

AIWA®

S/M Code No. 85-011
DATE OF ISSUE 3/1985

SERVICE MANUAL

STEREO PREAMPLIFIER

MODEL NO. GX-120



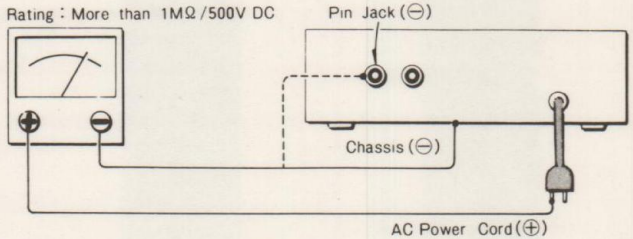
STEREO POWER AMPLIFIER

MODEL NO. BX-120



TYPE. HB, UB, EB, KB, ZB

Follow the instructions carefully, which will allow the user to optimise the products' performance and give many years of service.

1. No scratch and melting shall be made to covered lead-wires of an a.c. primary circuit including mains leads.
2. No illegibility shall be given to the specification plate, the caution labels, the fuse labels and others.
3. When, on pattern sides of circuit boards, additional repair-parts have been made up, the parts shall be firmly glued to circuit boards or other components, unless the parts can be attached firmly.
4. The following matters shall be maintained as they are, when repairing.
 - 1) Soldering of lead-wire ends
 - * Care should be taken of the space distance in an a.c. primary circuit as well as soldering.
 - 2) Wiring and holding of lead-wires with wire-clips and binders
 - 3) Materials of lead-wires
 - * e.g.; For UL models, lead-wires to be used shall be approved or accepted by the UL.
 - 4) Location of all kinds of insulators
 - 5) Setting of voltage selector switch
 - * Set the Voltage Selector Switch to 240V, 220V, or 120V, According to your Local Voltage.
5. After repaired, the insulation resistance or leakage current shall be measured with $500 \pm 5V$ D.C and shall be not less than $1M\Omega$.
Measuring Point
 Connect to Chassis or Outside \ominus of Pin Jack
 Rating : More than $1M\Omega/500V$ DC

6. General instructions for mechanism repair
 - 1) E-rings and poly slider washers shall be replaced with new ones, if once those have been removed. — No re-utilization due to unreliability.
 - 2) Regular spare-parts shall always be used for repair, because using irregular parts and tampering with the products shall cause deterioration, malfunction and damage.

SPECIFICATIONS

GX-120

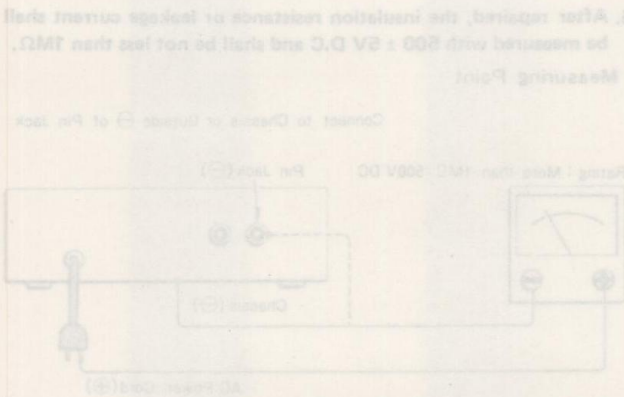
Total harmonic distortion:	TUNER, AUX, TAPE PLAY, CD 0.02% (1 kHz) PHONO (MM) 0.01% (1 kHz, REC OUT)
Frequency response:	30 Hz to 50 kHz (+0.5/-3 dB)
S/N ratio:	IHF A curve short circuited GX-120E, H, K, G, U PHONO (MM) 80 dB TUNER, AUX, TAPE 83 dB GX-120Z PHONO (MM) 76 dB TUNER, AUX, TAPE 83 dB
Input jacks (Sensitivity/input impedance):	PHONO (MM) 3 mV/47k ohms TUNER 150 mV/47k ohms CD 320 mV/27k ohms TAPE 150 mV/47k ohms AUX 150 mV/47k ohms MIC 1 mV/10 kOhm
Output jacks (Level/output impedance):	TAPE: 130 mV/47k ohms (REC OUT) OUTPUT: 1 V/47k ohms
RIAA deviation:	±0.5 dB (20 Hz ~ 20 kHz)

● Design and specifications are subject to change without notice.

BX-120

Effective output power:	BX-120H 100W+100W (10%, 8 ohms) BX-120G, E, K, Z 75W+75W (0.009%, 1 kHz, 8 ohms) < FTC Rule U mode only > 75 Watts per channel, Min. RMS at 8 ohms, from 20 Hz—20 kHz, with no more than 0.02% Total Harmonic Distortion.
Total harmonic distortion:	0.01% (50W+50W, 20 Hz—20 kHz, 8 ohms)
Frequency response:	10 Hz to 50 kHz (-1 dB)
S/N ratio:	IHF 110 dB, A curve short circuited
Input jacks (Sensitivity/ input impedance):	BX-120H 1V/47k ohms BX-120G, E, K, Z, U 800 mV/47k ohms
Output jacks (Level/ output impedance):	Headphones 1 mW/1 W (8Ω) Speakers (A or B) 8 to 16 ohms Speakers (A+B) 16 ohms
Damping Factor:	More than 30 (8 ohms, 1 kHz)
Power requirements:	BX-120U AC 120V, 60 Hz BX-120G, K AC 240V, 50/60 Hz BX-120H AC 120V/220V/240V switchable, 50/60 Hz BX-120E, Z AC 220V, 50/60 Hz
Power consumption:	BX-120G, E, K, Z 350 W BX-120U 100 W BX-120H 118 W 300 (W) × 71 (H) × 200 (D) mm
Dimensions:	
Weight:	4.5 kg

● Design and specifications are subject to change without notice.



1) E-rings and bolt slider washers shall be replaced with new ones if once they have been removed. — No re-utilization due to unavailability.

2) Regular spare-parts shall always be used for repair, because using regular parts and tampering with the product shall cause deterioration, malfunction and damage.

3) General instructions for mechanism repair.

1) The scratch and wiring shall be made to covered lead wires of an a.c. primary circuit including main leads.

2) No flexibility shall be given to the specification plate, the connection labels, the fuse labels and others.

3) When on pattern sides of circuit boards, additional repair-parts have been made up, the parts shall be firmly glued to circuit boards or other components, unless the parts can be attached firmly.

4) The following matters shall be maintained as they are, when repairing.

1) Soldering of lead-wire ends

* Care should be taken of the space distance in an a.c. primary circuit as well as soldering.

2) Wiring and holding of lead-wires with wire-clips and binders

3) Materials of lead-wires

* e.g., For UL models, lead-wires to be used shall be approved or accepted by the UL.

4) Location of all kinds of insulators

5) Setting of voltage selector switch

* Set the Voltage Selector Switch to 240V, 220V, or 120V, according to your local Voltage.

ELECTRICAL MAIN PARTS LIST (GX-120)

+++ mark denotes a component of assembled part which part code is represented by a previously stated component.
*-mark means less required items and availabilities may be limited.

CAPACITORS
No mark, U, UF: μF
P, PF : pF
COILS
MMH: mH
UH : μH
FUSE
MMA:mA

ELECTRICAL MAIN PARTS LIST (BX-120)

Table with columns: Ref. No., Part No., Description. It lists various electrical components such as ICs, transistors, capacitors, coils, fuses, and miscellaneous parts for the GX-120 and BX-120 models.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
J4	+++	JACK PLATE, ASSY (SPEAKERS A(R))	AS11	87-031-897	PUSH SW, SEA (POWER STANDBY/ON)	AF4	87-035-191	FUSE, T3.15A (E,K,Z ONLY)
J2	87-049-360	JACK 6.3 (PHONES)						
J5	* 81-738-631	SPEAKER-TERMINAL (SPEAKERS B)						
L1	* 87-005-158	INDUCTOR 1UH	=== DRIVER-1 CIRCUIT BOARD SECTION ===			=== VOLTAGE SELECTOR CIRCUIT BOARD SECTION (H ONLY) ===		
L2	* 87-005-158	INDUCTOR 1UH	PCB-C	*	DRIVER-1 CIRCUIT BOARD	PCB-G	*	VOLTAGE SELECTOR CIRCUIT BOARD
AR139	* 87-025-347	RES, MFO 2W10 (F)	C3	* 87-015-380	CAP, ELECT BP 4.7-25V		82-304-743	1P TERMINAL
AR140	* 87-025-347	RES, MFO 2W10 (F)	C7	* 87-018-121	CAP, CERA-SOL SS 150P	AF1	87-033-147	FUSE CLAMP
AR223	* 87-025-348	RES, NONFLAM 1W270	C9	* 87-018-124	CAP, CERA-SOL SS 270P	AF1	87-035-312	FUSE, 7A
AR224	* 87-025-348	RES, NONFLAM 1W270	C13	* 87-018-117	CAP, CERA-SOL SS 68P	AF2	87-035-256	FUSE, 3.15A
AR231	* 87-025-397	RES, NONFLAM 1K 2W	C17	* 87-018-104	CAP, CERA-SOL SS 10P	AS12	87-031-685	ROTARY SWITCH (VOLTAGE SELECTOR)
AR232	* 87-025-397	RES, NONFLAM 1K 2W	C19	* 87-018-099	CAP, CERA-SOL 3.9P			
AR301	* 87-029-383	RES, FUSIBLE 1W-3.3	C21	* 87-018-097	CAP, CERA-SOL SS 2.2P	=== MISCELLANEOUS ===		
AR302	* 87-029-383	RES, FUSIBLE 1W-3.3	C25	* 87-018-129	CAP, CERA-SOL 680P			
RY1	* 87-045-224	RELAY G2R 24V-2	C35	* 87-015-691	CAP, ELECT 0.1-50			
RY2	* 87-045-223	RELAY G4W 24V-2	C53	* 87-018-106	CAP, CERA-SOL SS 15P			
S1	87-031-892	SW SUL (AFBS(SPEAKER A))	C59	* 87-018-123	CAP, CERA-SOL SS 220P			
S5	+++	SW SUL (SPEAKERS A)	D1	87-027-469	DIODE, ZENER HZ16-2			
S6	+++	SW SUL (SPEAKERS B)	D3	87-020-110	DIODE, 1SS177			
		=== FRONT CIRCUIT BOARD SECTION ===	D5	87-027-469	DIODE, ZENER HZ16-2			
			D7	87-020-110	DIODE, 1SS177			
PCB-B	*	FRONT CIRCUIT BOARD	D15	87-027-625	DIODE, ZENER 05Z-6.8U			
C105	* 87-015-692	CAP, ELECT 0.22-50	D17	87-027-625	DIODE, ZENER 05Z-6.8U			
C106	* 87-015-692	CAP, ELECT 0.22-50	AR43	* 87-029-112	RES, FUSIBLE 1/4W-330			
C107	* 87-015-696	CAP, ELECT 2.2-50	SFR1	* 87-021-856	SFR 100			
C108	* 87-015-694	CAP, ELECT 0.47-50V	=== DRIVER-2 CIRCUIT BOARD SECTION ===					
C111	* 87-015-696	CAP, ELECT 2.2-50	PCB-D	*	DRIVER-2 CIRCUIT BOARD			
C112	* 87-015-694	CAP, ELECT 0.47-50V	C4	* 87-015-380	CAP, ELECT BP 4.7-25V			
C115	* 87-015-696	CAP, ELECT 2.2-50	D2	87-027-469	DIODE, ZENER HZ16-2			
C116	* 87-015-694	CAP, ELECT 0.47-50V	D4	87-020-110	DIODE 1SS177			
C119	* 87-015-696	CAP, ELECT 2.2-50	D6	87-027-469	DIODE, ZENER HZ16-2			
C120	* 87-015-694	CAP, ELECT 0.47-50V	D8	87-020-110	DIODE, 1SS177			
C123	* 87-015-696	CAP, ELECT 2.2-50	C8	* 87-018-121	CAP, CERA-SOL SS 150P			
C124	* 87-015-694	CAP, ELECT 0.47-50V	C10	* 87-018-124	CAP, CERA-SOL SS 270P			
C125	* 87-018-129	CAP, CERA-SOL 680P	C14	* 87-018-117	CAP, CERA-SOL SS 68P			
C126	* 87-018-129	CAP, CERA-SOL 680P	C18	* 87-018-104	CAP, CERA-SOL SS 10P			
C127	* 87-015-696	CAP, ELECT 2.2-50	C20	* 87-018-099	CAP, CERA-SOL 3.9P			
C128	* 87-015-694	CAP, ELECT 0.47-50V	C22	* 87-018-097	CAP, CERA-SOL SS 2.2P			
C129	* 87-018-124	CAP, CERA-SOL SS 270P	C26	* 87-018-129	CAP, CERA-SOL 680P			
C130	* 87-018-124	CAP, CERA-SOL SS 270P	C36	* 87-015-691	CAP, ELECT 0.1-50			
C131	* 87-015-696	CAP, ELECT 2.2-50	C54	* 87-018-106	CAP, CERA-SOL SS 15P			
C132	* 87-015-694	CAP, ELECT 0.47-50V	C60	* 87-018-123	CAP, CERA-SOL SS 220P			
C133	* 87-015-696	CAP, ELECT 2.2-50	D16	87-027-625	DIODE, ZENER, 05Z-6.8U			
C134	* 87-015-691	CAP, ELECT 0.1-50	D18	87-027-625	DIODE, ZENER 05Z-6.8U			
C135	* 87-015-694	CAP, ELECT 0.47-50V	AR44	* 87-029-112	RES, FUSIBLE 1/4W-330			
C137	* 87-015-690	CAP, ELECT 22-35V	SFR2	* 87-021-856	SFR 100			
C138	* 87-015-682	CAP, ELECT 22-16	=== FUSE CIRCUIT BOARD SECTION ===					
C144	* 87-018-127	CAP, CERA-SOL SS 470P	PCB-E	*	FUSE CIRCUIT BOARD (EXCEPT H)			
C146	* 87-018-130	CAP, CERA-SOL 820P		82-304-743	1P TERMINAL (EXCEPT H)			
C147	* 87-015-691	CAP, ELECT 0.1-50		87-033-147	FUSE CLAMP (EXCEPT H)			
C151	* 87-015-689	CAP, ELECT 35-10V	AF1	87-035-313	FUSE, 5A (U ONLY)			
D35	87-020-110	DIODE, 1SS177	AF1	87-035-190	FUSE, T2A (E,K,Z ONLY)			
D36	87-020-110	DIODE, 1SS177						
D37	87-020-110	DIODE, 1SS177	=== FUSE SUB CIRCUIT BOARD SECTION ===					
D38	87-020-110	DIODE, 1SS177	PCB-F	*	FUSE SUB CIRCUIT BOARD (EXCEPT H)			
D39	87-020-110	DIODE, 1SS177	D65	87-027-185	DIODE, 30D2FA (EXCEPT H)			
D40	87-020-110	DIODE, 1SS177	D66	87-027-185	DIODE, 30D2FA (EXCEPT H)			
D41	87-020-110	DIODE, 1SS177	D67	87-027-185	DIODE, 30D2FA (EXCEPT H)			
D42	87-020-110	DIODE, 1SS177	D68	87-027-185	DIODE, 30D2FA (EXCEPT H)			
D43	* 87-020-393	LED, TLR-206RPH (AFBS(SPEAKER A))	AF3	87-035-303	FUSE, 4A (U ONLY)			
D45	87-027-686	DIODE, ZENER HZ12A1	AF3	87-035-191	FUSE, T3.15A (E,K,Z ONLY)			
D46	87-020-110	DIODE 1SS177	AF4	87-035-303	FUSE, 4A (U ONLY)			
D47	87-020-110	DIODE, 1SS177						
FL	* 81-738-640	FL, CP1057GR						
AR229	* 87-029-390	RES, FUSIBLE 120 1/4W						

C-MOS IC handling precaution

The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and deposit.
2. To use solder iron less than 40W (less than 260°C) of power consumption for soldering. But do not overheat more than 10 second.
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.
4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (⊕).

⚠ Safety component symbol

This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

Note; Combination Circuit Board

The parts on the electrical parts list which are indicated by an asterisk (*) are supplied as one single combined circuit board. Therefore, they will not be supplied separately. If this becomes necessary, please order the entire circuit board.

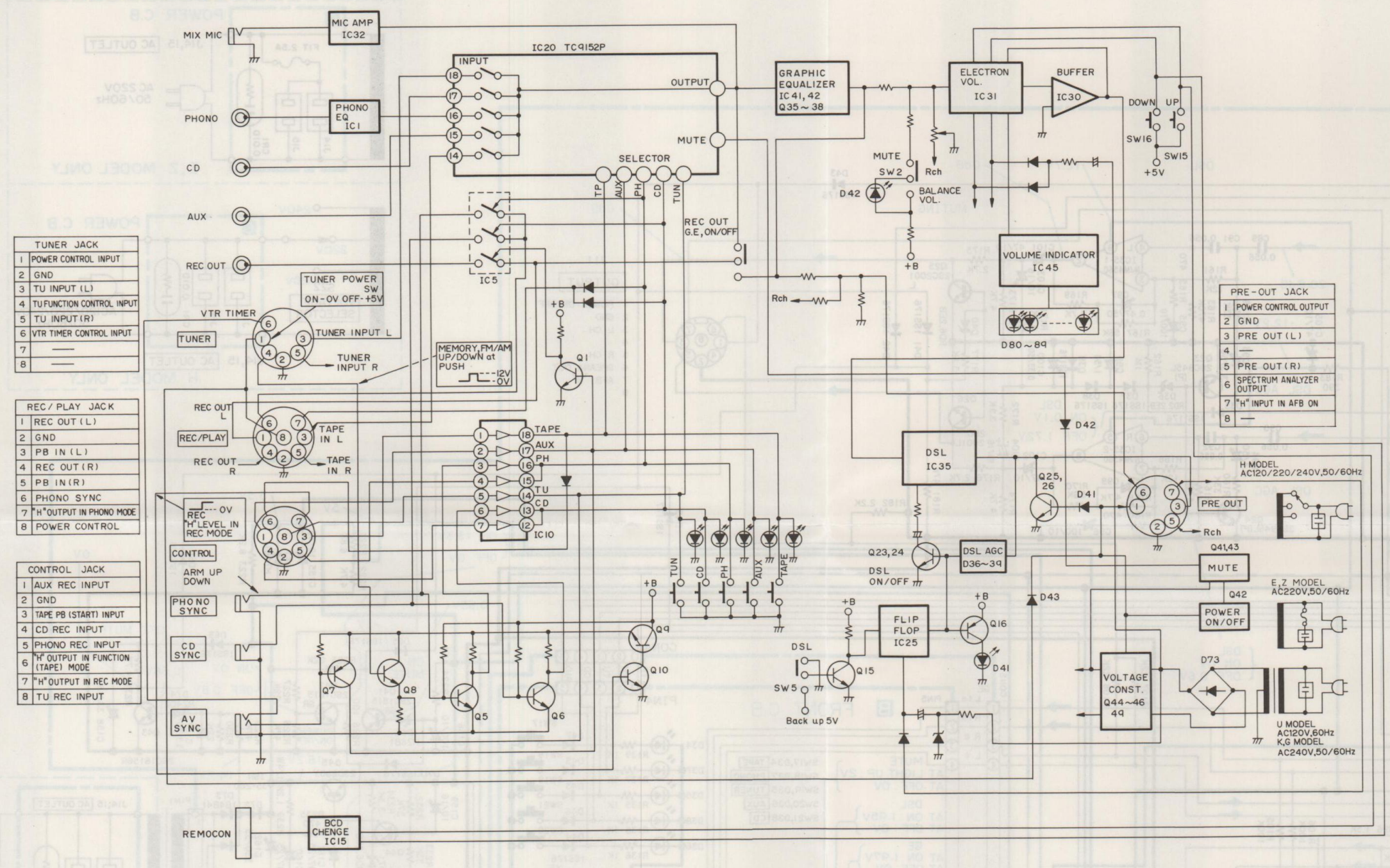
[GX-120]

Combination circuit board 81-729-610
 PCB-A 81-739-611
 PCB-B 81-739-612

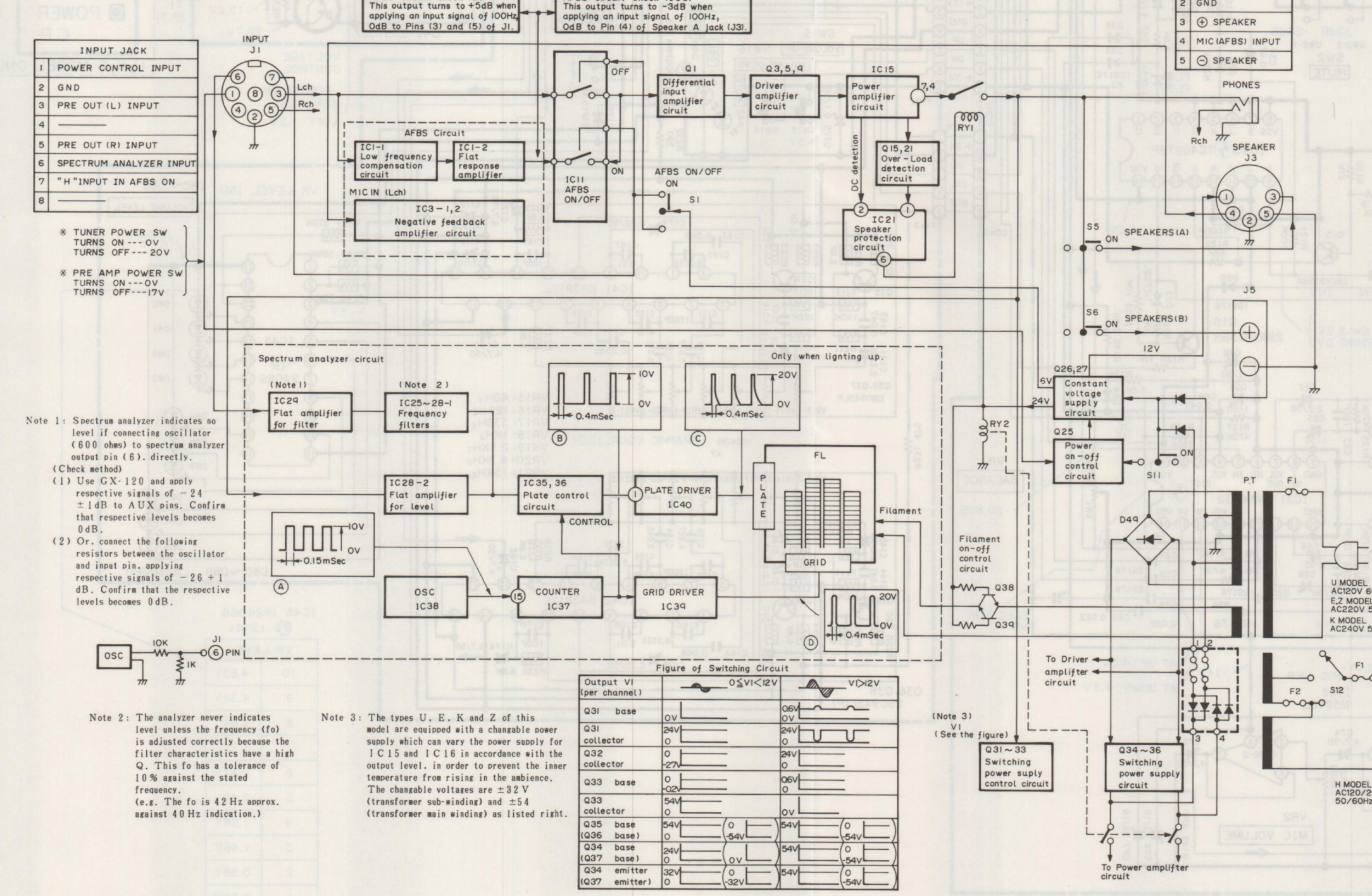
[BX-120]

Combination circuit board 81-738-610
 PCB-A 81-738-611
 PCB-B 81-738-612
 PCB-C 81-738-613
 PCB-D 81-738-614
 PCB-E 81-738-616 (EXCEPT H)
 PCB-F 81-738-617 (EXCEPT H)
 PCB-G 81-738-618 (H ONLY)

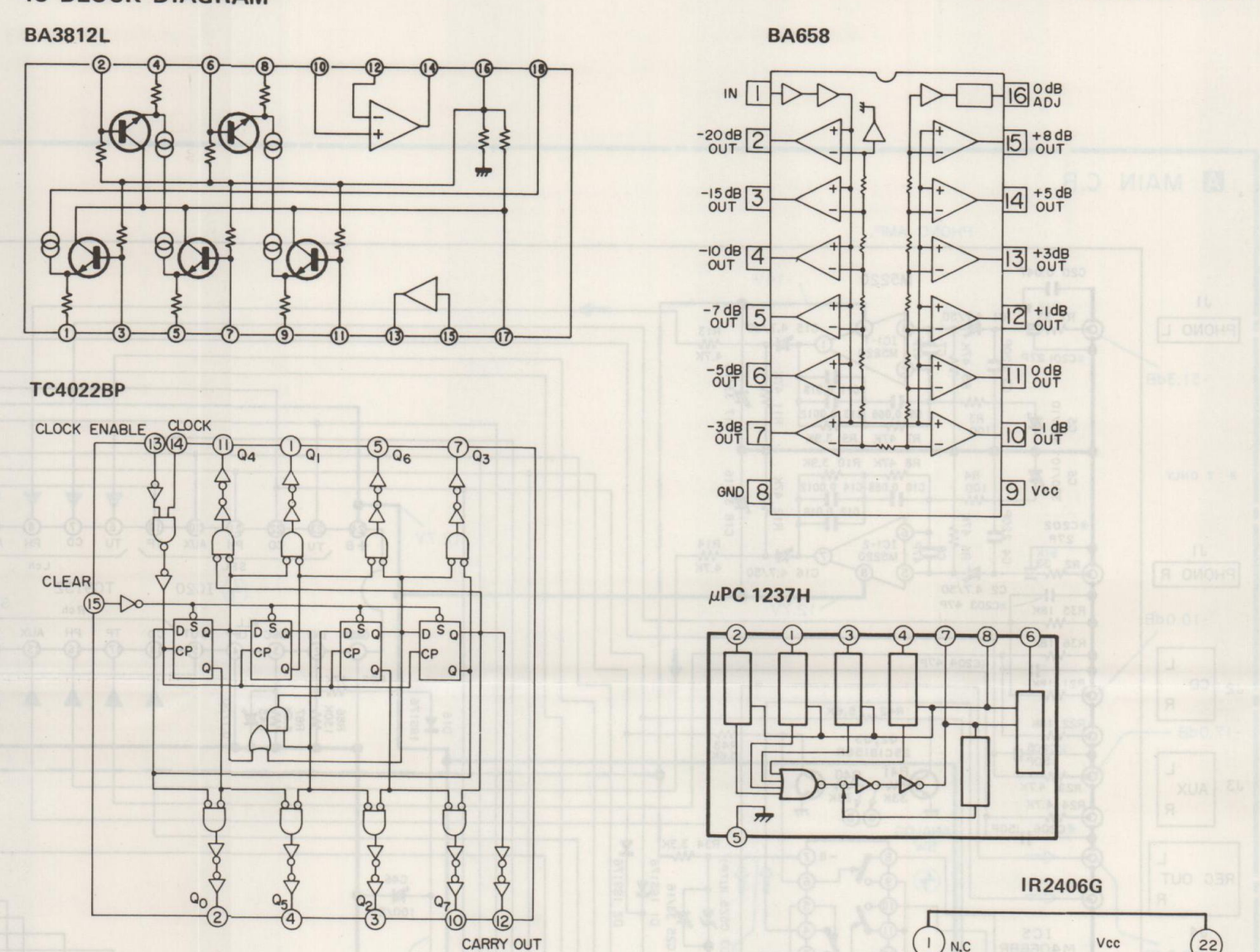
BLOCK DIAGRAM (GX-120)



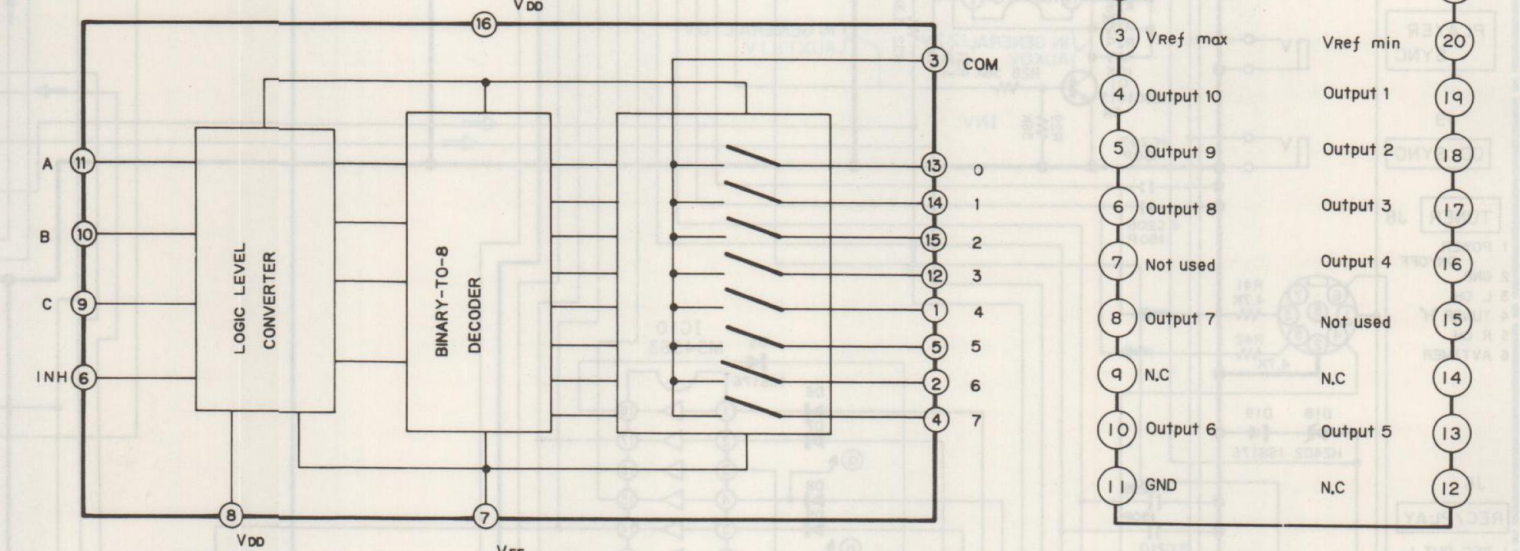
BLOCK DIAGRAM (BX-120)



IC BLOCK DIAGRAM



TC4051

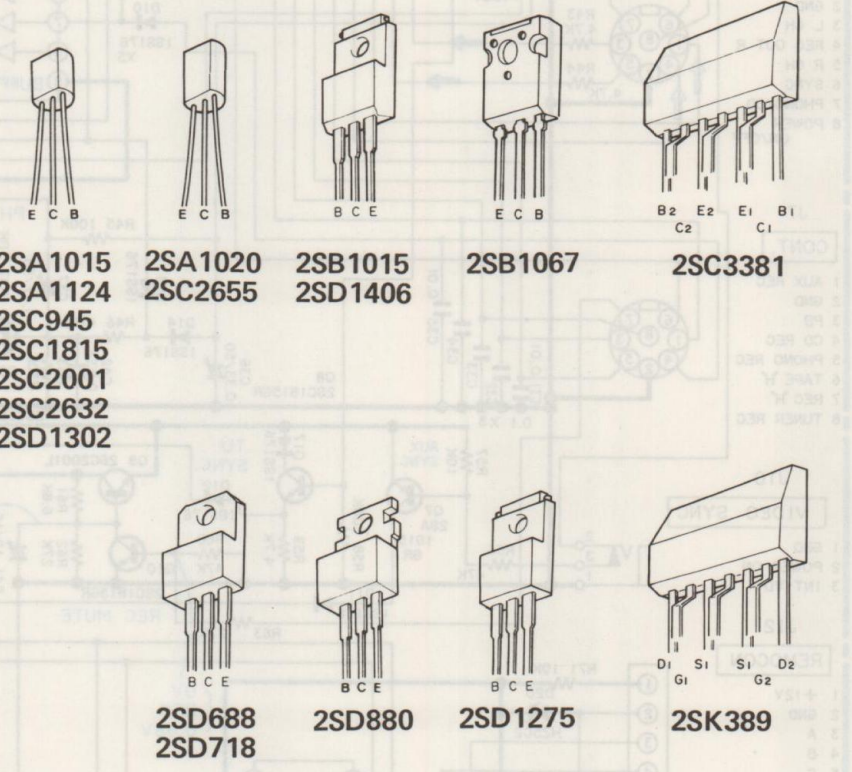


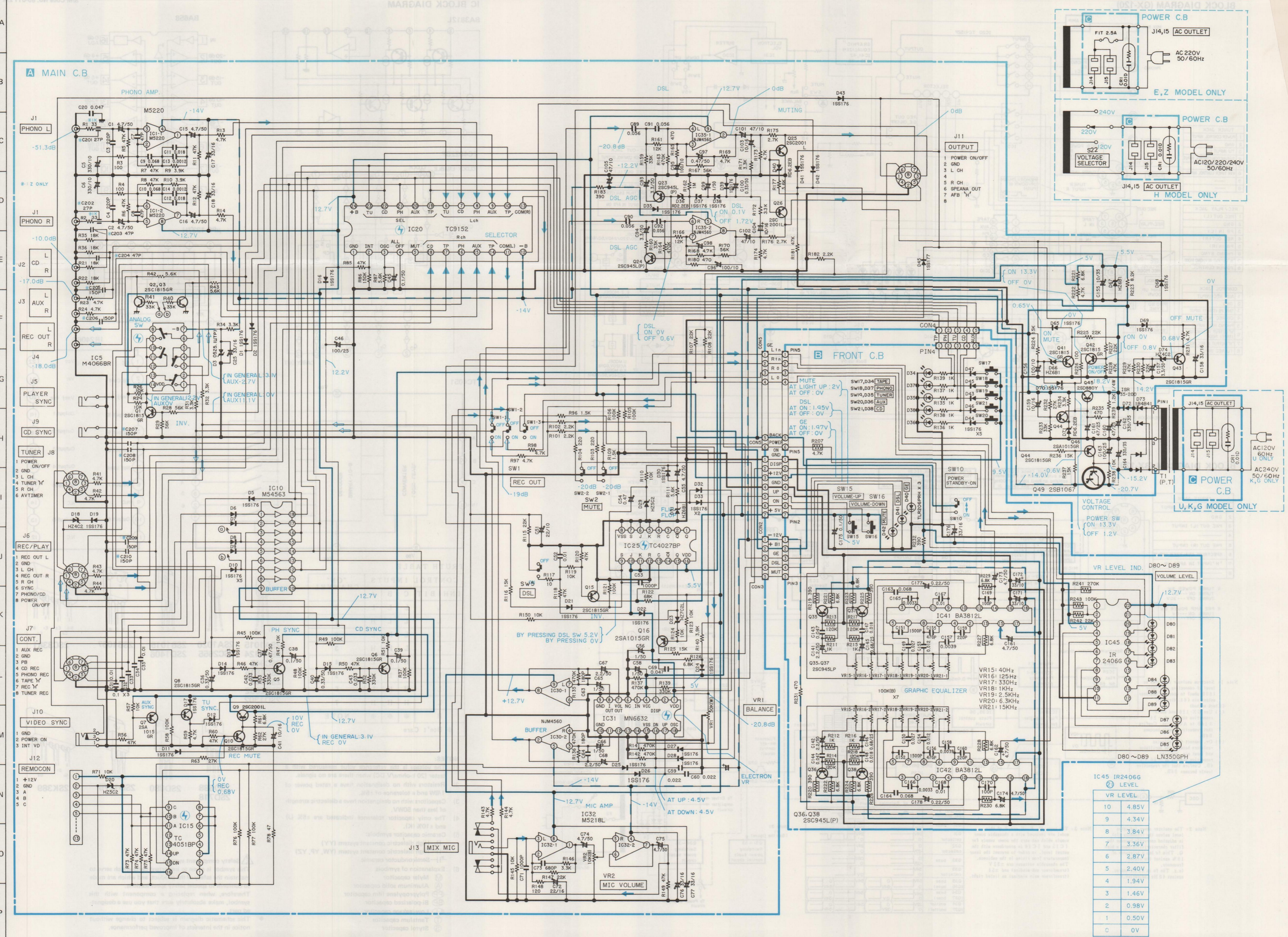
TRUTH TABLE

CONTROL INPUTS				"ON" CHANNEL
INHIBIT	C	B	A	
L	L	L	L	0
L	L	L	H	1
L	L	H	L	2
L	L	H	H	3
L	H	L	L	4
L	H	L	H	5
L	H	H	L	6
L	H	H	H	7
H	*	*	*	NOTE

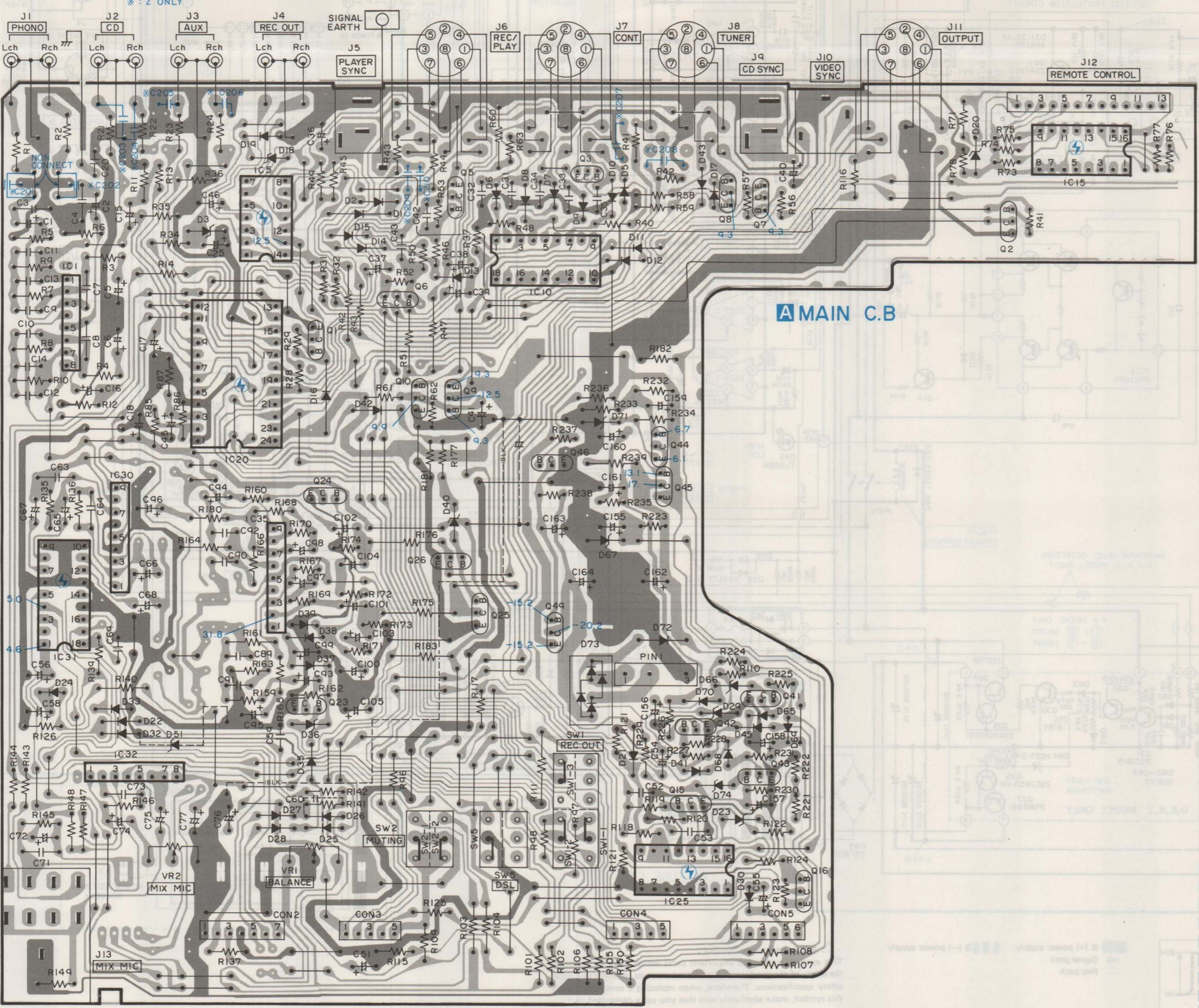
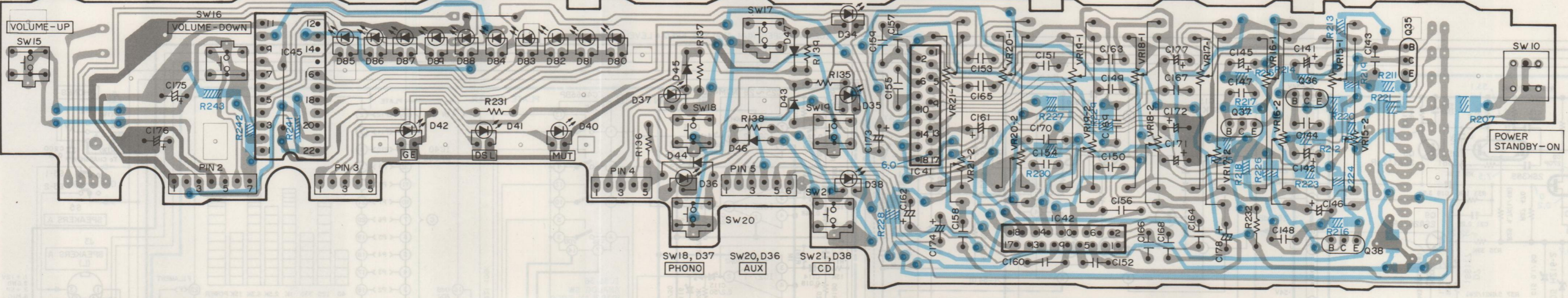
NOTES:

- The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals.
- Resistors with no designation have a rated power of 1/8W and a tolerance of ±5%.
- Capacitors with no designation have a dielectric strength of less than 50WV.
- The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
- Ceramic capacitor symbols:
 — High dielectric constant system (YY)
 — High dielectric constant system (YW, YP, YZ)
 — Semiconductor ceramic
- Explanation of symbols:
 M Mylar capacitor
 A Aluminum solid capacitor
 P Polypropylene film capacitor
 B Bi-polarized capacitor
 L Low-leakage capacitor
 T Tantalum capacitor
 S Styrol capacitor



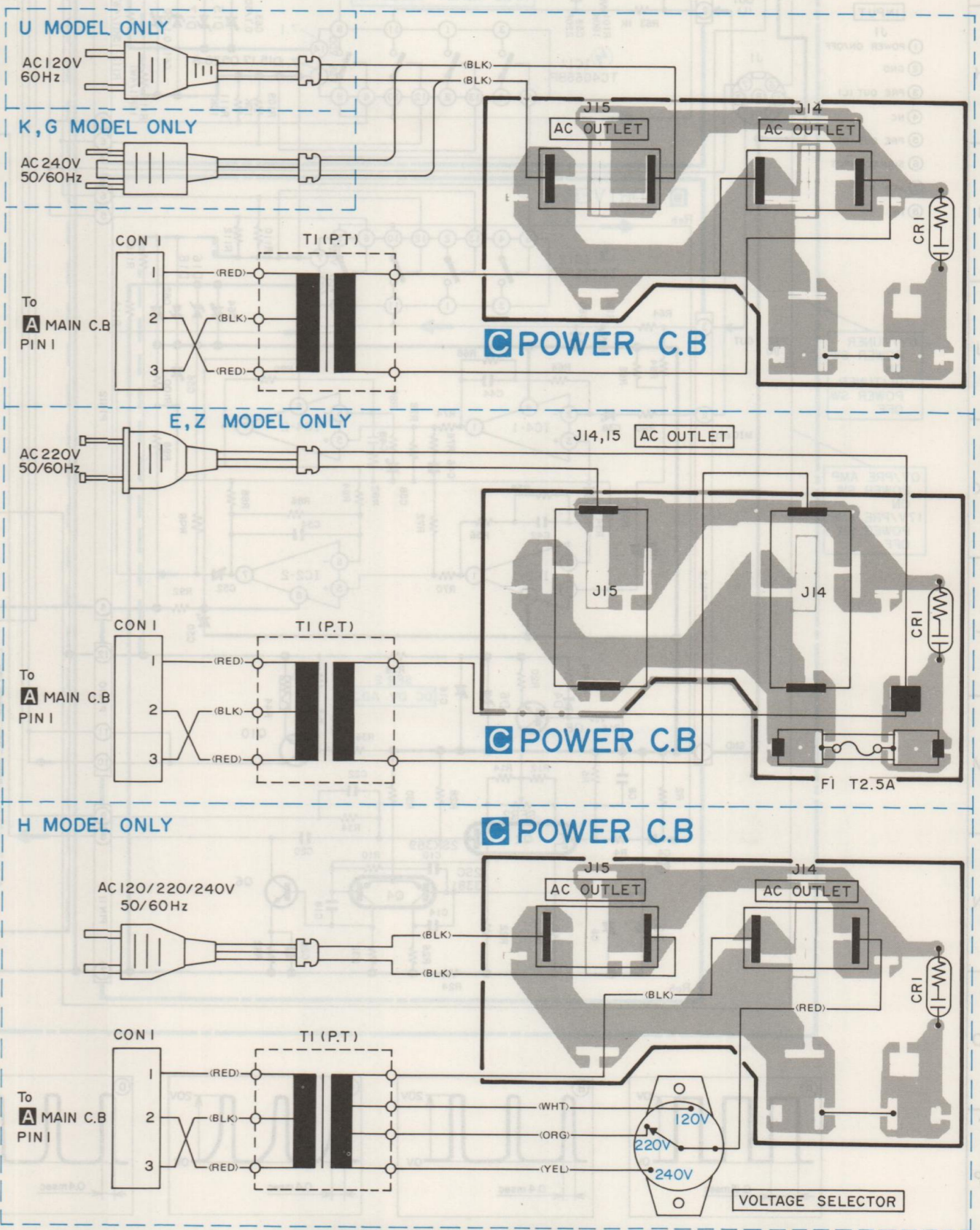


FRONT C.B



MAIN C.B

NOTES (1) Earth pattern Component side pattern Others pattern
 (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.



A MAIN C.B.

C DRIVER-1 C.B.

SFR 1 DC OV ADJ.

IC1.3 MS218L IC1.2 AFBS FILTER (PRE-OUT SIGNAL)

D DRIVER-2 C.B.

SFR 2 DC OV ADJ.

Q21-IC21 PROTECTION CIRCUIT

SWITCHING LEVEL DETECTION (U,E,K,Z MODEL ONLY)

* H MODEL ONLY

U,E,K,Z MODEL ONLY

IC25~28(SPECTRUM ANALYZE FREQ & LEVEL) AMP. FILTER

B FRONT C.B.

TC4066BP PLATE DRIVER

IC35.36 ANALOG SW (DISPLAY FREQ SELECTOR)

TC4066BP GRID DRIVER

IC39 LB1290 COUNTER

IC37 TC4022BP

IC38 TC4001BP CLOCK GENERATOR

D65~D68 30D2FA FUSE SUB C.B. (U,E,K,Z MODEL ONLY)

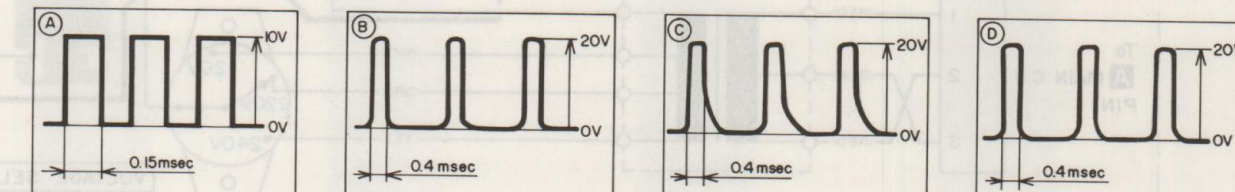
FUSE C.B.

H MODEL ONLY

VOLTAGE SELECTOR C.B. (H ONLY)

- INPUT
- 1 POWER ON/OFF
 - 2 GND
 - 3 PRE OUT (L)
 - 4 NC
 - 5 PRE OUT (R)
 - 6 SIGNAL INPUT
 - 7 AFB 'H'
 - 8 NC

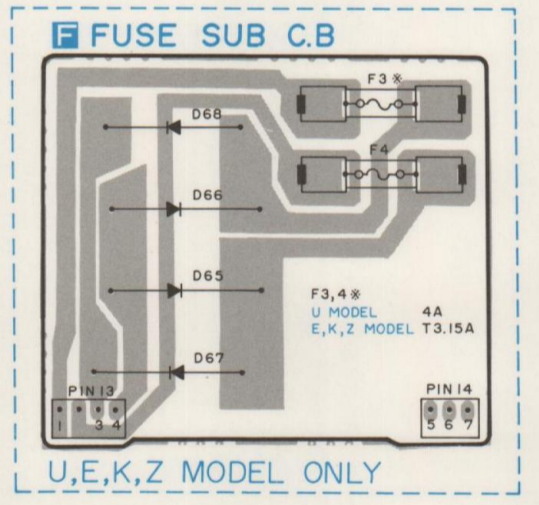
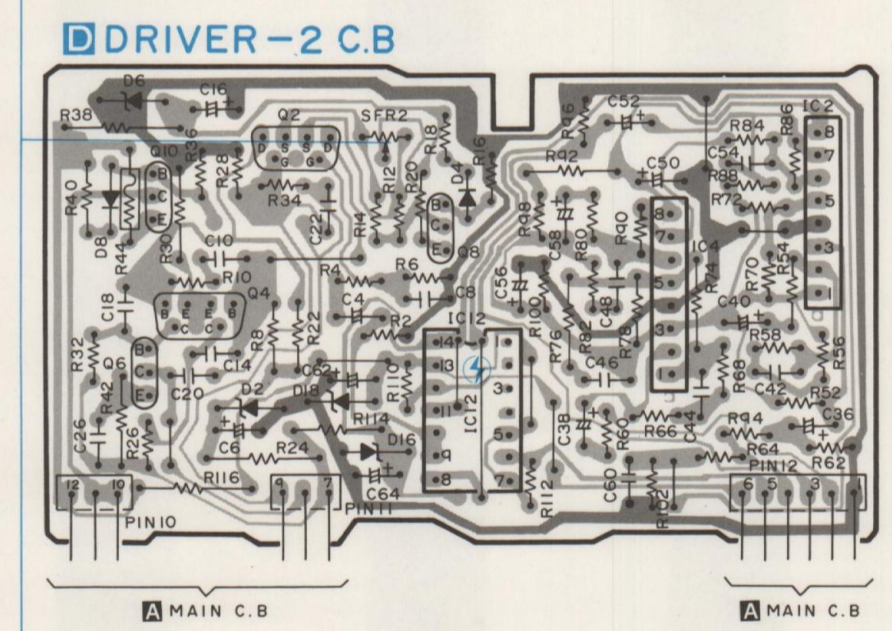
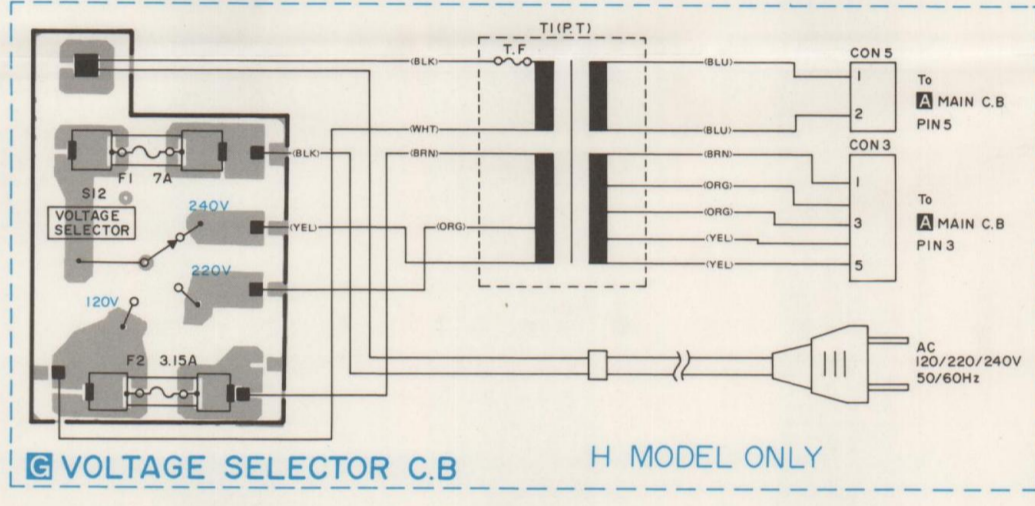
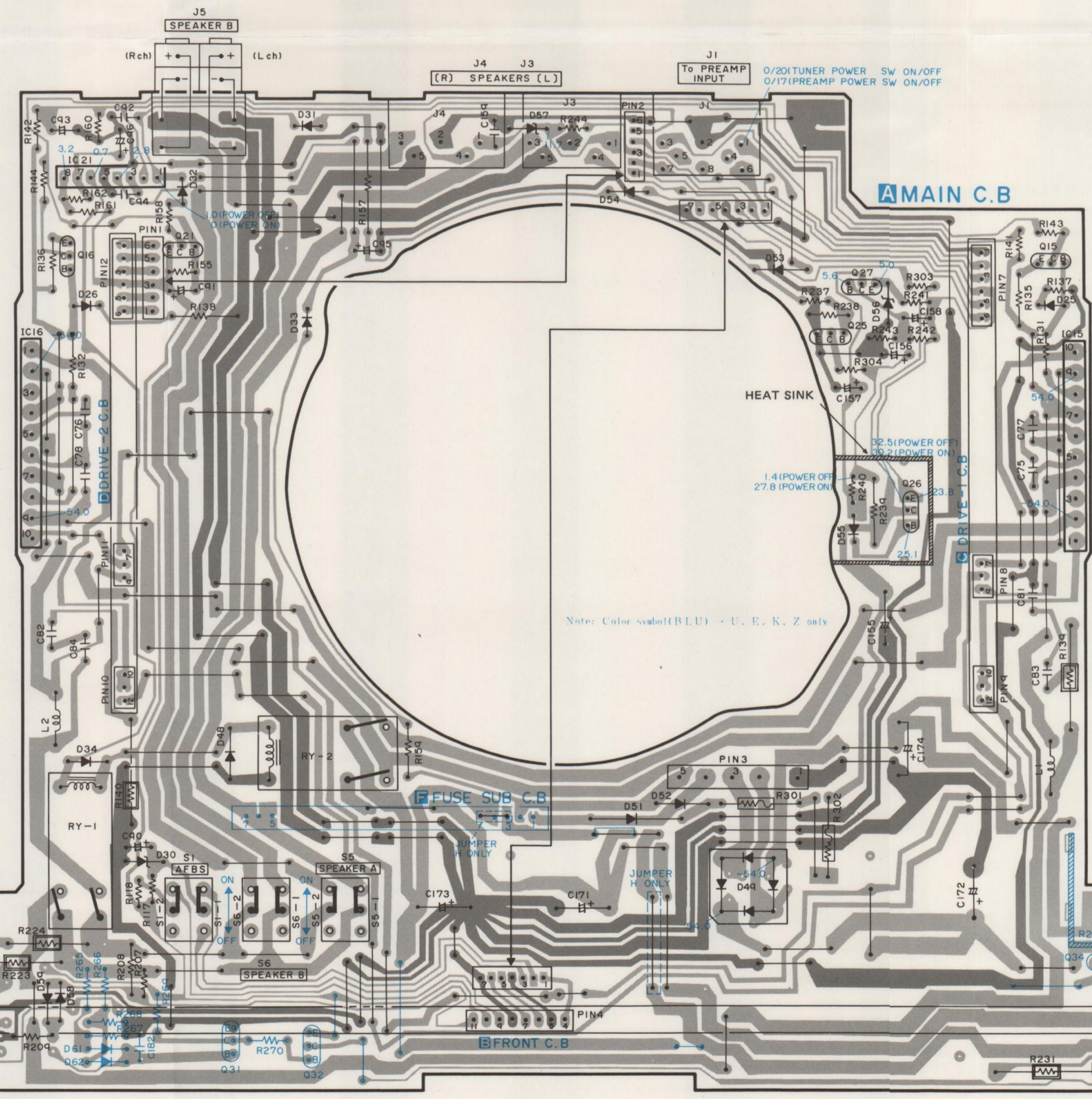
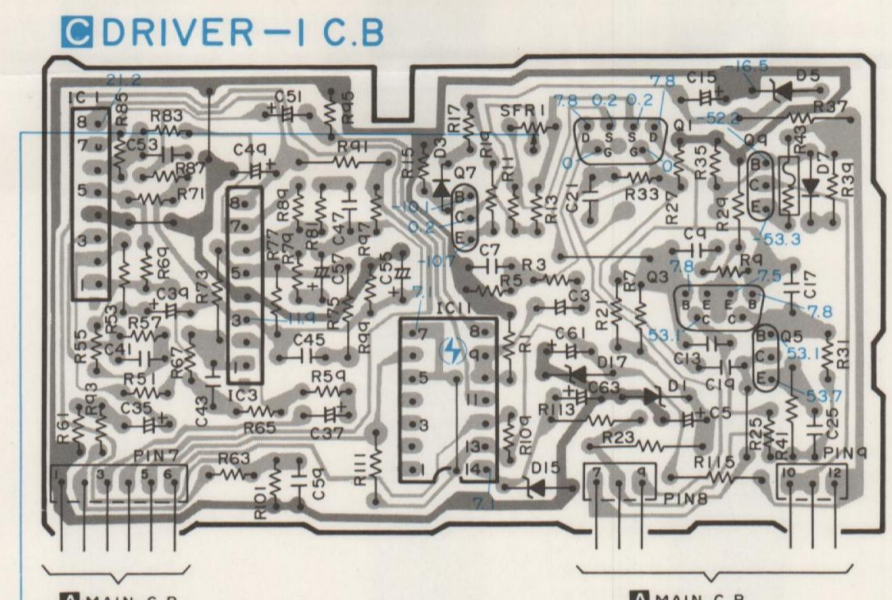
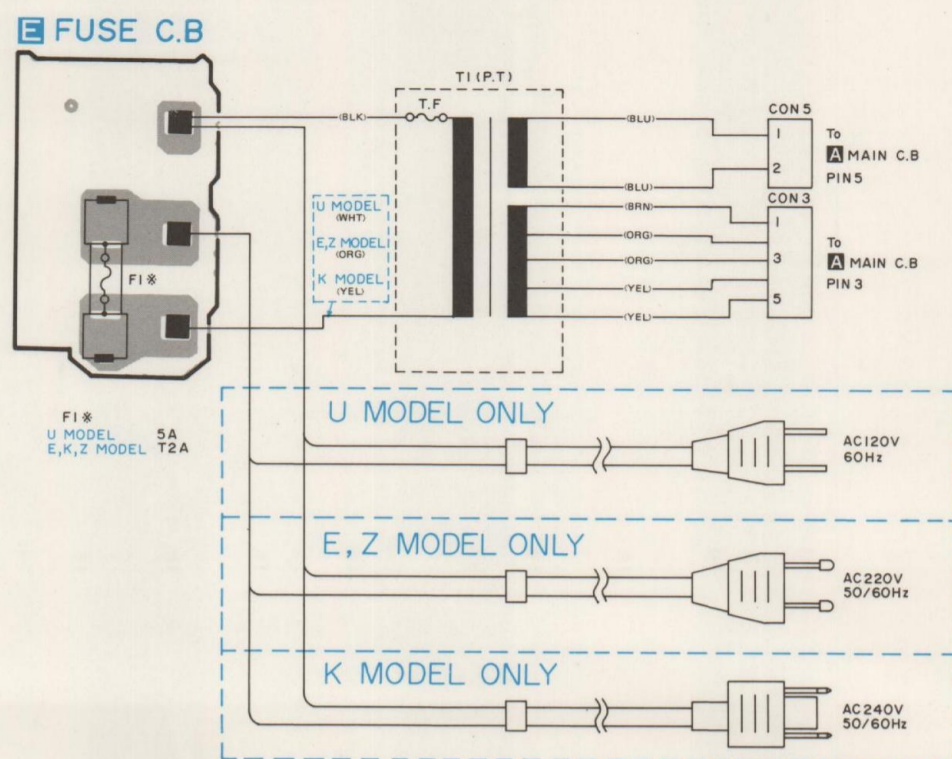
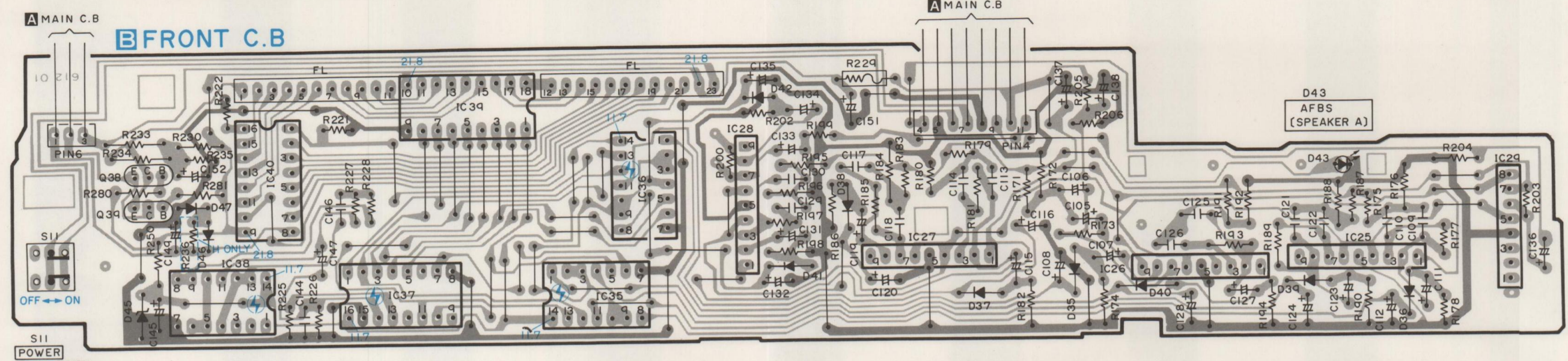
- OV/TUNER POWER SW ON
- 20V/TUNER POWER SW OFF
- OV/PRE AMP POWER SW ON
- 17V/PRE AMP POWER SW OFF



B (+) power supply
 B (-) power supply
 Signal path
 Rec path

⚠ Safety component symbol
 This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

	FI	AC
U	5A	120V 60Hz
E, Z	2AT	220V 50/60Hz
K	2AT	240V 50/60Hz



1. DC 0V ADJUSTMENT
 Settings: • Input signal: No signal
 • Test point: Speaker out B
 • Adjustment locations:
 SFR1 (Lch)
 SFR2 (Rch)
 Method: Adjust so that the voltage at the test point is 0 ± 10mV.

NOTES (1) [Symbol] Earth pattern [Symbol] Others pattern
 (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (⊕).

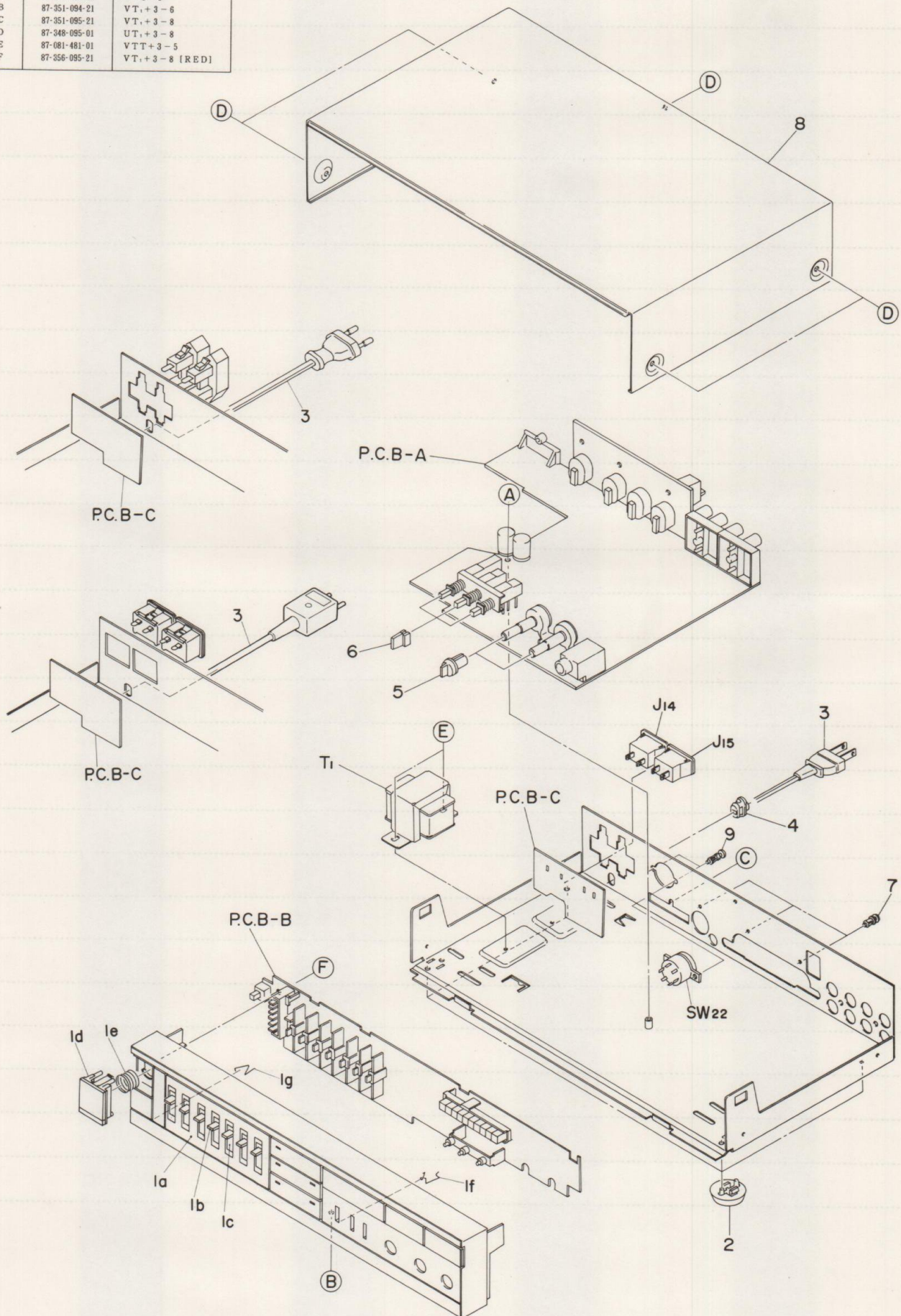
EXPLODED VIEW GX-120

OM3M

1 2 3 4 5 6 7

Ref. No.	Part No.	Description
A	87-067-054-01	V+3-6
B	87-351-094-21	VT,+3-6
C	87-351-095-21	VT,+3-8
D	87-348-095-01	UT,+3-8
E	87-081-481-01	VTT+3-5
F	87-356-095-21	VT,+3-8 [RED]

A
B
C
D
E
F
G
H
I
J

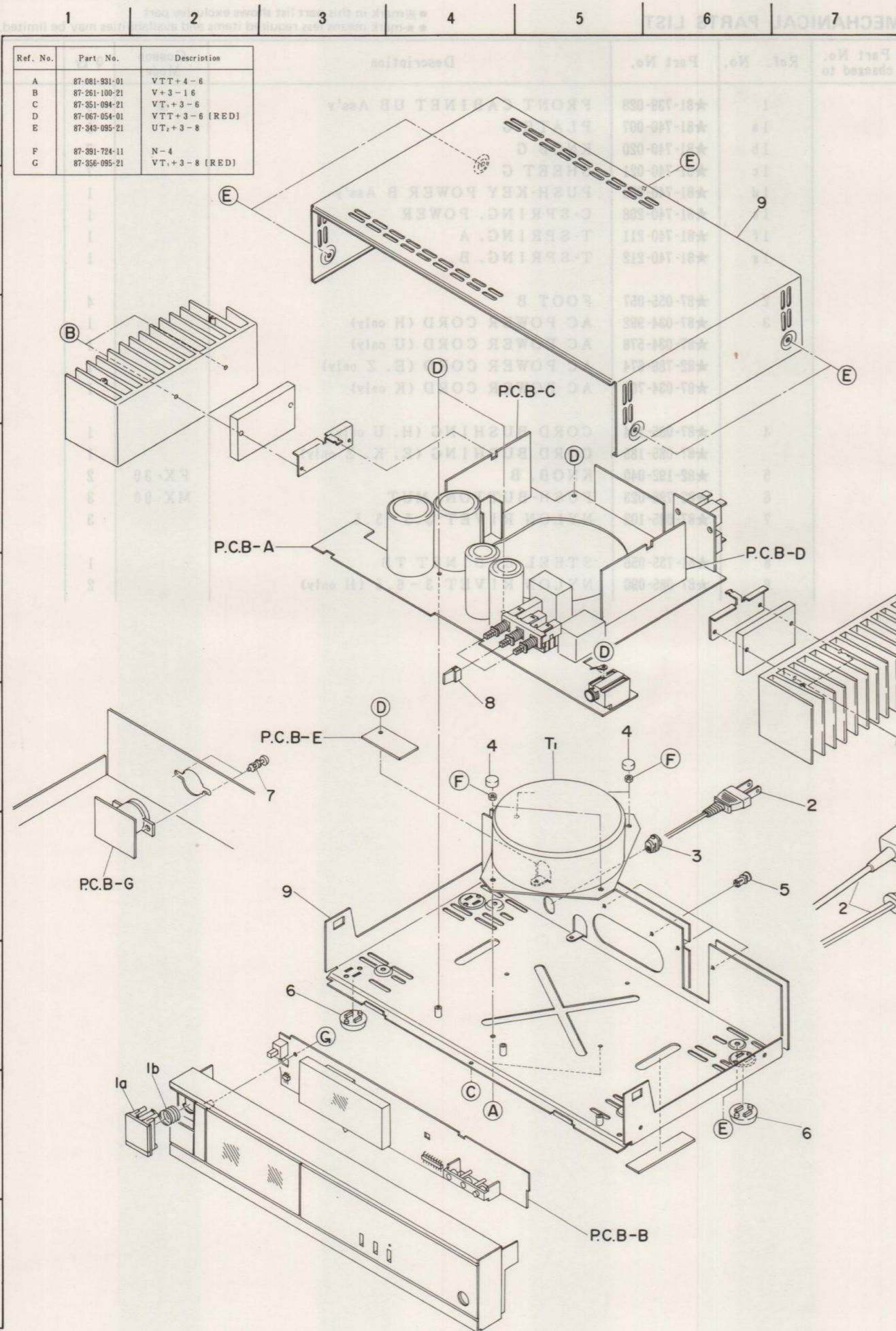


MECHANICAL PARTS LIST

●※mark in this part list shows exclusive part
 ●★mark means less required items and availabilities may be limited.

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1	★81-739-028	FRONT CABINET UB Ass'y	※	1
	1a	★81-740-007	PLATE G		1
	1b	★81-740-020	KNOB G		7
	1c	★81-740-021	SHEET G		7
	1d	★81-740-050	PUSH-KEY POWER B Ass'y		1
	1e	★81-740-208	C-SPRING, POWER		1
	1f	★81-740-211	T-SPRING, A		1
	1g	★81-740-212	T-SPRING, B		1
	2	★87-055-057	FOOT B		4
	3	★87-034-992	AC POWER CORD (H only)		1
		★87-034-578	AC POWER CORD (U only)		1
		★82-788-674	AC POWER CORD (E, Z only)		1
		★87-034-708	AC POWER CORD (K only)		1
	4	★87-085-184	CORD BUSHING (H, U only)		1
		★87-085-185	CORD BUSHING (E, K, Z only)		1
	5	★82-192-040	KNOB, B	FX-30	2
	6	★82-798-023	PUSH-BUTTON, MUT	MX-90	3
	7	★87-085-102	NYLON RIVET 3.5-5.5		3
	8	★81-735-056	STEEL CABINET TB		1
	9	★87-085-090	NYLON RIVET 3-6.5 (H only)		2

EXPLODED VIEW BX-120



Ref. No.	Part No.	Description
A	87-081-931-01	VTT+4-6
B	87-261-100-21	V+3-1 6
C	87-251-094-21	VT.+3-6
D	87-067-054-01	VTT+3-6 (RED)
E	87-345-095-21	UT.+3-8
F	87-391-724-11	N-4
G	87-356-095-21	VT.+3-8 (RED)

PARTS LIST

MECHANICAL PARTS LIST

●※ mark in this part list stows exclusive part.
●★- mark means less required items and availabilities may be limited.

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1	★81-738-028	FRONT CABINET UB Ass'y	※	1
	1a	★81-740-050	PUSH-KEY POWER B Ass'y		1
	1b	★81-740-208	C-SPRING, POWER		1
	2	★87-034-992	AC POWER CORD (H only)		1
		★87-034-578	AC POWER CORD (U only)		1
		★82-788-674	AC POWER CORD (E, Z only)		1
		★87-034-708	AC POWER CORD (K only)		1
	3	★87-085-184	CORD BUSHING (H, U only)		1
		★87-085-185	CORD BUSHING (E, K, Z only)		1
	4	★82-781-206	PLATE NUT	SA-P 80	2
	5	★87-085-102	NYLON RIVET 3.5-5.5		4
	6	★87-055-057	FOOT B		4
	7	★87-085-090	NYLON RIVET 3-6.5 (H only)		2
	8	★82-798-023	PUSH-BUTTON, MUT	MX-90	3
	9	★81-738-035	STEEL CABINET PB	※	1

ACCESSORIES/PACKAGE LIST

GX-120

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1	81-739-904	INSTRUCTION BOOKLET	*	1

BX-120

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1	★81-738-904	INSTRUCTION BOOKLET	*	1

AIWA Co., Ltd. Tokyo Japan