

KORG®

**PROGRAMMABLE
POLYPHONIC SYNTHESIZER
SERVICE MANUAL**

POLY-61 M

POLY-61 MIDI kit

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**KEIO ELECTRONIC LABORATORY CORPORATION
TOKYO/JAPAN**

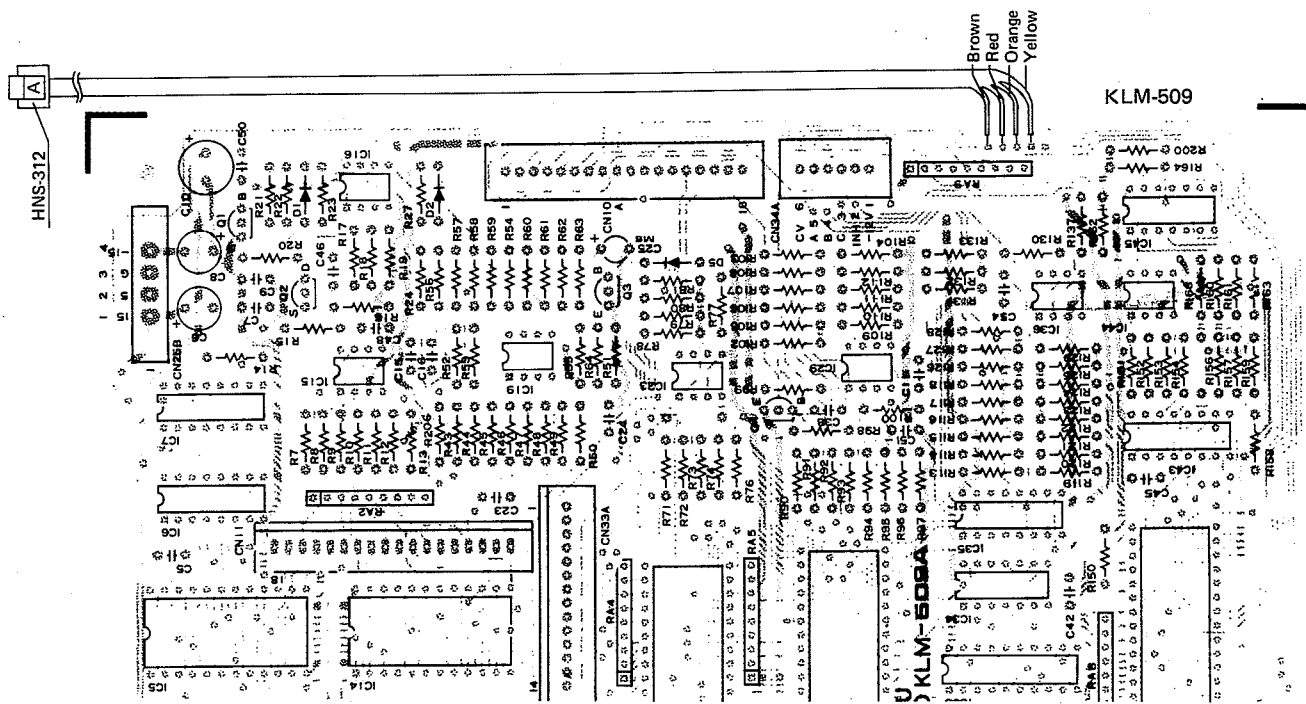
KEY BOARD

POLY 61 MIDI

SOLDER THE HARNESS TO KLM-509

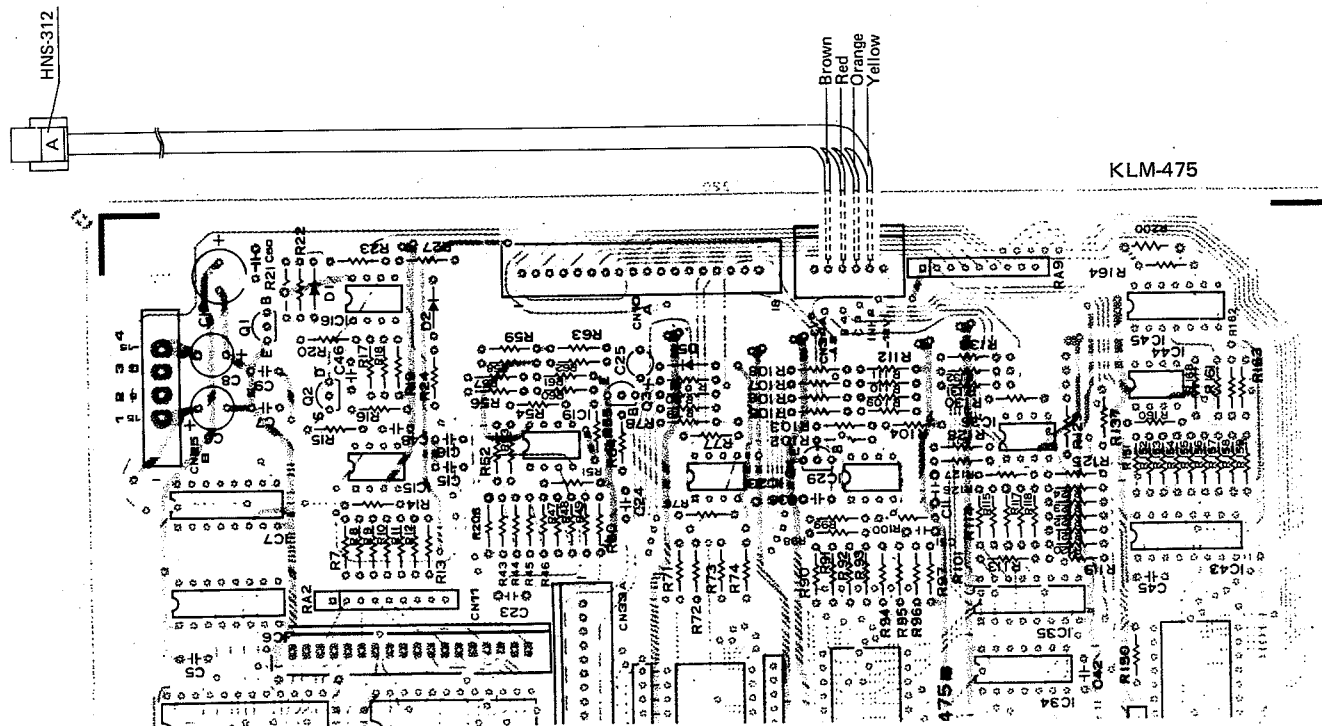
Insert the harness leads to the through holes and solder those.

Fig-1

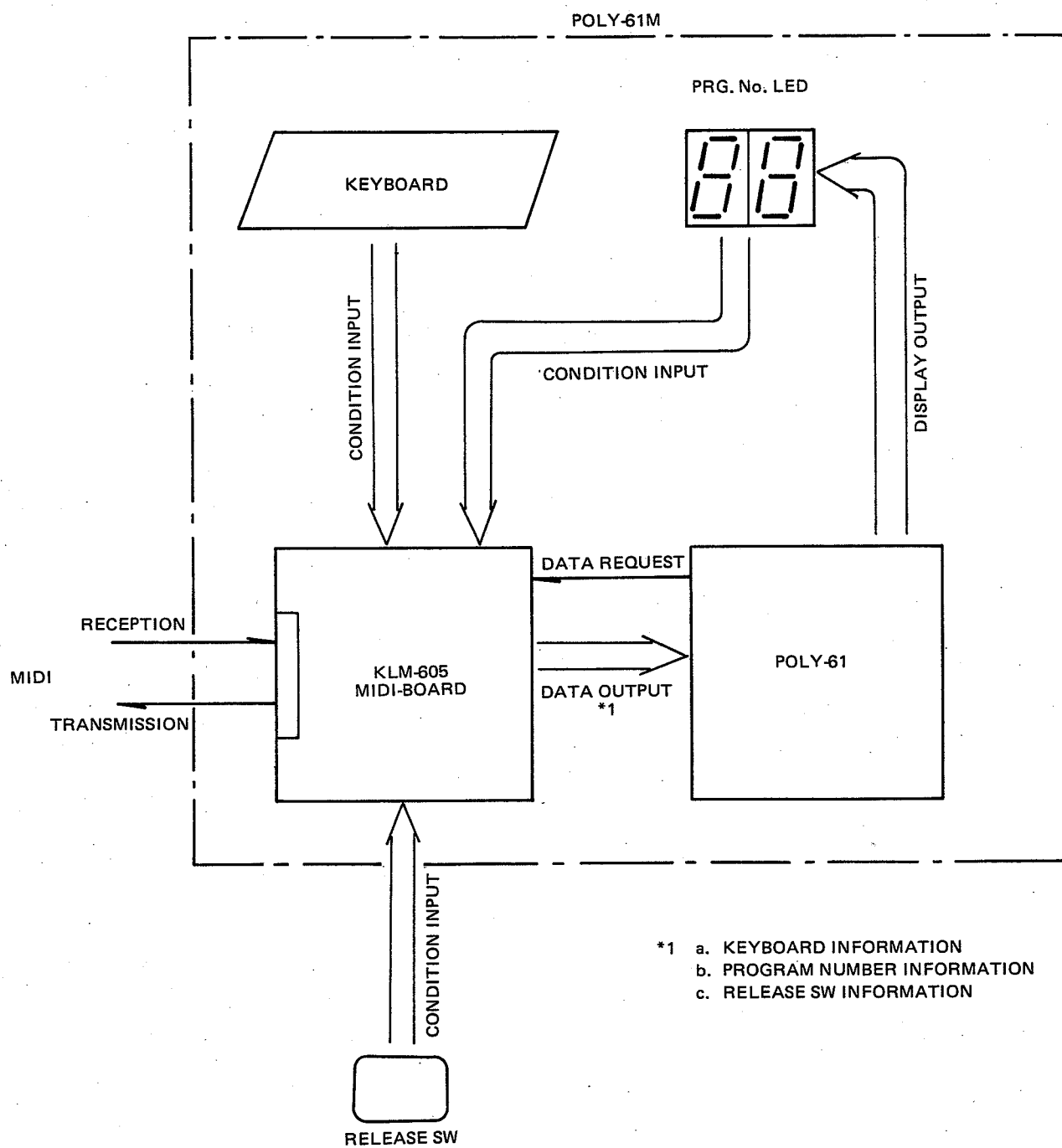


If the jumper lead are already fixed to the points where the harness HNS-312 is to be placed solder it from the soldering (back) side.

Fig-1



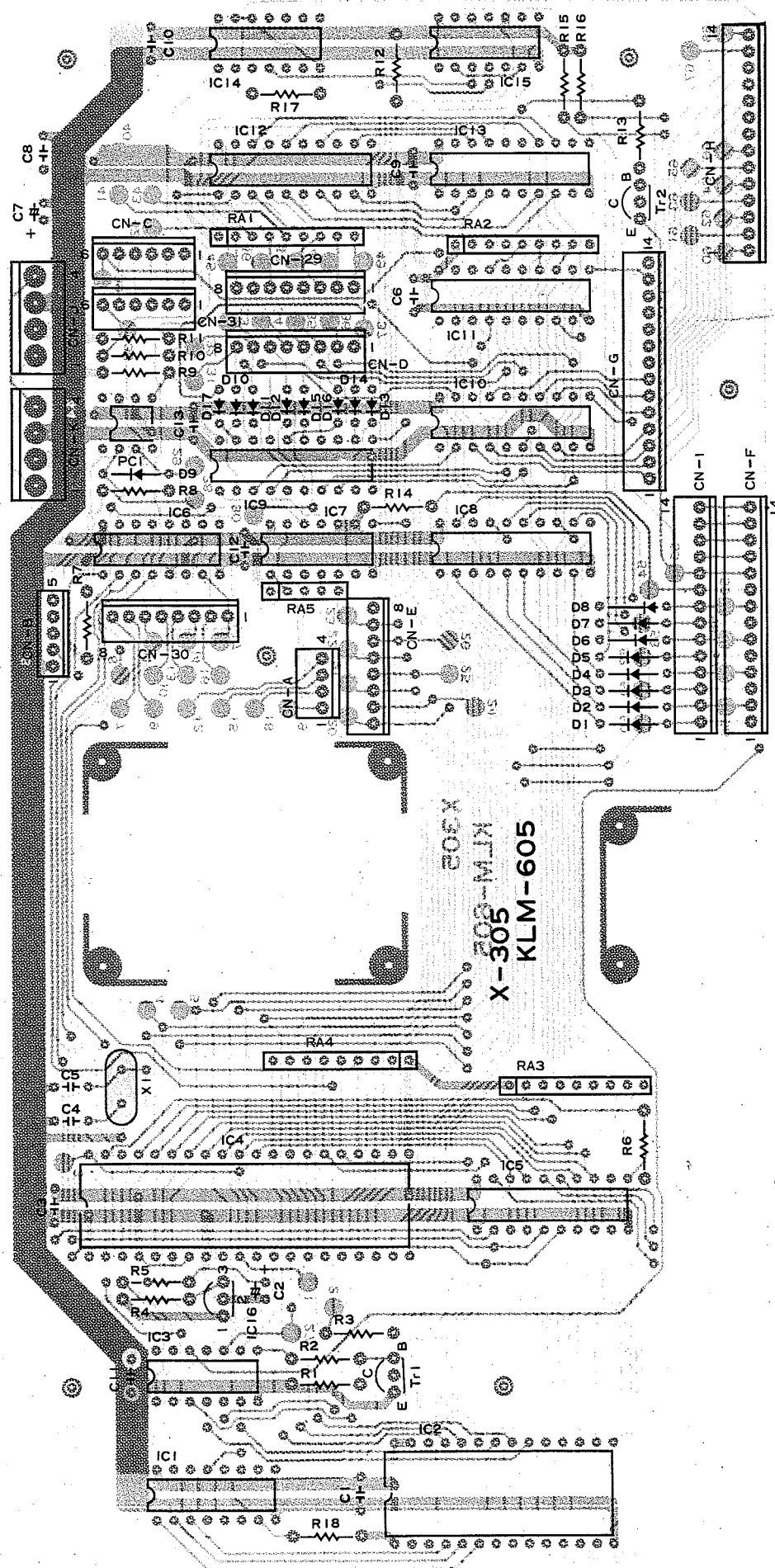
BLOCK DIAGRAM



PART CODE	PART NAME, SPECIFICATIONS	P.C. BOARD	IDENTIFICATION No. FUNCTION	Q'TY
IC SOCKET				
48005282	28P	KLM-605		1
		DIN-JACK		
48010093		KLM-605		2
CORD KEEP				
54005200	K-105G	KLM-605		1
BUSHINGS				
54005803	TA-305	KLM-605		6
54005900	TB-300			6
CABLE CLAMP				
54006300	DKN-13			1
WIRE BUNDLER				
54007200	PLT-1M	KLM-605		3
SPIRAL CLIP				
54008600	CS-8	KLM-605		2
SHIELDING SHEET				
58018008	KOC-F40294	KLM-605		1
MIDI PLATE				
64064200	KOC-C40524	KLM-605		1
ENVELOPES				
68400400	Polyethylene bag No.4 .03 X 90 X 170	KLM-605		1
68401000	Polyethylene bag No. 10 .03 X 180 X 270			1
68405800	Achilles chro-poly 0.05 X 150 X 250			1
68405900	Air pack #40 150 X 550			1

PART CODE	PART NAME, SPECIFICATIONS	P.C. BOARD	IDENTIFICATION No. FUNCTION	Q'TY
SCREWS (Please refer to structural diagram)				
70560308	FE B BZMC 3 X 8	KLM-605		2
70562606	FE B BZMC 2.6 X 6			4
71030318	TP1 P ZMC 3 X 18			6
77130300	HNI ZMC 3			2

P.C. BOARD



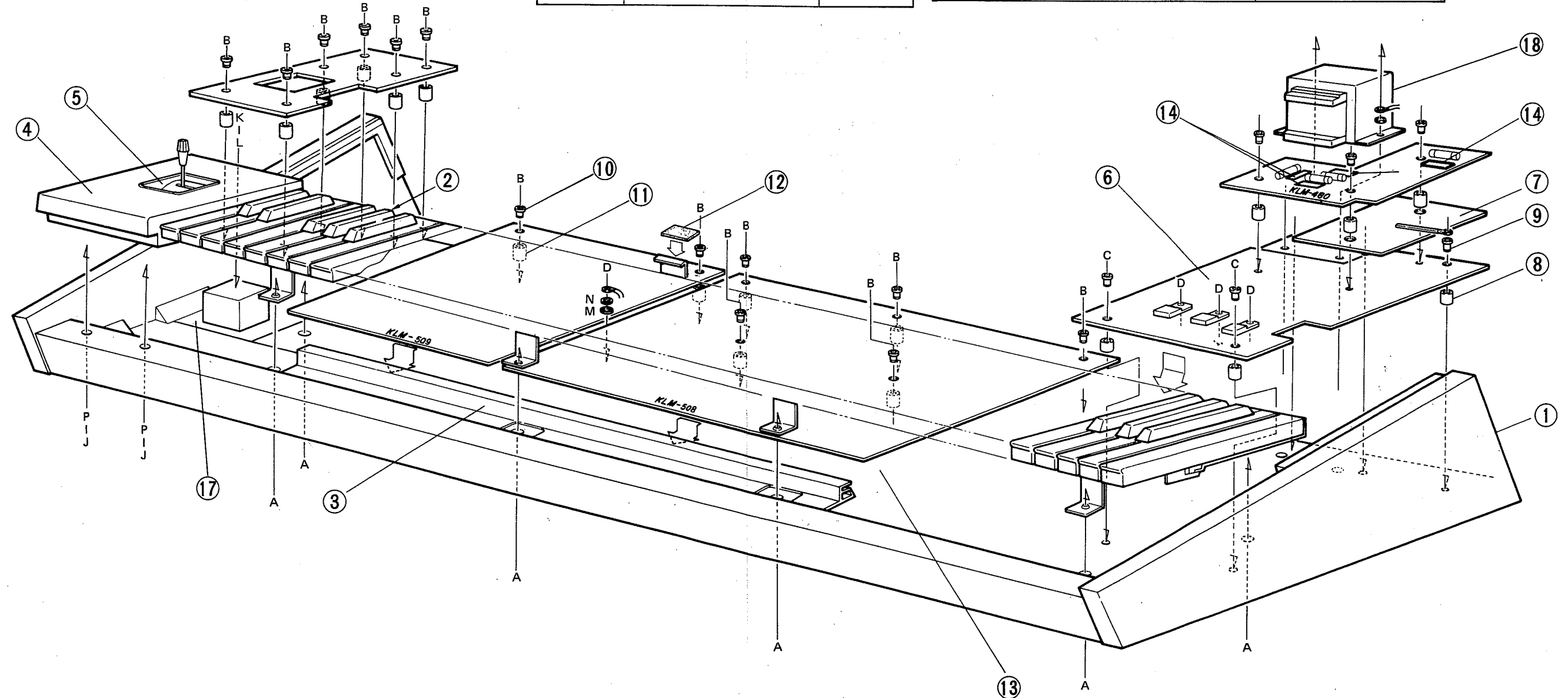
PART CODE	PART NAME SPECIFICATIONS	P.C. BOARD	Q'TY
SCREWS, WASHERS (PLEASE REFER TO STRUCTURAL DIAGRAM)			
70260308	FE O BZMC 3x8		4
70260320	FE O BZMC 3x20		2
70530306	FE B ZMC 3x6		25
70530308	FE B ZMC 3x8		4
70530310	FE B ZMC 3x10		3
70530314	FE B ZMC 3x14		3
70530420	FE B ZMC 4x20		1
70540410	FE B C-3 4x10		4
70560306	FE B BZMC 3x6		2
70560308	FE B BZMC 3x8		1
70560450	FE B BZMC 4x50		2
70730310	FE FEW ZMC 3x10		1
70730410	FE FEW ZMC 4x10		2
70760314	FE FEW BZMC 3x14		2
70760414	FE FEW BZMC 4x14		7
70760516	FE FEW BZMC 5x16		14
71530322	TP1 B ZMC 3x22		7
72130310	TP2 G F ZMC 3x10		1

PART CODE	PART NAME SPECIFICATIONS	P.C. BOARD	Q'TY
74530306	PLAX B ZMC 3x6		3
74530410	PLAX B ZMC 4x10		16
76333110	WS R ZMC 3.1x10		2
76363108	WS R BZMC 3.1x8		2
77030300	FHN ZMC 3		3
77030400	FHN ZMC 4		2
77130300	HN1 ZMC 3		2
77331200	VN ZMC 12		3
78030400	WM ZMC 4		1
78060500	WM BZMC 5x12		2
78430300	TWU ZMC 3		1
78430400	TWU ZMC 4		1
NYLON WASHER			
78800408	4x8x0.5		4
FIBER WASHERS			
79033308	3.3x8x2		1

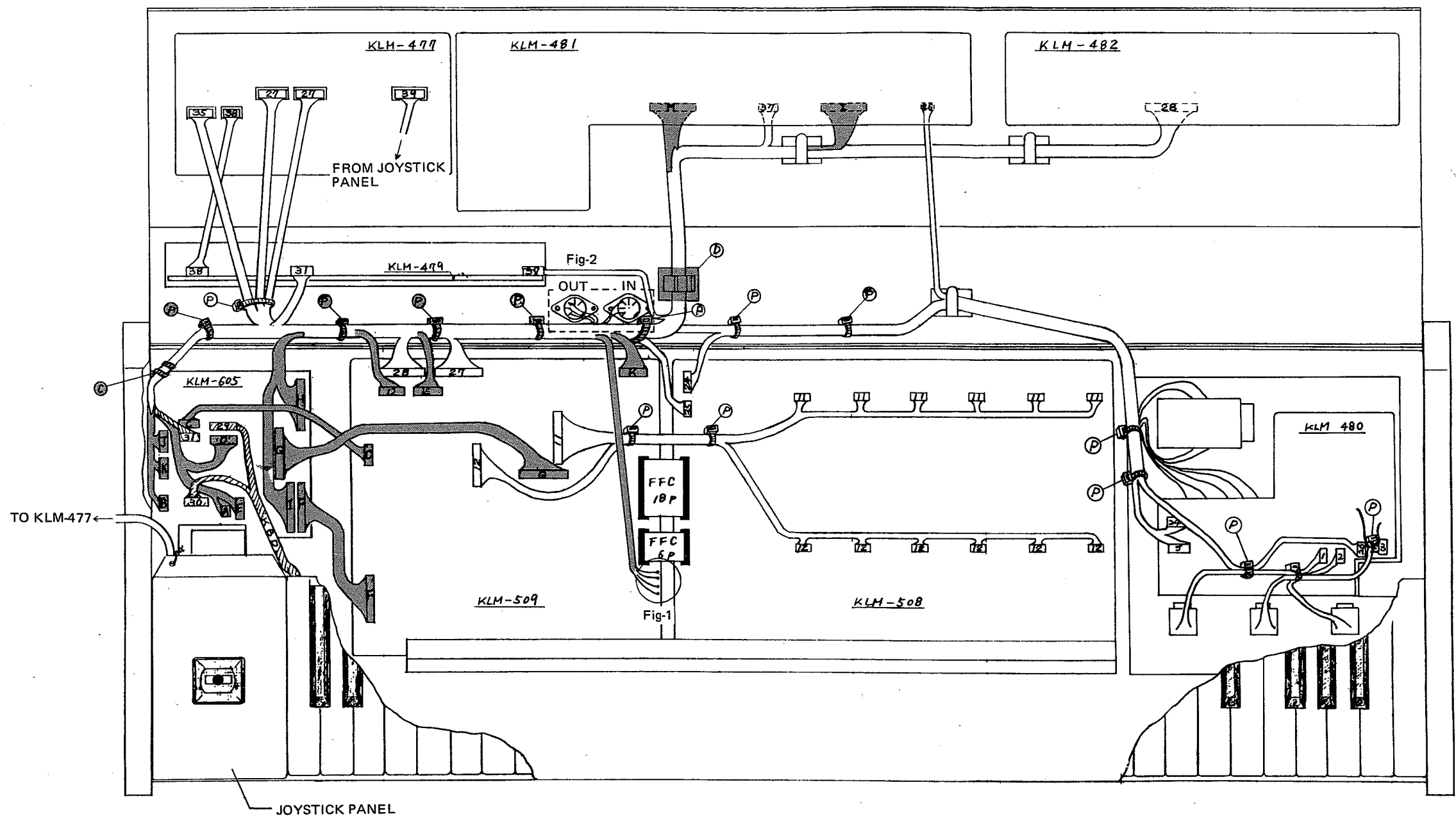
Diagram illustrating the assembly components for a joystick:

- LEVER KNOB
- JOYSTICK BOX
- JOYSTICK "X" SUPPORT
- JOYSTICK LEVER FIXED PIN
- JOYSTICK LEVER
- JOYSTICK "Y" SUPPORT

PART NO	PART NAME	PART CODE	
1	WOODEN CASE	64508400	
2	KEYBOARD	42002300	
3	PC BOARD RAIL		(attached on wooden case)
4	CONTROL PANEL	64609900	
5	JOYSTIC ASSEMBLY	64610100 64610101 64610102 64058400 64058402 62005301 78690500	JOYSTICK BOX JOYSTICK X-SUPPORT JOYSTICK LEVER JOYSTICK Y-SUPPORT JOYSTICK LEVER FIXED PIN JOYSTICK LEVER KNOB WASHER PSW 5
6	RADIATION BOARD	56002500	(KOC-C30207)
7	SHIELDING SHEET		(KOC-F40227)
8	BUSHING TA-305	54005804	
9	BUSHING TB-300	54005900	
10	BUSHING TA-310	54005800	
11	BUSHING TB-300	54005902	
12	FELT		(KOC-F40294)
13	SHIELDING SHEET		(attached on wooden case)
14	FUSE SEAL	58003001	
15	FUSE SEAL	58013200	
16	HARNES STOPPER	54008600	
17	SHIELDING SHEET FOR KLM-605 MIDI BOARD		
18	POWER TRANSFORMER	40007900	



INTERCONNECTION OF PS-61 AND MIDI-BOARD



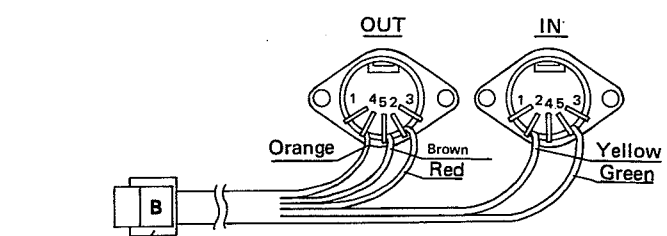
WIRE BUNDLER
BIND THE HARNESS PREVIOUSLY FIXED (NOT REMOVED). ALL THE OTHER ARE TO BE REMOVED NEWLY ADDED

CABLE CLAMP
NEWLY ADDED (REMOVED THE OLD ONE)

SPIRAL CLIP
NEWLY ADDED TO BE CO-SCREWED WHEN KLM-605 IS FIXED.

HARNESS
PREVIOUSLY ARRANGED HARNESSES (NOT REMOVED)
PREVIOUSLY CONTAINED HARNESSES BUT RECONNECTED
NEWLY ADDED HARNESS (OLD ONES ARE REPLACED)

Soldering of wires to DIN connector (5-pin) back side (inner) of rear panel.



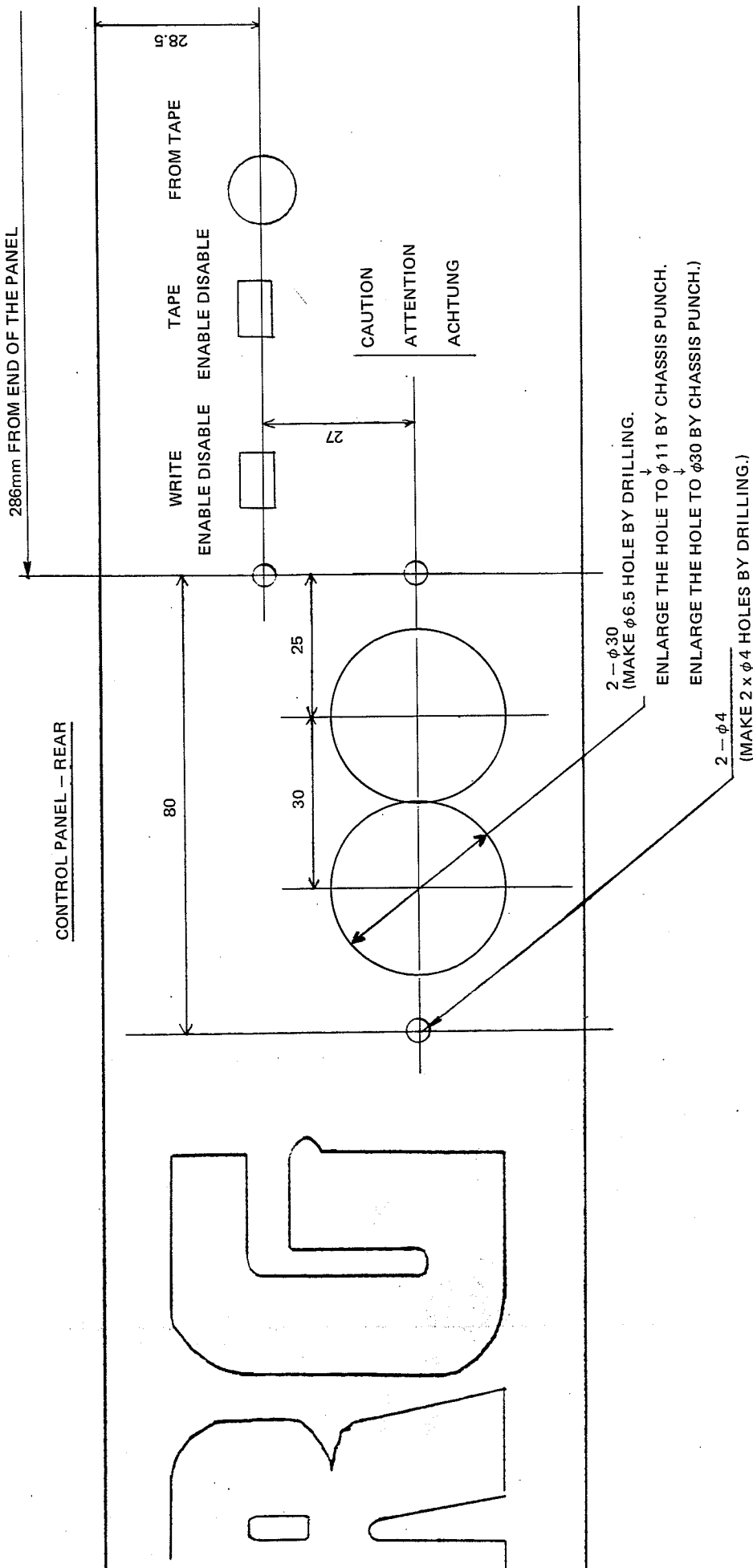
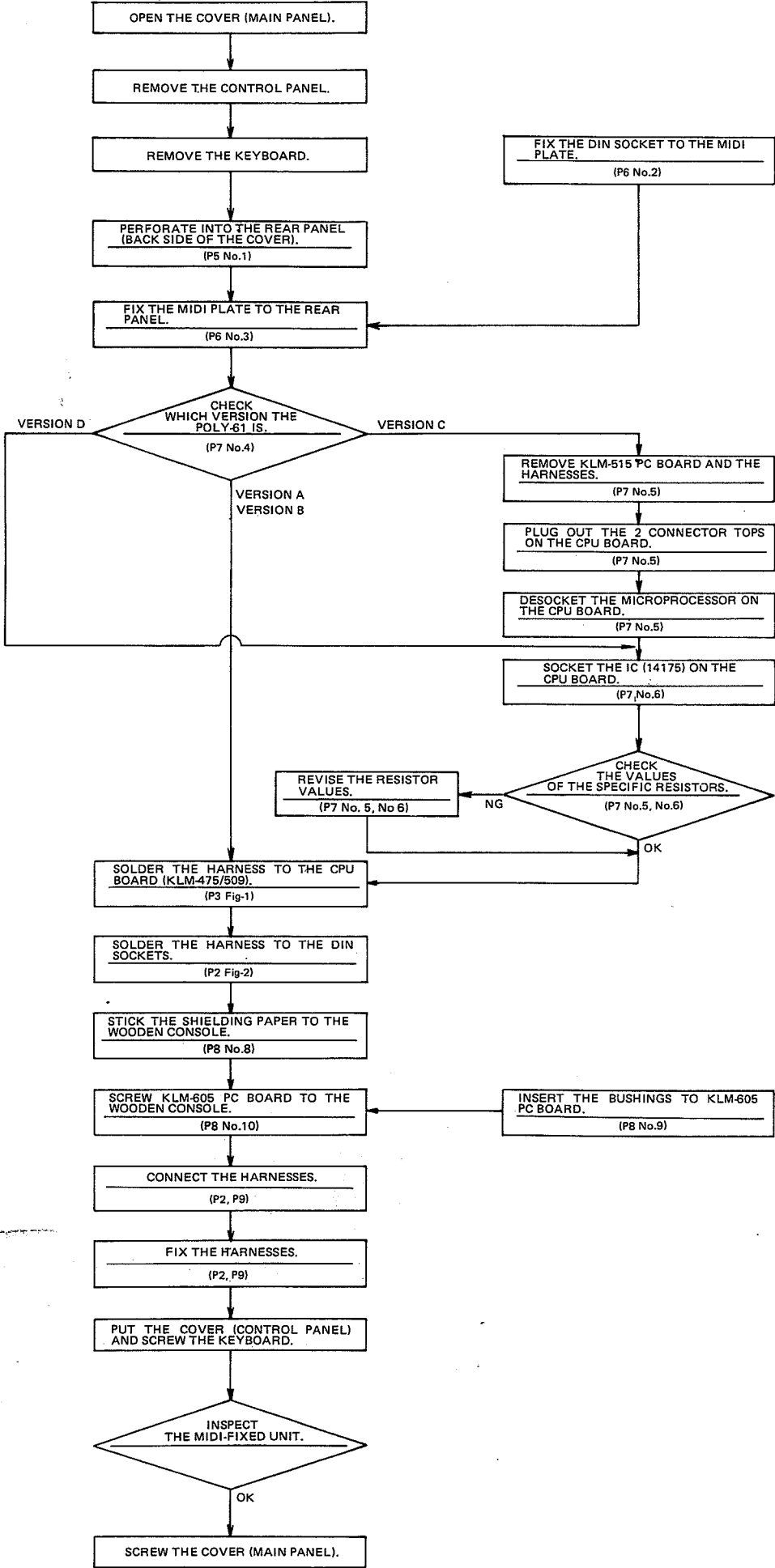
KEY **PIN**
Brown → Out 2
Red → Out 5
Orange → Out 4
Yerrow → In 4
Green → In 5

Insert wire leads into holes of terminal before soldering.

Fig-2

CONNECTION LIST	HARNESS No.	CONNECTION LIST	HARNESS No.
1 POWER SUPPLY CONNECTION KLM-480 CN25A (J) → KLM-605 CN J KLM-605 CN K → KLM-475/509 CN25B (K)	HNS-321 HNS-322	5 RELEASE CONTROL SIGNAL I/O CONNECTION KLM-475/509 CN31 (A) → KLM-605 CN C KLM-605 CN31 → KLM-479 CN31	HNS-314
2 KEYBOARD CONNECTION KEYBOARD CONNECTOR CN29 → KLM-605 CN29 KEYBOARD CONNECTOR CN30 → KLM-605 CN30 KLM-605 CN D → KLM-475/509 CN29 (D) KLM-605 CN E → KLM-475/509 CN30 (E)	HNS-315 HNS-316	6 CONTROL SIGNAL (A, B, C, INH) CONNECTION KLM-475/509 CN34 → KLM-605 CN A (A-BROWN → BROWN B-RED → RED C-ORANGE → ORANGE INH-YELLOW → YELLOW)	HNS-312
3 PROGRAM No. CONTROL SIGNAL OUTPUT CONNECTION KLM-475/509 CN32 (F) → KLM-605 CN F KLM-605 CN I → KLM-481 CN32B (I)	HNS-317 HNS-320	7 MIDI I/O CONNECTION MIDI SOCKET KLM-605 CN B	HNS-313
4 PROGRAM No. CONTROL SIGNAL INPUT CONNECTION KLM-481 CN33B (H) → KLM-605 CN H KLM-605 CN G → KLM-475/509 CN33 (G)	HNS-319 HNS-318	(MIDI OUT No. 4 PIN - ORANGE MIDI OUT No. 2 PIN - BROWN MIDI OUT No. 5 PIN - RED MIDI IN No. 4 PIN - YELLOW MIDI IN No. 5 PIN - GREEN)	

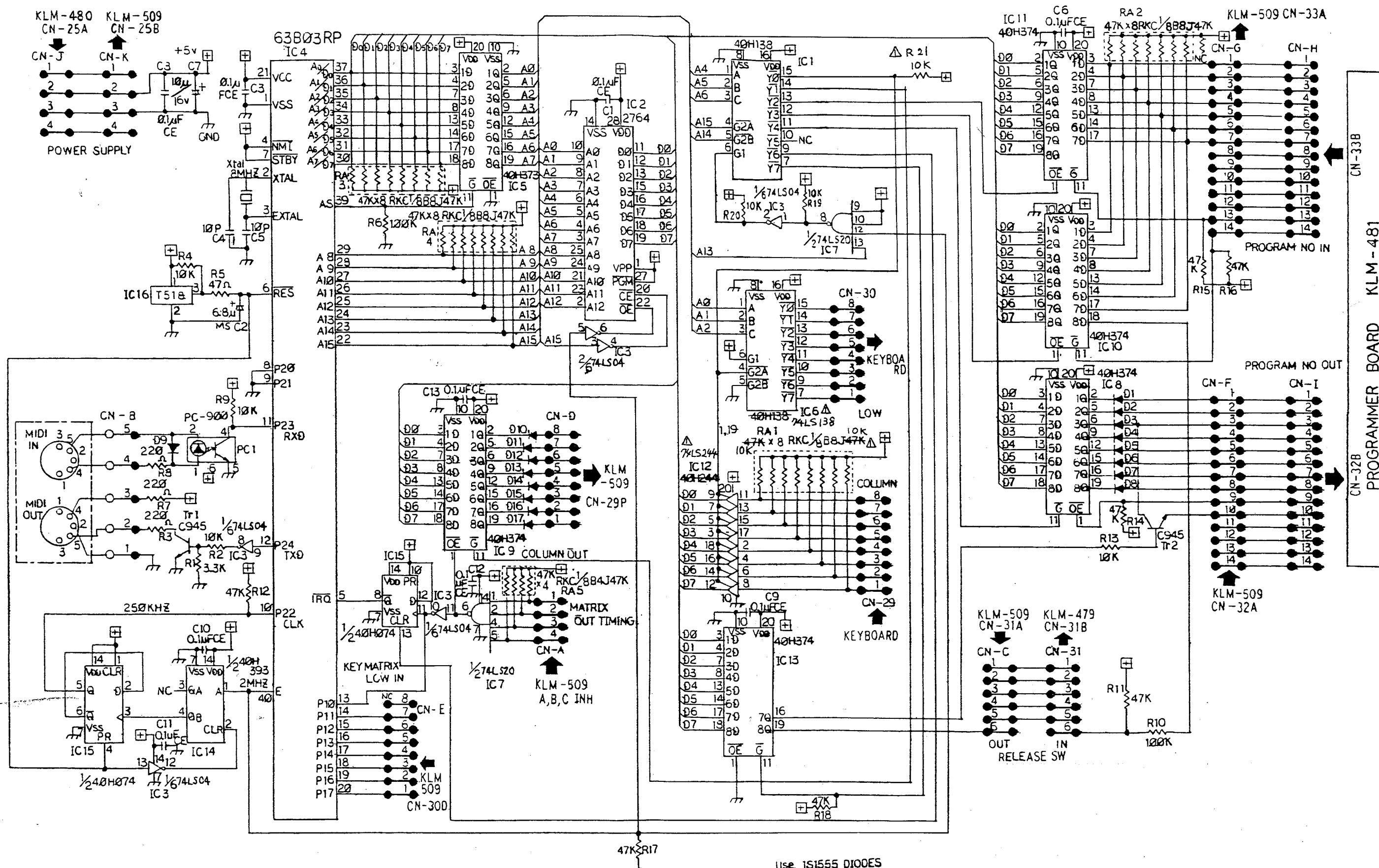
RETROFIT PROCEDURE



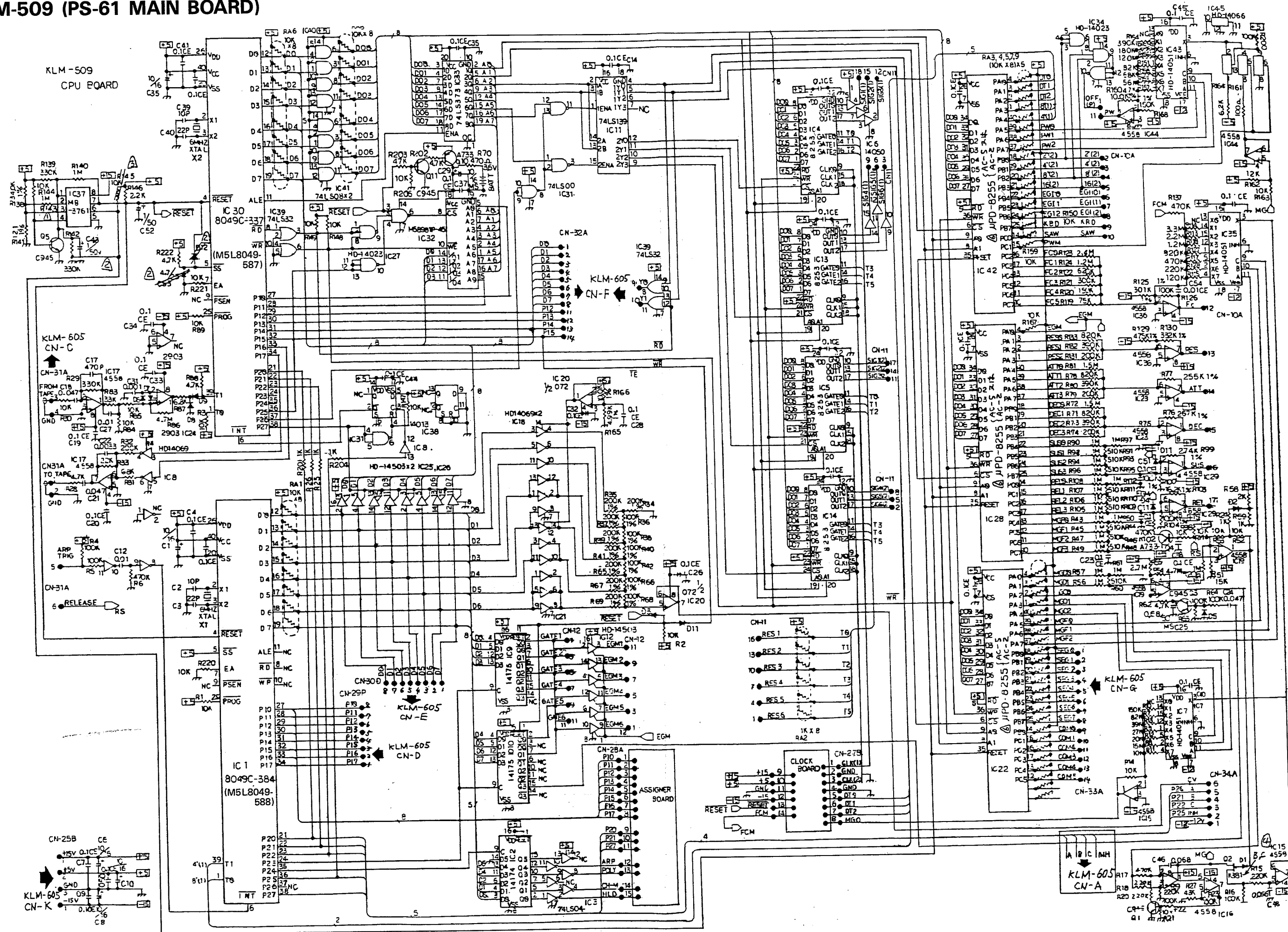
No. 1 Make holes on the rear panel for mounting the MIDI plate.

*The No.s in the () show: The reference drawings. Each process shall be referred to the drawings stated in the ().

CIRCUIT DIAGRAM KLM-605 (MIDI BOARD)

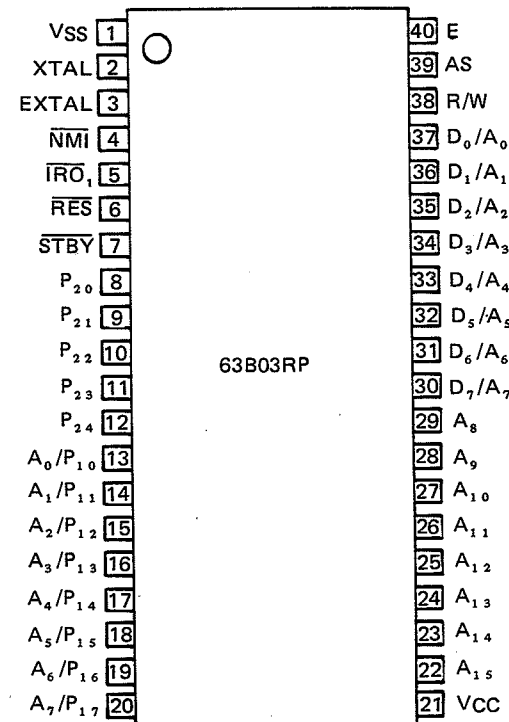


KLM-509 (PS-61 MAIN BOARD)

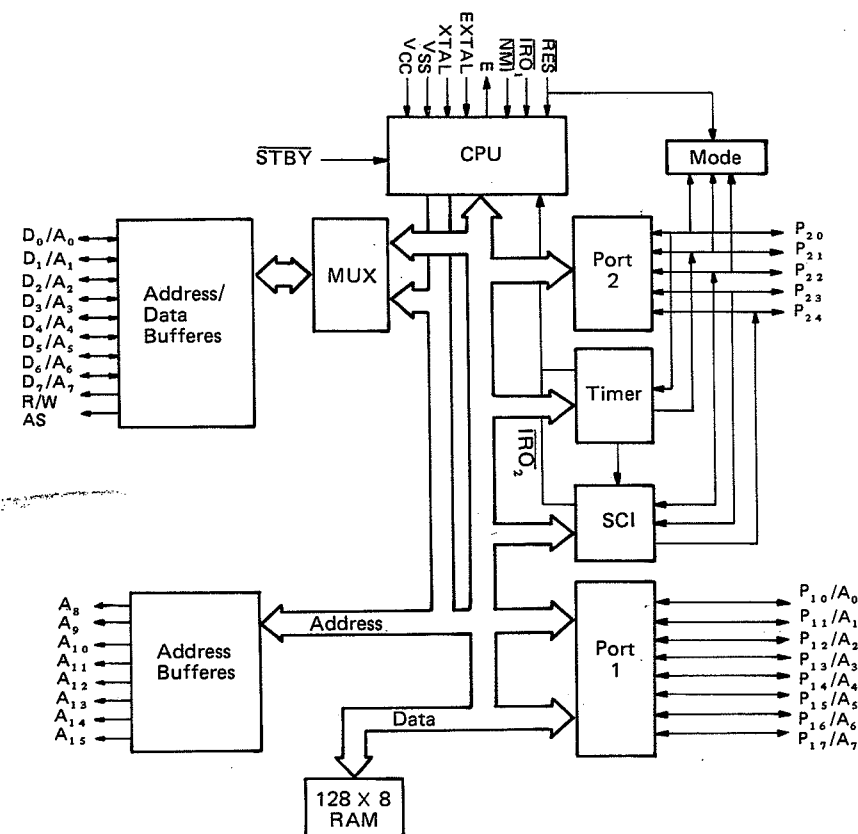


REFERENCE DATA

Pin Configuration



Block Diagram



KORG MIDI-BOARD (KLM-605) CHECKLIST AND TROUBLESHOOTING GUIDE

To check PS-61M functions, the malfunctioning unit should be connected to a properly functioning PS-61M (or POLY-800). If the POLY-800 is used, then only key data and program change data can be controlled via MIDI. Release switch data is ignored (because there is no release on/off function on the POLY-800).

1. Power supply voltage check.

Confirm +5V, (+5V $\pm 0.25V$). If there is anything wrong, disconnect the KLM-605 power supply connector CN-J and check whether +5V is being supplied by the power supply board KLM-480. If the supply is normal then the problem is in the MIDI board KLM-605. Check for overheating in ICs and other parts.

If KLM-605 CN-J is disconnected and +5V is still not correct then the problem is probably in the main board.

2. Reset and 250kHz clock check.

Use oscilloscope to check IC4 (63B03RP) pin-6 and pin-40. Confirm waveform in figure 1.

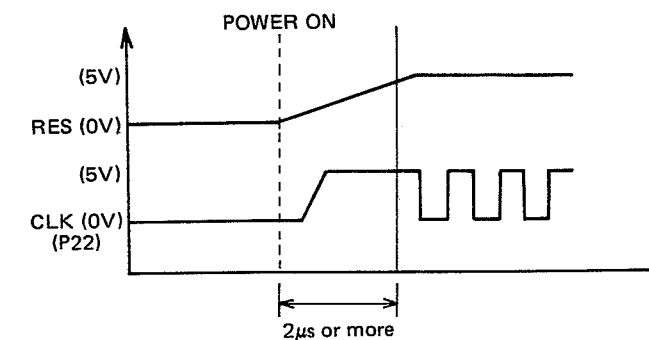


Fig-1

(1) Reset malfunction.

One at a time, disconnect IC4 (63B03), IC15 (40H074), and IC3 (74LS04) from load. (Isolate pin-6, pin-4 and pin-13, respectively, from circuit board). Check, if performance becomes normal when an IC is isolated then that IC is probably bad and should be replaced. If performance does not normalize when any of the above ICs' reset lines are isolated then the problem is in IC16 (T518), R4, R5, or C2.

(2) Clock malfunction.

IC4 (63B03), IC3 (74LS04), IC14 (40H393), or IC15 (40H074) is probably bad.

To find source of problem, check IC3 pin-12 output IC14 pin-1 input (2MHz square wave), and pin-4 output (500kHz square wave).

3. Enable (IC4 pin-40).

Check with oscilloscope. Confirm fig-2 waveform. If there is no waveform or if it looks wrong, then the problem is in IC4 (63B03) or the oscillator (8MHz).

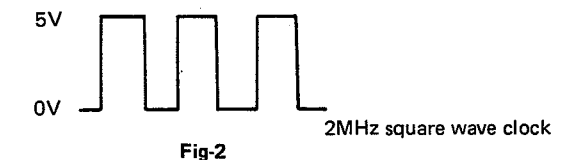


Fig-2

4. Release check.

Confirm 2.0V or more at CN31 and CN-C pin-6 when release switch is off (disconnected). Confirm 0.5V or less when release switch is on.

If all other functions are normal then a release control malfunction is probably caused by a bad IC10 (40H374) or IC13 (40H374).

5. General check.

Check MIDI transmission and reception of keyboard data, program change data, and release control data.

If there is anything wrong, disconnect MIDI board (KLM-605) keyboard connectors CN29, CN30, and control signal connector CN31. Then connect to main board (KLM-475 or KLM-509) to determine whether the problem is in the MIDI board or the main unit. If the problem is in the MIDI board then check the following:

Key data:

Bad transmission: Check IC6, IC12, connectors, and board pattern.

Bad reception: Check IC3, IC7, IC9, IC15, connectors, and board pattern.

Program change:

Bad transmission: IC10, IC11, CN33.

Bad reception: IC8, IC13, TR2, connectors.

POLY-61M MIDI IMPLEMENTATION

TRANSMITTED DATA

STATUS	SECOND	THIRD	DESCRIPTION
10000000	0KKKKKKK	01000000	NOTE OFF
10010000	0KKKKKKK	01000000	NOTE ON
10110000	01000000	00000000	RELEASE OFF
10110000	01000000	01111111	RELEASE ON
11000000	00PPPPPP		PROG CHANGE

NOTE 1. KKKKKKK ; NOTE #36 ~ 96
2. PPPPPP ; PROGRAM #0 ~ 63

RECOGNIZED RECEIVE DATA

STATUS	SECOND	THIRD	DESCRIPTION
1000nnnn	0KKKKKKK	0VVVVVVV	NOTE OFF
1001nnnn	0KKKKKKK	0VVVVVVV	VELOCITY IGNORED
1011nnnn	01000000	00000000	NOTE ON (V > 0)
1011nnnn	01000000	01111111	NOTE OFF (V = 0)
1011nnnn	01111011	00000000	VELOCITY IGNORED
10110000	01111100	00000000	RELEASE OFF
			RELEASE ON
	01111101	00000000	ALL NOTES OFF
			OMNI MODE OFF
			(ALL NOTES OFF)
	01111110	00000000	OMNI MODE ON
	01111111	00000000	(ALL NOTES OFF)
1100nnnn	0PPPPPPP		ALL NOTES OFF
11111111			PROG CHANGE
			SYSTEM RESET

NOTES: 1. KKKKKKK: NOTE # 36 ~ 96

A) If a note is outside of the 36 ~ 96 range then it will be assigned to the nearest octave and retain the same note name.
If 35 or lower then divide the key number by 12, and add 36 to the remainder to find the key data.
If 97 or more, then divide the key number by 12, and add 84 to the remainder to find the key data.

2. PPPPPP: PROGRAM # 0 ~ 63

B) If number exceeds 0 ~ 63 range then subtract 64 to find the program number.

3. nnnn: CHANNEL # 0 at OMNI OFF
0 - 15 at OMNI ON

PARTS LIST

PART CODE	PART NAME, SPECIFICATIONS	P.C. BOARD	IDENTIFICATION No. FUNCTION	Q'TY
CARBON RESISTORS				
10013247	S1/4JY 47Ω	KLM-605		1
10013322	S1/4JY 220Ω			3
10013433	S1/4JY 3.3kΩ			1
10013510	S1/4JY 10kΩ			7
10013547	S1/4JY 47kΩ			7
10013610	S1/4JY 100kΩ			2
BLOCK RESISTORS				
13504547	RKC1/8 B4J 47kΩ	KLM-605		1
13508510	RKC1/8 B8J 10kΩ			1
13508547	RKC1/8 B8J 47kΩ			3
CERAMIC CAPACITORS				
21238610	25V 0.1μF	KLM-605		9
21253210	50V 10PF			2
ELECTROLYTIC CAPACITORS				
23507210	16V 10μF	KLM-605		1
23807168	16V 6.8μF RB-LL			1
TRANSISTORS				
30202211	2SC2785 K	KLM-605		2
DIODE				
31000100	1S1555	KLM-605		17
ICs				
32003021	TC-40H074 P	KLM-605	Dual D flip-flop Dual D-type Positive Edge-triggered flip-flop with set, reset 3-line to 8-line decoder/demultiplexer Octal D-type Transparent latch with 3-state output Octal Positive Edge-triggered D-type flip-flop Dual 4-bit binary counter	1
32003026	TC-40H138 P		1	
32003058	TC-40H373 P		1	
32003059	TC-40H374 P		5	
32003063	TC-40H393 P		1	

PART CODE	PART NAME, SPECIFICATIONS	P.C. BOARD	IDENTIFICATION No. FUNCTION	QTY
PHOTO COUPLER				
32004031	HD-74LS04P	PC-900	HEX inverter	1
32004034	HD-74LS138P		3-line to 8-line decoder/demultiplexer	1
32004054	HD-74LS244		Octal buffer/line driver with 3 state output	1
32004067	HD-63B03		CMOS CPU	1
32004068	HD-74LS20P		Dual 4 input positive NAND gate	1
32012003	MBM-2764-25Z	KLM-605	(8K X 8) UV erasable PROM	1
32023001	PST-518		RESET	1
CRYSTAL OSCILLATOR				
33501000	HC18/U 8.00MHz	KLM-605		1
MIDI-BOARD (without parts)				
34060500		KLM-605		1
HARNESSES				
47041200	HNS-312	KLM-605		1
47041300	HNS-313			1
47041400	HNS-314			1
47041500	HNS-315			1
47041600	HNS-316			1
47041700	HNS-317			1
47041800	HNS-318			1
47041900	HNS-319			1
47042000	HNS-320			1
47042100	HNS-321			1
47042200	HNS-322			1
CONNECTOR TOPs				
47100401	B4P-SHF-1	KLM-605		1
47100501	B5P-SHF-1			1
47100601	B6P-SHF-1			2
47100801	B8P-SHF-1			4
47101401	B14P-SHF-1			4
CONNECTOR				
47150400	B4P-VH	KLM-605		2