AKAI SERVICE MANUAL

PROGRAMMABLE MATRIX SYNTHESIZER

MODEL VX600

CAUTION: Before servicing, to protect customer's program data from being damaged, save all data to IC memory card.

SPECIFICATIONS

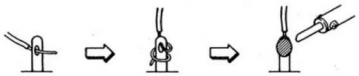
Model	Programmable matrix analog synthesizer
Key board	37-key C-C scale(with dynamics velocity and key pressure functions)
Simultaneous sounds	6 voices
Sound souce	12 VCO/2 VCO group
Display	40 characters x 8 lines,liquid crystal graphic display
Internal memory	Battery back up type
Packet	10×20 programs
Library	50 tones
Program	40 programs
Chord	20 patterns
External memory	Compatible with IC memory card (AKAI BR-16/16K' bytes)
Packet	10×20 programs ×2
Library	50 tones ×2
Program	40 programs ×2
Chord	20 patterns ×2
Function	BEND ADJUST/WIDTH GLIDE ADJUST/TIME BREATH ADJUST/SENSE VIBRATE VOLUME CONTROL KNOB CURSOR KEY(△ ▽ ◁ ▷) TEN KEY MENU KEY ENTER KEY SOFT KEY POWER SWITCH MEMORY PROTECT SWITCH CONTRAST
Connection terminals	
INSTRUMENT	Special multi-connector for AKAI EWI1000/EV1000
EXTERNAL IN	Standard phone jack ×2
LINE OUT	Standard phone jack
PHONES	Standard stereo phone jack (monaural)
VOICE OUT	DIN /13 pin
PROGRAM UP/DOWN	Standard stereo phone jack(for foot switch)
PEDAL 1	Standard stereo phone jack(for pedal switch)
PEDAL 2	Standard stereo phone jack(for pedal volume)
MIDI IN/OUT/THRU	DIN /5 pin
I/O PORT	For expansion.(cover is currentry installed)
Power requiament	AC 100V, 50/60Hz for japan AC 120V, 60Hz for USA and canada AC 220V, 50Hz for europe except UK AC 240V, 50Hz for UK and australia
Power consumption	21 W
External dimensions	602(W)x116(H) x305(D) mm
Weight	8.2 kg

*** For improvement purposes, specifications and design are subject to change without notice.**

★SAFETY INSTRUCTIONS

PRECAUTIONS DURING SERVICING

1. Parts identified by the ⚠ (✱) symbol parts are critical for safety. Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation.
   These must also be replaced only with specified replacements.
   Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers (Insulating Barriers)
   4) Insulation sheets for transistors
   5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

SAFETY CHECK AFTER SERVICING

After servicing, make measurements of leakage-current or resistance in order to determine that exposed parts are acceptably insulated from the supply circuit.
The leakage-current measurement should be done between accessible metal parts (such as chassis, ground terminal, microphone jacks, signal-input/output connectors, etc.) and the earth ground through a resister of 1500 ohms paralleled with a 0.15 μF capacitor, under the unit's normal working conditions. The leakage-current should be less than 0.5 mA rms AC.
The resistance measurement should be done between accessible exposed metal parts and power cord plug prongs with the power switch (if included) "ON". The resistance should be more than 2.2 Mohms.

PRECAUTIONS FOR LITHIUM BATTERY

The lithium battery may explode when heated excessively.
[OBSERVE THE FOLLOWING WHEN REPLACING]

- Replace with the same make and type only.
- Use soldering iron in "recommended way" only.
- Place battery in correct polarity.
- Do not short the terminals.
- Do not recharge battery.
- Do not dispose of battery in fire.

[DANGER]

[RECOMMENDED WAY]

★INFORMATION

SYMBOLS FOR PRIMARY DESTINATION

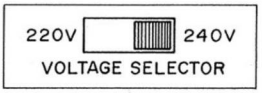
Alphabet indicates the destination of the units as listed below.

Symbols	Principal Destinations
A	USA
B	UK
C	Canada
E	Europe (except UK)
J	Japan
S	Australia
V	W. Germany only
U	Universal Area
Y*	Custom version

VOLTAGE CONVERSION

(E,V,B,S Model only)

Before connecting the power cord. Set the VOLTAGE SELECTOR located on the bottom plate with a screwdriver so that the correct voltage is indicated.



I. CONTROL

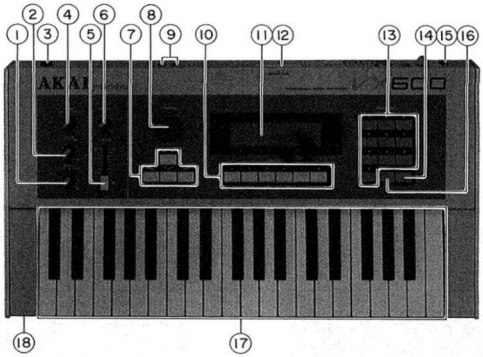


Fig. 1-1 View from the top

① BREATH ADJUST/SENSE control
This is used when using with the AKAI electric wind/valve instrument model EWI1000/EVI1000. There is a knob(ADJUST) to adjust the sensitivity of the breath sensor and a knob(SENSE) to set the operation point appropriate for the players breath pressure.

② GLIDE ADJUST/TIME control
This is used when using with the AKAI electric wind/valve instrument model EWI1000/EVI1000. There is a knob(ADJUST) to adjust the sensitivity of the glide controllers, and a knob(TIME) to adjust the glide time.

③ INSTRUMENT connector
This terminal is used to connect the EWI1000 or EVI1000 unit when playing the AKAI electric wind/valve instrument. Use the connection cable included with the EWI1000 or EVI1000, or the AKAI EW-X70(for the EWI1000) or the AKAI EV-X70(for the EVI1000) extension cable.

④ BEND ADJUST/WIDTH control
This is used when using with the AKAI electric wind/valve instrument model EWI1000/EVI1000. There is a knob(ADJUST) to adjust the sensitivity of the bend controllers, and a knob(WIDTH) to adjust the bend width.

⑤ VOLUME control
This is used to adjust the output level of the VX600.

⑥ VIBRATE control
This knob is used to adjust vibrate and tremolo when using the AKAI electric wind/valve instrument.

⑦ CURSOR key
These keys are used to increase or decrease the "octave shift" and to move the "cursor".

⑧ CONTROL knob
This knob is used to set the "VALUE" of the various parameters, and scroll the "MENU". It is also used to "input characters" for tone names, library names, packet names, etc..

⑨ EXT IN
When playing with the external source such as a digital sampler, etc.. This external input terminal can be used to process the tone and volume of the external source with the VX600.

⑩ SOFT keys
These are "soft keys" which have different functions according to the screen which is displayed.

⑪ DISPLAY
This display is used to shows the program menu, and various program editing screens.

⑫ MEMORY CARD port
This is the port for the "memory card". Use the AKAI "BR-16" memory cards.

⑬ TEN key
These keys are used to set the "VALUE" of the various parameters, input "LIBRARY NUMBERS" and "PACKET NUMBERS".

⑭ ENTER key
This key is used to call the mode specified by the cursor, and register items.

⑮ POWER switch
This switch used to turn the power ON and OFF.

⑯ MENU key
This is used to call the "MENU WINDOW".

⑰ KEY BOARD
This is a 37 key keyboard(C-C scale) which has dynamic velocity and key pressure functions.

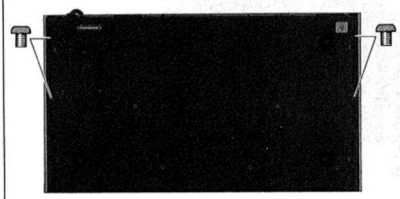
⑱ PHONES jack
A headphone set can be used to monitor. The volume output to the headphone is adjusted with "VOLUME" control.

II. DISASSEMBLY

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs.
Reassemble in the reverse order.

1-1. HOW TO OPEN THE TOP(CONTROL) PANEL.

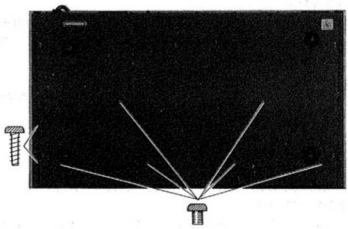
1.



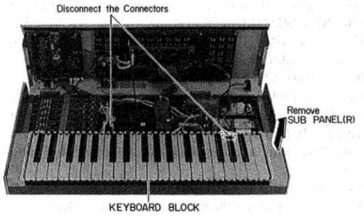
2.

1-2. HOW TO DISMANTLE THE KEYBOARD BLOCK.

3.



4.



III. PRINCIPAL PARTS LOCATION

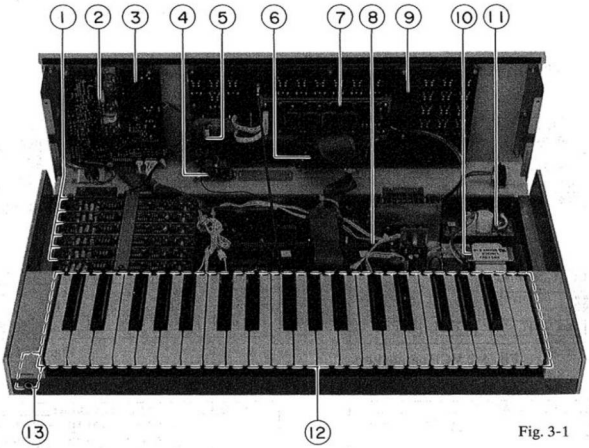


Fig. 3-1

① VOICE PCBs
② VR PCB
③ OPERATION (B) PCB
④ EXT IN JACK PCB
⑤ ENCODER PCB
⑥ MEMORY CARD PCB
⑦ LCD BLOCK
⑧ CPU PCB
⑨ OPERATION (A) PCB
⑩ POWER TRANSFORMER
⑪ FILTER PCB
⑫ KEYBOARD BLOCK
⑬ HEADPHONE PCB

IV. ELECTRICAL ADJUSTMENT

4-1. BEFOR ADJUSTMENT

When adjusting the model VX600, each adjustment requires a particular setting of parameters and modulation matrix. Befor adjustment, edit the library which used for the adjustment according to the following procedure and save them to the memory card.

[L01: For VIBRATE OFF-SET adjustment]

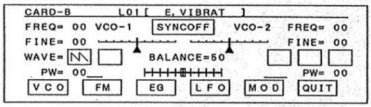


Fig. 4-1 VCO parameters

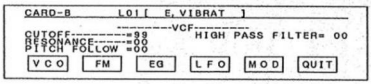


Fig. 4-2 VCF parameters

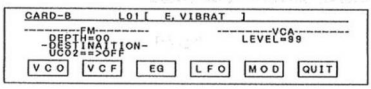


Fig. 4-3 FM/VCA parameters

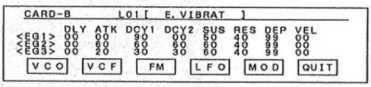


Fig. 4-4 EG parameters

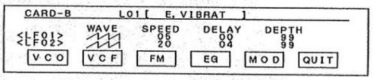


Fig. 4-5 LFO parameters

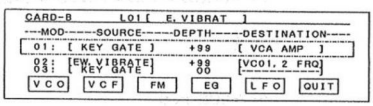


Fig. 4-6 MOD. matrix

[L02: For AFTER TOUCH adjustment]

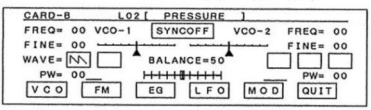


Fig. 4-7 VCO parameters

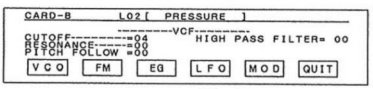


Fig. 4-8 VCF parameters

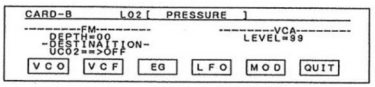


Fig. 4-9 FM/VCA parameters

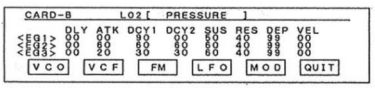


Fig. 4-10 EG parameters

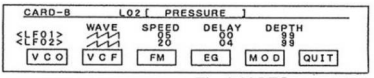


Fig. 4-11 LFO parameters

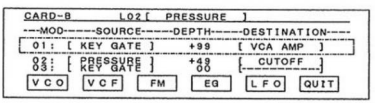


Fig. 4-12 MOD. matrix

[L03: For DAC OUTPUT LEVEL adjustment]

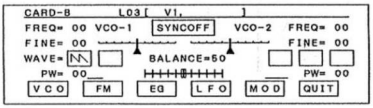


Fig. 4-13 VCO parameters

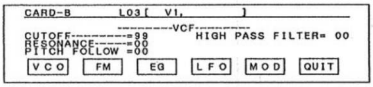


Fig. 4-14 VCF parameters

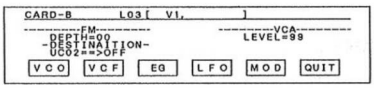


Fig. 4-15 FM/VCA parameters

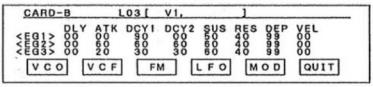


Fig. 4-16 EG parameters

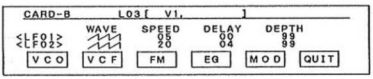


Fig. 4-17 LFO parameters

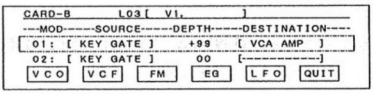


Fig. 4-18 MOD. matrix

[L04: For NOISE OUTPUT LEVEL adjustment]

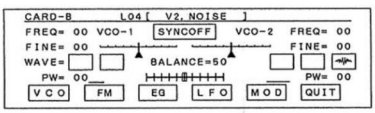


Fig. 4-19 VCO parameters

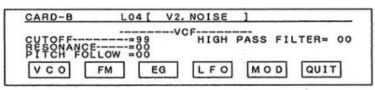


Fig. 4-20 VCF parameters

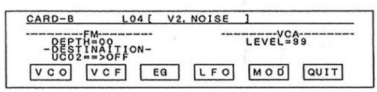


Fig. 4-21 FM/VCA parameters

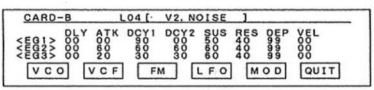


Fig. 4-22 EG parameters

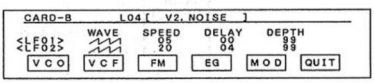


Fig. 4-23 LFO parameters

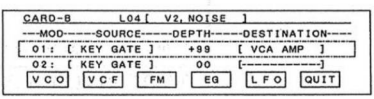


Fig. 4-24 MOD. matrix

4-2. INSTRUMENT CONNECTION

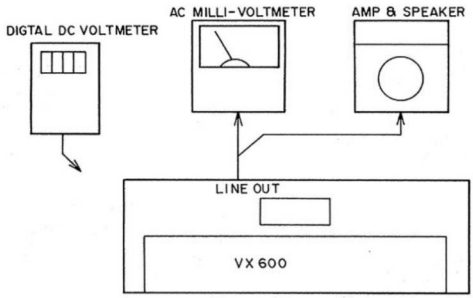


Fig. 4-25 Instrument connection

4-3. ADJUSTMENT OF THE OPERATION (B) PC BOARD.

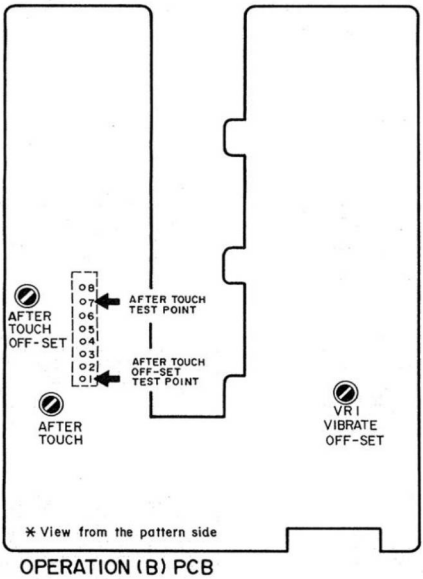


Fig. 4-26 Adjustment points of the OPERATION (B) PCB.

4-3-1. VIBRATE OFF-SET adjustment

1) Set the memory card which made in the step 4-1. BEFOR ADJUSTMENT, and select library to "L01 [E, VIBRATE]".
2) While pressing the "C5" key, turn the VIBRATE control knob fully clockwith and counter clockwith.
3) If the tone is changed, when the VIBRATE control knob is turning fully clockwith and counter clockwith, adjust VR1(VIBRATE OFF-SET) so that the tone is not changed.

4-3-2. AFTER TOUCH adjustment

1) Select the library to "L02 [PRESSURE]" and connect a digital DC voltmeter between pin ① of the IC1(M5218L) and GND.
2) Adjust VR3(AFTER TOUCH OFF-SET) so that the reading on the digital DC voltmeter is 0 V.
3) Connect a DC voltmeter between pin ⑦ of the IC1(M5218L) and GND. At this time confirm that the reading voltage is more than 4.8 V.
4) While pressing the lightest key by about 200g presure, adjust VR2(AFTER TOUCH) so that the reading voltage is decreased to nearly 0 V.

4-4. ADJUSTMENT OF THE CPU PC BOARD

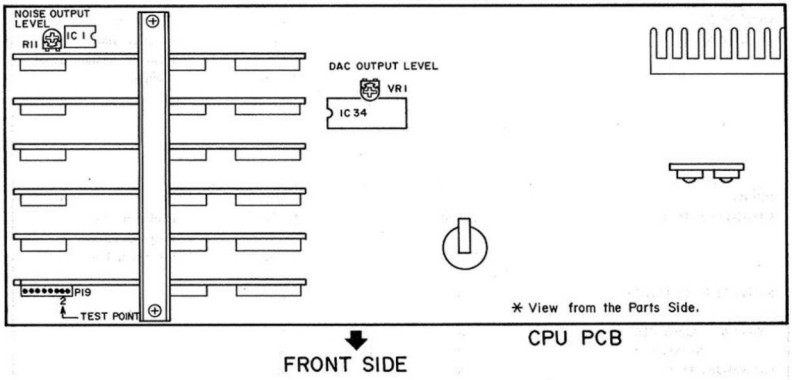


Fig. 4-27 Adjustment points of the CPU PCB

4-4-1. DAC OUTPUT LEVEL adjustment

1) Select the library to "L03 [V1,]" and connect a digital DC voltmeter between pin ② of the connector P19 and GND (refer to Fig. 4-27).
2) Adjust VR1(DAC OUTPUT LEVEL) so that the reading on the digital DC voltmeter is 2.5 V.

4-4-2. NOISE OUTPUT LEVEL adjustment

1) Select the library to "L04 [V2, NOISE]", and connect an AC milli-voltmeter to LINE OUT.
2) While pressing the any key, adjust R11(NOISE OUTPUT LEVEL) so that the reading on the AC milli-voltmeter is -8 dBm.

[NOTE]: Adjustment volume R11(NOISE OUTPUT LEVEL) is not included on some models.

V. MIDI IMPLEMENTAION CHART

[PROGRAMABLE MATRIX SYNTHESIZER]
Model VX600 MIDI Implementation Chart Version : 1.00

FUNCTION	TRANSMITTED	RECOGNIZED	REMARKS
BASIC DEFAULT CHANEL CHANGED	1 - 16 1 - 16	1 - 16 1 - 16	Memorized
DEFAULT MODE MESSAGES ALTERED	Mode 3	× × ×	
NOTE NUMBER : True voice	24 - 108	24 - 108	Octave shift
VELOCITY NOTE ON NOTE OFF	9nH V=1 - 127 9nH V=0 ,8nH	O O	
After KEY'S Touch CH'S	× O	× O	
PINCH BENDER	O	O	
CONTROL 4 CHANGE 7 64	O O O	O O O 00 - 31	Foot pedal Main volume Damper, Sustain pedal Assignable
PROG CHANGE : TRUE #	 1 - 20 1 - 40 1 - 50	 1 - 20 1 - 40 1 - 50	 Packet mode Program mode Library mdoe
SYSTEM EXCLUSIVE	×	×	
SYSTEM : SONG POS SONG SEL COMMON: TUNE	× × ×	× × ×	
SYSTEM : CLOCK REAL TIME : COMMANDS	× ×	× ×	
AUX : LOCAL ON/OFF ALL NOTES OFF MES- : ACTIVE SENSE SAGES : RESTE	× O × ×	× O × ×	
Notes			

MODE 1 : OMNI ON, POLY MODE 2 : MONI ON, MONO O=YES
MONE 3 : OMNI OFF, POLY MODE 4 : 4MONI OFF, MONO ×=NO

ATTENTION

1. **When placing an order for parts, be sure to list Part No., Model No. and the description of eachpart. Otherwise, the non-delivery of the part or the delivery of a wrong part may result.**
2. **Please make sure that Part No. is correct when ordering. If not, a part different from the one you ordered may be delivered.**
3. **Since the parts shown in Parts List of Preliminary Service Manual may have been the subject of changes, please use this Parts List for all future reference.**

HOW TO USE THIS PARTS LIST

1. This Parts List lists those parts which are considered necessary for repairs. Other common parts, such as resistors and capacitors, are listed in the "Common List for Service Parts" from which these parts should be selected and stocked.
2. The Recommended Spare Parts List shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not in principle be supplied.
4. How to read the Parts List.

a) Mechanism Block

2. HEAD BASE BLOCK

REF. NO.	PART NO.	DESCRIPTION
1	BH-T2023A320A	HEAD BASE BLOCK
2	HP-H2206A010A	HEAD R/P PR4-8FU C
3	ZS-477876	PAN20×03STL CMT
4	ZS-536488	BID20×08STL CMT
5	ZG-402895	SP CS ANGLE ADJUST

SP (Service Parts) Classification

This number corresponds with the individ ual parts index number in that figure.

b) PC Board

6. MAIN PC BOARD

REF. NO.	PART NO.	DESCRIPTION
IC1	EI-324536	IC HD14049BP
IC2	EI-336801	IC MB8841-564M
C1A	EC-338399	C MMY V 223M 250AC [U,E,B,S]
C1B	EC-350949	C MMY V 223M 250DC [J]
C1C	EC-338397	C MMY V 223M 125AC [C,A]
X1	EI-318384	OSC X'TAL NC-18C

Symbols for primary destination

[A] : AAL (U.S.A) [S] : SAA (Australia)
[B] : BEAB (England) [U] : U/T (Universa
[C] : CSA (Canada) Area)
[E] : CEE (Europe) [V] : VDE (W. Germany)
[J] : JPN (Janan) [Y] : Custom Version

SP (Service Parts) Classification

These reference symbols correspond with component symbols in the Schematic Diagrams.

The available PC Board Blocks are listed separately.

5. When Part No. is known, Parts Index at end of Parts List can be used to locate where that part is shown in Parts List by its Reference No.listed at right of Part No.

WARNING

⚠(*) INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS.

AVERTISSEMENT

⚠(*) IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉDE L'APPAREIL, NE REMPLACER QUE DES PIÉCES RECOMMANDEES PAR LÉ FABRICANT.

1. RECOMMENDED SPARE PARTS

We suggest you to stock the following Recommended Spare Part items listed below since they can cover most of the routine service.

Ref. No.	Part No.	Description
1	✱BT-383927J	TRANS POW L1023 C,A [C,A,Y1]
2	✱BT-383928J	TRANS POW L1023 E,V,B,S [E,V,B,S]
3	✱BT-383926J	TRANS POW L1023 J [J]
4	✱BT-383935J	TRANS PULSE 2E16-1001-01
5	ED-376335	D SCHOTTKY SB02-03 T05
6	✱ED-357036	D SILICON DBA20B-K15 100/ 2.0A
7	✱ED-357038	D SILICON DBB10B 100/ 1.0A
8	ED-301911	D SILICON H DS448
9	ED-344280	D SILICON H GMA-01-FY2 F05
10	ED-346536	D ZENER H HZ7C3L
11	✱EF-355385	FUSE BET T 250V 315MA [B]
12	✱EF-355374	FUSE BET T 250V 500MA [B]
13	✱EF-358974	FUSE BET T 250V 630MA [B]
14	✱EF-695766	FUSE SEMKO T 250V 315MA [E,V,S]
15	✱EF-593706	FUSE SEMKO T 250V 500MA [E,V,S]
16	✱EF-601942	FUSE SEMKO T 250V 630MA [E,V,S]
17	✱EF-306124	FUSE TSC A 250V 630MA [J]
18	✱EF-309388	FUSE TSC A 250V 800MA [J]
19	✱EF-305703	FUSE TSC 125V 630MA [C,A,Y1]
20	✱EF-309391	FUSE TSC 125V 800MA [C,A,Y1]
21	EH-370520	COMP C EXF-P8102ZW
22	EH-351973	COMP R RKC1/8B4 472J
23	EH-353789	COMP R RKC1/8B6 103J
24	EH-359185	COMP R RKC1/8B8 103J
25	EH-379500	FILTER EMI EXC-EMT102BC
26	✱EI-380920J	IC AN6531
27	✱EI-380921J	IC AN6535
28	✱EI-380919J	IC AN79L12
29	EI-380918J	IC CEM3374
30	EI-385445J	IC CEM3378
31	EI-369660	IC CXK5816PN-12L
32	EI-375437	IC LC3664NL-10
33	EI-378276	IC LC7981
34	EI-375347	IC MM74HC14N
35	EI-375345	IC MM74HC373N
36	EI-375439	IC M5206P
37	EI-353227	IC M5216L
38	EI-346071	IC M5218L-21
39	EI-349719	IC M5218P
40	✱EI-359552	IC M5236L
41	EI-362588	IC M5238P
42	EI-364275	IC M74LS05P
43	EI-364247	IC NJM13600
44	EI-385444J	IC NMC27C256Q200 [BLANK ROM]
45	EI-389670J5	IC NMC27C256Q200 VX600-1-V1.15 (PROGRAMMED ROM)
46	EI-380948J	IC NMC27C64Q200 [BLANK ROM]
47	EI-388249J2	IC NMC27C84Q200 VX600-2-V1.12 (PROGRAMMED ROM)
48	EI-378297	IC PCM54HP
49	EI-364253	IC PST520D-2
50	EI-376178	IC SSM2300
51	EI-302233	IC TC4051BP
52	EI-200573	IC TC4053BP
53	EI-310036	IC TC4066BP
54	EI-360040	IC TC74HCU04P
55	EI-360037J1	IC TC74HC00AP
56	EI-360026J1	IC TC74HC04AP
57	EI-375222	IC TC74HC125P
58	EI-356049	IC TC74HC139P
59	EI-375220	IC TC74HC154P
60	EI-360053	IC TC74HC175P
61	EI-360029	IC TC74HC244P
62	EI-360032J1	IC TC74HC245AP
63	EI-360047	IC TC74HC374P
64	EI-370487	IC TC74HC42P
65	EI-360028	IC TC74HC74P
66	EI-371671	IC UPD78C11G-044-36
67	EI-380939J	IC UPD78310G-36
68	EI-354146	IC UPD8253C-2
69	EI-364257	OSC X'TAL NR-18
70	EM-382317J	IND LCD EDMIG245633B
71	✱EO-360068	COIL LF LF-2 B
72	✱ER-200972	R FUSE H S10 ERD2FC 1/4W 33R0G
73	✱ER-360725	R OMF H S12 FS 1W 221J
74	ES-380946J	ROTARY ENCORDER EC16B25D
75	ES-364255	SW SLIDE SSP322 [MEMORY PROTECT SW]
76	ES-349474	SW TACT SKHHAM004A
77	ES-306430	VOLTAGE SELECTOR SW
78	ET-354167	DETECTOR PC900V
79	✱ET-375446	TR 2SB1142
80	ET-349883	TR 2SC3243 D,E
81	ET-360137	TR 2SC3330 U,V F05
82	ET-349592	TR 2SC3400 F05
83	EV-385801J	VR ROTARY EWJCGAS22364B103B503 [BEND]
84	EV-365865	VR ROTARY V012LPH B202 L=20 [CONTRAST VR]
85	EV-365876	VR SLIDE VJ4513-2PVNB5 103 [VOLUME]
86	EZ-358816	BATTERY LITHIUM BR2032-1HF

2. P.C BOARD BLOCK

Ref. No.	Part No.	Description
1	BA-L1023A020A	PC CPU BLK VX600
2	BA-L1023A030A	PC VOICE BLK VX600
3	BA-L1023A040A	PC(✱)OPERATION BLK VX600

PC (✱) OPERATION BLK CONSISTS OF FOLLOWING P.C BOARD.

- OPERATION (A) P.C BOARD
- OPERATION (B) P.C BOARD
- VR P.C BOARD
- OPERATION (D) P.C BOARD
- HEADPHONE P.C BOARD
- ENCORDER P.C BOARD
- OPERATION (G) P.C BOARD

3. CPU P.C BOARD

Ref. No.	Part No.	Description
BT1	EZ-358816	BATTERY LITHIUM BR2032-1HF
C122	EC-368716	C EC V CUT SR-AKY 102M 25.0DC
C123	EC-368716	C EC V CUT SR-AKY 102M 25.0DC
C126	EC-368719	C EC V CUT SR-TIK 472M 16.0DC
CR1	EH-370520	COMP C EXF-P8102ZW
CR2	EH-359185	COMP R RKC1/8B8 103J
CR3	EH-353789	COMP R RKC1/8B6 103J
CR4	EH-351973	COMP R RKC1/8B4 472J
D1	✱ED-357038	D SILICON DBB10B 100/ 1.0A
D2	✱ED-357036	D SILICON DBA20B-K15 100/ 2.0A
D4	ED-344280	D SILICON H GMA-01-FY2 F05
D5	ED-344280	D SILICON H GMA-01-FY2 F05
D6	ED-344280	D SILICON H GMA-01-FY2 F05
D7	ED-344280	D SILICON H GMA-01-FY2 F05
D8	ED-344280	D SILICON H GMA-01-FY2 F05
D9	ED-344280	D SILICON H GMA-01-FY2 F05
D10	ED-344280	D SILICON H GMA-01-FY2 F05
D11	ED-344280	D SILICON H GMA-01-FY2 F05
D12	ED-346536	D ZENER H HZ7C3L
D13	ED-301911	D SILICON H DS448
D14	ED-344280	D SILICON H GMA-01-FY2 F05
D15	ED-301911	D SILICON H DS448
D16	ED-344280	D SILICON H GMA-01-FY2 F05
D17	ED-344280	D SILICON H GMA-01-FY2 F05
D18	ED-344280	D SILICON H GMA-01-FY2 F05
D19	ED-344280	D SILICON H GMA-01-FY2 F05
D20	ED-344280	D SILICON H GMA-01-FY2 F05
D21	ED-301911	D SILICON H DS448
FL1	EH-379500	FILTER EMI EXC-EMT102BC
FL2	EH-379500	FILTER EMI EXC-EMT102BC
FL3	EH-379500	FILTER EMI EXC-EMT102BC
FL4	EH-379500	FILTER EMI EXC-EMT102BC
FL5	EH-379500	FILTER EMI EXC-EMT102BC
FL6	EH-379500	FILTER EMI EXC-EMT102BC
FL7	EH-379500	FILTER EMI EXC-EMT102BC
FL8	EH-379500	FILTER EMI EXC-EMT102BC
FL9	EH-379500	FILTER EMI EXC-EMT102BC
FL10	EH-379500	FILTER EMI EXC-EMT102BC
FL11	EH-379500	FILTER EMI EXC-EMT102BC
IC1	EI-349719	IC M5218P
IC2	EI-349719	IC M5218P
IC3	EI-310036	IC TC4066BP
IC4	EI-353227	IC M5216L
IC5	EI-362588	IC M5238P
IC6	EI-364247	IC NJM13600
IC7	EI-362588	IC M5238P
IC8	EI-360047	IC TC74HC374P
IC9	EI-360047	IC TC74HC374P
IC10	EI-376178	IC SSM2300
IC11	EI-376178	IC SSM2300
IC12	EI-376178	IC SSM2300
IC13	EI-376178	IC SSM2300
IC14	EI-376178	IC SSM2300
IC15	EI-362588	IC M5238P
IC16	EI-364247	IC NJM13600
IC17	EI-362588	IC M5238P
IC18	EI-360047	IC TC74HC374P
IC19	EI-360047	IC TC74HC374P
IC20	EI-376178	IC SSM2300
IC21	EI-376178	IC SSM2300
IC22	EI-376178	IC SSM2300
IC23	EI-376178	IC SSM2300
IC24	EI-362588	IC M5238P
IC25	EI-364247	IC NJM13600
IC26	EI-362588	IC M5238P
IC27	EI-360047	IC TC74HC374P
IC28	EI-360047	IC TC74HC374P
IC29	EI-349719	IC M5218P
IC31	EI-360053	IC TC74HC175P
IC32	EI-364275	IC M74LS05P
IC33	EI-360037J1	IC TC74HC00AP
IC34	EI-378297	IC PCM54HP
IC35	EI-360047	IC TC74HC374P
IC36	EI-360032J1	IC TC74HC245AP
IC37	EI-375222	IC TC74HC125P
IC38	EI-360029	IC TC74HC244P

Ref. No.	Part No.	Description
IC39	EI-360029	IC TC74HC244P
IC40	EI-302233	IC TC4051BP
IC41	EI-375345	IC MM74HC373N
IC42	EI-375345	IC MM74HC373N
IC43	EI-360053	IC TC74HC175P
IC44	EI-380939J	IC UPD78310G-36
IC45	EI-389670J5	IC NMC27C256Q200 VX600-1-V1.15 [PROGRAMMED ROM]
*IC45	EI-385444J	IC NMC27C256Q200 [BLANK ROM]
IC46	EI-371671	IC UPD78C11G-044-36
IC47	EI-388249J2	IC NMC27C64Q200 VX600-2-V1.12 [PROGRAMED ROM]
*IC47	EI-380948J	IC NMC27C64Q200 [BLANK ROM]
IC48	EI-360026J1	IC TC74HC04AP
IC49	EI-356049	IC TC74HC139P
IC50	EI-360028	IC TC74HC74P
IC51	EI-375437	IC LC3664NL-10
IC52	EI-370487	IC TC74HC42P
IC53	EI-370487	IC TC74HC42P
IC54	EI-360040	IC TC74HCU04P
IC55	EI-360047	IC TC74HC374P
IC56	EI-360037J1	IC TC74HC00AP
IC57	EI-375437	IC LC3664NL-10
IC58	EI-369660	IC CXK5816PN-12L
IC59	EI-375220	IC TC74HC154P
IC60	EI-375220	IC TC74HC154P
IC61	EI-354146	IC UPD8253C-2
IC62	EI-375347	IC MM74HC14N
IC63	EI-378276	IC LC7981
IC64	✱EI-359552	IC M5236L
IC65	✱EI-380920J	IC AN6531
IC66	✱EI-380921J	IC AN6535
IC67	✱EI-380920J	IC AN6531
IC68	✱EI-380921J	IC AN6535
IC69	EI-364253	IC PST520D-2
IC70	✱EI-380919J	IC AN79L12
IC71	EI-346071	IC M5218L-21
J1	EJ-360771	DIN J TCS5037-01-241 13P [VOICE OUT]
J2	EJ-354105	PHONE J 2P HLJ0520-110 6.3 [LINE OUT]
J3	EJ-379523	PHONE J 3P HLJ4305-3080 S.NUT [PROTECT SW]
J4	EJ-354105	PHONE J 2P HLJ0520-110 6.3 [UP/DOWN]
J5	EJ-379523	PHONE J 3P HLJ4305-3080 S.NUT [PRG]
J6	EJ-364256	DIN J M1704 3P [MIDI]
L1	EO-318365	COIL FIX 1 LAL04 102K
L2	EO-318365	COIL FIX 1 LAL04 102K
PH1	ET-354167	DETECTOR PC900V
P28	EJ-365834	PLUG RK-H341TD-0190 34P
P29	EJ-365891	OLUG RA-H261TD-0190 26P
R29	ER-306805	R CB H S15 FS RDS 1/2W 101J
R30	ER-306805	R CB H S15 FS RDS 1/2W 101J
R152	✱ER-360725	R OMF H S12 FS 1W 221J
R165	✱ER-200972	R FUSE H S10 ERD2FC 1/4W 33R0G
RL1	EQ-348929	RELAY SIG G5A-237P 2TR 12V
SW1	ES-364255	SW SLIDE SSP322 [MEMORY PROTECT SW]
T1	✱BT-383935J	TRANS PULSE 2E16-1001-01
TR1	ET-360137	TR 2SC3330 U,V F05
TR2	ET-360137	TR 2SC3330 U,V F05
TR3	ET-349883	TR 2SC3243 D,E
TR4	✱ET-375446	TR 2SB1142
TR5	ET-360137	TR 2SC3330 U,V F05
TR6	ET-360137	TR 2SC3330 U,V F05
TR7	ET-349592	TR 2SC3400 F05
TR8	ET-349592	TR 2SC3400 F05
TR9	ET-349592	TR 2SC3400 F05
TR10	ET-349592	TR 2SC3400 F05
TR11	ET-349592	TR 2SC3400 F05
TR12	ET-349592	TR 2SC3400 F05

Ref. No.	Part No.	Description
VR1	EV-365865	VR ROTARY V012LPH B202 L=20 [CONTRAST VR]
VR2	EV-390045J	R S-FIX H RH0421C 0.20W 332
VR3	EV-390046J	R S-FIX H RH0421C 0.20W 224
X1	EI-364257	OSC X'TAL NR-18
W201	EW-380934J	WIRE ASSY VX600 W201 26P
1	EZ-200473	SILICON RUBBER SHEET TC-30
F2	*EF-306124	FUSE TSC A 250V 630MA [J]
F3	*EF-309388	FUSE TSC A 250V 800MA [J]
F4	*EF-309388	FUSE TSC A 250V 800MA [J]
F2A	*EF-305703	FUSE TSC 125V 630MA [C,A,Y1]
F3A	*EF-309391	FUSE TSC 125V 800MA [C,A,Y1]
F4A	*EF-309391	FUSE TSC 125V 800MA [C,A,Y1]
F2B	*EF-593706	FUSE SEMKO T 250V 500MA [E,V,S]
F3B	*EF-601942	FUSE SEMKO T 250V 630MA [E,V,S]
F4B	*EF-601942	FUSE SEMKO T 250V 630MA [E,V,S]
F2C	*EF-355374	FUSE BET T 250V 500MA [B]
F3C	*EF-358974	FUSE BET T 250V 630MA [B]
F4C	*EF-358974	FUSE BET T 250V 630MA [B]

4. VOICE P.C BOARD

Ref. No.	Part No.	Description
C25	EC-306445	C MC V FM 221J 500DC
C26	EC-427948	C MC V FM 100J 500DC
C29	EC-306445	C MC V FM 221J 500DC
C31	EC-306445	C MC V FM 221J 500DC
D2	ED-344280	D SILICON H GMA-01-FY2 F05
D3	ED-344280	D SILICON H GMA-01-FY2 F05
D4	ED-344280	D SILICON H GMA-01-FY2 F05
D5	ED-344280	D SILICON H GMA-01-FY2 F05
IC1	EI-380918J	IC CEM3374
IC2	EI-349719	IC M5218P
IC3	EI-310036	IC TC4066BP
IC4	EI-200573	IC TC4053BP
IC5	EI-385445J	IC CEM3378
IC6	EI-349719	IC M5218P
IC7	EI-375439	IC M5206P
IC8	EI-349719	IC M5218P

5. OPERATION (A) P.C BOARD

Ref. No.	Part No.	Description
D1	ED-301911	D SILICON H DS448
D2	ED-301911	D SILICON H DS448
D3	ED-301911	D SILICON H DS448
D4	ED-301911	D SILICON H DS448
D5	ED-301911	D SILICON H DS448
D6	ED-301911	D SILICON H DS448
D7	ED-301911	D SILICON H DS448
D8	ED-301911	D SILICON H DS448
D9	ED-301911	D SILICON H DS448
D10	ED-301911	D SILICON H DS448
D11	ED-301911	D SILICON H DS448
D12	ED-301911	D SILICON H DS448
D13	ED-301911	D SILICON H DS448
D14	ED-301911	D SILICON H DS448
D15	ED-301911	D SILICON H DS448
D16	ED-301911	D SILICON H DS448
D17	ED-301911	D SILICON H DS448
D18	ED-301911	D SILICON H DS448
D19	ED-301911	D SILICON H DS448
D20	ED-301911	D SILICON H DS448
D21	ED-301911	D SILICON H DS448
D22	ED-301911	D SILICON H DS448
SW1	ES-349474	SW TACT SKHHAM004A
SW2	ES-349474	SW TACT SKHHAM004A
SW3	ES-349474	SW TACT SKHHAM004A
SW4	ES-349474	SW TACT SKHHAM004A
SW5	ES-349474	SW TACT SKHHAM004A
SW6	ES-349474	SW TACT SKHHAM004A
SW7	ES-349474	SW TACT SKHHAM004A
SW8	ES-349474	SW TACT SKHHAM004A
SW9	ES-349474	SW TACT SKHHAM004A
SW10	ES-349474	SW TACT SKHHAM004A
SW11	ES-349474	SW TACT SKHHAM004A
SW12	ES-349474	SW TACT SKHHAM004A
SW13	ES-349474	SW TACT SKHHAM004A
SW14	ES-349474	SW TACT SKHHAM004A
SW15	ES-349474	SW TACT SKHHAM004A
SW16	ES-349474	SW TACT SKHHAM004A
SW17	ES-349474	SW TACT SKHHAM004A
SW18	ES-349474	SW TACT SKHHAM004A
SW19	ES-349474	SW TACT SKHHAM004A
SW20	ES-349474	SW TACT SKHHAM004A
SW21	ES-349474	SW TACT SKHHAM004A
SW22	ES-349474	SW TACT SKHHAM004A
TR1	ET-349592	TR 2SC3400 F05
TR2	ET-349592	TR 2SC3400 F05
TR3	ET-349592	TR 2SC3400 F05

6. OPERATION (B) P.C BOARD

Ref. No.	Part No.	Description
D1	ED-376335	D SCHOTTKY SB02-03 T05
D2	ED-376335	D SCHOTTKY SB02-03 T05
D3	ED-344280	D SILICON H GMA-01-FY2 F05
D4	ED-344280	D SILICON H GMA-01-FY2 F05
D5	ED-376335	D SCHOTTKY SB02-03 T05
D6	ED-376335	D SCHOTTKY SB02-03 T05
D7	ED-376335	D SCHOTTKY SB02-03 T05
D8	ED-376335	D SCHOTTKY SB02-03 T05
D9	ED-376335	D SCHOTTKY SB02-03 T05
D10	ED-376335	D SCHOTTKY SB02-03 T05
D11	ED-376335	D SCHOTTKY SB02-03 T05
D12	ED-376335	D SCHOTTKY SB02-03 T05
D13	ED-376335	D SCHOTTKY SB02-03 T05
D14	ED-376335	D SCHOTTKY SB02-03 T05
D15	ED-376335	D SCHOTTKY SB02-03 T05
D16	ED-376335	D SCHOTTKY SB02-03 T05
D17	ED-359863	D LED LN81CV-(LF) AK ORANGE
D18	ED-359863	D LED LN81CV-(LF) AK ORANGE
D19	ED-359863	D LED LN81CV-(LF) AK ORANGE
IC1	EI-346071	IC M5218L-21
IC2	EI-346071	IC M5218L-21
IC3	EI-346071	IC M5218L-21
IC4	EI-346071	IC M5218L-21
L1	EO-318365	COIL FIX 1 LAL04 102K
L2	EO-318365	COIL FIX 1 LAL04 102K
VR1	EV-387796J	VR ROTARY EVJ-2KA056B14 B103 [VIBRATE]
VR2	EV-356582	R S-FIX H RH0615C 0.10W 473
VR3	EV-356582	R S-FIX H RH0615C 0.10W 473
VR4	EV-356582	R S-FIX H RH0615C 0.10W 473
VR5	EV-365876	VR SLIDE VJ4513-2PVNB5 103 [VOLUME]
W101	EW-380936J	WIRE ASSY VX600 W101 26P

7. VR P.C BOARD

Ref. No.	Part No.	Description
VR1	EV-385801J	VR ROTARY EWJCGAS22364B103B503 [BEND]
VR2	EV-385801J	VR ROTARY EWJCGAS22364B103B503 [GLIDE]
VR3	EV-385801J	VR ROTARY EWJCGAS22364B103B503 [BREATH]

8. OPERATION (D) P.C BOARD

Ref. No.	Part No.	Description
J1	EJ-380944J	SOCKET 75080950 34P
W109	EW-380947J	WIRE ASSY VX600 W109 34P

9. HEAD PHONE P.C BOARD

Ref. No.	Part No.	Description
J1	EJ-348846	PHONE J 3P HLJ0540-010 6.3

10. ENCORDER P.C BOARD

Ref. No.	Part No.	Description
VR1	ES-380946J	ROTARY ENCORDER EC16B25D

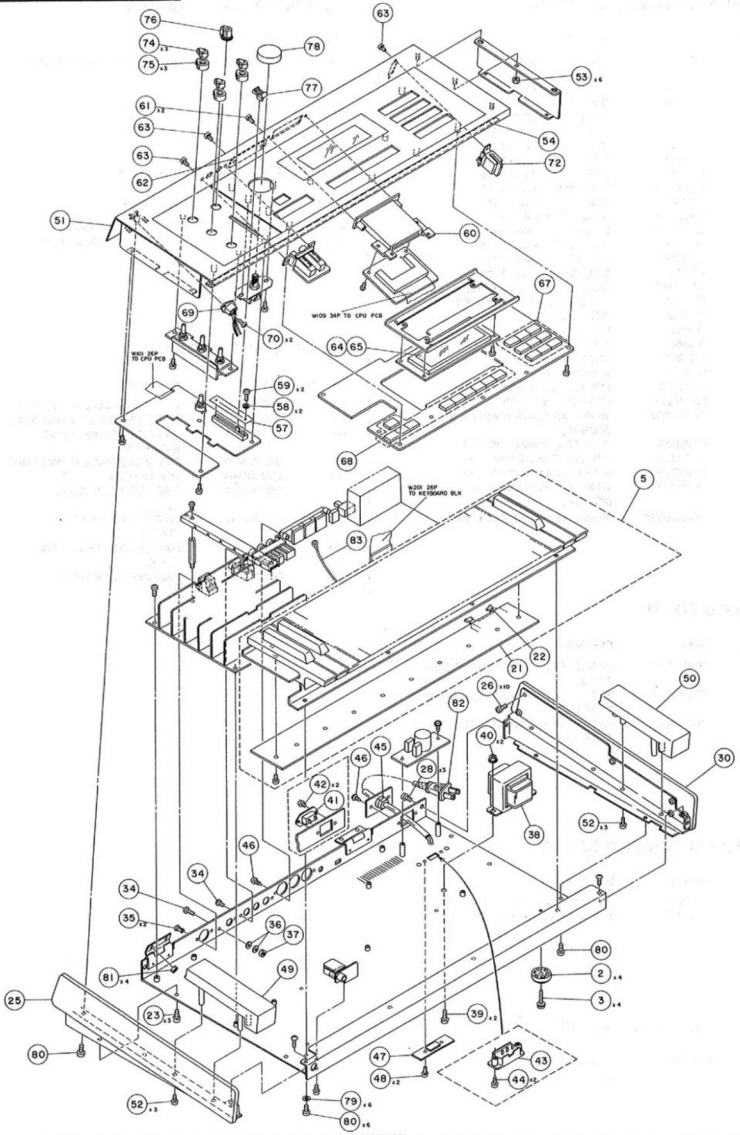
11. OPERATION (G) P.C BOARD

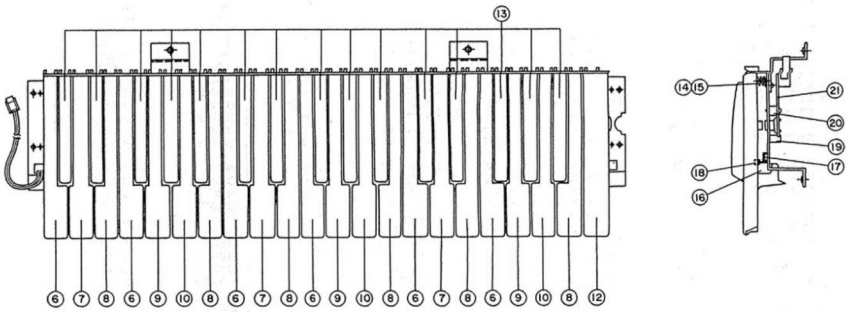
Ref. No.	Part No.	Description
J1	EJ-354105	PHONE J 2P HLJ0520-110 6.3
J2	EJ-354105	PHONE J 2P HLJ0520-110 6.3

12. FILTER P.C BOARD

Ref. No.	Part No.	Description
C2	✻EC-358450	C CE V DNS102MBE B 102M 400AC
C3	✻EC-358450	C CE V DNS102MBE B 102M 400AC
C4	✻EC-338411	C CE V DE7 FZ 103P 400AC [EXCEPT J]
C5	✻EC-358450	C CE V DNS102MBE B 102M 400AC
FL1	✻EO-360068	COIL LF LF-2 B
F1	✻EF-306124	FUSE TSC A 250V 630MA [J]
F1A	✻EF-305703	FUSE TSC 125V 630MA [C,A,Y1]
F1B	✻EF-695766	FUSE SEMKO T 250V 315MA [E,V,S]
F1C	✻EF-355385	FUSE BET T 250V 315MA [B]

FINAL ASSEMBLY BLOCK





NOTE:
Parts will not be supplied if they are not listed in the parts list, even if they appear on the assembling illustrations with reference No.

13. FINAL ASSEMBLY BLOCK

Ref. No.	Part No.	Description
2	SA-332850	FOOT ROUND SHAPED
3	ZS-362533	ST PAN30X05STL CMT C080 [FOOT FIX]
5	BK-383936J	KEYBOARD BLK ESK-832 37KEY
6	SK-726278J	KEY WHITE CF K80
7	SK-726279J	KEY WHITE D K80
8	SK-726280J	KEY WHITE BE K80
9	SK-726281J	KEY WHITE G K80
10	SK-726282J	KEY WHITE A K80
12	SK-726277J	KEY WHITE CC K80
13	SK-726283J	KEY BLACK 5 K80
14	ZG-728369J	SP KEY BLACK K70BN27
15	ZG-728370J	SP KEY WHITE K70BN6
16	MZ-728371J	DAMPER K60DP79
17	MZ-728372J	DAMPER K90DP27
18	MB-727158J	K10 GUID GUM A
19	MZ-728374J	ANGLE K30AG136
20	ZW-728375J	SPEACER K30SS135
21	BA-728376J	PC K60PB165
22	EJ-365891	PLUG RA-H261TD-0190 26P
23	ZS-388071J	ST BID40X05STL BNI
25	SP-383776J	COVER(L)
26	ZS-417137	BID30X04STL CMT
28	ZS-341960	ST BID40X06STL BNI
30	SP-383786J	COVER SIDE(R)
34	ZS-355511	BID30X06STL BNI
35	ZW-698308	RV NYL30X055 BL
36	ZW-273802	TW30
37	ZW-516993	N30STL CMT 1
38	*BT-383926J	TRANS POW L1023 J [J]
38A	*BT-383927J	TRANS POW L1023 C,A [C,A,Y1]
38B	*BT-383928J	TRANS POW L1023 E,V,B,S [E,V,B,S]
39	ZS-378447	ST BID40X10STL BNI [TRANS POWER FIX]
40	ZW-413267	N FRANGE 40STL CMT
41	*EJ-358633	SOCKET INLET SOT-17 2P [J,E,V,B,S,Y,]
42	ZS-311746	T2CTS30X08STL BNI
43	*ES-306430	SW SLIDE J-S4013#01 01-2 [VOLTAGE SELECTOR SW] [E,V,B,S]
44	ZS-350934	PT BR30X08STL BNI
45	EZ-302906	STRAIN RELIEF SR-6N-4 [C,A,Y,]
46	ZS-447761	T2BR30X06STL BNI
47	SC-383644J	COVER VOLTAGE SELECTOR [J,C,A,Y,]
48	ZS-463353	T2BR30X08STL BNI
49	SP-384038J	PANEL SUB(L)
50	SP-384039J	PANEL SUB(R)
51	SP-383787J	PANEL FRONT PART
52	ZS-331532	PT BID30X08STL BNI
53	ZW-413188	N40STL CMT 1
54	SZ-384036J	MASK KEYBOARD
57	SE-362389A-A	MASK VOLUME(A)
58	ZW-321317	PW21X040X050PSL
59	ZS-362266	PAN20X02STL BNI
60	SE-383777J	ESCUTCHEON IC CARD
61	ZS-383937J	PT PAN30X08STL NI3
62	SC-388713J	COVER CONNECTOR
63	ZS-593908	PAN30X06STL NI3
64	EM-382317J	IND LCD EDMIG245633B
65	EL-728382J	EDMIG245633B EL BACK LIGHT
67	SK-383388J	KNOB PUSH [DATA KNTRY]
68	SK-384037J	KNOB PUSH(B) [SOFT/CURSOR KEY]
69	EJ-375424	PLUG EMC-TM
70	ZS-355818	ST BR26X04STL CMT
72	ES-364478	SW SEESAW SDDTA1 T8.5 01-1 [SW POWER]
74	SK-383789J	KNOB DOUBLE(UPPER) PART [BEND/GLIDE/BREATH]
75	SK-383781J	KNOB DOUBLE(LOWER)
76	SK-383790J	KNOB SINGLE PART [VIBRATE]
77	SK-383390J	KNOB SLIDE [VOLUME]
78	SK-382429J	KNOB UPPER PART [CONTROL]
79	ZW-273914	SW40
80	ZS-537074	BID40X06STL BNI [KEYBOARD FIX]
81	ZW-516993	N30STL CMT 1
82	*EW-365947	AC CORD 250 SKP210KS17B A [J]
82A	*EW-357931	AC CORD 3 CORES VM0033A SJT18A [C,Y1]
82B	*EW-366055	AC CORD 250 KP11WSJT18 UC [A]
82C	*EW-358629	AC CORD 2C KP4819C KS-17Y [E,V]
82D	*EW-358631	AC CORD 2C KS-17 LTBS2F BS [B]
82E	*EW-358630	AC CORD 2C KP560 LTSA2F KS17 S [S]
83	EW-362290	WIRE EARTH LUG 260MM 18AWG

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ABBREVIATIONS FOR THE SERVICE MANUAL

ABBREVIATION	EXPLANATION	ABBREVIATION	EXPLANATION
ADC	Analogue to Digital Converter	MIDI	Musical Instrument Digital Interface
AMP (Amp)	AMPlifier		
BBD	Backet Brigade Diode	MINI	MINImum
BCD	Binary Code Decimal	MIX	MIXer
B.DOWN	Brak DOWN	MOD	MODulation
B.UP	Back UP	M.WHEEL	Modulation WHEEL
CE	Chip Enable	OSC	OSCillator
CH	CHannel	RAM	Random Access Memory
COMP	COMParator	RD	ReaD
CONT	CONTrol	REG	REGulator
CV	Control Voltage	RESO	RESOnance
DAC	Digital to Analogue Converter	RL	ReLay
EG	Envelope Generator	ROM	Read Only Memory
EXT	EXTernal	S/H	Sample and Hold
FREQ	FREQuency	SW	SWitch
HPF	High Pass Filter	THRU	THRoUgh
INH	INHibit	TRANS	TRANSpose
INT	INTerrupt	U	Upper
INV	INVerter	VA	Voltage Analog
L	Lower	VCA	Voltage Controlled Amplifier
LFO	Low Frequency Oscillator	VCF	Voltage Controlled Filter
MAX	MAXimum	VR	Variable Resistor
MEMO	MEMOry	V_{REF}	REFerence Voltage
		WR	WRite

AKAI ELECTRIC CO., LTD.

12-14, 2-Chome, Higashi-Kojiya, Ohta-Ku, Tokyo, Japan
SERVICE DEPARTMENT TEL: Tokyo(745)9884 TOKYO TELEX: J26261

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