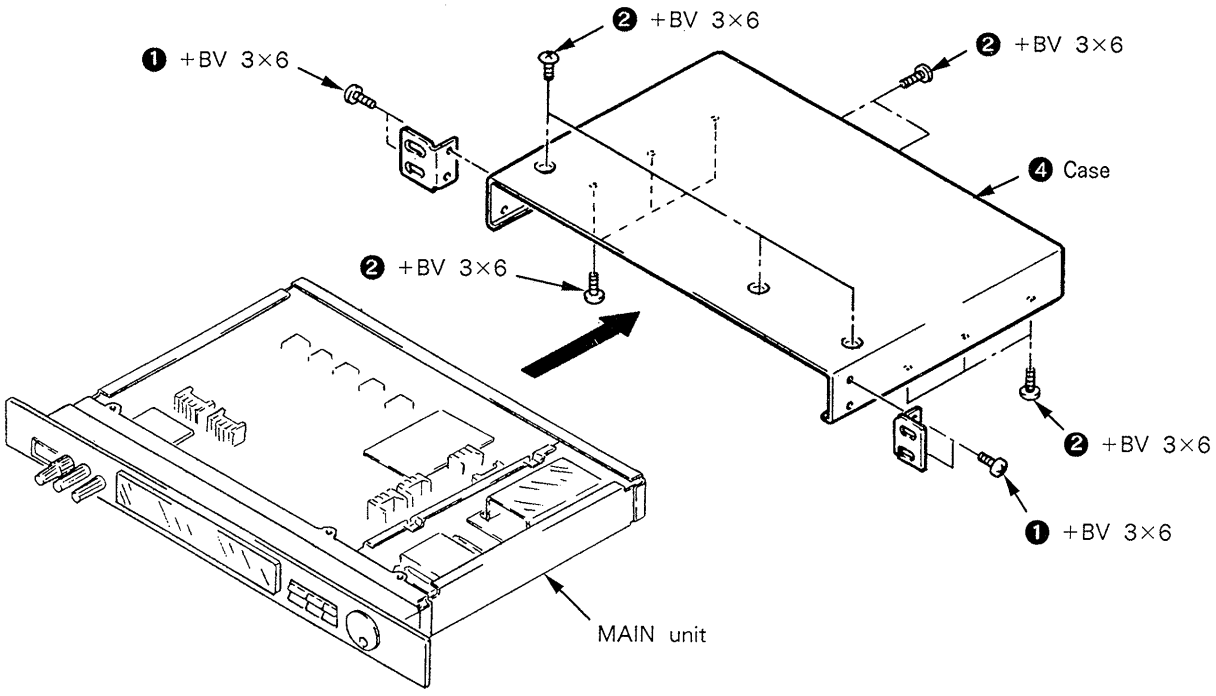
This LSI has a built-in Instruction RAM, Coefficient RAM, Data RAM, Multiplicator, Level shifter, etc. This is also a digital audio signal processing LSI which is equipped with Serial I/O, Delay I/O (maximum performance : stereo 1024 sample delay), and Micro-computer interface as peripheral devices.

Terminal No.	Terminal Name	I/O	Description
1	SDT	I	This is a serial data input terminal which receives commands, coefficients, and I/O controls from a micro-computer
2	SCK	I	This a serial clock input terminal for SDT which reads starting-up data
3	XSLD	I	This is a latch signal input terminal for system micro-computers to latch serial data in the IC. LOW active (LCK for DPAC1)
4	SI02	I	This an input terminal which sets the number of clocks of the serial bit clock BCK during channel (ch1 or ch2) data transmission at 1 sampling interval. It will be in 32 bit clock mode at time of GND fixation and in 24 bit clock mode at time of +5V fixation. (This machine is a 32 bit one.)
5	DYSL	I	This is a delay I/O mode switching input terminal. It will be in serial mode at time of GND fixation and function in the same way as the serial I/O. It will be in delay mode at the time of +5V fixation and consists of a delay line for two channels by connecting an external DRAM (64 kbit).
6	TST	I	This is a testing pin. It is normally fixed to GND
7	VSS		This is a GND terminal
8	MCK1	I	This terminal is the master clock input 1. The master clock ACK in the IC is 1/2 frequency of this frequency. Fix MCK2 to +5V when inputting the master clock from MCK1.
9	MCK2	I	This terminal is the master clock input 2. The master clock ACK in the IC has the same frequency as this frequency. Fix MCK1 to +5V when inputting the master clock from MCK2.
10	SI	I	This is a serial data inputting terminal for 1 sampling of 2 channels.
11	SO	O	This is a serial data outputting terminal for 1 sampling of 2 channels.
12	BCK	I	This is a serial bit clock inputting terminal for SI and SO. This BCK terminal reads serial input data when starting up and sends output data at the last transition.(64FS)
13	LRCK	I	This is an FS clock inputting terminal for I/O.(1FS)
14	XOVF	O	Arith-mometer overflow detecting output. "L" when there is overflow
15	A6	O	External DRAM address output A6
16	A3	O	External DRAM address output A3
17	A4	O	External DRAM address output A4
18	A5	O	External DRAM address output A5
19	A7	O	External DRAM address output A7
20	XCLR	I	This is a testing pin. It is normally fixed to +5V
21	VDD	—	+5V power terminal
22	A1	O	External DRAM address output A1
23	A2	O	External DRAM address output A2
24	A0	O	External DRAM address output A0
25	XRAS	O	This is a low address strobe outputting terminal for an external DRAM
26	XWSO	O	This is a serial data inputting terminal when DYSL is "L" and functions according to each serial I/O mode. It will also will be the write enable outputting terminal when DYSL is "H".
27	DIO	I/O	This is a serial data outputting terminal when DYSL is "L" and reads according to each serial I/O mode. It will also be an external DRAM data input/output terminal when DYSL is "H" and will be a common line for DRAM data input DIN and data output Dout
28	XCAS	O	This is an external DRAM column address strobe outputting terminal

Terminal No.	Terminal Name	I/O	Description
1	A4	O	External D-RAM address output terminal, A0 : LSB A8 is opened when 256kD-RAM is in use
2	A5		
3	A6		
4	A7		
5	A8		
6	VSS1		GND side power terminal, external short circuit with pin 30
7	XIN	I	Input terminal for crystal oscillator or input terminal for external clock
8	XOUT	O	Output terminal for crystal oscillator
9	SCK	O	Clock output terminal for external IC
10	24/32	I	Bit clock number selection terminal "H" : 24 bit "L" : 32 bit
11	EXT/INT	I	Serial data transmission mode selection terminal "H" : LRCK, BCK terminals are for inputting. External synchronization "L" : LRCK, BCK terminals are for outputting. Internal synchronization
12	RAM-SEL	I	External D-RAM capacity selection terminal "H" : 1M "L" : 256k
13	DATA-SEL	I	Used number of external D-RAM and data bit number selection terminal "H" : 3, 24 bit "L" : 2, 16 bit
14	TEST	I	Testing terminal. This terminal is fixed to "L" when not in use. It is available as a reset terminal of a data address counter. (Refer to "How to use testing terminal" for details.)
15	DAOUT	O	Serial output terminal of digital audio/stereo signal data
16	BCK	I/O	Bit clock input/output terminal for DAOUT sending DAOUT data is converted by the last transition of this signal
17	LRCK	I/O	Sampling frequency clock input/output terminal "H" : L-CH transmission, "L" : R-CH transmission
18	ADIN	I	Serial output terminal of digital audio/stereo signal data
19	PRG-L	I	This is the signal input terminal which latches and transmits the PRG-DT data serial input to the parallel latch circuit "H" : Latch , "L" : Transmission
20	PRG-DT	I	Serial data input terminal of micro program
21	PRG-CK	I	Clock input terminal for micro program data This reads in PRG-DT data every last transition
22	D0	I/O	External D-RAM data input/output terminal This inputs "L" to D0−D3 when using two D-RAMs.
23	D1		
24	D2		
25	D3		
26	D4		
27	D5		
28	D6		
29	D7		
30	VSS2		GND side power terminal, external short circuit with pin 6.
31	D8	I/O	External D-RAM data input/output terminal This inputs "L" to D0−D3 when using two D-RAMs.
32	D9		
33	D10		
34	D11		
35	$\overline{CAS}$	O	$\overline{CAS}$ signal output terminal for external D-RAM
36	$\overline{WE}$	O	$\overline{WE}$ signal output terminal for external D-RAM
37	$\overline{RAS}$	O	$\overline{RAS}$ signal output terminal for external D-RAM
38	A0	O	External D-RAM address output terminal, A0 : LSB A8 is opened when 256 kD-RAM is in use.
39	A1		
40	A2		
41	A3		
42	VDD	−	+ side power terminal, +4.5V−+5.5V (Vss standard)

SECTION 3
DISASSEMBLY

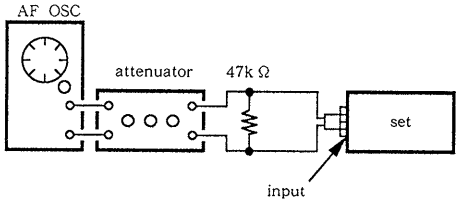
REMOVAL OF CASE



SECTION 4
ADJUSTMENT

LED Level Adjustment

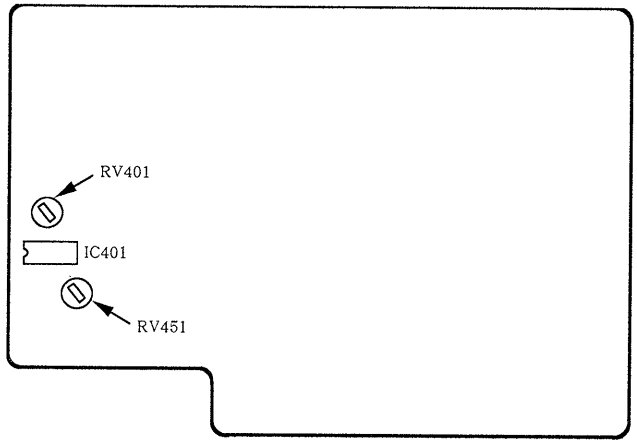
Setting :



Adjusting method :

1. INPUT Volume : MAX
2. Input −30dBs, 1kHz signal to UN BALANCE input.
3. Adjust RV401 (CH-1) and RV451 (CH-2) so that the LED display of the level meter lights until 0dB.

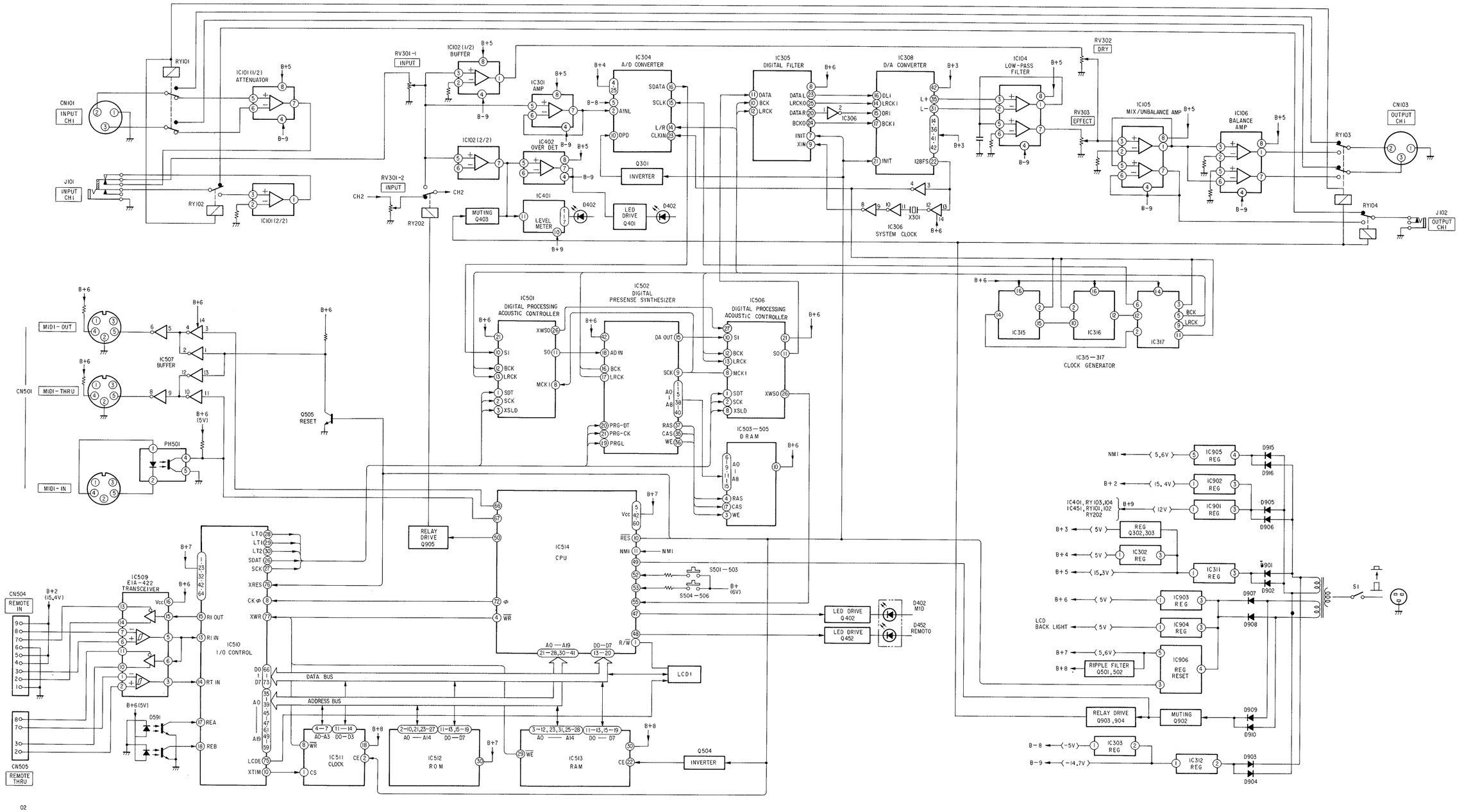
Adjusting points : MAIN Board



(Conductor side)

5-1. BLOCK DIAGRAM

SECTION 5
DIAGRAMS



• SEMICONDUCTOR LEAD LAYOUTS

CXD2552Q-1



2SD1944-K



DTC114ES
DTC144ES



2SK161GR



2SA1175-HFE
2SC2785-HFE



PC900



2SC2878B



2SD773-4



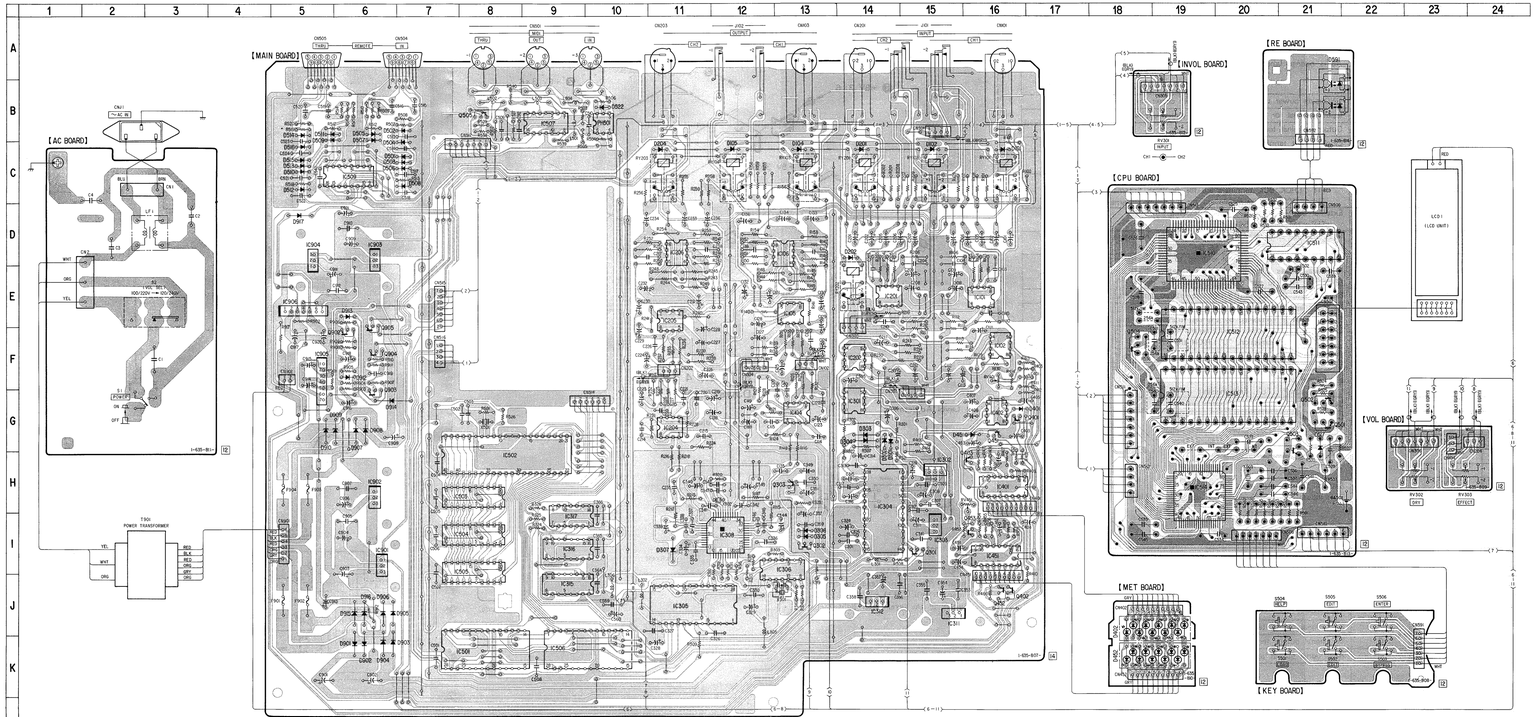
Note :

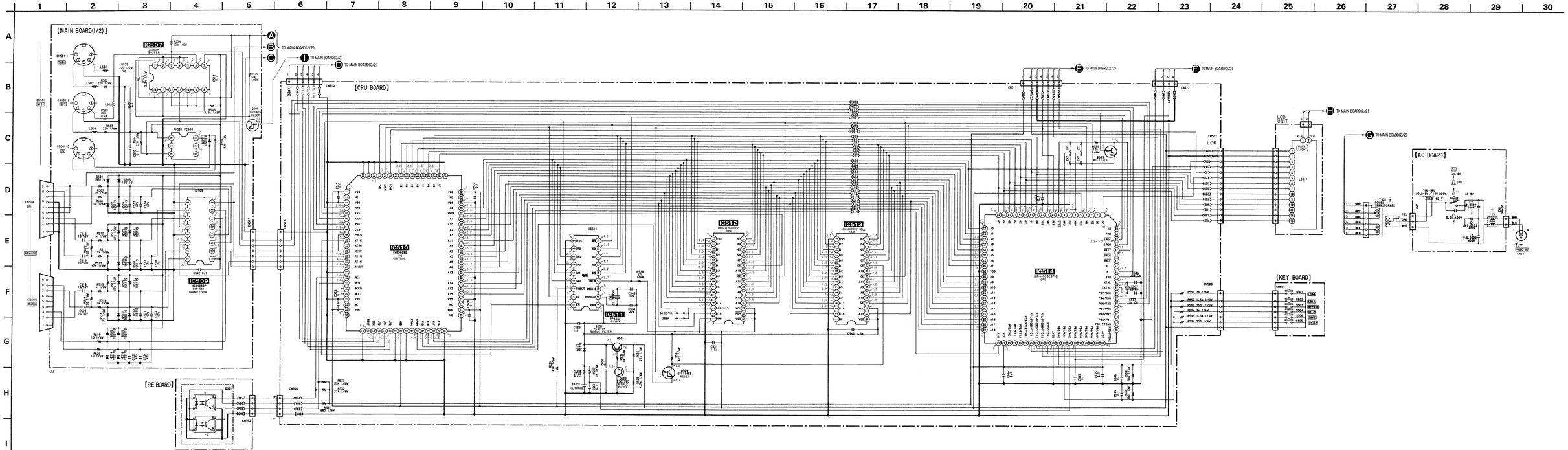
- O— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.
- ● : Through hole.
- ▨ : Pattern on the side which is seen.
- ▨ : Pattern of the rear side.

• SEMICONDUCTOR LOCATION

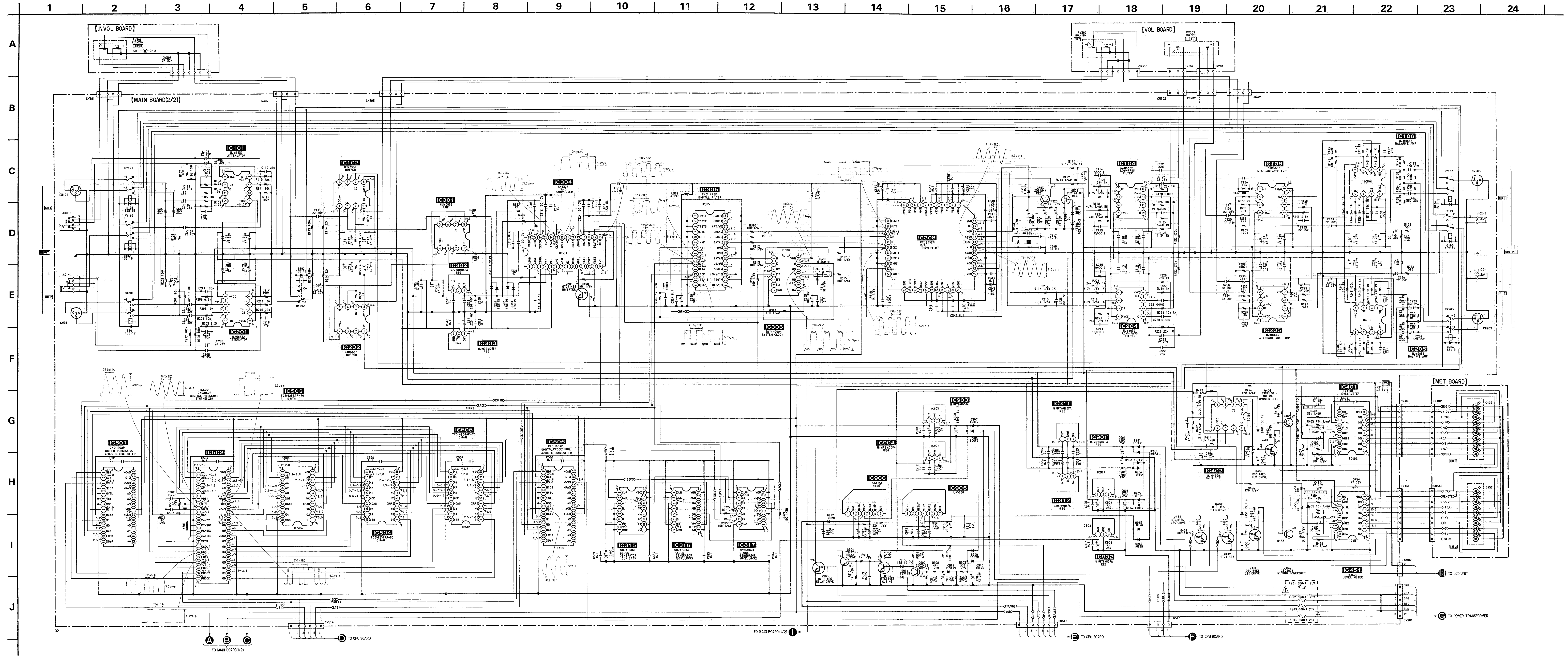
Ref. No.	Location	Ref. No.	Location
IC101	E-16	Q902	F-6
IC102	F-16	Q903	G-6
IC104	G-13	Q904	F-6
IC105	E-13	Q905	F-6
IC106	D-13		
IC201	E-14	D101	C-16
IC202	F-14	D102	C-15
IC204	G-11	D104	C-13
IC205	E-11	D105	C-12
IC206	D-11	D201	C-14
IC301	G-14	D202	D-14
IC302	H-15	D204	C-11
IC303	I-15	D301	G-14
IC304	H-14	D302	G-14
IC305	J-11	D303	G-14
IC306	I-13	D304	G-14
IC308	I-12	D305	I-13
IC311	J-15	D306	I-13
IC312	J-14	D307	I-11
IC315	J-9	D401	G-16
IC316	I-9	D402	J-18
IC317	I-9	D451	G-16
IC401	H-16	D452	K-18
IC402	G-16	D501	C-7
IC451	I-16	D502	B-7
IC501	K-8	D503	C-7
IC502	H-8	D504	C-7
IC503	H-8	D505	B-6
IC504	I-8	D506	C-7
IC505	I-8	D507	B-6
IC506	K-9	D508	C-7
IC507	B-9	D509	B-5
IC509	C-6	D510	C-5
IC510	D-19	D511	B-5
IC511	D-21	D512	C-5
IC512	F-20	D513	C-5
IC513	G-20	D514	B-5
IC514	H-19	D515	C-5
IC901	I-6	D516	C-5
IC902	H-6	D517	G-21
IC903	D-6	D522	B-10
IC904	D-5	D591	B-21
IC905	F-5	D901	K-6
IC906	E-5	D902	K-6
		D903	K-6
Q301	I-15	D904	K-6
Q302	I-13	D905	J-6
Q303	H-13	D906	J-6
Q401	G-16	D907	G-6
Q402	J-16	D908	G-6
Q403	H-16	D909	G-6
Q451	G-16	D910	G-5
Q452	J-16	D912	F-6
Q453	I-16	D913	E-6
Q501	G-21	D914	G-6
Q502	G-21	D915	J-6
Q503	G-21	D916	J-6
Q504	F-18	D917	D-5
Q505	B-8		

5-2. PRINTED WIRING BOARDS




【MAIN BOARD(1/2)】
【CPU BOARD】
【RE BOARD】
【AC BOARD】
【KEY BOARD】
LCD UNIT
IC507
IC509
IC510
IC511
IC512
IC513
IC514
TO MAIN BOARD(2/2)
TO MAIN BOARD(2/1)
TO MAIN BOARD(2/3)
TO MAIN BOARD(2/21)

5-4. SCHEMATIC DIAGRAM(2)



Note :

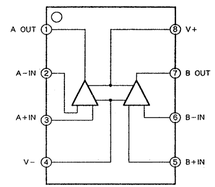
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- % : indicates tolerance.
- △ : internal component.
- [resistor symbol] : nonflammable resistor.

Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

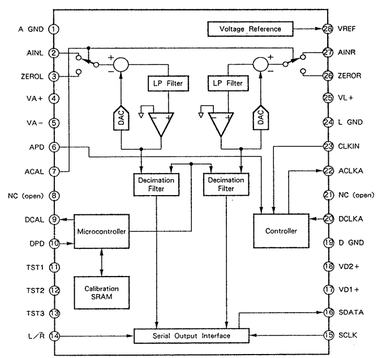
- ▬▬ : B+ Line
- ▬ ▬ ▬ : B− Line
- [ ] : adjustment for repair.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
- Voltages are taken with a VOM (Input impedance 10M Ω). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.

5-5. IC BLOCK DIAGRAMS

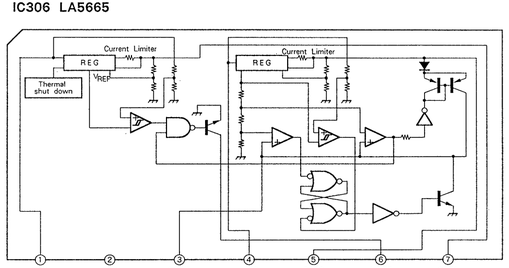
IC104 etc. NJM5532D-D



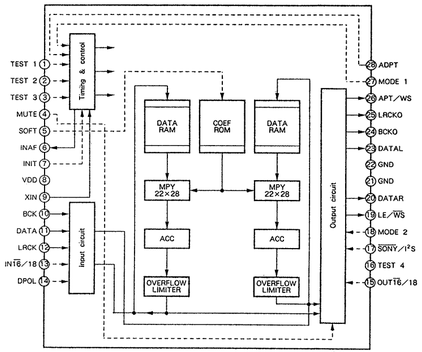
IC304 AK5328



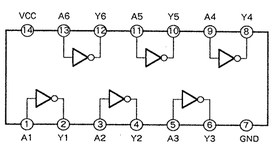
IC306 LA5665



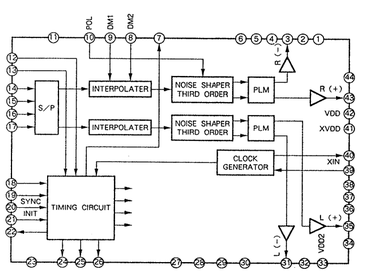
IC305 CXD1144BP



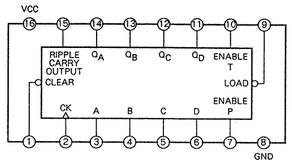
IC306 74HCU04



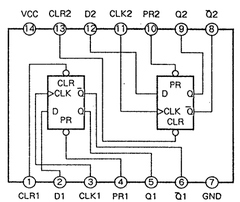
IC308 CXD2552Q



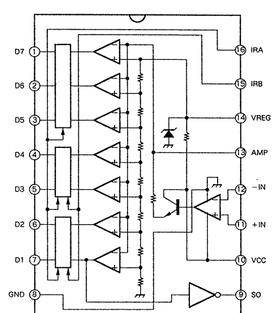
IC315, 316 74HC161



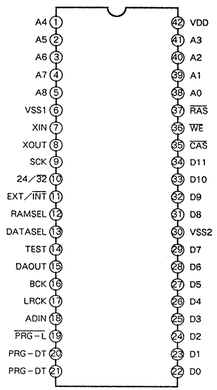
IC317 74HC74/AC74



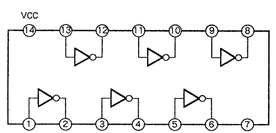
IC401, 451 IR2E02



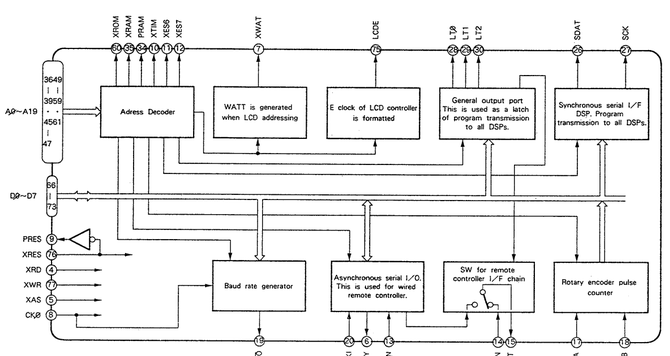
IC502 CXD8162P



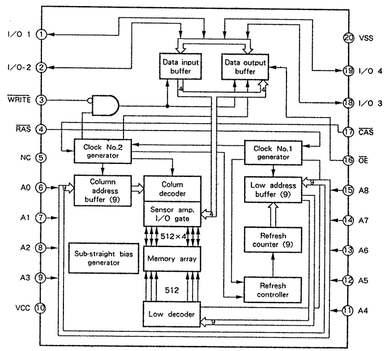
IC507 74HC05



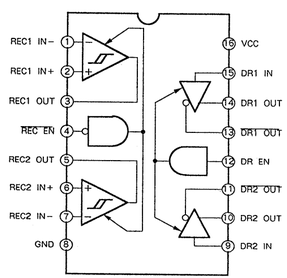
IC510 CXD2903Q



IC503–505 TC51425AP/70



IC509 MC34050P



SECTION 6
EXPLODED VIEWS

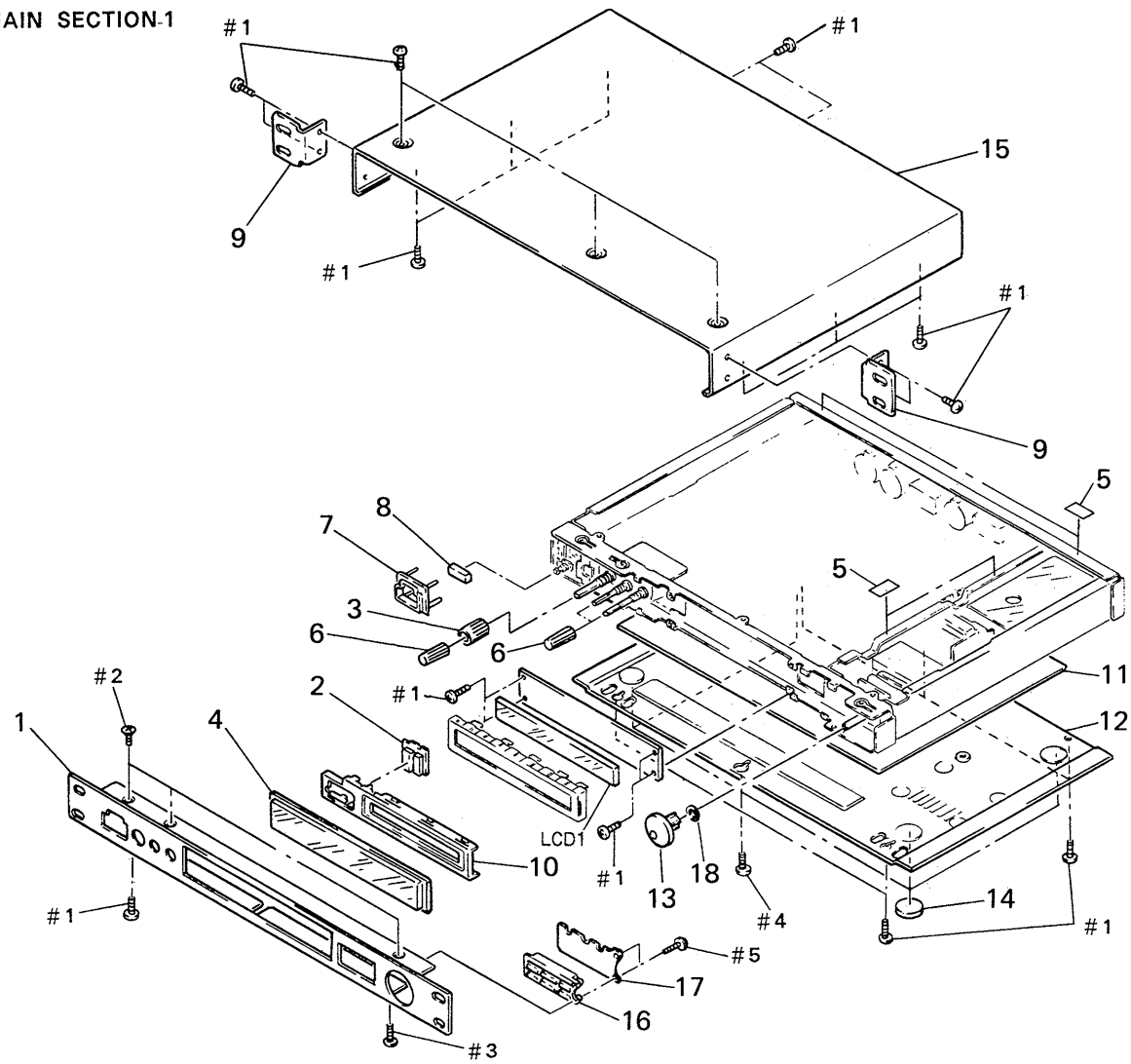
NOTE:

- —XX, —X mean standardized parts, so they may have some differences from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Color indication of Appearance Parts Example:
  KNOB, BALANCE (WHITE)....(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

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

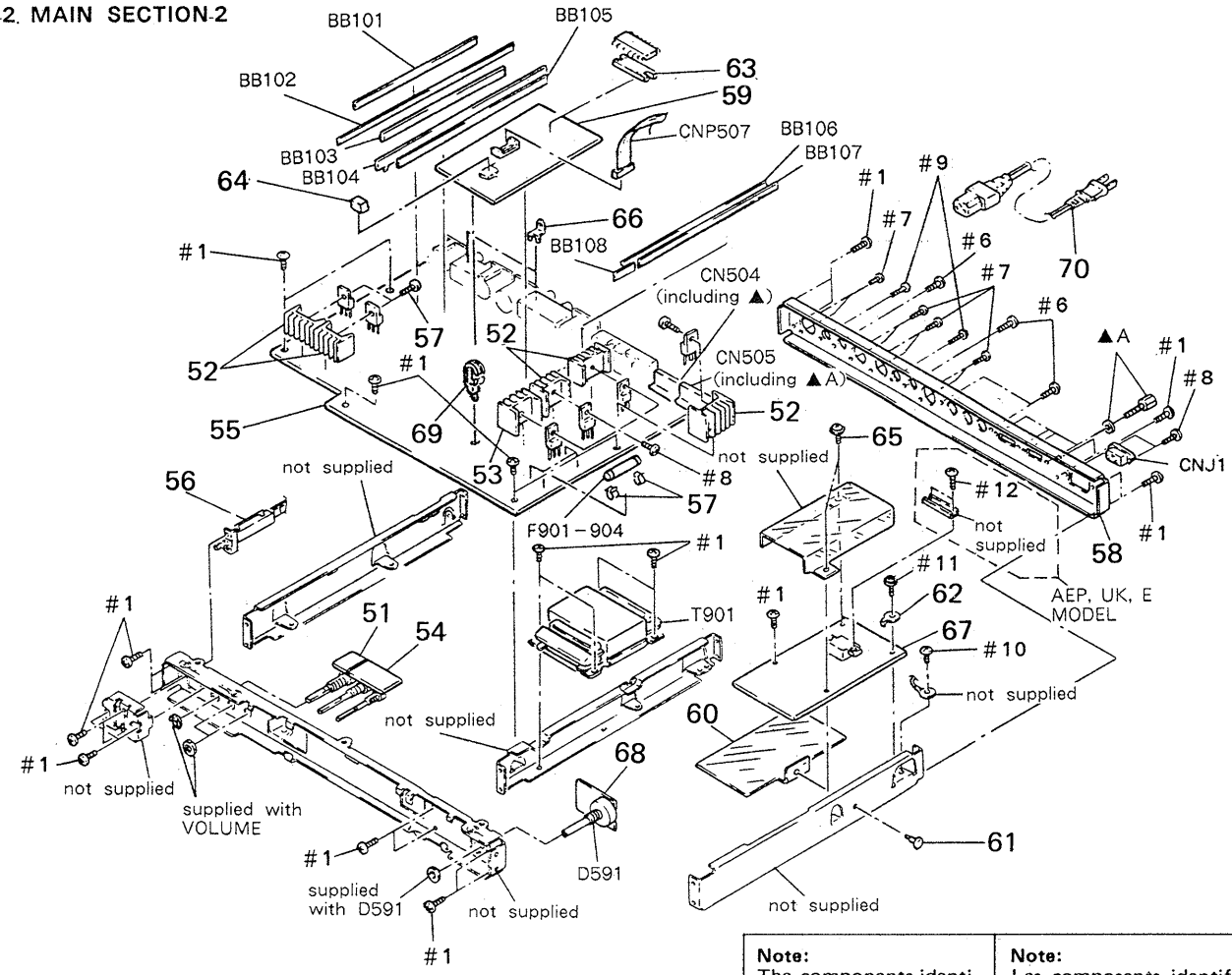
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifé.

6-1. MAIN SECTION-1



Ref. No.	Part No.	Description	Remark
1	4-941-151-01	PANEL	
2	* 1-635-810-11	MET BOARD	
3	4-941-136-01	KNOB (B)	
4	4-941-144-01	PLATE, INDICATION	
5	3-831-441-XX	SPACER	
6	4-941-142-01	KNOB (A)	
7	4-941-139-01	ESCUTCHEON (A)	
8	4-922-921-21	BUTTON (POWER)	
9	* 4-916-305-01	REINFORCEMENT	
10	4-941-150-01	ESCUTCHEON (B)	
11	* 4-916-327-01	SHEET, INSULATING	
12	* 4-916-320-01	PLATE, BOTTOM	
13	4-941-138-01	KNOB (RE)	
14	* 4-907-980-01	FOOT	
15	4-916-342-11	CASE (US, Canadian)	
15	4-916-342-21	CASE (AEP, UK, E)	
16	X-4941-028-2	BUTTON ASSY	
17	* 1-635-808-11	KEY BOARD	
18	4-941-141-01	STOPPER (RE)	
LCD1	1-809-076-11	DISPLAY PANEL, LIQUID CRYSTAL	

6-2. MAIN SECTION-2



Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
51	* 1-635-812-11	INVOL BOARD	
52	* 4-921-402-21	HEAT SINK	
53	* 4-363-146-00	HEAT SINK, V. OUT	
54	* 1-635-809-11	VOL BOARD	
55	* A-4338-659-A	MAIN BOARD, COMPLETE	
56	1-572-490-21	SWITCH, PUSH (AC POWER)	
57	* 1-533-213-31	HOLDER, FUSE	
58	* 4-941-146-01	PANEL, BACK	
59	* A-4341-047-A	CPU BOARD, COMPLETE	
60	* 4-916-303-01	SHEET, INSULATING	
61	* 3-531-576-51	RIVET	
62	4-870-539-00	PLATE, GROUND	
63	* 1-526-971-21	SOCKET, IC 28P	
64	9-911-849-XX	CUSHION	
65	4-886-821-01	SCREW, S TIGHT, +PTTWH 3X6	
66	* 4-916-318-01	PLATE, GROUND	
67	* 1-635-811-11	AC BOARD	
68	* 1-635-814-11	RE BOARD	
69	* 3-697-708-01	CLAMP (8), HARNESS	
70	1-557-377-11	CORD, POWER (US, Canadian)	
70	1-590-910-11	CORD SET, POWER (AEP, UK, E)	
BB101	* 1-560-242-71	BUS BAR 6P	
BB102	* 1-560-242-41	BUS BAR 11P	
BB104	* 1-560-242-41	BUS BAR 11P	
BB105	* 1-560-242-91	BUS BAR 10P	
BB106	* 1-560-242-41	BUS BAR 11P	
BB107	* 1-560-242-41	BUS BAR 11P	
BB108	* 1-560-242-61	BUS BAR 2P	
CN504	1-568-200-21	SOCKET, CONNECTOR 9P (REMOTE IN)	
CN505	1-568-200-21	SOCKET, CONNECTOR 9P (REMOTE THRU)	
CNP507	* 1-575-940-11	LEAD (WITH CONNECTOR)	
CNJ1	* 1-580-375-21	INLET 3P (AC IN)	
D951	1-466-386-11	DIODE ENCODER, ROTARY	
F901	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F901	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian	
F902	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F902	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian	
F903	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F903	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian	
F904	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F904	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian	
T901	⚠ 1-450-176-11	TRANSFORMER, POWER (US, Canadian)	
T901	⚠ 1-450-690-11	TRANSFORMER, POWER (AEP, UK, E)	

CPU

SECTION 7
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.
- —XX, —X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL : Metal-film resistor
  METAL OXIDE : Metal Oxide-film resistor
  F : nonflammable
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ, for example :
  uA.... : μA...., uPA.... : μPA....
  uPB.... : μPB...., uPC.... : μPC....
  uPD.... : μPD....
- CAPACITORS
  uF : μF
- COILS
  uH : μH

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

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

Ref. No.	Part No.	Description			Remark
	* A-4341-047-A	CPU BOARD, COMPLETE			
		**********			
	* 1-526-971-21	SOCKET, IC 28P			
		< BATTERY >			
BA501	1-528-225-11	BATTERY, LITHIUM			
		< CAPACITOR >			
C525	1-164-159-11	CERAMIC	0.1uF		50V
C526	1-164-159-11	CERAMIC	0.1uF		50V
C527	1-164-159-11	CERAMIC	0.1uF		50V
C528	1-164-159-11	CERAMIC	0.1uF		50V
C529	1-164-159-11	CERAMIC	0.1uF		50V
C530	1-162-209-31	CERAMIC	27PF	5%	50V
C531	1-162-176-00	CERAMIC	1.5uF		25V
C533	1-164-159-11	CERAMIC	0.1uF		50V
C534	1-164-159-11	CERAMIC	0.1uF		50V
C535	1-164-159-11	CERAMIC	0.1uF		50V
C536	1-162-206-31	CERAMIC	20PF	5%	50V
C537	1-162-206-31	CERAMIC	20PF	5%	50V
C539	1-162-176-00	CERAMIC	1.5uF		25V
C540	1-162-176-00	CERAMIC	1.5uF		25V
C541	1-164-159-11	CERAMIC	0.1uF		50V
C543	1-162-201-31	CERAMIC	12PF	5%	50V
C544	1-164-159-11	CERAMIC	0.1uF		50V
C545	1-164-159-11	CERAMIC	0.1uF		50V
C546	1-164-159-11	CERAMIC	0.1uF		50V
		< CONNECTOR >			
CN506	* 1-564-507-11	PLUG, CONNECTOR 4P			
CN507	* 1-580-043-11	SOCKET, CONNECTOR			
CN508	* 1-564-341-11	PIN, CONNECTOR 7P			
CN510	1-561-115-00	SOCKET, CONNECTOR 6P			
CN511	* 1-561-651-00	SOCKET, CONNECTOR 7P			
CN512	1-562-087-00	SOCKET, CONNECTOR 4P			
CN513	* 1-561-651-00	SOCKET, CONNECTOR 7P			
		< DIODE >			
D517	8-719-911-19	DIODE 1SS119			
		< IC >			
IC510	8-759-502-92	IC CXD2903Q			
IC511	8-759-984-34	IC RP5C62			
IC512	8-759-702-93	IC uPD27C512D-D7			
IC513	8-752-337-49	IC CXK58257AP-12LL			
IC514	8-759-323-88	IC HD6435328RA00F			
		< TRANSISTOR >			
Q501	8-729-119-76	TRANSISTOR 2SA1175-HFE			
Q502	8-729-119-78	TRANSISTOR 2SC2785-HFE			
Q503	8-729-900-80	TRANSISTOR DTC114ES			
Q504	8-729-900-80	TRANSISTOR DTC114ES			
		< RESISTOR >			
R521	1-259-468-11	CARBON	47K	5%	1/6W
R522	1-259-444-11	CARBON	4.7K	5%	1/6W
R523	1-259-452-11	CARBON	10K	5%	1/6W
R524	1-259-460-11	CARBON	22K	5%	1/6W
R525	1-259-444-11	CARBON	4.7K	5%	1/6W
R528	1-259-468-11	CARBON	47K	5%	1/6W
R530	1-259-418-11	CARBON	390	5%	1/6W
R531	1-259-424-11	CARBON	680	5%	1/6W
R532	1-259-464-11	CARBON	33K	5%	1/6W
R533	1-259-464-11	CARBON	33K	5%	1/6W
R535	1-259-452-11	CARBON	10K	5%	1/6W
R536	1-259-468-11	CARBON	47K	5%	1/6W

CPU MAIN

Ref. No.	Part No.	Description			Remark
R537	1-259-500-11	CARBON	1M	5%	1/6W
R538	1-259-418-11	CARBON	390	5%	1/6W
R591	1-259-439-11	CARBON	3K	5%	1/6W
R592	1-259-432-11	CARBON	1.5K	5%	1/6W
R593	1-259-425-11	CARBON	750	5%	1/6W
R594	1-259-439-11	CARBON	3K	5%	1/6W
R595	1-259-432-11	CARBON	1.5K	5%	1/6W
R596	1-259-425-11	CARBON	750	5%	1/6W
		< CRYSTAL >			
X502	1-567-098-00	OSCILLATOR, CRYSTAL (32.768MHz)			
X503	1-577-121-11	VIBRATOR, CRYSTAL (20MHz)			

****

* A-4338-659-A MAIN BOARD, COMPLETE
****

* 1-533-213-31 HOLDER, FUSE
* 1-560-242-41 BUS BAR 11P
* 1-560-242-51 BUS BAR 7P
* 1-560-242-61 BUS BAR 2P
* 1-560-242-71 BUS BAR 6P

* 1-560-242-91 BUS BAR 10P
* 4-363-146-00 HEAT SINK, V.OUT
* 4-916-318-01 PLATE, GROUND
* 4-921-402-21 HEAT SINK
7-682-548-09 SCREW +BVTT 3X8 (S)

< CAPACITOR >

C101	1-126-233-11	ELECT	22uF	20%	50V
C102	1-126-233-11	ELECT	22uF	20%	50V
C103	1-162-282-31	CERAMIC	100PF	10%	50V
C104	1-162-282-31	CERAMIC	100PF	10%	50V
C105	1-126-233-11	ELECT	22uF	20%	50V
C106	1-126-233-11	ELECT	22uF	20%	50V
C107	1-126-233-11	ELECT	22uF	20%	50V
C108	1-124-477-11	ELECT	47uF	20%	25V
C109	1-124-477-11	ELECT	47uF	20%	25V
C110	1-162-207-31	CERAMIC	22PF	5%	50V
C111	1-126-233-11	ELECT	22uF	20%	50V
C112	1-124-477-11	ELECT	47uF	20%	25V
C113	1-124-477-11	ELECT	47uF	20%	25V
C114	1-110-335-11	MYLAR	100PF	5%	50V
C115	1-110-335-11	MYLAR	100PF	5%	50V
C117	1-162-207-31	CERAMIC	22PF	5%	50V
C118	1-124-477-11	ELECT	47uF	20%	25V
C119	1-124-477-11	ELECT	47uF	20%	25V
C120	1-130-472-00	MYLAR	0.0012uF	5%	50V
C121	1-130-472-00	MYLAR	0.0012uF	5%	50V

Ref. No.	Part No.	Description			Remark
C122	1-162-207-31	CERAMIC	22PF	5%	50V
C123	1-126-233-11	ELECT	22uF	20%	50V
C124	1-126-233-11	ELECT	22uF	20%	50V
C125	1-126-233-11	ELECT	22uF	20%	50V
C126	1-162-215-31	CERAMIC	47PF	5%	50V
C127	1-124-477-11	ELECT	47uF	20%	25V
C128	1-124-477-11	ELECT	47uF	20%	25V
C129	1-126-233-11	ELECT	22uF	20%	50V
C130	1-126-233-11	ELECT	22uF	20%	50V
C131	1-124-477-11	ELECT	47uF	20%	25V
C132	1-124-477-11	ELECT	47uF	20%	25V
C133	1-126-059-11	ELECT	330uF	20%	25V
C134	1-126-059-11	ELECT	330uF	20%	25V
C135	1-110-337-51	MYLAR	150PF	5%	50V
C136	1-126-233-11	ELECT	22uF	20%	50V
C138	1-162-207-31	CERAMIC	22PF	5%	50V
C201	1-126-233-11	ELECT	22uF	20%	50V
C202	1-126-233-11	ELECT	22uF	20%	50V
C203	1-162-282-31	CERAMIC	100PF	10%	50V
C204	1-162-282-31	CERAMIC	100PF	10%	50V
C205	1-126-233-11	ELECT	22uF	20%	50V
C206	1-126-233-11	ELECT	22uF	20%	50V
C207	1-126-233-11	ELECT	22uF	20%	50V
C208	1-124-477-11	ELECT	47uF	20%	25V
C209	1-124-477-11	ELECT	47uF	20%	25V
C210	1-162-207-31	CERAMIC	22PF	5%	50V
C211	1-126-233-11	ELECT	22uF	20%	50V
C212	1-124-477-11	ELECT	47uF	20%	25V
C213	1-124-477-11	ELECT	47uF	20%	25V
C214	1-110-335-11	MYLAR	100PF	5%	50V
C215	1-110-335-11	MYLAR	100PF	5%	50V
C217	1-162-207-31	CERAMIC	22PF	5%	50V
C218	1-124-477-11	ELECT	47uF	20%	25V
C219	1-124-477-11	ELECT	47uF	20%	25V
C220	1-130-472-00	MYLAR	0.0012uF	5%	50V
C221	1-130-472-00	MYLAR	0.0012uF	5%	50V
C222	1-162-207-31	CERAMIC	22PF	5%	50V
C223	1-126-233-11	ELECT	22uF	20%	50V
C224	1-126-233-11	ELECT	22uF	20%	50V
C225	1-126-233-11	ELECT	22uF	20%	50V
C226	1-162-215-31	CERAMIC	47PF	5%	50V
C227	1-124-477-11	ELECT	47uF	20%	25V
C228	1-124-477-11	ELECT	47uF	20%	25V
C229	1-126-233-11	ELECT	22uF	20%	50V
C230	1-126-233-11	ELECT	22uF	20%	50V

MAIN

Ref. No.	Part No.	Description			Remark
C231	1-124-477-11	ELECT	47uF	20%	25V
C232	1-124-477-11	ELECT	47uF	20%	25V
C233	1-126-059-11	ELECT	330uF	20%	25V
C234	1-126-059-11	ELECT	330uF	20%	25V
C235	1-110-337-51	MYLAR	150PF	5%	50V
C236	1-126-233-11	ELECT	22uF	20%	50V
C238	1-162-207-31	CERAMIC	22PF	5%	50V
C301	1-162-207-31	CERAMIC	22PF	5%	50V
C305	1-124-477-11	ELECT	47uF	20%	25V
C306	1-124-477-11	ELECT	47uF	20%	25V
C307	1-164-159-11	CERAMIC	0.1uF		50V
C308	1-126-176-11	ELECT	220uF	20%	10V
C309	1-164-159-11	CERAMIC	0.1uF		50V
C310	1-164-159-11	CERAMIC	0.1uF		50V
C311	1-126-176-11	ELECT	220uF	20%	10V
C312	1-164-159-11	CERAMIC	0.1uF		50V
C313	1-164-159-11	CERAMIC	0.1uF		50V
C314	1-124-443-00	ELECT	100uF	20%	10V
C315	1-136-153-00	FILM	0.01uF	5%	50V
C316	1-124-443-00	ELECT	100uF	20%	10V
C317	1-164-159-11	CERAMIC	0.1uF		50V
C318	1-136-153-00	FILM	0.01uF	5%	50V
C324	1-124-443-00	ELECT	100uF	20%	10V
C325	1-164-159-11	CERAMIC	0.1uF		50V
C326	1-162-294-31	CERAMIC	0.001uF	10%	50V
C327	1-164-159-11	CERAMIC	0.1uF		50V
C328	1-124-443-00	ELECT	100uF	20%	10V
C329	1-124-443-00	ELECT	100uF	20%	10V
C330	1-164-159-11	CERAMIC	0.1uF		50V
C334	1-124-443-00	ELECT	100uF	20%	10V
C335	1-164-159-11	CERAMIC	0.1uF		50V
C336	1-162-294-31	CERAMIC	0.001uF	10%	50V
C337	1-164-159-11	CERAMIC	0.1uF		50V
C338	1-164-159-11	CERAMIC	0.1uF		50V
C339	1-124-443-00	ELECT	100uF	20%	10V
C340	1-124-443-00	ELECT	100uF	20%	10V
C341	1-164-159-11	CERAMIC	0.1uF		50V
C342	1-164-159-11	CERAMIC	0.1uF		50V
C343	1-124-443-00	ELECT	100uF	20%	10V
C344	1-124-443-00	ELECT	100uF	20%	10V
C345	1-164-159-11	CERAMIC	0.1uF		50V
C346	1-164-159-11	CERAMIC	0.1uF		50V
C347	1-162-199-31	CERAMIC	10PF	5%	50V
C348	1-162-199-31	CERAMIC	10PF	5%	50V
C349	1-126-176-11	ELECT	220uF	20%	10V
C350	1-164-159-11	CERAMIC	0.1uF		50V
C351	1-124-477-11	ELECT	47uF	20%	25V
C352	1-124-477-11	ELECT	47uF	20%	25V

Ref. No.	Part No.	Description			Remark
C353	1-164-159-11	CERAMIC	0.1uF		50V
C354	1-124-479-11	ELECT	330uF	20%	25V
C355	1-164-159-11	CERAMIC	0.1uF		50V
C356	1-164-159-11	CERAMIC	0.1uF		50V
C357	1-124-479-11	ELECT	330uF	20%	25V
C358	1-164-159-11	CERAMIC	0.1uF		50V
C359	1-164-159-11	CERAMIC	0.1uF		50V
C364	1-164-159-11	CERAMIC	0.1uF		50V
C365	1-164-159-11	CERAMIC	0.1uF		50V
C366	1-164-159-11	CERAMIC	0.1uF		50V
C401	1-124-477-11	ELECT	47uF	20%	25V
C402	1-124-482-11	ELECT	33uF	20%	35V
C403	1-124-907-11	ELECT	10uF	20%	50V
C404	1-124-477-11	ELECT	47uF	20%	25V
C405	1-124-477-11	ELECT	47uF	20%	25V
C406	1-124-477-11	ELECT	47uF	20%	25V
C407	1-124-477-11	ELECT	47uF	20%	25V
C451	1-124-477-11	ELECT	47uF	20%	25V
C452	1-124-482-11	ELECT	33uF	20%	35V
C453	1-124-907-11	ELECT	10uF	20%	50V
C454	1-124-477-11	ELECT	47uF	20%	25V
C501	1-164-159-11	CERAMIC	0.1uF		50V
C502	1-162-206-31	CERAMIC	20PF	5%	50V
C503	1-162-206-31	CERAMIC	20PF	5%	50V
C504	1-164-159-11	CERAMIC	0.1uF		50V
C505	1-164-159-11	CERAMIC	0.1uF		50V
C506	1-164-159-11	CERAMIC	0.1uF		50V
C507	1-164-159-11	CERAMIC	0.1uF		50V
C508	1-164-159-11	CERAMIC	0.1uF		50V
C509	1-164-159-11	CERAMIC	0.1uF		50V
C510	1-164-159-11	CERAMIC	0.1uF		50V
C512	1-164-159-11	CERAMIC	0.1uF		50V
C513	1-162-215-31	CERAMIC	47PF	5%	50V
C514	1-162-215-31	CERAMIC	47PF	5%	50V
C515	1-124-657-00	ELECT	10uF	20%	50V
C516	1-124-657-00	ELECT	10uF	20%	50V
C517	1-162-215-31	CERAMIC	47PF	5%	50V
C518	1-162-215-31	CERAMIC	47PF	5%	50V
C519	1-124-657-00	ELECT	10uF	20%	50V
C520	1-124-657-00	ELECT	10uF	20%	50V
C521	1-162-215-31	CERAMIC	47PF	5%	50V
C522	1-162-215-31	CERAMIC	47PF	5%	50V
C523	1-162-215-31	CERAMIC	47PF	5%	50V
C524	1-162-215-31	CERAMIC	47PF	5%	50V
C542	1-164-159-11	CERAMIC	0.1uF		50V
C559	1-164-159-11	CERAMIC	0.1uF		50V
C560	1-124-443-00	ELECT	100uF	20%	10V

Ref. No.	Part No.	Description			Remark
C901	1-128-136-11	ELECT	2200uF	20%	35V
C902	1-128-136-11	ELECT	2200uF	20%	35V
C903	1-128-136-11	ELECT	2200uF	20%	35V
C904	1-124-479-11	ELECT	330uF	20%	25V
C905	1-164-159-11	CERAMIC	0.1uF		50V
C906	1-124-479-11	ELECT	330uF	20%	25V
C907	1-164-159-11	CERAMIC	0.1uF		50V
C908	1-126-017-11	ELECT	6800uF	20%	16V
C909	1-124-473-11	ELECT	1000uF	20%	10V
C910	1-164-159-11	CERAMIC	0.1uF		50V
C911	1-124-473-11	ELECT	1000uF	20%	10V
C912	1-164-159-11	CERAMIC	0.1uF		50V
C913	1-126-233-11	ELECT	22uF	20%	50V
C914	1-124-903-11	ELECT	1uF	20%	50V
C915	1-124-907-11	ELECT	10uF	20%	50V
C916	1-124-482-11	ELECT	33uF	20%	35V
C917	1-126-233-11	ELECT	22uF	20%	50V
C918	1-126-233-11	ELECT	22uF	20%	50V
C919	1-136-157-00	FILM	0.022uF	5%	50V
C920	1-124-585-11	ELECT	3300uF	20%	10V
C921	1-124-473-11	ELECT	1000uF	20%	10V

< CONNECTOR >

CN101		1-568-006-11	CONNECTOR, XLR TYPE 3P
CN102	*	1-564-506-11	PLUG, CONNECTOR 3P
CN103		1-568-005-11	CONNECTOR, XLR TYPE 3P
CN201		1-568-006-11	CONNECTOR, XLR TYPE 3P
CN202	*	1-564-506-11	PLUG, CONNECTOR 3P
CN203		1-568-005-11	CONNECTOR, XLR TYPE 3P
CN301	*	1-560-062-00	PIN, CONNECTOR 4P
CN302	*	1-564-507-11	PLUG, CONNECTOR 4P
CN303	*	1-564-507-11	PLUG, CONNECTOR 4P
CN304	*	1-564-507-11	PLUG, CONNECTOR 4P
CN401	*	1-564-666-11	PIN, CONNECTOR 10P
CN451	*	1-564-666-11	PIN, CONNECTOR 10P
CN501		1-580-042-11	CONNECTOR, DIN
CN504		1-568-200-21	SOCKET, CONNECTOR 9P (REMOTE IN)
CN505		1-568-200-21	SOCKET, CONNECTOR 9P (REMOTE THRU)
CN514	*	1-508-980-11	PIN, CONNECTOR
CN515	*	1-560-532-00	PIN, CONNECTOR 7P
CN516	*	1-506-509-11	PIN, CONNECTOR 4P
CN517	*	1-560-532-00	PIN, CONNECTOR 7P
CN901	*	1-560-064-00	PIN, CONNECTOR 6P
CN902	*	1-564-505-11	PLUG, CONNECTOR 2P

< DIODE >

D101		8-719-911-19	DIODE 1SS119
D102		8-719-911-19	DIODE 1SS119
D104		8-719-911-19	DIODE 1SS119
D105		8-719-911-19	DIODE 1SS119
D201		8-719-911-19	DIODE 1SS119
D202		8-719-911-19	DIODE 1SS119
D204		8-719-911-19	DIODE 1SS119
D301		8-719-911-19	DIODE 1SS119
D302		8-719-911-19	DIODE 1SS119
D303		8-719-911-19	DIODE 1SS119
D304		8-719-911-19	DIODE 1SS119
D305		8-719-911-19	DIODE 1SS119
D306		8-719-114-29	DIODE RD5.1JS-B1
D307		8-719-200-29	DIODE 11DQ04
D401		8-719-911-19	DIODE 1SS119
D451		8-719-911-19	DIODE 1SS119
D501		8-719-911-19	DIODE 1SS119
D502		8-719-911-19	DIODE 1SS119
D503		8-719-911-19	DIODE 1SS119
D504		8-719-911-19	DIODE 1SS119
D505		8-719-911-19	DIODE 1SS119
D506		8-719-911-19	DIODE 1SS119
D507		8-719-911-19	DIODE 1SS119
D508		8-719-911-19	DIODE 1SS119
D509		8-719-911-19	DIODE 1SS119
D510		8-719-911-19	DIODE 1SS119
D511		8-719-911-19	DIODE 1SS119
D512		8-719-911-19	DIODE 1SS119
D513		8-719-911-19	DIODE 1SS119
D514		8-719-911-19	DIODE 1SS119
D515		8-719-911-19	DIODE 1SS119
D516		8-719-911-19	DIODE 1SS119
D522		8-719-911-19	DIODE 1SS119
D901		8-719-911-55	DIODE U05G
D902		8-719-911-55	DIODE U05G
D903		8-719-911-55	DIODE U05G
D904		8-719-911-55	DIODE U05G
D905		8-719-911-55	DIODE U05G
D906		8-719-911-55	DIODE U05G
D907		8-719-911-55	DIODE U05G
D908		8-719-911-55	DIODE U05G
D909		8-719-200-77	DIODE 10E2N
D910		8-719-200-77	DIODE 10E2N
D912		8-719-911-19	DIODE 1SS119
D913		8-719-911-19	DIODE 1SS119
D914		8-719-911-19	DIODE 1SS119
D915		8-719-200-77	DIODE 10E2N
D916		8-719-200-77	DIODE 10E2N
D917		8-719-200-77	DIODE 10E2N

MAIN

Ref. No.	Part No.	Description	Remark
		< IC >	
IC101	8-759-982-03	IC NJM5322D-D	
IC102	8-759-982-03	IC NJM5532D-D	
IC104	8-759-982-03	IC NJM5532D-D	
IC105	8-759-982-03	IC NJM5532D-D	
IC106	8-759-982-03	IC NJM5532D-D	
IC201	8-759-982-03	IC NJM5532D-D	
IC202	8-759-982-03	IC NJM5532D-D	
IC204	8-759-982-03	IC NJM5532D-D	
IC205	8-759-982-03	IC NJM5532D-D	
IC206	8-759-982-03	IC NJM5532D-D	
IC301	8-759-982-03	IC NJM5532D-D	
IC302	8-759-982-31	IC RC78M05FA	
IC303	8-759-982-52	IC RC79M05FA	
IC304	8-759-502-91	IC AK5328-VP	
IC305	8-752-332-01	IC CXD1144BP	
IC306	8-759-917-18	IC SN74HCU04N	
IC308	8-752-335-51	IC CXD2552Q-1	
IC311	8-759-982-36	IC RC78M15FA	
IC312	8-759-701-70	IC NJM79M15FA	
IC315	8-759-921-19	IC SN74HC161N	
IC316	8-759-921-19	IC SN74HC161N	
IC317	8-759-916-29	IC SN74HC74N	
IC401	8-759-912-79	IC IR2E02	
IC402	8-759-945-58	IC RC4558P	
IC451	8-759-912-79	IC IR2E02	
IC501	8-752-331-87	IC CXD1160AP	
IC502	8-759-502-90	IC CXD8162P	
IC503	8-759-243-04	IC TC514256AP-70	
IC504	8-759-243-04	IC TC514256AP-70	
IC505	8-759-243-04	IC TC514256AP-70	
IC506	8-752-331-87	IC CXD1160AP	
IC507	8-759-916-15	IC SN74HC05N	
IC509	8-759-011-90	IC MC34050P	
IC901	8-759-929-62	IC LM7812CT	
IC902	8-759-982-36	IC RC78M15FA	
IC903	8-759-982-31	IC RC78M05FA	
IC904	8-759-982-31	IC RC78M05FA	
IC905	8-759-802-61	IC LA5666	
IC906	8-759-801-79	IC LA5665	
		< JACK >	
J101	1-580-041-11	JACK, LARGE (2 GANG) (INPUT)	
J102	1-563-363-11	JACK, LARGE TYPE 2P (OUTPUT)	
		< COIL >	
L301	1-410-324-11	INDUCTOR 4.7uH	
L302	1-410-324-11	INDUCTOR 4.7uH	
L303	1-410-324-11	INDUCTOR 4.7uH	
L306	1-410-324-11	INDUCTOR 4.7uH	
L501	* 1-410-858-11	INDUCTOR 0uH	
L502	* 1-410-858-11	INDUCTOR 0uH	
L503	* 1-410-858-11	INDUCTOR 0uH	
L504	* 1-410-858-11	INDUCTOR 0uH	
		< PHOTO INTERUPTER >	
PH501	8-719-938-71	DIODE PC900	
		< TRANSISTOR >	
Q301	8-729-900-80	TRANSISTOR DTC114ES	
Q302	8-729-216-13	TRANSISTOR 2SK161-GR	
Q303	8-729-905-67	TRANSISTOR 2SD1944-K	
Q401	8-729-900-89	TRANSISTOR DTC144ES	
Q402	8-729-900-80	TRANSISTOR DTC114ES	
Q403	8-729-201-05	TRANSISTOR 2SC2878-B	
Q451	8-729-900-89	TRANSISTOR DTC144ES	
Q452	8-729-900-80	TRANSISTOR DTC114ES	
Q453	8-729-201-05	TRANSISTOR 2SC2878-B	
Q505	8-729-900-80	TRANSISTOR DTC114ES	
Q902	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q903	8-729-900-80	TRANSISTOR DTC114ES	
Q904	8-729-140-98	TRANSISTOR 2SD773-4	
Q905	8-729-900-80	TRANSISTOR DTC114ES	
		< RESISTOR >	
R101	1-249-469-11	CARBON 100K 5% 1/4W	
R102	1-249-469-11	CARBON 100K 5% 1/4W	
R103	1-249-942-11	CARBON 6.2K 5% 1/4W	
R104	1-247-725-11	CARBON 10K 5% 1/4W	
R105	1-247-725-11	CARBON 10K 5% 1/4W	
R106	1-249-942-11	CARBON 6.2K 5% 1/4W	
R107	1-249-469-11	CARBON 100K 5% 1/4W	
R108	1-249-469-11	CARBON 100K 5% 1/4W	
R109	1-249-469-11	CARBON 100K 5% 1/4W	
R110	1-249-462-11	CARBON 22K 5% 1/4W	
R111	1-247-725-11	CARBON 10K 5% 1/4W	
R112	1-249-469-11	CARBON 100K 5% 1/4W	
R113	1-249-469-11	CARBON 100K 5% 1/4W	
R114	1-249-462-11	CARBON 22K 5% 1/4W	
R115	1-215-444-00	METAL 9.1K 1% 1/6W	
R116	1-215-437-00	METAL 4.7K 1% 1/6W	
R117	1-215-444-00	METAL 9.1K 1% 1/6W	
R118	1-215-437-00	METAL 4.7K 1% 1/6W	
R121	1-215-454-00	METAL 24K 1% 1/6W	
R124	1-215-454-00	METAL 24K 1% 1/6W	

MAIN

Ref. No.	Part No.	Description			Remark
R125	1-247-193-00	CARBON	22K	1%	1/4W
R126	1-249-947-11	CARBON	10K	1%	1/4W
R127	1-249-941-11	CARBON	5.6K	1%	1/4W
R128	1-247-715-11	CARBON	1.5K	5%	1/4W
R129	1-247-721-11	CARBON	4.7K	5%	1/4W
R130	1-247-725-11	CARBON	10K	5%	1/4W
R132	1-249-616-11	CARBON	470K	5%	1/4W
R135	1-249-462-11	CARBON	22K	5%	1/4W
R136	1-249-462-11	CARBON	22K	5%	1/4W
R137	1-247-725-11	CARBON	10K	5%	1/4W
R138	1-247-138-00	CARBON	2K	5%	1/4W
R139	1-249-469-11	CARBON	100K	5%	1/4W
R140	1-247-146-00	CARBON	4.3K	5%	1/4W
R141	1-247-723-11	CARBON	6.8K	5%	1/4W
R142	1-249-947-11	CARBON	10K	1%	1/4W
R143	1-249-616-11	CARBON	470K	5%	1/4W
R144	1-249-956-11	CARBON	24K	1%	1/4W
R145	1-249-947-11	CARBON	10K	1%	1/4W
R146	1-249-956-11	CARBON	24K	1%	1/4W
R147	1-249-903-11	CARBON	150	1%	1/4W
R148	1-249-947-11	CARBON	10K	1%	1/4W
R149	1-249-956-11	CARBON	24K	1%	1/4W
R150	1-249-947-11	CARBON	10K	1%	1/4W
R151	1-249-956-11	CARBON	24K	1%	1/4W
R152	1-249-903-11	CARBON	150	1%	1/4W
R153	1-249-947-11	CARBON	10K	1%	1/4W
R154	1-249-947-11	CARBON	10K	1%	1/4W
R155	1-249-469-11	CARBON	100K	5%	1/4W
R156	1-249-469-11	CARBON	100K	5%	1/4W
R158	1-247-710-11	CARBON	560	5%	1/4W
R159	1-249-469-11	CARBON	100K	5%	1/4W
R201	1-249-469-11	CARBON	100K	5%	1/4W
R202	1-249-469-11	CARBON	100K	5%	1/4W
R203	1-249-942-11	CARBON	6.2K	5%	1/4W
R204	1-247-725-11	CARBON	10K	5%	1/4W
R205	1-247-725-11	CARBON	10K	5%	1/4W
R206	1-249-942-11	CARBON	6.2K	5%	1/4W
R207	1-249-469-11	CARBON	100K	5%	1/4W
R208	1-249-469-11	CARBON	100K	5%	1/4W
R209	1-249-469-11	CARBON	100K	5%	1/4W
R210	1-249-462-11	CARBON	22K	5%	1/4W
R211	1-247-725-11	CARBON	10K	5%	1/4W
R212	1-249-469-11	CARBON	100K	5%	1/4W
R213	1-249-469-11	CARBON	100K	5%	1/4W
R214	1-249-462-11	CARBON	22K	5%	1/4W
R215	1-215-444-00	METAL	9.1K	1%	1/6W
R216	1-215-437-00	METAL	4.7K	1%	1/6W
R217	1-215-444-00	METAL	9.1K	1%	1/6W
R218	1-215-437-00	METAL	4.7K	1%	1/6W
R221	1-215-454-00	METAL	24K	1%	1/6W
R224	1-215-454-00	METAL	24K	1%	1/6W
R225	1-247-193-00	CARBON	22K	1%	1/4W
R226	1-249-947-11	CARBON	10K	1%	1/4W
R227	1-249-941-11	CARBON	5.6K	1%	1/4W
R228	1-247-715-11	CARBON	1.5K	5%	1/4W
R229	1-247-721-11	CARBON	4.7K	5%	1/4W
R230	1-247-725-11	CARBON	10K	5%	1/4W
R232	1-249-616-11	CARBON	470K	5%	1/4W
R235	1-249-462-11	CARBON	22K	5%	1/4W
R236	1-249-462-11	CARBON	22K	5%	1/4W
R237	1-247-725-11	CARBON	10K	5%	1/4W
R238	1-247-138-00	CARBON	2K	5%	1/4W
R239	1-249-469-11	CARBON	100K	5%	1/4W
R240	1-247-146-00	CARBON	4.3K	5%	1/4W
R241	1-247-723-11	CARBON	6.8K	5%	1/4W
R242	1-249-947-11	CARBON	10K	1%	1/4W
R243	1-249-616-11	CARBON	470K	5%	1/4W
R244	1-249-956-11	CARBON	24K	1%	1/4W
R245	1-249-947-11	CARBON	10K	1%	1/4W
R246	1-249-956-11	CARBON	24K	1%	1/4W
R247	1-249-903-11	CARBON	150	1%	1/4W
R248	1-249-947-11	CARBON	10K	1%	1/4W
R249	1-249-956-11	CARBON	24K	1%	1/4W
R250	1-249-947-11	CARBON	10K	1%	1/4W
R251	1-249-956-11	CARBON	24K	1%	1/4W
R252	1-249-903-11	CARBON	150	1%	1/4W
R253	1-249-947-11	CARBON	10K	1%	1/4W
R254	1-249-947-11	CARBON	10K	1%	1/4W
R255	1-249-469-11	CARBON	100K	5%	1/4W
R256	1-249-469-11	CARBON	100K	5%	1/4W
R258	1-247-710-11	CARBON	560	5%	1/4W
R259	1-249-469-11	CARBON	100K	5%	1/4W
R301	1-259-396-11	CARBON	47	5%	1/6W
R302	1-259-396-11	CARBON	47	5%	1/6W
R303	1-259-404-11	CARBON	100	5%	1/6W
R307	1-259-380-11	CARBON	10	5%	1/6W
R308	1-259-452-11	CARBON	10K	5%	1/6W
R309	1-259-428-11	CARBON	1K	5%	1/6W
R310	1-259-404-11	CARBON	100	5%	1/6W
R311	1-259-404-11	CARBON	100	5%	1/6W
R312	1-259-404-11	CARBON	100	5%	1/6W
R313	1-259-404-11	CARBON	100	5%	1/6W
R314	1-259-404-11	CARBON	100	5%	1/6W
R315	1-259-404-11	CARBON	100	5%	1/6W
R316	1-259-500-11	CARBON	1M	5%	1/6W

MAIN

Ref. No.	Part No.	Description				Remark
R317	1-259-404-11	CARBON	100	5%	1/6W	
R319	1-259-428-11	CARBON	1K	5%	1/6W	
R320	1-259-445-11	CARBON	5.1K	5%	1/6W	
R321	1-259-396-11	CARBON	47	5%	1/6W	
R322	1-259-396-11	CARBON	47	5%	1/6W	
R323	1-259-428-11	CARBON	1K	5%	1/6W	
R324	1-259-404-11	CARBON	100	5%	1/6W	
R325	1-259-404-11	CARBON	100	5%	1/6W	
R326	1-259-404-11	CARBON	100	5%	1/6W	
R402	1-259-424-11	CARBON	680	5%	1/6W	
R403	1-259-452-11	CARBON	10K	5%	1/6W	
R404	1-259-464-11	CARBON	33K	5%	1/6W	
R405	1-259-455-11	CARBON	13K	5%	1/6W	
R406	1-259-471-11	CARBON	62K	5%	1/6W	
R407	1-259-440-11	CARBON	3.3K	5%	1/6W	
R409	1-259-452-11	CARBON	10K	5%	1/6W	
R410	1-259-424-11	CARBON	680	5%	1/6W	
R411	1-215-430-00	METAL	2.4K	1%	1/6W	
R412	1-215-434-00	METAL	3.6K	1%	1/6W	
R413	1-259-452-11	CARBON	10K	5%	1/6W	
R414	1-259-452-11	CARBON	10K	5%	1/6W	
R415	1-259-452-11	CARBON	10K	5%	1/6W	
R416	1-259-420-11	CARBON	470	5%	1/6W	
R452	1-259-424-11	CARBON	680	5%	1/6W	
R453	1-259-452-11	CARBON	10K	5%	1/6W	
R454	1-259-464-11	CARBON	33K	5%	1/6W	
R455	1-259-455-11	CARBON	13K	5%	1/6W	
R456	1-259-471-11	CARBON	62K	5%	1/6W	
R457	1-259-440-11	CARBON	3.3K	5%	1/6W	
R459	1-259-452-11	CARBON	10K	5%	1/6W	
R460	1-259-424-11	CARBON	680	5%	1/6W	
R466	1-259-420-11	CARBON	470	5%	1/6W	
R501	1-259-500-11	CARBON	1M	5%	1/6W	
R502	1-259-412-11	CARBON	220	5%	1/6W	
R503	1-259-412-11	CARBON	220	5%	1/6W	
R504	1-259-412-11	CARBON	220	5%	1/6W	
R505	1-259-436-11	CARBON	2.2K	5%	1/6W	
R506	1-259-412-11	CARBON	220	5%	1/6W	
R507	1-259-380-11	CARBON	10	5%	1/6W	
R508	1-259-380-11	CARBON	10	5%	1/6W	
R509	1-249-782-11	CARBON	150	5%	1/6W	
R510	1-259-428-11	CARBON	1K	5%	1/6W	
R511	1-259-428-11	CARBON	1K	5%	1/6W	
R512	1-259-468-11	CARBON	47K	5%	1/6W	
R513	1-259-468-11	CARBON	47K	5%	1/6W	
R514	1-249-782-11	CARBON	150	5%	1/6W	
R515	1-259-428-11	CARBON	1K	5%	1/6W	
R516	1-259-428-11	CARBON	1K	5%	1/6W	
R517	1-259-468-11	CARBON	47K	5%	1/6W	
R518	1-259-468-11	CARBON	47K	5%	1/6W	
R519	1-259-380-11	CARBON	10	5%	1/6W	
R520	1-259-380-11	CARBON	10	5%	1/6W	
R526	1-259-404-11	CARBON	100	5%	1/6W	
R527	1-259-436-11	CARBON	2.2K	5%	1/6W	
R529	1-259-452-11	CARBON	10K	5%	1/6W	
R534	1-259-452-11	CARBON	10K	5%	1/6W	
R539	1-259-412-11	CARBON	220	5%	1/6W	
R540	1-259-412-11	CARBON	220	5%	1/6W	
R901	1-259-452-11	CARBON	10K	5%	1/6W	
R902	1-259-460-11	CARBON	22K	5%	1/6W	
R903	1-259-415-11	CARBON	300	5%	1/6W	
R904	1-249-782-11	CARBON	150	5%	1/6W	
R905	1-259-482-11	CARBON	180K	5%	1/6W	
R906	1-259-452-11	CARBON	10K	5%	1/6W	
R907	1-259-436-11	CARBON	2.2K	5%	1/6W	
R908	1-259-468-11	CARBON	47K	5%	1/6W	
R909	1-259-468-11	CARBON	47K	5%	1/6W	
R910	1-259-428-11	CARBON	1K	5%	1/6W	
R911	1-259-428-11	CARBON	1K	5%	1/6W	
R912	⚠ 1-216-433-00	METAL OXIDE	1.2K	5%	1W	F
R917	⚠ 1-216-355-11	METAL OXIDE	3.3	5%	1W	F

< VARIABLE RESISTOR >

RV401	1-238-016-11	RES, ADJ, CARBON 10K (LED LEVEL L)
RV451	1-238-016-11	RES, ADJ, CARBON 10K (LED LEVEL R)

< RELAY >

RY101	1-515-726-11	RELAY
RY102	1-515-726-11	RELAY
RY103	1-515-726-11	RELAY
RY104	1-515-726-11	RELAY
RY201	1-515-726-11	RELAY
RY202	1-515-726-11	RELAY
RY203	1-515-726-11	RELAY

< CRYSTAL >

X301	1-579-068-11	FILTER, CRYSTAL (15.36MHz)
X302	1-579-069-11	VIBRATOR, CRYSTAL (40.96MHz)
X501	1-577-665-11	VIBRATOR, CRYSTAL (26.0MHz)

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

Note:
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

KEY VOL MET AC INVOL RE

Ref. No.	Part No.	Description	Remark
	* 1-635-808-11	KEY BOARD	
		*********	
		< SWITCH >	
S501	1-572-198-11	SWITCH, KEY BOARD (LOAD)	
S502	1-572-198-11	SWITCH, KEY BOARD (EDIT)	
S503	1-572-198-11	SWITCH, KEY BOARD (BYPASS)	
S504	1-572-198-11	SWITCH, KEY BOARD (HELP)	
S505	1-572-198-11	SWITCH, KEY BOARD (SAVE)	
S506	1-572-198-11	SWITCH, KEY BOARD (ENTER)	
**********			
	* 1-635-809-11	VOL BOARD	
		*********	
		< VARIABLE RESISTOR >	
RV302	1-237-306-11	RES, VAR, CARBON 10K/10K (DRY)	
RV303	1-237-306-11	RES, VAR, CARBON 10K/10K (EFFECT)	
**********			
	* 1-635-810-11	MET BOARD	
		*********	
		< DIODE >	
D402	8-759-502-93	LED LD-010DW	
D452	8-759-502-93	LED LD-010DW	
**********			
	* 1-635-811-11	AC BOARD	
		********	
	4-870-539-00	PLATE, GROUND	
		< CAPACITOR >	
C1	⚠ 1-161-744-00	CERAMIC 0.01uF	400V
C2	⚠ 1-161-742-00	CERAMIC 0.0022uF 20%	400V
C3	⚠ 1-161-742-00	CERAMIC 0.0022uF 20%	400V
C4	⚠ 1-161-742-00	CERAMIC 0.0022uF 20%	400V
C5	⚠ 1-161-742-00	CERAMIC 0.0022uF 20%	400V (AEP, UK, E)
		< CONNECTOR >	
CN1	* 1-580-629-11	PIN, CONNECTOR 2P	
CN2	* 1-564-687-11	PIN, CONNECTOR 3P	
		< LINE FILTER >	
LF1	⚠ 1-421-915-11	COIL, LINE FILTER	
		< SWITCH >	
S1	⚠ 1-572-418-11	SWITCH, PUSH (AC POWER) (US, Canadian)	
S1	⚠ 1-572-530-11	SWITCH, PUSH (AC POWER) (1KEY) (AEP, UK, E)	
S2	⚠ 1-570-173-11	SWITCH, VOLTAGE CHANGE	
**********			
	* 1-635-812-11	INVOL BOARD (INPUT)	
		**********	
		< VARIABLE RESISTOR >	
RV301	1-241-170-11	RES, VAR, CARBON 20K/20K	
**********			
	* 1-635-814-11	RE BOARD	
		********	
		< DIODE >	
D591	1-466-386-11	DIODE ENCODER, ROTARY	
**********			
		MISCELLANEOUS	
		**********	
56	1-572-490-21	SWITCH, PUSH (AC POWER)	
CNJ1	* 1-580-375-21	INLET 3P (AC IN)	
CNP507	* 1-575-940-11	LEAD (WITH CONNECTOR)	
F901	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F901	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian)	
F902	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F902	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian)	
F903	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F903	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian)	
F904	⚠ 1-532-215-00	FUSE, TIME-LAG (AEP, UK, E)	
F904	⚠ 1-532-739-11	FUSE, GLASS TUBE (US, Canadian)	
LCD1	⚠ 1-809-076-11	DISPLAY PANEL, LIQUID CRYSTAL	
T901	⚠ 1-450-176-11	TRANSFORMER, POWER (US, Canadian)	
T901	⚠ 1-450-690-11	TRANSFORMER, POWER (AEP, UK, E)	

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

Note:
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-557-377-11	CORD, POWER (US, Canadian)	
	1-590-910-11	CORD SET, POWER (AEP, UK, E)	
	3-701-947-10	LABEL (T800MA), FUSE (AEP, UK, E)	
*	3-704-343-01	SHEET (STANDARD), PROTECTION	
	3-752-185-11	MANUAL, INSTRUCTION (GERMAN, SPANISH) (AEP, UK, E)	
	3-752-185-21	MANUAL, INSTRUCTION (ENGLISH, FRENCH)	
*	4-941-101-01	CUSHION (L)	
*	4-941-102-01	CUSHION (R)	
*	4-947-725-01	INDIVIDUAL CARTON	

****

HARDWARE LIST

****

#1	7-682-547-09	SCREW +BV 3X6, S TIGHT
#2	7-682-247-09	SCREW +K 3X6
#3	7-685-870-01	SCREW +BVTT 3X5 (S)
#4	7-685-645-79	SCREW +BTP 3X6 TYPE2 N-S
#5	7-685-105-19	TOTSU PTPWH 2X8, TYPE2, SLIT
#6	7-685-646-79	SCREW +BTP 3X8 TYPE2 N-S
#7	7-621-775-20	SCREW +P 2.6X5
#8	7-682-548-09	SCREW +BVTT 3X8 (S)
#9	7-621-771-06	SCREW, LOCK
#10	7-682-661-09	SCREW +PS 4X8
#11	7-682-548-04	SCREW, TIGHT, S
#12	7-685-133-19	SCREW +P 2.6X6 TYPE2 NON-SLIT (AEP, UK, E)

9-977-088-11

Sony Corporation
Audio Group

English
9110219-1
Printed in Japan
©1991.9
Published by Customer Relations and Service Group

DPS-D7

SONY

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
E Model

SUPPLEMENT-1

File this suppplement with the service manual.

Data Format of MIDI

CONTENTS

Introduction 4
Hardware of MIDI 4
Data Format of MIDI 4
MIDI Implementation Chart 6
- Channel voice messages 6
  - Program change 6
  - Control change 6
  - Note ON 6
  - Channel key pressure 6
- Channel mode messages 6
  - Mode message 6
- System exclusive messages 7
  - Identity Request 7
  - Identity Reply 7
- Format of SONY exclusive messages 7
- Commands 8
  - ALL DATA DUMP REQUEST 8
  - ALL USER MEMORY DUMP REQUEST 8
  - SYSTEM DUMP REQUEST 8
  - MIDI DUMP REQUEST 8
  - USER MEMORY DUMP REQUEST 8
  - ALL DATA DUMP 8
  - ALL USER MEMORY DUMP 8
  - SYSTEM DUMP 9
  - MIDI DUMP 9
  - USER MEMORY DUMP 9
  - Start address transfer 9
  - Data transfer 10
  - System check 10

Data Composition of User Memory and Data Length of Each Block 12
- ALG 13
- INPUT 13
- EQ 14
- AUTOPAN 15
- OUTPUT 15
- LCL.MIDI 16
- DELAY BLOCK 17
  - stereo delay :STD 17
  - feedback delay :FBD 17
  - double delay :DBD 18
  - tap delay :TPD 19
  - long delay :LGD 22
  - panpot tap delay :PTD 25
  - multi delay :MTD 26
- DATE 28
- NAME 28

Data Composition and Data Length of System 30
Data Composition and Data Length of System MIDI 30
Examples of Data 31

Introduction

MIDI is the acronym for Musical Instrument Digital Interface, worldwide common specifications of data communications systems between electronic instruments, with which the operator can control other electronic instruments using a keyboard or those which can automatically play music using a sequencer or a computer. As long as an instrument complies with the MIDI specifications, it can transmit to another instrument of a different manufacturer in a different type.

Hardware of MIDI

Circuit

The MIDI interface transmits information in an asynchronous serial transmission system at a transmission rate of 31.25 Kbit/sec (±1%), in a format of a start bit, 8 data bits and a stop bit without parity. The interface transmits and receives data at a forwarding rate more than 3 times as high as 9600 bit/sec normally in effect with an ordinary RS-232C interface used for personal computers, etc.

The circuit of the interface employs an optical isolator to prevent creation of a ground loop and errors in data, caused by the loop, thus electrically isolating the transmission side from the receiving side.

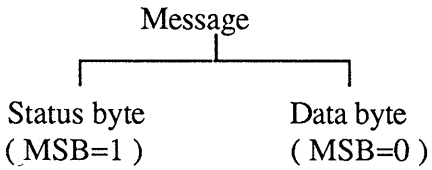
Connectors

The following 3 types of MIDI terminals carry MIDI data for transmission and receiving:

MIDI IN: Receives data from other MIDI apparatus.
MIDI OUT: Transmits data to other MIDI apparatus.
MIDI THRU: Transmits data received by the MIDI IN, without modifications.

Data Format of MIDI

Interfacing of MIDI data is activated by the "Messages" composed of several bytes. Except for the real-time and exclusive messages, each "Message" consists of a "status byte" and a "data byte" or two "data bytes." At that time, the number of "data bytes" is determined by the "status byte."

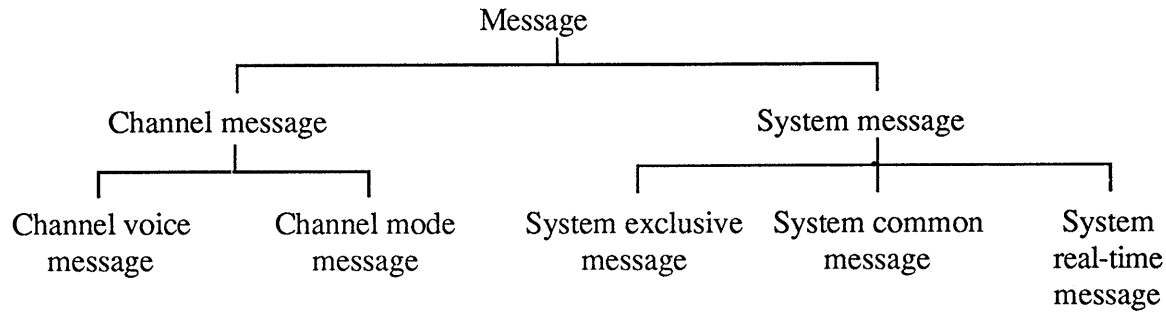


The "Messages" are classified into "channel message" for transmitting information on playing and "system message" for transmitting information necessary for the entire system.

With a "channel message," 16 channels can be assigned using 4 LSD bits of the "status byte," from which only data required by the receiving side can be extracted, as if a receiving channel is selected with a TV set.

* With the omni mode turned ON, information in any MIDI channel can be received no matter which MIDI channel is set.

The "channel messages" are classified into "voice message" for controlling information on playing or setting and "mode message" for determining how an apparatus in the receiving side controls the voice message.
The "system messages" are classified into "common message" effective in the entire system, "real-time message" effective in the entire system and transmissible even to a byte in another message" and "exclusive message" capable of transmitting any number of bytes for data following a status byte. With the DPS series, data in the user memory can be transmitted or received using the exclusive message.



MIDI Implementation Chart

Channel voice messages

●Program change (receiving)

When the captioned command in the same channel (or all channels with the omni turned ON):
When DPS-D7 is in LOAD state - The memory preset by the program change no. or memory no. of the SYS.MIDI is accessed.
When DPS-D7 is in the state of selecting program change no. of the SYS.MIDI - Received program number is selected.

command	1 1 0 0 n n n n (C n) n n n n : c h a n n e l n u m b e r (0 − 1 6)
data	0 p p p p p p p p p p p p p p : p r o g r a m n u m b e r (0 − 1 2 7)

●Control change (receiving)

When the command in the same channel (or all channels with the omni turned ON) is received, parameters preset by LCL.MIDI are controlled.

command	1 0 1 1 n n n n (B n) n n n n : c h a n n e l n u m b e r (0 − 1 6)
data	0 c c c c c c c 0 v v v v v v v c c c c c c c : c o n t r o l n u m b e r (0 − 1 2 7) v v v v v v v : c o n t r o l v a l u e (0 − 1 2 7)

●Note ON (receiving)

When the command in the same channel (or all channels with the omni turned ON) is received, parameters preset by LCL.MIDI are controlled.

command	1 0 0 1 n n n n (9 n) n n n n : c h a n n e l n u m b e r (0 − 1 6)
data	0 k k k k k k k 0 v v v v v v v k k k k k k k : n o t e n u m b e r (0 − 1 2 7) v v v v v v v : n o t e o n v e l o c i t y (1 − 1 2 7)

●Channel key pressure (channel after-touch) (receiving)

When the command in the same channel (or all channels with the omni turned ON) is received, parameters preset by LCL.MIDI are controlled.

command	1 1 0 1 n n n n (D n) n n n n : c h a n n e l n u m b e r (0 − 1 6)
data	0 v v v v v v v v v v v v v v : p r e s s u r e v a l u e (0 − 1 2 7)

Channel mode messages

●Mode message (receiving)

When the command in the same channel is received, the mode is changed to omni-ON (or OFF).

command	1 0 1 1 n n n n (B n) n n n n : c h a n n e l n u m b e r (0 − 1 6)
data	0 c c c c c c c 0 v v v v v v v c c c c c c c = 1 2 4 o m n i m o d e o f f = 1 2 5 o m n i m o d e o n v v v v v v v = 0

System exclusive messages

●Identity Request (receiving)

When the message is received, Identity Reply is transmitted.

byte	description
1111 0000 (F0)	System exclusive status
0111 1110 (7E)	Non real time
0000 nnnn (0n)	MIDI channel
0000 0110 (06)	General information
0000 0001 (01)	Identitiy Request
1111 0111 (F7)	End of exclusive

●Identity Reply (transmission)

The message is issued only when Identity Request is received.

byte	description
1111 0000 (F0)	System exclusive status
0111 1110 (7E)	Non real time
0000 nnnn (0n)	MIDI channel
0000 0110 (06)	General Information
0000 0010 (02)	Identitiy Reply
0100 1100 (4C)	SONY ID
0000 0001 (01)	Device family code
0000 0000 (00)	
0000 0001 (01)	Device family number code
0000 0000 (00)	
ssss ssss (ss)	software version
ssss ssss (ss)	
ssss ssss (ss)	
ssss ssss (ss)	
1111 0111 (F7)	End of exclusive

software version – 4 byte ASCI code

Example: Ver. 1. 40 = 31 2E 34 30

Format of SONY exclusive messages

byte	description
1111 0000 (F0)	System exclusive status
0100 1100 (4C)	SONY ID
0000 nnnn (0n)	Global channel
0001 0001 (11)	DPS-D7 ID
0ccc cccc	command
0ddd dddd	data
⋮	
⋮	
0ddd dddd	
1111 0111 (F7)	End of exclusive

* Global channel = MIDI channel

* Data length differs depending on each command.

Commands

●ALL DATA DUMP REQUEST (receiving)

When the command is received, all data (all data in the user memory, system information and system MIDI information) is transmitted.

command	0 0 0 1 0 0 0 0 (1 0)
data	none

●ALL USER MEMORY DUMP REQUEST (receiving)

When the command is received, all data in the user memory is transmitted.

command	0 0 0 1 0 0 0 1 (1 1)
data	none

●SYSTEM DUMP REQUEST (receiving)

When the command is received, system information is transmitted.

command	0 0 0 1 0 0 1 0 (1 2)
data	none

●MIDI DUMP REQUEST (receiving)

When the command is received, system MIDI information is transmitted.

command	0 0 0 1 0 0 1 1 (1 3)
data	none

●USER MEMORY DUMP REQUEST (receiving)

When the command is received, data in an assigned user memory or preset memory is transmitted.

command	0 0 0 1 0 1 n n (1 4 o r 1 5 o r 1 6) b i t 8 7
data	0 n n n n n n n b i t 6 5 4 3 2 1 0 n n n n n n n n n : m e m o r y n u m b e r (0 − 3 5 5) b i t 8 7 6 5 4 3 2 1 0 0 − 2 5 5 : u s e r n o − 1 2 5 6 − 3 5 5 : p r e s e t n o + 2 5 5

●ALL DATA DUMP (receiving)

All data (all data in the user memory, system information and system MIDI information) is received.

* In ALL DATA DUMP transmission, ALL USER MEMORY DUMP, SYSTEM DUMP and SYS. MIDI DUMP are transmitted in continuation.

command	0 0 0 1 1 0 0 0 (1 8)
data	0 d d d d d d d ···· d d d d d d d : data (s e e n o t e 1、6)

●ALL USER MEMORY DUMP (transmission and receiving)

All data in the user memory is transmitted or received.

command	0 0 0 1 1 0 0 1 (1 9)
data	0 d d d d d d d ···· d d d d d d d : data (s e e n o t e 1、2)

●SYSTEM DUMP (transmission and receiving)

System information is transmitted or received.

command	0 0 0 1 1 0 1 0 (1 A)
data	0 d d d d d d d d ···· d d d d d d d : data (s e e n o t e 1、3)

●MIDI DUMP (transmission and receiving)

MIDI information is transmitted or received.

command	0 0 0 1 1 0 1 1 (1 B)
data	0 d d d d d d d d ···· d d d d d d d : data (s e e n o t e 1、4)

●USER MEMORY DUMP (transmission and receiving)

Data in an assigned user memory or preset memory is transmitted.

Or, data in an assigned user memory is received.

command	0 0 0 1 1 1 n n (1 C o r 1 D o r 1 E) b i t 8 7
data	0 n n n n n n n b i t 6 5 4 3 2 1 0 0 d d d d d d d ···· n n n n n n n n : m e m o r y n u m b e r (transmission & receiving : 0 − 2 5 5) b i t 8 7 6 5 4 3 2 1 0 (transmission : 0 − 3 5 5) transmission & receiving 0 − 2 5 5 : u s e r n o − 1 transmission only 2 5 6 − 3 5 5 : p r e s e t n o + 2 5 5 d d d d d d d d : data (s e e n o t e 1)

●Start address transfer (receiving)

Although a subroutine can be accessed directly to an assigned address using the captioned command, preferably do not use the command because the absolute address is not disclosed.

Even if data in the user memory, etc. is destroyed by using the command, SONY is not liable for any losses.

command	0 0 1 0 0 0 0 0 (2 0)
data	0 a a a a a a a b i t 6 5 4 3 2 1 0 0 a a a a a a a b i t D C B A 9 8 7 0 0 0 a a a a a b i t 12 1110 F E a a a a a a a a a a a a a a a a : start address (0 h − 7 F F F F h) b i t 121110 F E D C B A 9 8 7 6 5 4 3 2 1 0

●Data transfer (transmission and receiving)

Although data can be written directly in an assigned address using the command, preferably do not use the command because the absolute address is not disclosed.

Even if data in the user memory, etc. is destroyed by using the command, SONY is not liable for any losses.

command	0 1 0 0 0 0 0 0 (4 0)
data	0 a a a a a a a b i t 6 5 4 3 2 1 0 0 a a a a a a a b i t D C B A 9 8 7 0 0 0 a a a a a b i t 12 1110 F E 0 d d d d d d d ···· a a a a a a a a a a a a a a a a a a a a a : start address (0 h − 7 F F F F h) b i t 121110 F E D C B A 9 8 7 6 5 4 3 2 1 0 d d d d d d d d : (s e e n o t e 1)

●System check (transmission and receiving)

The command is used to inspect products in the works. However, do not use the command unless a version is checked or the clock is set.

command	0 1 1 1 1 1 1 1 (7 F)
sub− command	0 s s s s s s s s s : subcommand (transmission : s e e n o t e 7) (receiving : s e e n o t e 8)
data	0 d d d d d d d ···· b i t 7 6 5 3 2 1 0 d d d d d d d d : (s e e n o t e 1)

▼n o t e 1 − d d : Data format

With the DPS series, a transfer data by the exclusive message is composed by dividing the 8-bit data into 7-bit data as follows and attaching 0 to each MSB. Therefore, a 7-byte data is obtained by 8 bytes of MIDI data. Unless the number of bytes in the MIDI data is less than 8, data in a range certified by received data is obtained.
(Example: MIDI data in 3 bytes -> data in 2 bytes)

```
     0 d d d d d d d  0 d d d d d d d  0 d d d d d d d  0 d d d d d d d −
b i t  7 6 5 4 3 2 1    0 7 6 5 4 3 2    1 0 7 6 5 4 3    2 1 0 7 6 5 4
       ←  d d 0        →←  d d 1        →←  d d 2        →←  d d 3

     0 d d d d d d d  0 d d d d d d d  0 d d d d d d d  0 d d d d d d d ····
b i t  3 2 1 0 7 6 5    4 3 2 1 0 7 6    5 4 3 2 1 0 7    6 5 4 3 2 1 0
       d d 3 →←  d d 4        →←  d d 5        →←  d d 6        →←
```

▼n o t e 2 − A L L U S E R M E M O R Y D U M P F O R M A T

d d 0 − d d 5 1 3 : U S E R M E M O R Y F A T
d d 5 1 4 − d d 2 6 1 1 3 : U S E R M E M O R Y D A T A

* Set the leading end address of each user memory to an even number.

▼n o t e 3 − S Y S T E M D U M P F O R M A T

d d 0 − d d 4 7 : S Y S T E M D A T A

▼note4 – MIDI DUMP FORMAT

dd0 – dd257 : MIDI DATA

▼note5 – USER MEMORY DUMP FORMAT

dd0 – dd425 (max) : USER MEMORY DATA

▼note6 – ALL DATA DUMP FORMAT

dd0 – dd47 : SYSTEM DATA
dd48 – dd305 : MIDI DATA
dd306 – dd819 : USER MEMORY FAT
dd820 – dd26419 : USER MEMORY DATA
* Set the leading end address of each user memory to an even address.

▼note7 – ss : System check subcommand
ss<40h : 1 byte type
ss≧40h : Plural byte type (The following data is processed as the data type of note 1. Data length is preset by the subcommand.)
· 1 byte type
00h – 1Fh checked result
· 5 byte type data (see note 1)
7Fh·· SOFT Ver.
(SOFT Ver. – 4 byte ASCI code
Example: Ver. 1. 40 = 31 2E 34 30)

▼note8 – ss : System request format
dd<40h : 1 byte type
ss≧40h : Plural byte type (The following data is processed as the data type of note 1. Data length is determined by the subcommand.)
· 1 byte type data
20h – 2Fh check command
· 7 byte type data (see note 1)
70h···· DATE SET
(DATE DATA – 6 byte data
ex. '92 Jun 21 12:34:56 = 5C 06 15 0C 22 38)

Data Composition of User Memory and Data Length of Each Block

	byte	compression
ALG	2	
INPUT	16	
EQ	16	affected
AUTOPAN	16	affected
OUTPUT	6	
LCL.MIDI	12	
DELAY	4 - 308	
stereo delay :STD	4	
feedback delay :FBD	16	
double delay :DBD	32	
tap delay :TPD	308	affected
long delay :LGD	248	affected
panpot tap delay :PTD	84	
multi delay :MTD	126	
DATE	2	
NAME	1-47	
CHECK SUM	1	

* When ALL DATA DUMP or ALL USER MEMORY DUMP is used, set the leading end address of each user memory to an even number by entering an empty byte after CHECK SUM.
* CHECK SUM is a LSB of a result of adding data from ALG to NAME in byte units.

Although the DPS-D7 is provided with a user memory storage area of 6400h (25600), each memory capacity is so large that areas not in use are compressed for storing.

When EQ or AUTOPAN is OFF or there are taps not used in the DELAY blocks tap delay: TPD or long delay: LGD, the number of the taps is stored as a flag instead of storing actual data.

Address and data composition in each block are described in the following.

Word data in the type column is stored as follows in the above.

Example) It is stored like H L

Address 0 1

ALG

name	ch	type	data address	comment
algorithm		word	0 - 1	

name	data composition
algorithm	bit 15 : memory protect : 1 = on : 0 = off 14 - 10 : algorithm : 1 - 7 *1024 1 : stereo delay :STD 2 : feedback delay :FBD 3 : double delay :DBD 4 : tap delay :TPD 5 : long delay :LGD 6 : panpot tap delay :PTD 7 : multi delay :MTD 9 - 8 : autopan compression flag : 1 = no data : 0 = data exists 7 - 6 : eq compression flag : 1 = no data : 0 = data exists 5 - 0 : number of taps, the data for which is not stored

INPUT

name	ch	type	data address	comment
level	ch1	word	2 - 3	MSB = phase
〃	ch2	〃	4 - 5	〃
panpot	ch1	〃	6 - 7	
〃	ch2	〃	8 - 9	
pan limit min	ch1	〃	A - B	
〃	ch2	〃	C - D	
pan limit max	ch1	〃	E - F	
〃	ch2	〃	10 - 11	

name	data composition	
level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
phase	bit15	0 : normal , 1 : inverse
panpot	0 - 4096 , 1 step	0 - 100% , 0.0244% step
pan limit min	〃	〃
pan limit max	〃	〃

*panpot limit min ≦ panpot ≦ panpot limit max

EQ

name	ch	type	data address	comment
on/off		byte	12	
empty		〃	13	
bass level	ch1	〃	14	
〃	ch2	〃	15	
bass freq.	ch1	〃	16	
〃	ch2	〃	17	
treble level	ch1	〃	18	
〃	ch2	〃	19	
treble freq.	ch1	〃	1A	
〃	ch2	〃	1B	
peq level	ch1	〃	1C	
〃	ch2	〃	1D	
peq freq.	ch1	〃	1E	
〃	ch2	〃	1F	
peq q	ch1	〃	20	
〃	ch2	〃	21	

name	data composition	
on/off	0 - 1 , 1 step	0 : off , 1 : on
bass level	0 - 240 , 1 step	-12dB - 12dB , 0.1dB step
treble level	〃	〃
peq level	〃	〃
bass freq.	4 - 56 , 1 step	16Hz - 6.3kHz , 1/6oct step
treble freq.	32 - 66 , 1 step	400Hz - 20.0kHz , 〃
peq freq.	16 - 66 , 1 step	63Hz - 20.0kHz , 〃
peq q	0 - 7 , 1 step	0 : 0.267 (4oct)
		1 : 0.667 (2oct)
		2 : 1.414 (1oct)
		3 : 2.145 (2/3oct)
		4 : 4.319 (1/3oct)
		5 : 8.651 (1/6oct)
		6 : 17.31 (1/12oct)
		7 : 34.62 (1/24oct)

* Frequency data of EQ represents the following frequencies.

4	16.0 Hz	20	100 Hz	36	630 Hz	52	4.00 kHz
5	18.0 Hz	21	112 Hz	37	710 Hz	53	4.50 kHz
6	20.0 Hz	22	125 Hz	38	800 Hz	54	5.00 kHz
7	22.5 Hz	23	140 Hz	39	900 Hz	55	5.60 kHz
8	25.0 Hz	24	160 Hz	40	1.00 kHz	56	6.30 kHz
9	28.0 Hz	25	180 Hz	41	1.12 kHz	57	7.10 kHz
10	31.5 Hz	26	200 Hz	42	1.25 kHz	58	8.00 kHz
11	35.5 Hz	27	225 Hz	43	1.40 kHz	59	9.00 kHz
12	40.0 Hz	28	250 Hz	44	1.60 kHz	60	10.0 kHz
13	45.0 Hz	29	280 Hz	45	1.80 kHz	61	11.2 kHz
14	50.0 Hz	30	315 Hz	46	2.00 kHz	62	12.5 kHz
15	56.0 Hz	31	355 Hz	47	2.25 kHz	63	14.0 kHz
16	63.0 Hz	32	400 Hz	48	2.50 kHz	64	16.0 kHz
17	71.0 Hz	33	450 Hz	49	2.80 kHz	65	18.0 kHz
18	80.0 Hz	34	500 Hz	50	3.15 kHz	66	20.0 kHz
19	90.0 Hz	35	560 Hz	51	3.55 kHz		

AUTOPAN

name	ch	type	data address	comment
on/off		byte	22	
wave select		〃	23	
freq.		word	24 - 25	
phase	ch1,2	byte	26	
trig select		〃	27	
limit min		word	28 - 29	
limit max		〃	2A - 2B	
trig threshold		〃	2C - 2D	
LFO step		〃	2E - 2F	
LFO start point		〃	30 - 31	

name	data composition		
on/off	0 - 1 , 1 step	0 : off , 1 : on	
wave select	0 - 3 , 1 step	0 : sin	
		1 : triangle	
		2 : special 1	
		3 : special 2	
freq.	1 - 290 , 1 step	1 - 100 : 0.01Hz - 1.0Hz	0.01Hz step
		101 - 290 : 1.1Hz - 20Hz	0.1Hz step
phase	bit6 - ch1	0 : normal , 1 : inverse	
	7 - ch2	0 : normal , 1 : inverse	
trig select	0 - 3 , 1 step	0 : off	
		1 : ch1	
		2 : ch2	
		3 : MIDI	
limit min	0 - 4096 , 1 step	0 - 100% , 0.0244% step	
limit max	〃	〃	
trig threshold	〃	〃	
LFO step	0 - 360 , 1 step	0 - 360° , 1° step	
LFO start point	0 - 359 , 1 step	0 - 359° , 1° step	

OUTPUT

name	ch	type	data address	comment
level	ch1	word	32 - 33	MSB = phase
〃	ch2	〃	34 - 35	〃
round on/off		byte	36	
empty		〃	37	

name	data composition	
level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
phase	bit15	0 : normal , 1 : inverse
round on/off	0 - 1 , 1 step	0 : off , 1 : on

LCL.MIDI

name	ch	type	data address	comment
ctl no 1		byte	38	
ctl no 2		〃	39	
ctl no 3		〃	3A	
ctl no 4		〃	3B	
prm no 1		word	3C - 3D	
prm no 2		〃	3E - 3F	
prm no 3		〃	40 - 41	
prm no 4		〃	42 - 43	

name	data composition	
ctl no 1	0 - 125 , 1 step	0 - 120 = ctl change no. 121 = Not in use 122 = note on velocity 123 = channel pressure 124 = note number 125 = off
ctl no 2	〃	〃
ctl no 3	〃	〃
ctl no 4	〃	〃
prm no 1	0 - 400 (max),1 step	INPUT+OUTPUT+EQ+AUTOPAN+DELAY-1 (Excluding QUIT in each block and time scale and tap-in in the DELAY block)
prm no 2	〃	〃
prm no 3	〃	〃
prm no 4	〃	〃

How to calculate prm no.

A number representing a sum of parameter numbers except for QUIT of each block and time scale and tap-in of the DELAY block is stored. Methods of adding are shown in the following,0 together with an example of calculating a maximum value of each block.

prm no = INPUT+OUTPUT+EQ+AUTOPAN+DELAY-1

Maximum value of each block 15 7 22 12 3 - 345

DELAY	stereo delay	:STD	3
	feedback delay	:FBD	21
	double delay	:DBD	42
	tap delay	:TPD	345
	long delay	:LGD	277
	panpot tap delay	:PTD	87
	multi delay	:MTD	147

Example): Delay time sync of stereo delay is allocated.

prm no = 15+7+22+12+1-1 = 56

DELAY BLOCK

stereo delay :STD

name	ch	type	data address	comment
delay time	ch1	word	44 - 45	
〃	ch2	〃	46 - 47	

name	data composition
delay time	0 - 65535 , 1 step　　0 - 65535words , 1word step

feedback delay :FBD

name	ch	type	data address	comment
delay time	ch1	word	44 - 45	
〃	ch2	〃	46 - 47	
feedback level	ch1	〃	48 - 49	MSB = phase
〃	ch2	〃	4A - 4B	〃
feedback bass level	ch1	byte	4C	
〃	ch2	〃	4D	
feedback bass freq.	ch1	〃	4E	
〃	ch2	〃	4F	
feedback treb level	ch1	〃	50	
〃	ch2	〃	51	
feedback treb freq.	ch1	〃	52	
〃	ch2	〃	53	

name	data composition	
delay time	1 - 65530 , 1 step	1 - 65530words , 1word step
feedback level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
feedback phase	bit15	0 : normal , 1 : inverse
feedback bass level	0 - 240 , 1 step	-12dB - 12dB , 0.1dB step
feedback treb level	〃	〃
feedback bass freq.	8 - 56 , 1 step	25Hz - 6.3kHz , 1/6oct step
feedback treb freq.	32 - 66 , 1 step	400Hz - 20.0kHz , 〃

double delay :DBD

name	ch	type	data address	comment
delay 1 time	ch1	word	44 - 45	
〃	ch2	〃	46 - 47	
feedback 1 level	ch1	〃	48 - 49	MSB = phase
〃	ch2	〃	4A - 4B	〃
feedback 1 bass level	ch1	byte	4C	
〃	ch2	〃	4D	
feedback 1 bass freq.	ch1	〃	4E	
〃	ch2	〃	4F	
feedback 1 treb level	ch1	〃	50	
〃	ch2	〃	51	
feedback 1 treb freq.	ch1	〃	52	
〃	ch2	〃	53	
delay 2 time	ch1	〃	54 - 55	
〃	ch2	〃	56 - 57	
feedback 2 level	ch1	〃	58 - 59	MSB = phase
〃	ch2	〃	5A - 5B	〃
feedback 2 bass level	ch1	byte	5C	
〃	ch2	〃	5D	
feedback 2 bass freq.	ch1	〃	5E	
〃	ch2	〃	5F	
feedback 2 treb level	ch1	〃	60	
〃	ch2	〃	61	
feedback 2 treb freq.	ch1	〃	62	
〃	ch2	〃	63	

name	data composition	
delay 1,2 time	1 - 32757 , 1 step	1 - 32757words , 1word step
delay 1,2 level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
feedback 1,2 level	〃	〃
feedback 1,2 phase	bit15	0 : normal , 1 : inverse
feedback 1,2 bass level	0 - 240 , 1 step	-12dB - 12dB , 0.1dB step
feedback 1,2 treb level	〃	〃
feedback 1,2 bass freq.	8 - 56 , 1 step	25Hz - 6.3kHz , 1/6oct step
feedback 1,2 treb freq.	32 - 66 , 1 step	400Hz - 20.0kHz , 〃

tap delay :TPD

name	ch	type	data address	comment
pre delay time	ch1	word	44 - 45	
〃	ch2	〃	46 - 47	
tap1 time	ch1	〃	48 - 49	
〃	ch2	〃	4A - 4B	
tap1 level	ch1	〃	4C - 4D	MSB = phase
〃	ch2	〃	4E - 4F	〃
tap2 time	ch1	〃	50 - 51	
〃	ch2	〃	52 - 53	
tap2 level	ch1	〃	54 - 55	MSB = phase
〃	ch2	〃	56 - 57	〃
tap3 time	ch1	〃	58 - 59	
〃	ch2	〃	5A - 5B	
tap3 level	ch1	〃	5C - 5D	MSB = phase
〃	ch2	〃	5E - 5F	〃
tap4 time	ch1	〃	60 - 61	
〃	ch2	〃	62 - 63	
tap4 level	ch1	〃	64 - 65	MSB = phase
〃	ch2	〃	66 - 67	〃
tap5 time	ch1	〃	68 - 69	
〃	ch2	〃	6A - 6B	
tap5 level	ch1	〃	6C - 6D	MSB = phase
〃	ch2	〃	6E - 6F	〃
tap6 time	ch1	〃	70 - 71	
〃	ch2	〃	72 - 73	
tap6 level	ch1	〃	74 - 75	MSB = phase
〃	ch2	〃	76 - 77	〃
tap7 time	ch1	〃	78 - 79	
〃	ch2	〃	7A - 7B	
tap7 level	ch1	〃	7C - 7D	MSB = phase
〃	ch2	〃	7E - 7F	〃
tap8 time	ch1	〃	80 - 81	
〃	ch2	〃	82 - 83	
tap8 level	ch1	〃	84 - 85	MSB = phase
〃	ch2	〃	86 - 87	〃
tap9 time	ch1	〃	88 - 89	
〃	ch2	〃	8A - 8B	
tap9 level	ch1	〃	8C - 8D	MSB = phase
〃	ch2	〃	8E - 8F	〃
tap10 time	ch1	〃	90 - 91	
〃	ch2	〃	92 - 93	
tap10 level	ch1	〃	94 - 95	MSB = phase
〃	ch2	〃	96 - 97	〃
tap11 time	ch1	〃	98 - 99	
〃	ch2	〃	9A - 9B	
tap11 level	ch1	〃	9C - 9D	MSB = phase
〃	ch2	〃	9E - 9F	〃
tap12 time	ch1	〃	A0 - A1	
〃	ch2	〃	A2 - A3	
tap12 level	ch1	〃	A4 - A5	MSB = phase
〃	ch2	〃	A6 - A7	〃
tap13 time	ch1	〃	A8 - A9	
〃	ch2	〃	AA - AB	
tap13 level	ch1	〃	AC - AD	MSB = phase
〃	ch2	〃	AE - AF	〃

name	ch	type	data address	comment
tap14 time	ch1	word	B0 - B1	
〃	ch2	〃	B2 - B3	
tap14 level	ch1	〃	B4 - B5	MSB = phase
〃	ch2	〃	B6 - B7	〃
tap15 time	ch1	〃	B8 - B9	
〃	ch2	〃	BA - BB	
tap15 level	ch1	〃	BC - BD	MSB = phase
〃	ch2	〃	BE - BF	〃
tap16 time	ch1	〃	C0 - C1	
〃	ch2	〃	C2 - C3	
tap16 level	ch1	〃	C4 - C5	MSB = phase
〃	ch2	〃	C6 - C7	〃
tap17 time	ch1	〃	C8 - C9	
〃	ch2	〃	CA - CB	
tap17 level	ch1	〃	CC - CD	MSB = phase
〃	ch2	〃	CE - CF	〃
tap18 time	ch1	〃	D0 - D1	
〃	ch2	〃	D2 - D3	
tap18 level	ch1	〃	D4 - D5	MSB = phase
〃	ch2	〃	D6 - D7	〃
tap19 time	ch1	〃	D8 - D9	
〃	ch2	〃	DA - DB	
tap19 level	ch1	〃	DC - DD	MSB = phase
〃	ch2	〃	DE - DF	〃
tap20 time	ch1	〃	E0 - E1	
〃	ch2	〃	E2 - E3	
tap20 level	ch1	〃	E4 - E5	MSB = phase
〃	ch2	〃	E6 - E7	〃
tap21 time	ch1	〃	E8 - E9	
〃	ch2	〃	EA - EB	
tap21 level	ch1	〃	EC - ED	MSB = phase
〃	ch2	〃	EE - EF	〃
tap22 time	ch1	〃	F0 - F1	
〃	ch2	〃	F2 - F3	
tap22 level	ch1	〃	F4 - F5	MSB = phase
〃	ch2	〃	F6 - F7	〃
tap23 time	ch1	〃	F8 - F9	
〃	ch2	〃	FA - FB	
tap23 level	ch1	〃	FC - FD	MSB = phase
〃	ch2	〃	FE - FF	〃
tap24 time	ch1	〃	100 - 101	
〃	ch2	〃	102 - 103	
tap24 level	ch1	〃	104 - 105	MSB = phase
〃	ch2	〃	106 - 107	〃
tap25 time	ch1	〃	108 - 109	
〃	ch2	〃	10A - 10B	
tap25 level	ch1	〃	10C - 10D	MSB = phase
〃	ch2	〃	10E - 10F	〃
tap26 time	ch1	〃	110 - 101	
〃	ch2	〃	112 - 103	
tap26 level	ch1	〃	114 - 115	MSB = phase
〃	ch2	〃	116 - 117	〃
tap27 time	ch1	〃	118 - 119	
〃	ch2	〃	11A - 11B	
tap27 level	ch1	〃	11C - 11D	MSB = phase
〃	ch2	〃	11E - 11F	〃

name	ch	type	data address	comment
tap28 time	ch1	word	120 - 121	
〃	ch2	〃	122 - 123	
tap28 level	ch1	〃	124 - 125	MSB = phase
〃	ch2	〃	126 - 127	〃
tap29 time	ch1	〃	128 - 129	
〃	ch2	〃	12A - 12B	
tap29 level	ch1	〃	12C - 12D	MSB = phase
〃	ch2	〃	12E - 12F	〃
tap30 time	ch1	〃	130 - 121	
〃	ch2	〃	132 - 123	
tap30 level	ch1	〃	134 - 135	MSB = phase
〃	ch2	〃	136 - 137	〃
tap31 time	ch1	〃	138 - 139	
〃	ch2	〃	13A - 13B	
tap31 level	ch1	〃	13C - 13D	MSB = phase
〃	ch2	〃	13E - 13F	〃
tap32 time	ch1	〃	140 - 131	
〃	ch2	〃	142 - 133	
tap32 level	ch1	〃	144 - 145	MSB = phase
〃	ch2	〃	146 - 147	〃
tap33 time	ch1	〃	148 - 149	
〃	ch2	〃	14A - 14B	
tap33 level	ch1	〃	14C - 14D	MSB = phase
〃	ch2	〃	14E - 14F	〃
tap34 time	ch1	〃	150 - 141	
〃	ch2	〃	152 - 143	
tap34 level	ch1	〃	154 - 155	MSB = phase
〃	ch2	〃	156 - 157	〃
tap35 time	ch1	〃	158 - 159	
〃	ch2	〃	15A - 15B	
tap35 level	ch1	〃	15C - 15D	MSB = phase
〃	ch2	〃	15E - 15F	〃
tap36 time	ch1	〃	160 - 151	
〃	ch2	〃	162 - 153	
tap36 level	ch1	〃	164 - 165	MSB = phase
〃	ch2	〃	166 - 167	〃
tap37 time	ch1	〃	168 - 169	
〃	ch2	〃	16A - 16B	
tap37 level	ch1	〃	16C - 16D	MSB = phase
〃	ch2	〃	16E - 16F	〃
tap38 time	ch1	〃	170 - 161	
〃	ch2	〃	172 - 163	
tap38 level	ch1	〃	174 - 175	MSB = phase
〃	ch2	〃	176 - 177	〃

name	data composition	
pre delay time	1 - 4799 , 1 step	1 - 4799words , 1word step
tap1-38 time	0 - 60735 , 1 step	0 - 60735words , 1word step
tap1-38 level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
tap1-38 phase	bit15	0 : normal , 1 : inverse

long delay :LGD

name	ch	type	data address	comment
mix level	ch1	word	44 - 45	MSB = phase
〃	ch2	〃	46 - 47	〃
tap 1 time	ch1	〃	48 - 49	
〃	ch2	〃	4A - 4B	
tap 1 level	ch1	〃	4C - 4D	MSB = phase
〃	ch2	〃	4E - 4F	〃
tap 2 time	ch1	〃	50 - 51	
〃	ch2	〃	52 - 53	
tap 2 level	ch1	〃	54 - 55	MSB = phase
〃	ch2	〃	56 - 57	〃
tap 3 time	ch1	〃	58 - 59	
〃	ch2	〃	5A - 5B	
tap 3 level	ch1	〃	5C - 5D	MSB = phase
〃	ch2	〃	5E - 5F	〃
tap 4 time	ch1	〃	60 - 61	
〃	ch2	〃	62 - 63	
tap 4 level	ch1	〃	64 - 65	MSB = phase
〃	ch2	〃	66 - 67	〃
tap 5 time	ch1	〃	68 - 69	
〃	ch2	〃	6A - 6B	
tap 5 level	ch1	〃	6C - 6D	MSB = phase
〃	ch2	〃	6E - 6F	〃
tap 6 time	ch1	〃	70 - 71	
〃	ch2	〃	72 - 73	
tap 6 level	ch1	〃	74 - 75	MSB = phase
〃	ch2	〃	76 - 77	〃
tap 7 time	ch1	〃	78 - 79	
〃	ch2	〃	7A - 7B	
tap 7 level	ch1	〃	7C - 7D	MSB = phase
〃	ch2	〃	7E - 7F	〃
tap 8 time	ch1	〃	80 - 81	
〃	ch2	〃	82 - 83	
tap 8 level	ch1	〃	84 - 85	MSB = phase
〃	ch2	〃	86 - 87	〃
tap 9 time	ch1	〃	88 - 89	
〃	ch2	〃	8A - 8B	
tap 9 level	ch1	〃	8C - 8D	MSB = phase
〃	ch2	〃	8E - 8F	〃
tap 10 time	ch1	〃	90 - 91	
〃	ch2	〃	92 - 93	
tap 10 level	ch1	〃	94 - 95	MSB = phase
〃	ch2	〃	96 - 97	〃
tap 11 time	ch1	〃	98 - 99	
〃	ch2	〃	9A - 9B	
tap 11 level	ch1	〃	9C - 9D	MSB = phase
〃	ch2	〃	9E - 9F	〃
tap 12 time	ch1	〃	A0 - A1	
〃	ch2	〃	A2 - A3	
tap 12 level	ch1	〃	A4 - A5	MSB = phase
〃	ch2	〃	A6 - A7	〃
tap 13 time	ch1	〃	A8 - A9	
〃	ch2	〃	AA - AB	
tap 13 level	ch1	〃	AC - AD	MSB = phase
〃	ch2	〃	AE - AF	〃

name	ch	type	data address	comment
tap 14 time	ch1	word	B0 - B1	
〃	ch2	〃	B2 - B3	
tap 14 level	ch1	〃	B4 - B5	MSB = phase
〃	ch2	〃	B6 - B7	〃
tap 15 time	ch1	〃	B8 - B9	
〃	ch2	〃	BA - BB	
tap 15 level	ch1	〃	BC - BD	MSB = phase
〃	ch2	〃	BE - BF	〃
tap 16 time	ch1	〃	C0 - C1	
〃	ch2	〃	C2 - C3	
tap 16 level	ch1	〃	C4 - C5	MSB = phase
〃	ch2	〃	C6 - C7	〃
tap 17 time	ch1	〃	C8 - C9	
〃	ch2	〃	CA - CB	
tap 17 level	ch1	〃	CC - CD	MSB = phase
〃	ch2	〃	CE - CF	〃
tap 18 time	ch1	〃	D0 - D1	
〃	ch2	〃	D2 - D3	
tap 18 level	ch1	〃	D4 - D5	MSB = phase
〃	ch2	〃	D6 - D7	〃
tap 19 time	ch1	〃	D8 - D9	
〃	ch2	〃	DA - DB	
tap 19 level	ch1	〃	DC - DD	MSB = phase
〃	ch2	〃	DE - DF	〃
tap 20 time	ch1	〃	E0 - E1	
〃	ch2	〃	E2 - E3	
tap 20 level	ch1	〃	E4 - E5	MSB = phase
〃	ch2	〃	E6 - E7	〃
tap 21 time	ch1	〃	E8 - E9	
〃	ch2	〃	EA - EB	
tap 21 level	ch1	〃	EC - ED	MSB = phase
〃	ch2	〃	EE - EF	〃
tap 22 time	ch1	〃	F0 - F1	
〃	ch2	〃	F2 - F3	
tap 22 level	ch1	〃	F4 - F5	MSB = phase
〃	ch2	〃	F6 - F7	〃
tap 23 time	ch1	〃	F8 - F9	
〃	ch2	〃	FA - FB	
tap 23 level	ch1	〃	FC - FD	MSB = phase
〃	ch2	〃	FE - FF	〃
tap 24 time	ch1	〃	100 - 101	
〃	ch2	〃	102 - 103	
tap 24 level	ch1	〃	104 - 105	MSB = phase
〃	ch2	〃	106 - 107	〃
tap 25 time	ch1	〃	108 - 109	
〃	ch2	〃	10A - 10B	
tap 25 level	ch1	〃	10C - 10D	MSB = phase
〃	ch2	〃	10E - 10F	〃
tap 26 time	ch1	〃	110 - 101	
〃	ch2	〃	112 - 103	
tap 26 level	ch1	〃	114 - 115	MSB = phase
〃	ch2	〃	116 - 117	〃
tap 27 time	ch1	〃	118 - 119	
〃	ch2	〃	11A - 11B	
tap 27 level	ch1	〃	11C - 11D	MSB = phase
〃	ch2	〃	11E - 11F	〃

name	ch	type	data address	comment
tap 28 time	ch1	word	120 - 121	
〃	ch2	〃	122 - 123	
tap 28 level	ch1	〃	124 - 125	MSB = phase
〃	ch2	〃	126 - 127	〃
tap 29 time	ch1	〃	128 - 129	
〃	ch2	〃	12A - 12B	
tap 29 level	ch1	〃	12C - 12D	MSB = phase
〃	ch2	〃	12E - 12F	〃
feedback time		〃	130 - 131	
feedback level		〃	132 - 133	MSB = phase
feedback bass level		byte	134	
feedback bass freq.		〃	135	
feedback treble level		〃	136	
feedback treble freq.		〃	137	
feedback PEQ level		〃	138	
feedback PEQ freq.		〃	139	
feedback PEQ q		〃	13A	
empty		〃	13B	

name	data composition	
tap 1-29 time	1 - 65530 , 1 step	2 - 131060words , 2word step
feedback time	〃	〃
mix level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
tap 1-29 level	〃	〃
feedback level	〃	〃
mix phase	bit15	0 : normal , 1 : inverse
tap 1 phase	〃	〃
feedback phase	〃	〃
feedback bass level	0 - 240 , 1 step	-12dB - 12dB , 0.1dB step
feedback treble level	〃	〃
feedback PEQ level	〃	〃
feedback bass freq.	8 - 56 , 1 step	25Hz - 6.3kHz , 1/6oct step
feedback treble freq.	32 - 66 , 1 step	400Hz - 20.0kHz , 〃
feedback PEQ freq.	16 - 66 , 1 step	63Hz - 20.0kHz , 〃
feedback PEQ q	0 - 7 , 1 step	0 : 0.267 (4oct)
		1 : 0.667 (2oct)
		2 : 1.414 (1oct)
		3 : 2.145 (2/3oct)
		4 : 4.319 (1/3oct)
		5 : 8.651 (1/6oct)
		6 : 17.31 (1/12oct)
		7 : 34.62 (1/24oct)

panpot tap delay :PTD

name	ch	type	data address	comment
pre delay time	ch1	word	44 - 45	
〃	ch2	〃	46 - 43	
pre delay level	ch1	〃	48 - 49	MSB = phase
〃	ch2	〃	4A - 4B	〃
pre delay fdbk time	ch1	〃	4C - 4D	
〃	ch2	〃	4E - 4F	
pre delay fdbk level	ch1	〃	50 - 51	MSB = phase
〃	ch2	〃	52 - 53	〃
tap1 time	ch1	〃	54 - 55	
〃	ch2	〃	56 - 57	
tap1 level	ch1	〃	58 - 59	MSB = phase
〃	ch2	〃	5A - 5B	〃
tap1 panpot	ch1	〃	5C - 5D	
〃	ch2	〃	5E - 5F	
tap2 time	ch1	〃	60 - 61	
〃	ch2	〃	62 - 63	
tap2 level	ch1	〃	64 - 65	MSB = phase
〃	ch2	〃	66 - 67	〃
tap2 panpot	ch1	〃	68 - 69	
〃	ch2	〃	6A - 6B	
tap3 time	ch1	〃	6C - 6D	
〃	ch2	〃	6E - 6F	
tap3 level	ch1	〃	70 - 71	MSB = phase
〃	ch2	〃	72 - 73	〃
tap3 panpot	ch1	〃	74 - 75	
〃	ch2	〃	76 - 77	
tap4 time	ch1	〃	78 - 79	
〃	ch2	〃	7A - 7B	
tap4 level	ch1	〃	7C - 7D	MSB = phase
〃	ch2	〃	7E - 7F	〃
tap4 panpot	ch1	〃	80 - 81	
〃	ch2	〃	82 - 83	
tap5 time	ch1	〃	84 - 85	
〃	ch2	〃	86 - 87	
tap5 level	ch1	〃	88 - 89	MSB = phase
〃	ch2	〃	8A - 8B	〃
tap5 panpot	ch1	〃	8C - 8D	
〃	ch2	〃	8E - 8F	
feedback time	ch1	〃	90 - 91	
〃	ch2	〃	92 - 93	
feedback level	ch1	〃	94 - 95	MSB = phase
〃	ch2	〃	96 - 97	〃

name	data composition	
pre delay time	0 - 32765 , 1 step	0 - 32765wds , 1word step
pre delay fdbk time	1 - 32765 , 1 step	1 - 32765wds , 1word step
tap1-5 time	0 - 32767 , 1 step	0 - 32767wds , 1word step
feedback time	1 - 32767 , 1 step	1 - 32767wds , 1word step
pre delay level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
pre delay fdbk level	〃	〃
tap1-5 level	〃	〃
feedback level	〃	〃
tap1-5 panpot	〃	〃
pre delay phase	bit15	0 : normal , 1 : inverse
pre delay fdbk phase	〃	〃
tap1-5 phase	〃	〃
feedback phase	〃	〃

multi delay :MTD

name	ch	type	data address	comment
pre delay 1 time	ch1	word	44 - 45	
〃	ch2	〃	46 - 47	
pre delay 1 level	ch1	〃	48 - 49	MSB = phase
〃	ch2	〃	4A - 4B	〃
pre delay 2 time	ch1	〃	4C - 4D	
〃	ch2	〃	4E - 4F	
pre delay 2 level	ch1	〃	50 - 41	MSB = phase
〃	ch2	〃	52 - 43	〃
early rfl 1 time	ch1	〃	54 - 55	
〃	ch2	〃	56 - 57	
early rfl 1 level	ch1	〃	58 - 59	MSB = phase
〃	ch2	〃	5A - 5B	〃
early rfl 2 time	ch1	〃	5C - 5D	
〃	ch2	〃	5E - 5F	
early rfl 2 level	ch1	〃	60 - 51	MSB = phase
〃	ch2	〃	62 - 53	〃
early rfl 3 time	ch1	〃	64 - 65	
〃	ch2	〃	66 - 67	
early rfl 3 level	ch1	〃	68 - 69	MSB = phase
〃	ch2	〃	6A - 6B	〃
cross pre delay time	ch1	〃	6C - 6D	
〃	ch2	〃	6E - 6F	
cross pre delay level	ch1	〃	70 - 61	MSB = phase
〃	ch2	〃	72 - 63	〃
tap1 time	ch1	〃	74 - 75	
〃	ch2	〃	76 - 77	
tap1 level	ch1	〃	78 - 79	MSB = phase
〃	ch2	〃	7A - 7B	〃
tap2 time	ch1	〃	7C - 7D	
〃	ch2	〃	7E - 7F	
tap2 level	ch1	〃	80 - 81	MSB = phase
〃	ch2	〃	82 - 83	〃
tap3 time	ch1	〃	84 - 85	
〃	ch2	〃	86 - 87	
tap3 level	ch1	〃	88 - 89	MSB = phase
〃	ch2	〃	8A - 8B	〃

name	ch	type	data address	comment
cross tap1 time	ch1	word	8C - 8D	
〃	ch2	〃	8E - 8F	
cross tap1 level	ch1	〃	90 - 81	MSB = phase
〃	ch2	〃	92 - 83	〃
cross tap2 time	ch1	〃	94 - 95	
〃	ch2	〃	96 - 97	
cross tap2 level	ch1	〃	98 - 99	MSB = phase
〃	ch2	〃	9A - 9B	〃
cross tap3 time	ch1	〃	9C - 9D	
〃	ch2	〃	9E - 9F	
cross tap3 level	ch1	〃	A0 - 91	MSB = phase
〃	ch2	〃	A2 - 93	〃
feedback time	ch1	〃	A4 - A5	
〃	ch2	〃	A6 - A7	
feedback level	ch1	〃	A8 - A9	MSB = phase
〃	ch2	〃	AA - AB	〃
feedback bass level	ch1	byte	AC	
〃	ch2	〃	AD	
feedback bass freq.	ch1	〃	AE	
〃	ch2	〃	AF	
feedback treble level	ch1	〃	B0	
〃	ch2	〃	B1	
feedback treble freq.	ch1	〃	B2	
〃	ch2	〃	B3	
feedback PEQ level	ch1	〃	B4	
〃	ch2	〃	B5	
feedback PEQ freq.	ch1	〃	B6	
〃	ch2	〃	B7	
feedback PEQ q	ch1	〃	B8	
〃	ch2	〃	B9	
cross feedback time	ch1	word	BA - BB	
〃	ch2	〃	BC - BD	
cross feedback level	ch1	〃	BE - BF	MSB = phase
〃	ch2	〃	C0 - C1	〃

name	data composition	
pre delay 1,2 time	0 - 32757 , 1 step	0 - 32757words , 1word step
early rfl 1-3 time	〃	〃
cross pre delay time	1 - 32757 , 1 step	1 - 32757words , 1word step
tap1-3 time	0 - 32767 , 1 step	0 - 32767words , 1word step
cross tap1-3 time	1 - 32767 , 1 step	1 - 32767words , 1word step
feedback time	〃	〃
cross feedback time	〃	〃
pre delay 1,2 level	0 - 4096 , 1 step	0 - 100% , 0.0244% step
early rfl 1-3 level	〃	〃
cross pre delay level	〃	〃
tap1-3 level	〃	〃
cross tap1-3 level	〃	〃
feedback level	〃	〃
cross feedback level	〃	〃
pre delay 1,2 phase	bit15	0 : normal , 1 : inverse
early rfl 1-3 phase	〃	〃
cross pre delay phase	〃	〃
tap1-3 phase	〃	〃
cross tap1-3 phase	〃	〃
cross feedback phase	〃	〃
feedback phase	〃	〃
feedback bass level	0 - 240 , 1 step	-12dB - 12dB , 0.1dB step
feedback treble level	〃	〃
feedback PEQ level	〃	〃
feedback bass freq.	8 - 56 , 1 step	25Hz - 6.3kHz , 1/6oct step
feedback treble freq.	32 - 66 , 1 step	400Hz - 20.0kHz , 〃
feedback PEQ freq.	16 - 66 , 1 step	63Hz - 20.0kHz , 〃
feedback PEQ q	0 - 7 , 1 step	0 : 0.267 (4oct) 1 : 0.667 (2oct) 2 : 1.414 (1oct) 3 : 2.145 (2/3oct) 4 : 4.319 (1/3oct) 5 : 8.651 (1/6oct) 6 : 17.31 (1/12oct) 7 : 34.62 (1/24oct)

DATE

name	data length	data composition
date	2byte	year : 7bit month : 4bit day : 5bit Example: B'1011100011000001 ; 1011100 0110 00001 ; 1992 June 1

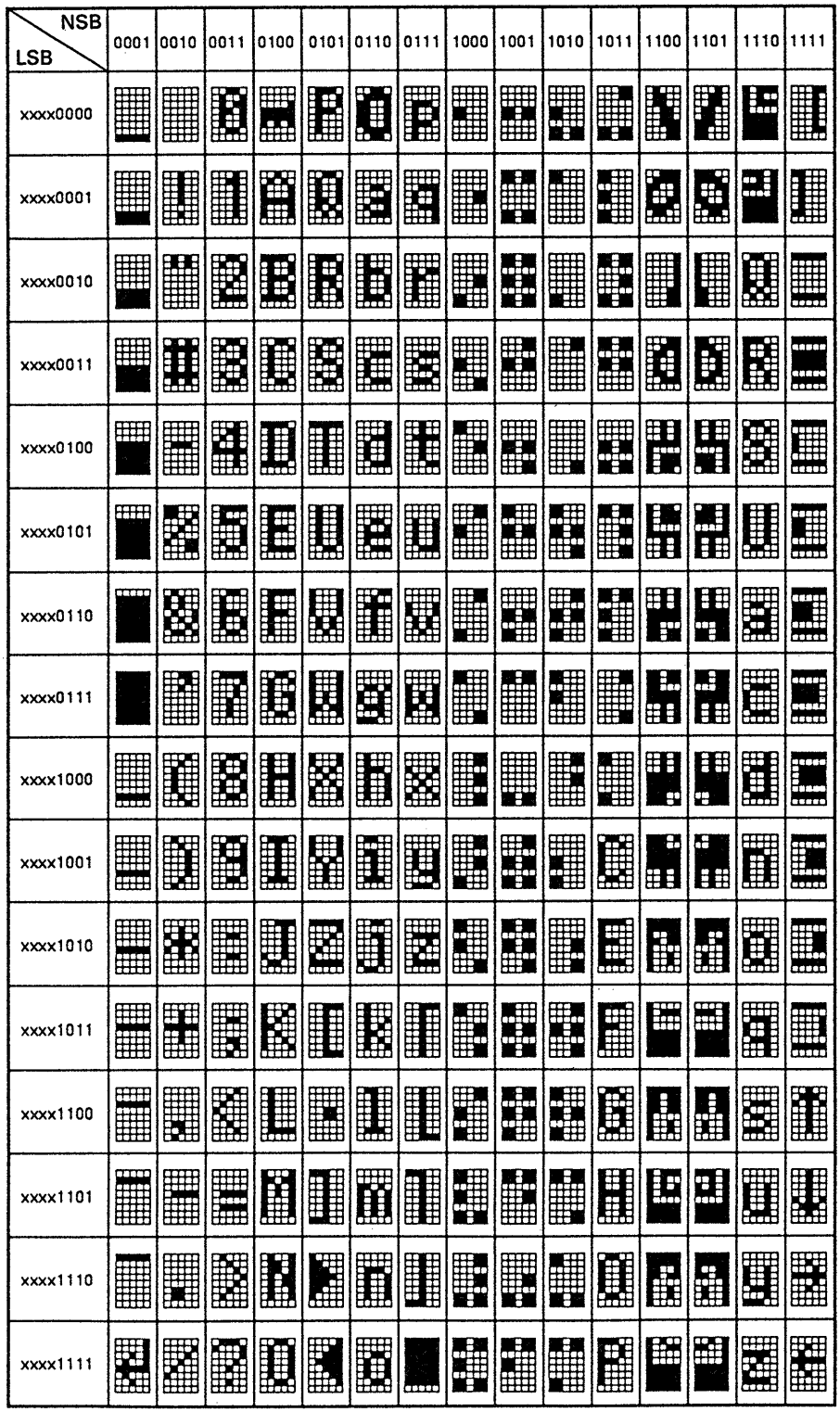
NAME

name	data length	data composition

name	1 - 47byte	Basically, ASCII code.
		End code = 0 (maximum: 46 characters + 1 byte of end code)
		Compression code: A byte next to 7 becomes (number of spaces - 1).
		Example: Preset memory No. 3
		`Sound on Sound`
		`tempo= 96`
		`db 7, 4-1 ; 4-character compression`
		`db 'Sound on sound'`
		`db 7, 12-1 ;12-character compression`
		`db 'tempo= 96', 0`

List of character data

The character data for the DPS series is shown in the following. Refer to the list for creating NAME data. At that time, 0Xh and 7Fh represent a control code and a RAM data, respectively, so do not use them as NAME data. In addition, do not use the data for displaying icon as NAME data.



Data Composition and Data Length of System

SYSTEM

name	data length	data composition
input mode	1	0 : stereo , 1 : mono
auto help	1	0 : off , 1 : on
load form	1	0 : auto load , 1 : enter load
load time	1	0 : fast , 1 : medium , 2 : slow
unit (time)	1	0 : word , 1 : msec , 2 : m , 3 : Quarter note
unit (level)	1	0 : % , 1 : dB
unit (q)	1	0 : q , 1 : oct
remote ch	1	0 - 14 , 1 step 1 - 15 ch , 1ch step
remote baud rate	1	0 : 9600 , 1 : 19200 , 2 : 31250
empty	1	0 : Set all empty areas to 0 (for expansion).
clock	6	Replace decimal data with hexadecimal one. Example: June 21, 1992 12:34:56 db 92h,06h,21h,12h,34h,56h
user's name	16	Basically, ASCII code End code is 0.
date of birth	2	Example: December 6 db 12,6
key protect	1	0 : off , 1 : on
memory compare	1	0 : edit/memory 1 : edit/parameter 2 : edit/parameter/memory 3 : edit/parameter/block/memory
dial sensitivity	1	0 - 11 , 1 step 1 - 12 , 1 step (Ver. 1.40 or later versions)
empty	11	0 : Set all empty areas to 0 (for expansion).

Data Composition and Data Length of System MIDI

SYS.MIDI

name	data length	data composition
MIDI omni	1	0:off,1:on
MIDI ch	1	0 - 15 , 1 step 1 - 16 ch , 1ch step
PGM change no.1	2	0 - 356 , 1 step 0 - 255 : U1 - U256
- memory no.		256 - 355 : P1 - P100
¦	(total 256)	356 : BYPASS
PGM change no.128		
- memory no.		

Examples of Data

With the DPS-D7, data can be compressed unless EQ, AUTOPAN or a tap (only for tap delay and long delay) is used. However, compressing of data is not always necessary.

```
ALG     equ     1024
EQ      equ     64                      ; EQ compression flag
PAN     equ     256                     ; AUTOPAN compression flag
CLOCKI  equ     1011010100000001B       ; August 1, 1990
SPACE   equ     7                       ; compression of user name space


PM_4:                                   ; preset memory No. 4
        dw      4*ALG+EQ+PAN+33         ; ALG 4:tap delay   Compression of EQ, AUTOPAN and 33 taps
; input
        dw      2048,2048       ; input level
        dw      0,0             ; panpot
        dw      0,0             ; panpot limit min.
        dw      2048,2048       ; panpot limit max.
; eq
; auto pan
; output
        dw      2048,2048       ; output level
        db      1               ; round
        db      0               ; empty
; local midi
        db      1               ; ctl no. 1 - 1 : mod wheel
        db      6               ; ctl no. 2 - 6 : data entry
        db      125             ; ctl no. 3 - 125 : off
        db      125             ; ctl no. 4 - 125 : off
        dw      15+7+22+12+4-1  ; prm no. 1 - tap 1 time sync
        dw      0               ; prm no. 2 - input level sync
        dw      0               ; prm no. 3
        dw      0               ; prm no. 4
; dly
        dw      1,1             ; pre delay time
        dw      6720,6720       ; tap1 time
        dw      1024,0          ; tap1 level , phase
        dw      13440,13440     ; tap2 time
        dw      1024,1024       ; tap2 level , phase
        dw      20160,20160     ; tap3 time
        dw      0,1024          ; tap3 level , phase
        dw      26880,33600     ; tap4 time
        dw      1024,1024       ; tap4 level , phase
        dw      40320,40320     ; tap5 time
        dw      0,1024          ; tap5 level , phase

        dw      CLOCKI

        db      SPACE,4-1
        db      "Pol"
        db      H'EE                    ; y   jammed to the left
        db      "-rhythm 4+3",0
```

```
PM_43:                                  ; preset memory No. 43
        dw      4*ALG+PAN       ; ALG 4
; input
        dw      2048,2048       ; input level
        dw      0,0             ; panpot
        dw      0,0             ; panpot limit min.
        dw      2048,2048       ; panpot limit max.
; eq
        db      1               ; eq sw
        db      0               ; empty
        db      0,0             ; bass level
        db      20,20           ; bass freq.
        db      0,0             ; treb level
        db      56,56           ; treb freq.
        db      130,130         ; peq level
        db      56,56           ; peq freq.
        db      3,3             ; peq q
; auto pan
; output
        dw      2048,2048       ; output level
        db      1               ; round
        db      0               ; empty
; local midi
        db      1               ; ctl no. 1 - 1 : mod wheel
        db      6               ; ctl no. 2 - 6 : data entry
        db      125             ; ctl no. 3 - 125 : off
        db      125             ; ctl no. 4 - 125 : off
        dw      15+7+22+12+1-1  ; prm no. 1 - pre delay time sync
        dw      0               ; prm no. 2 - input level sync
        dw      0               ; prm no. 3
        dw      0               ; prm no. 4
; dly
        dw      100,100         ; pre delay time
        dw      1,1             ; tap1 time
        dw      33,33           ; tap1 level , phase
        dw      2,2             ; tap2 time
        dw      119,119         ; tap2 level , phase
        dw      3,3             ; tap3 time
        dw      269,269         ; tap3 level , phase
        dw      4,4             ; tap4 time
        dw      446,446         ; tap4 level , phase
        dw      5,5             ; tap5 time
        dw      568,568         ; tap5 level , phase
        dw      6,6             ; tap6 time
        dw      553,553         ; tap6 level , phase
        dw      7,7             ; tap7 time
        dw      371,371         ; tap7 level , phase
        dw      8,8             ; tap8 time
        dw      87,87           ; tap8 level , phase
        dw      9,9             ; tap9 time
        dw      32934,32934     ; tap9 level , phase
        dw      10,10           ; tap10 time
        dw      33034,33034     ; tap10 level , phase
        dw      11,11           ; tap11 time
        dw      32949,32949     ; tap11 level , phase
        dw      12,12           ; tap12 time
        dw      4,4             ; tap12 level , phase
        dw      13,13           ; tap13 time
        dw      151,151         ; tap13 level , phase
```

```
dw      14,14           ; tap14 time
dw      164,164         ; tap14 level , phase
dw      15,15           ; tap15 time
dw      56,56           ; tap15 level , phase
dw      16,16           ; tap16 time
dw      32843,32843     ; tap16 level , phase
dw      17,17           ; tap17 time
dw      32896,32896     ; tap17 level , phase
dw      18,18           ; tap18 time
dw      32841,32841     ; tap18 level , phase
dw      19,19           ; tap19 time
dw      30,30           ; tap19 level , phase
dw      20,20           ; tap20 time
dw      93,93           ; tap20 level , phase
dw      21,21           ; tap21 time
dw      72,72           ; tap21 level , phase
dw      22,22           ; tap22 time
dw      32771,32771     ; tap22 level , phase
dw      23,23           ; tap23 time
dw      32832,32832     ; tap23 level , phase
dw      24,24           ; tap24 time
dw      32831,32831     ; tap24 level , phase
dw      25,25           ; tap25 time
dw      32779,32779     ; tap25 level , phase
dw      26,26           ; tap26 time
dw      42,42           ; tap26 level , phase
dw      27,27           ; tap27 time
dw      52,52           ; tap27 level , phase
dw      28,28           ; tap28 time
dw      18,18           ; tap28 level , phase
dw      29,29           ; tap29 time
dw      32792,32792     ; tap29 level , phase
dw      30,30           ; tap30 time
dw      32806,32806     ; tap30 level , phase
dw      31,31           ; tap31 time
dw      32782,32782     ; tap31 level , phase
dw      32,32           ; tap32 time
dw      25,25           ; tap32 level , phase
dw      33,33           ; tap33 time
dw      49,49           ; tap33 level , phase
dw      34,34           ; tap34 time
dw      46,46           ; tap34 level , phase
dw      35,35           ; tap35 time
dw      24,24           ; tap35 level , phase
dw      36,36           ; tap36 time
dw      2,2             ; tap36 level , phase
dw      37,37           ; tap37 time
dw      8,8             ; tap37 level , phase
dw      38,38           ; tap38 time
dw      8,8             ; tap38 level , phase

dw      CLOCKI

db      SPACE,4-1
db      "AM r"
db      H'E6,H'E8               ; ad jammed to the left
db      "i"
db      H'EA                    ; o jammed to the left
db      " sound",0
```

9-977-088-81

Sony Corporation
Audio Group

English
92I1918-1
Printed in Japan
© 1992.9
Published by Customer Relations and Service Group

DPS-D7

SONY

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
E model

SUPPLEMENT-2

File this Supplement with the Service Manual.

Subject:
• REMOTE CONTROLLER DATA FORMAT ADDITION

The format for transfer between DPS-D7 and RM-DPS7 dedicated remote controller was added.
For details, see the DPS-M7 SUPPLEMENT-1 (9-956-852-82).

Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

English
95J0204097-1D
Printed in Japan
©1995.10
Published by Home A&V Products Div.
Quality Engineering Dept.

9-977-088-83