DIGITAL MULTI-DIMENSIONAL
SYNTHESIZER MODULE

K5/K5m

SCHEMATIC DIAGRAM

KAWAI
Kawai Musical Instrument
Manufacturing Co., Ltd.

CONTENTS

1. K5/K5m P.W.B. INFORMATION 1
2. K5/K5m SPECIFICATION 2
3. K5 PARTS LIST 3
4. K5m PARTS LIST 4
5. K5 SEMICONDUCTORS LIST 5
6. K5m SEMICONDUCTORS LIST 6
7. K5 WIRING CONNECTION 7
8. K5m WIRING CONNECTION 8
9. BLOCK DIAGRAM 9
10. MI-003 CIRCUIT 10
11. MI-004 CIRCUIT 11
12. MI-005, MI-006, MI-008 CIRCUITS 12
13. MI-007, MI-009, MI-013, MI-015 CIRCUITS 13
14. MI-012, MI-014 CIRCUITS 14
15. K90PB102, K90PB101 CIRCUITS 15
16. MI-010, MI-011 CIRCUITS 16
17. TROUBLESHOOTING 17

NOTE: P.W.B. Layout Diagrams will be prepared in the separate volume.

1. K5/K5m P.W.B. INFORMATION

P.W.B. Name	Description	Code No.	
		K5	K5m
MI-003-004 (1): All markets	MI-003: CPU, PROGRAM ROM	236001	Not Use
MI-003-004 (2): All markets	I/F, TONE RAM etc	Not Use	236009
	MI-004: TONE GENERATOR A/D CONVERTOR		
MI-005-009 (1): All markets	MI-005: PANEL SW (LEFT)	236002	Not Use
MI-005-009 (2): All markets	MI-006: PANEL SW (RIGHT)	Not Use	236010
	MI-007: MASTER VOLUME		
	MI-008: INCREMENT		
	MI-009: CARD SLOT		
MI-010-011 (1): } Japan	MI-010: POWER SUPPLY	236003	Not Use
(6): } Japan	MI-011: PRIMARY FUSE	Not Use	236011
(2): } U.S.A.		236004	Not Use
(7): } U.S.A.		Not Use	236012
(3): } Canada		236005	Not Use
(8): } Canada		Not Use	236013
(4): } Australia, West Germany, Europe, U.K.		236006	Not Use
(9): } Australia, West Germany, Europe, U.K.		Not Use	236014
(5): } 110/220V markets		236007	Not Use
(10): } 110/220V markets		Not Use	236015
MI-012 (1): All markets	MIDI JACK	236008	Not Use
MI-013-015 (1): All markets	MI-013: LCD CONTRAST VOLUME	Not Use	236016
	MI-014: MIDI JACK		
	MI-015: PHONES JACK		
K90PB101 : All markets	Keyboard SW Circuits	Use	Not Use
K90PB102 : All markets	Keyboard SW Circuits	Use	Not Use

2. K5/K5m SPECIFICATION

KEYBOARD : 61 KEYS (K5 ONLY)

SOUND SOURCES : 16 VOICES

PROGRAM CAPACITY : INTERNAL 96 (48 TIMBRE/48 MACRO), CARD 96 (48 TIMBRE/48 MACRO)

TIMBRE EDIT PARAMETERS : MODE – 1-127 HARMONICS/1-63 HARMONICS x 2
NAME
COPY

1. **DFG:** COARSE, FINE, FIXED, PITCH BEND, PORTA SW, PORTA SPEED [DFG MOD] LFO DEP, WHEEL DEP, PRESS DEP, ENV DEP, AT VELO, PRESS LFO
2. **DHG 1:** HARMONIC SELECT, INTENSITY, ENV ASSIGN, MOD ASSIGN [GROUP CONTROL PARAMETERS] All. ODD, EVEN. OCT, 5TH
3. **DCF:** ON/OFF, CUTOFF, SLOPE HARMONIC LEVEL [DCF MOD] CUTOFF MOD, SLOPE MOD, by VELO, LFO PRESS, KS
4. **DCA:** ON/OFF
   [DCA MOD] AT VELO LEVEL, RL VELO LEVEL, KS LEVEL, AT VELO SPEED, PRESS SPEED, KS SPEED, LFO MOD
5. **DFG ENV:** 12 PARAMETERS, LOOP (3-4 SEG.)
6. **DHG ENV:** 12 PARAMETERS, SHADOW, TOP PHASE
7. **DCF ENV:** 12 PARAMETERS, TOP PHASE
8. **DCA ENV:** 14 PARAMETERS, TOP PHASE
9. **DFT:** ON/OFF, CO-C10
10. **DHG 2:** ACT, EFFECT (ENV 1-4)
    [DHG MOD] VELO, PRESS, KS, LFO
11. **KS:** LEFT DEP, BREAK POINT, RIGHT DEP
12. **LFO:** SPEED, DELAY, TREND, SHAPE (TRIANGLE, REV-TRI, SQUARE, REV-SQR, SAWTOOTH, REV-SAW, RANDOM)

MACRO EDIT PARAMETERS : POLY LIMIT ON/OFF, (TRACK 1-15) TUNE, LEVEL, POLY, TIMBRE, MIDI CH, RANGE, VELO SW, OUTPUT ASSIGN

LINK PARAMETERS : LINK NUMBER, LINK NAME

SYSTEM PARAMETERS : TUNE, TRANSPOSE, VELO CURVE

MIDI PARAMETERS : PARAMETER SEND, RCV EXCLUSIVE, MACRO CHANGE, DATA DUMP [MIDI RCV/TRANSMIT] VELO, PRESS, BEND, MOD, PEDAL, EXPRESSION, PORTAMENTO, PROGRAM CHANGE, HOLD, TUNE, VOLUME (RCV ONLY), OMNI SW (RCV ONLY)

SAVE/LOAD : SAVE/LOAD

FUNCTION SWITCHES : WRITE, FUNCTION

CONTROLS : INCREMENTAL VALUE CONTROL, VOLUME, CURSOR

MEMORY CARD : MEMORY CARD (DC-32)

FRONT PANEL : HEADPHONE JACK, POWER SW

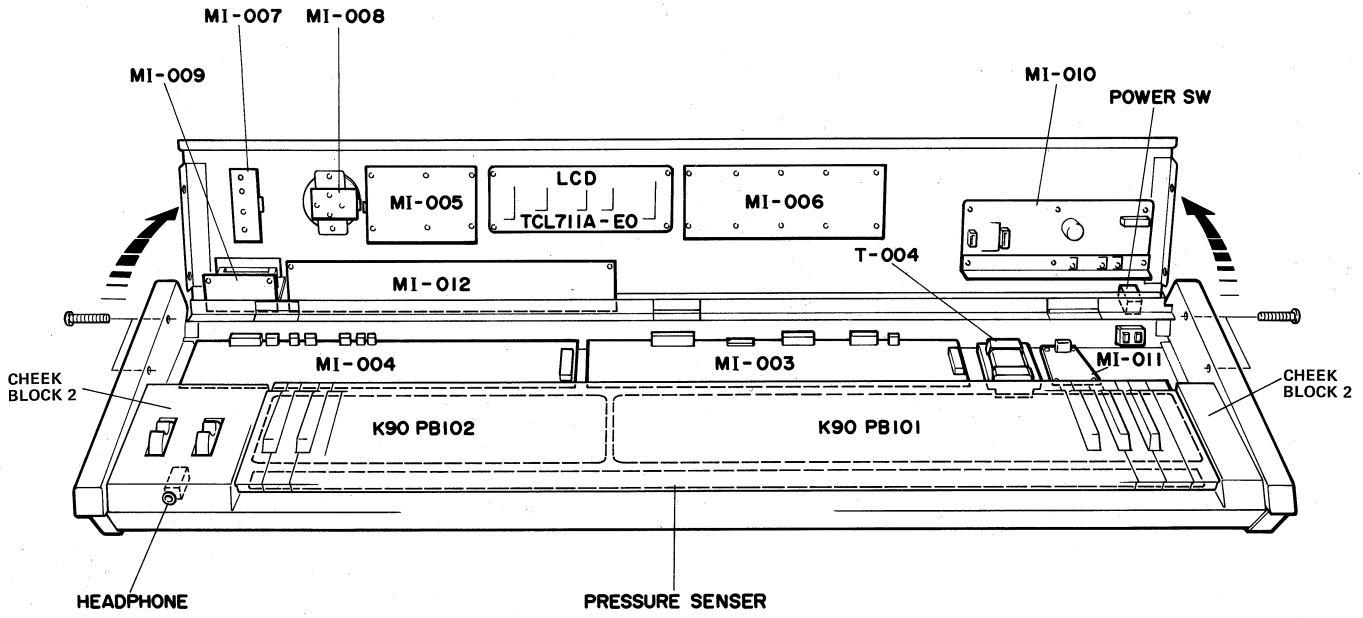
REAR PANEL : DISPLAY CONTRAST, MIDI CONNECTORS (IN/OUT/THRU), ROTECT ON/OFF, HOLD JACK, LINK JACK, PEDAL JACK, EXPRESSION JACK, OUTPUT JACK (MIX, 1, 2, 3, 4)

DISPLAY : 64 x 240 FULL DOT LCD DISPLAY

DIMENSIONS : K5: 41" (W) x 13.5" (D) x 4" (H) (1,040 (W) x 339 (D) x 99 (H) mm)
K5m: 19" (W) x 4.75" (D) x 7" (H) (483 (W) x 120 (D) x 177 (H) mm)

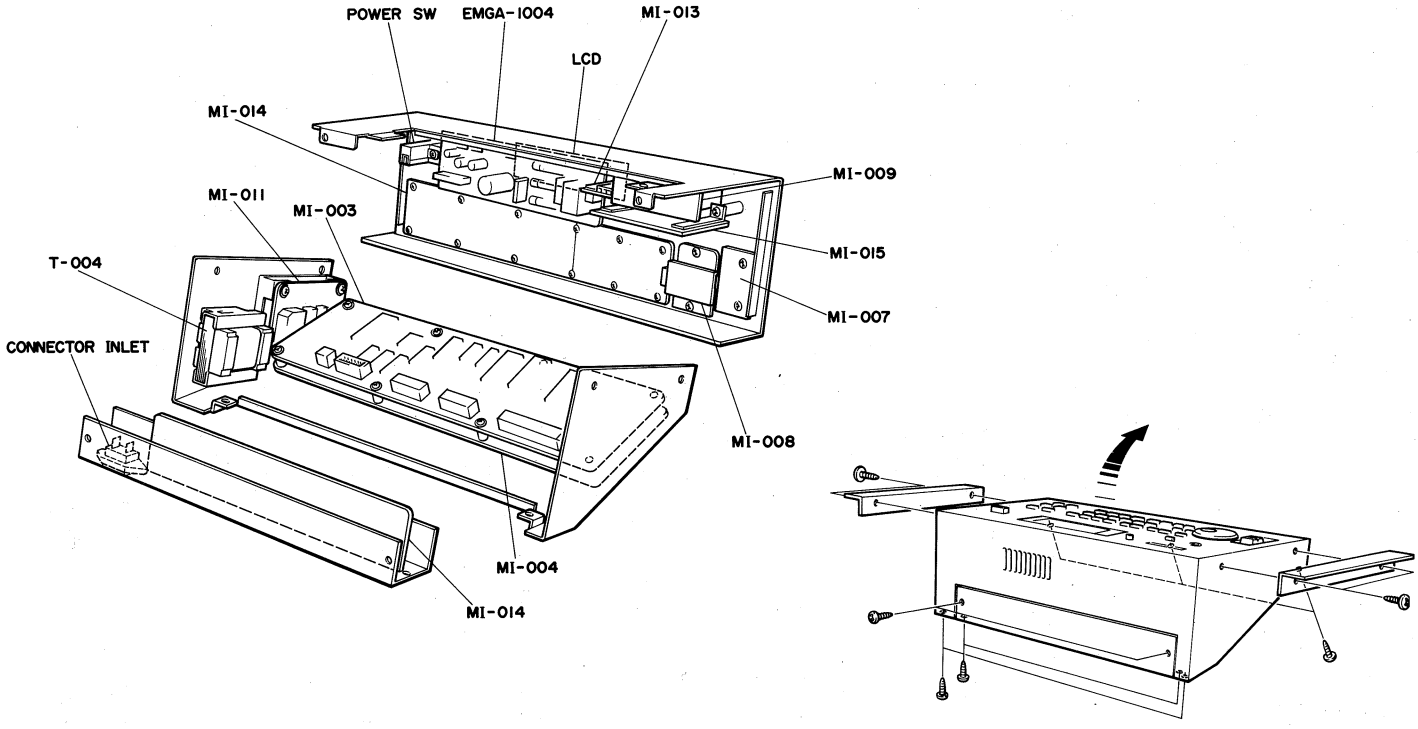
WEIGHT : K5: 28 Lbs. (12.8 kg)
K5m: 10.5 Lbs. (4.8 kg)

3. K5 PARTS LIST



Code No.	Name	Country	Pieces
236001	MI-003 (1) MI-004 (1)	All markets	1
236002	MI-005-009 (1)	All markets	1
236003	MI-010 (1) MI-011 (1)	Japan	1
236004	MI-010 (2) MI-011 (2)	U.S.A.	1
236005	MI-010 (3) MI-011 (3)	Canada	1
236006	MI-010 (4) MI-011 (4)	West Germany, U.K., Australia	1
236007	MI-010 (5) MI-011 (5)	110/220V markets	1
236008	MI-012 (1)	All markets	1
802388	Wheel	All markets	2
802413	Power SW: SDDJA1	All markets	1
802537	AC Inlet: PA-126-6.0	Japan, West Germany, U.K., Australia, 110/220V markets	1
803614	AC Inlet: PA-125	U.S.A., Canada	1
803488	Cheek Block 2 (R)	All markets	1
803503	Sideboard R	All markets	1
803504	Sideboard L	All markets	1
803505	Cheek Block 1 (L)	All markets	1
803507	Volume Cover	All markets	1
803509	Increment Knob	All markets	1
803510	Volume Knob	All markets	1
803519	Power Transformer: T-004-D	Japan	1
803520	Power Transformer: T-004-J	U.S.A., Canada	1
803521	Power Transformer: T-004-I	West Germany, U.K., Australia	1
803522	Power Transformer: T-004-E	110/220V markets	1
803523	Keyboard: ESK-90501	All markets	1
803595	Lithium Battery: CR14250SE-FT	All markets	1
803629	Memory Card: BS32C1-A 32K	All markets	1

4. K5m PARTS LIST



Code No.	Name	Country	Pieces
236009	MI-003 (2) MI-004 (2)	All markets	1
236010	AAW-6010 MI-005-009 (2)	All markets	1
236011	MI-010 (6) MI-011 (6)	Japan	1
236012	MI-010 (7) MI-011 (7)	U.S.A.	1
236013	MI-010 (8) MI-011 (8)	Canada	1
236014	MI-010 (9) MI-011 (9)	West Germany, U.K., Australia	1
236015	MI-010 (10) MI-011 (10)	110/220V markets	1
236016	MI-013-015 (1)	All markets	1
802537	AC Inlet: PA-126-6.0	Japan, West Germany, U.K., Australia, 110/220V markets	1
803614	AC Inlet: PA-125	U.S.A., Canada	1
802769	Power SW: SDDLD	All markets	1
803507	Volume Cover	All markets	1
803509	Increment Knob	Japan, Canada, West Germany, U.K., Australia, 110/220V markets	1
803510	Volume Knob	All markets	1
803519	Power Transformer: T-004-D	Japan	1
803520	Power Transformer: T-004-U	U.S.A., Canada	1
803521	Power Transformer: T-004-I	West Germany, U.K., Australia	1
803522	Power Transformer: T-004-E	110/220V markets	1
803595	Lithium Battery: CR14250SE-FT	All markets	1
803629	Memory Card: BS32C1-A 32K	Japan, Canada, West Germany, U.K., Australia, 110/220V markets	1
910855	Panel	All markets	1
910865	Sideboard	All markets	1
910870	Rear Panel	All markets	1

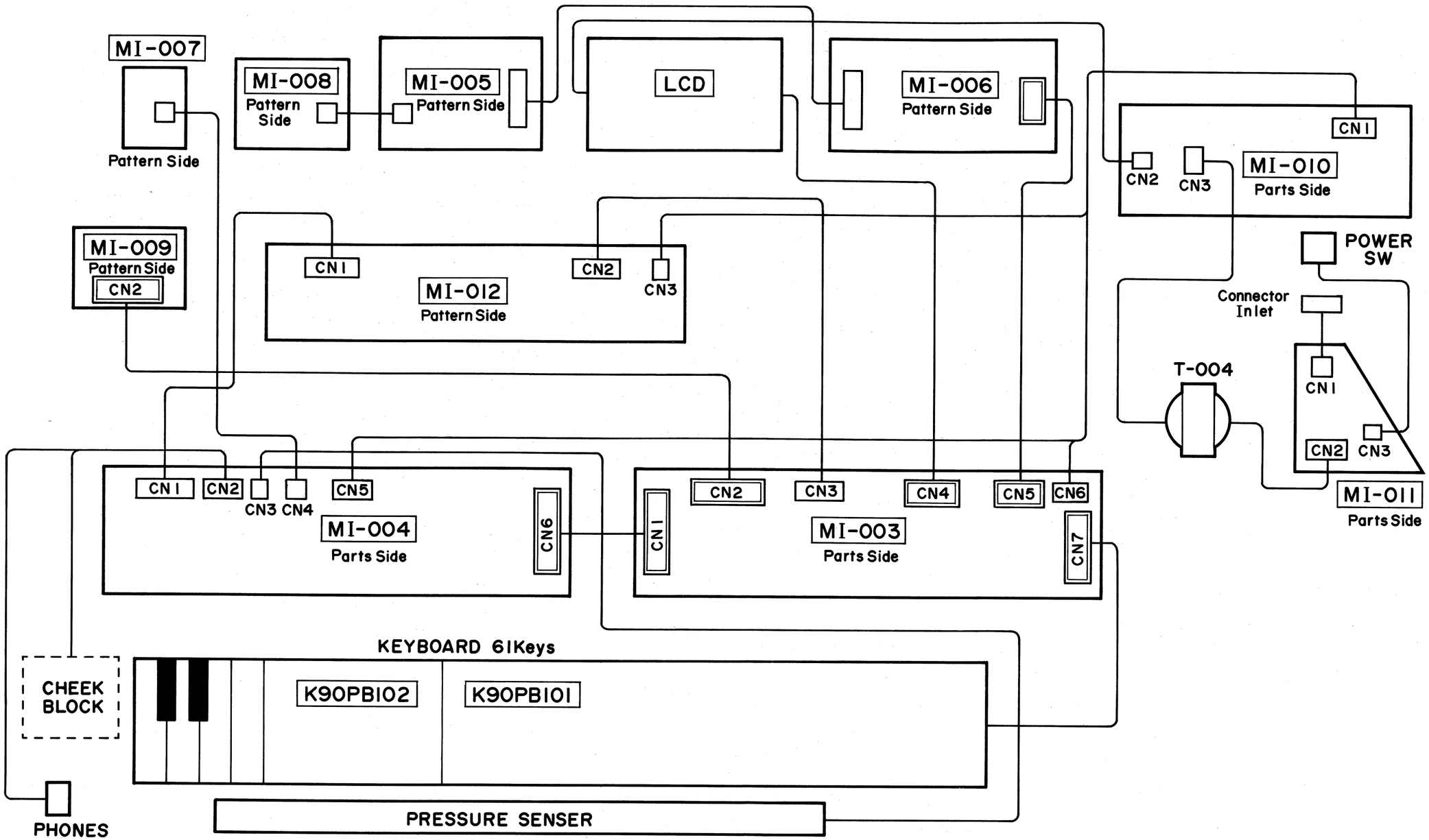
5. K5 SEMICONDUCTORS LIST

	Code No.	Name	Pieces
IC	706985	MB84053B	3
	707005	NJM-386D	1
	800715	5222L	2
	801926	TC74HC08	1
	802825	6116ALSP-15	2
	802832	MSM74HC04	2
	802833	MSM74HC32	2
	802834	MSM74HC74	2
	802835	MSM74HC139	1
	802838	MSM74HC244	5
	802842	MSM74HC373	1
	802931	MSM74HC02	1
	802932	MSM74HC138	1
	802934	MSM74HC240	1
	802935	MSM74HC245	3
	802936	MSM74HC365	2
	802937	TA8505P	1
	803005	MSM74HC00	1
	803397	PCM55HP	2
	803571	NJM-064D	4
	803572	M54534P	1
	803573	NE555	1
	803575	ADC0809CCN	1
	803576	74HC11	1
	803577	74HC352	2
	803578	74ALS74	1
	803579	74ALS137	1
	803580	74ALS139	1
	803581	CXK5864AP-70L	5
	803582	CXK58256AP-15LL	1
	803583	PD4464C-15L	2
	803584	PD70208G	1
	803585	MB63H158	1
	803586	MB87159	2
	803587	MB87160	2
	803588	MB651111U	1
	803589	MB653119A	1
	910785	MB83256-20 (MASKROM: P015)	1
	910790	MBM27C512-25 (EPROM: P019)	1
	910795	MBM27C512-25 (EPROM: P020)	1
	802888	AN7805F	1
	803568	AN7806F	1
	803569	AN7906F	1
	803570	79L15	1
	706951	SN74LS03N	1
	803006	MSM74HC14	1
TRANSISTOR	706102	2SA564R	1
	802508	2SC3331T	2
DIODE	802364	MA-700	3
	802898	DSK-10B	6
	706317	1S2473	32
	706319	RB-152	2
ZENOR DIODE	803591	HZS-2BLL	2
	803592	HZS-4ALL	1
SW	803618	TM1-01	32
INVERTER	803613	NI03-05-05	1
FUSE	803622	MT4 1A	1
	803623	(A)TSC 0.5A	3
	803624	(A)TSC 1A	1
	803625	MT4 0.5A	3
	803626	SET 0.25A	1
	803627	SET 0.5A	2
	803628	SET 1A	1
PHOTO COUPLER	803590	6N137	1

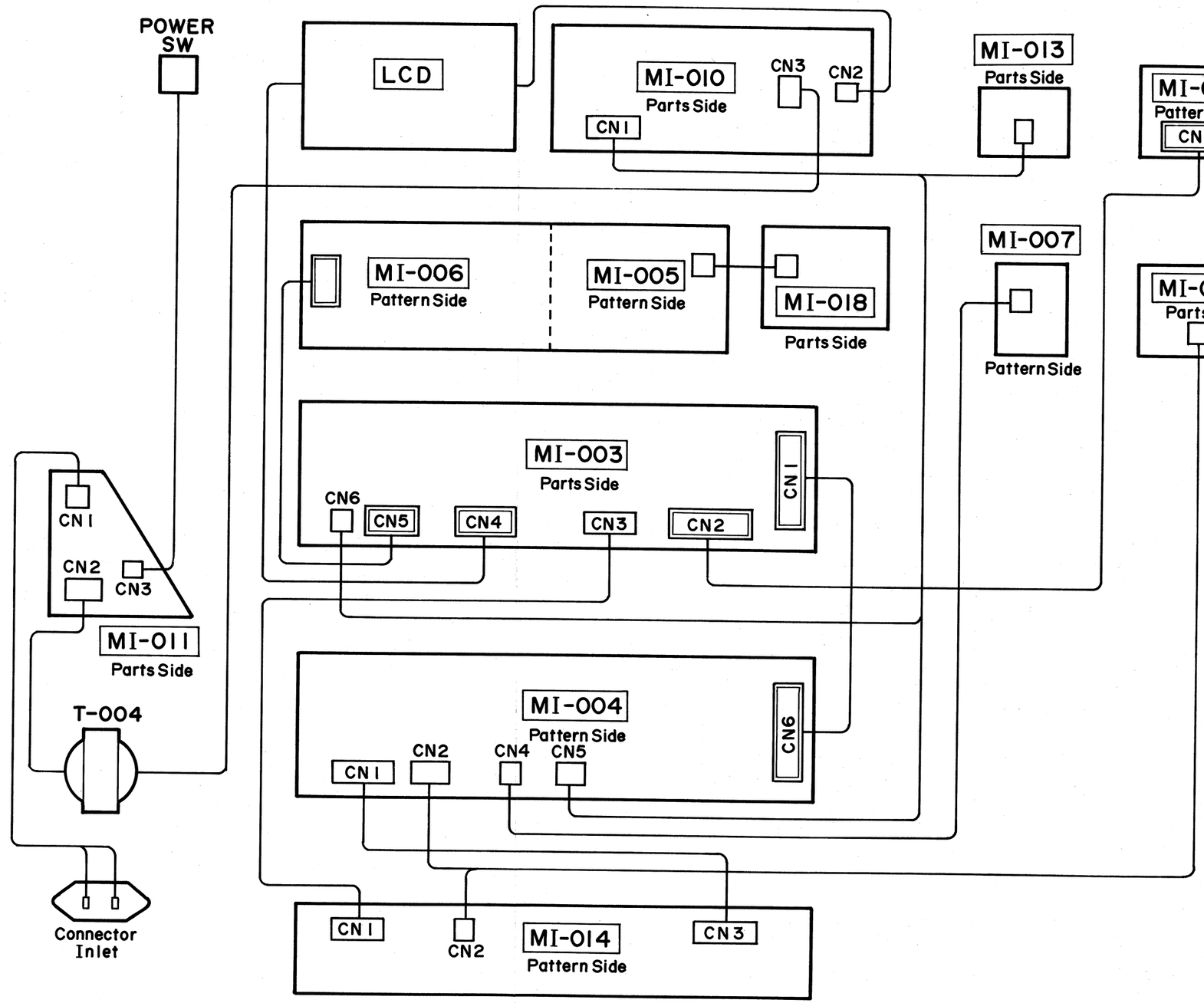
6. K5m SEMICONDUCTORS LIST

	Code No.	Name	Pieces
IC	706985	MB84053B	3
	707005	NJM-386D	1
	800715	5222L	2
	801926	TC74HC08	1
	802832	MSM74HC04	2
	802833	MSM74HC32	2
	802834	MSM74HC74	2
	802835	MSM74HC139	1
	802838	MSM74HC244	5
	802842	MSM74HC373	1
	802931	MSM74HC02	1
	802934	MSM74HC240	1
	802935	MSM74HC245	3
	802936	MSM74HC365	2
	802937	TA8505P	1
	803005	MSM74HC00	1
	803397	PCM55HP	2
	803571	NJM-064D	4
	803572	M54534P	1
	803573	NE555	1
	803575	ADC0809CCN	1
	803576	74HC11	1
	803578	74ALS74	1
	803579	74ALS137	1
	803580	74ALS139	1
	803581	CXK5864AP-70L	5
	803582	CXK58256AP-15LL	1
	803583	PD4464C-15L	2
	803584	PD70208G	1
	803586	MB87159	2
	803587	MB87160	2
	803588	MB651111U	1
	803589	MB653119A	1
	910785	MB83256-20 (MASKROM: P015)	1
	910790	MBM27C512-25 (EPROM: P019)	1
	910795	MBM27C512-25 (EPROM: P020)	1
	802888	AN7805F	1
	803568	AN7806F	1
	803569	AN7906F	1
	803570	79L15	1
	706951	SN74LS03N	1
	803006	MSM74HC14	1
TRANSISTOR	706102	2SA564R	1
	802508	2SC3331T	2
DIODE	802364	MA-700	3
	802898	DSK-10B	9
	706317	1S2473	32
	706319	RB-152	2
ZENOR DIODE	803591	HZS-2BLL	2
	803592	HZS-4ALL	1
INVERTER	803613	NI03-05-05	1
FUSE	803622	MT4 1A	1
	803623	(A)TSC 0.5A	3
	803624	(A)TSC 1A	1
	803625	MT4 0.5A	3
	803626	SET 0.25A	1
	803627	SET 0.5A	2
	803628	SET 1A	1
PHOTO COUPLER	803399	6N137	1

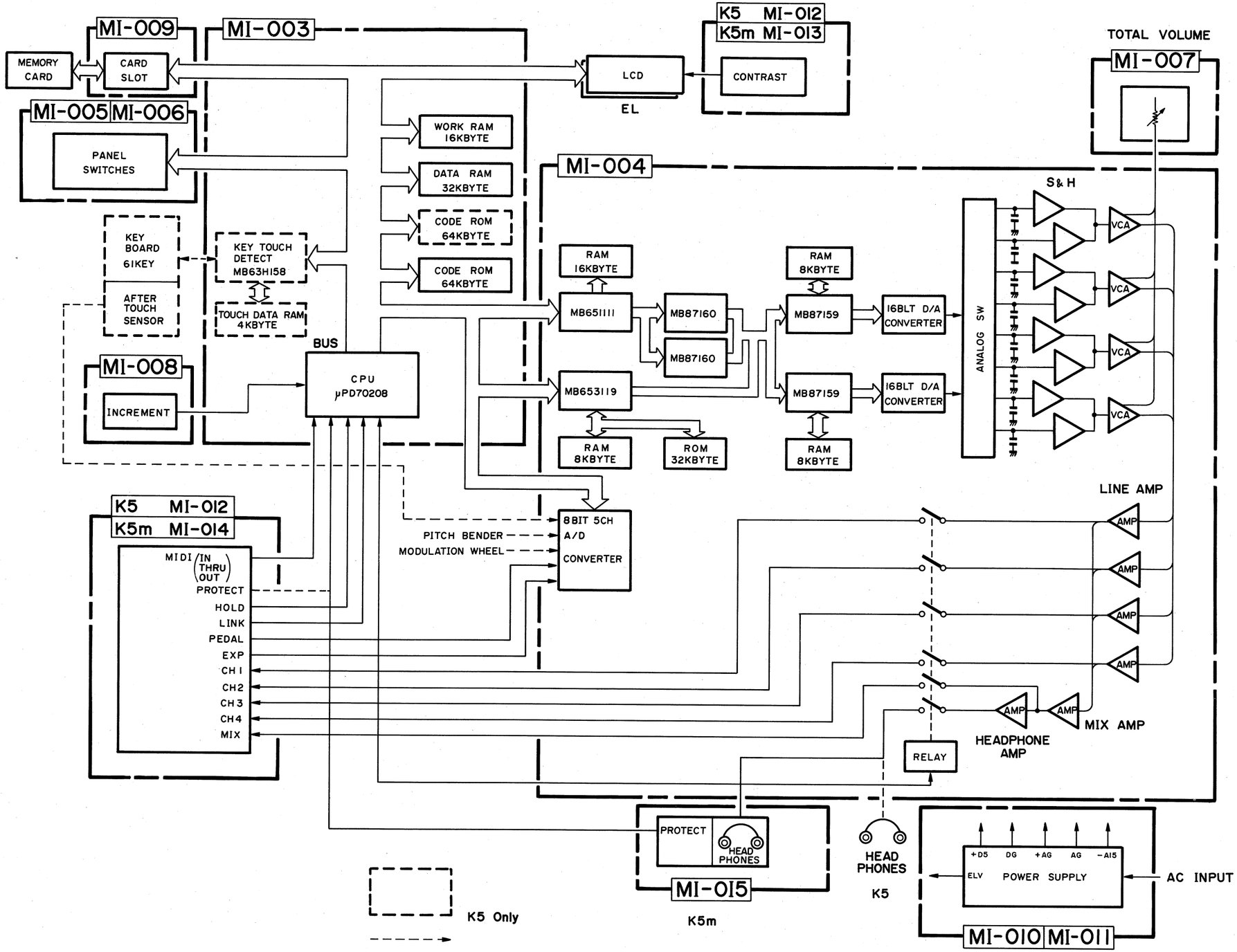
7. K5 WIRING CONNECTION



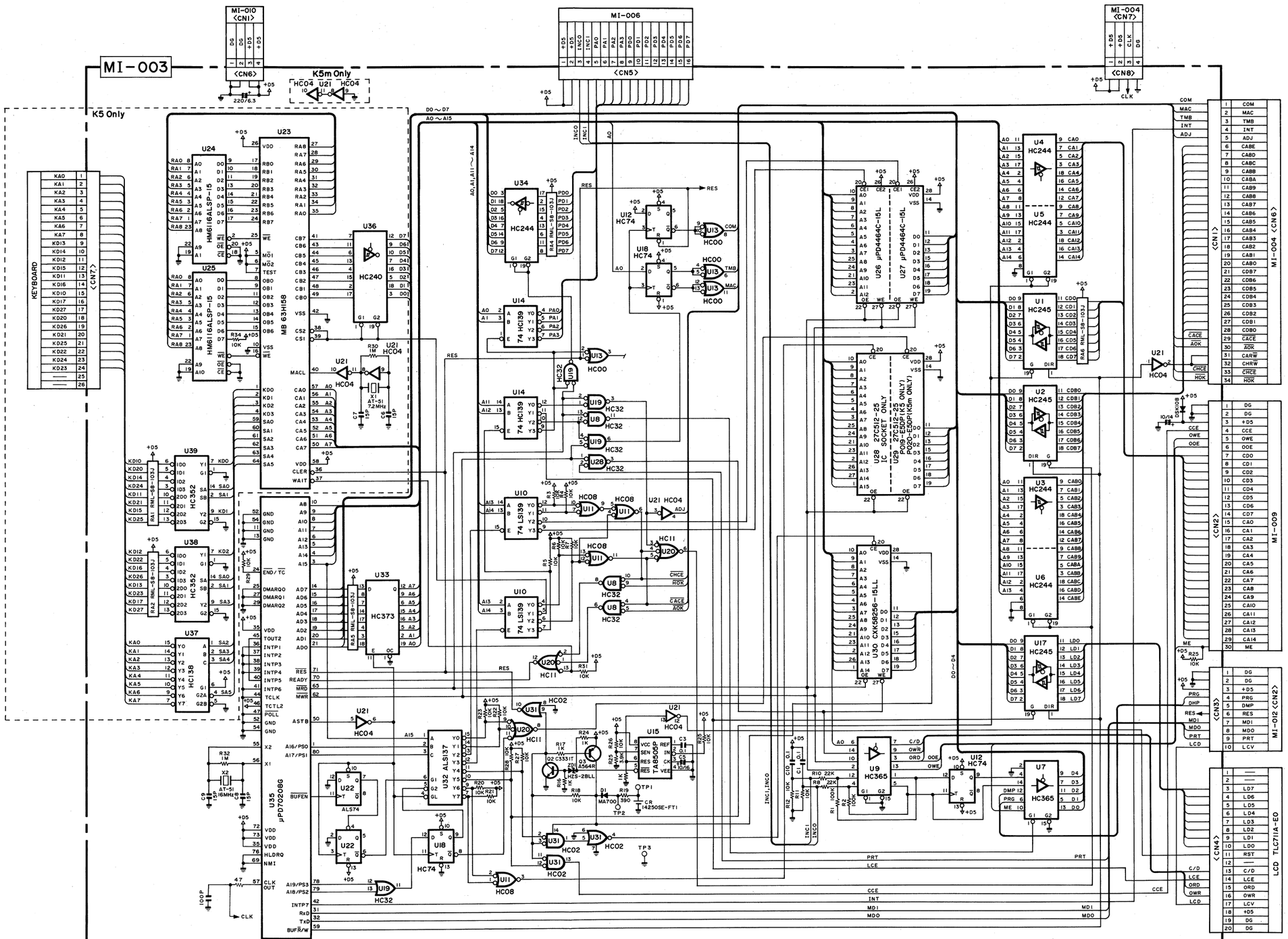
8. K5m WIRING CONNECTION



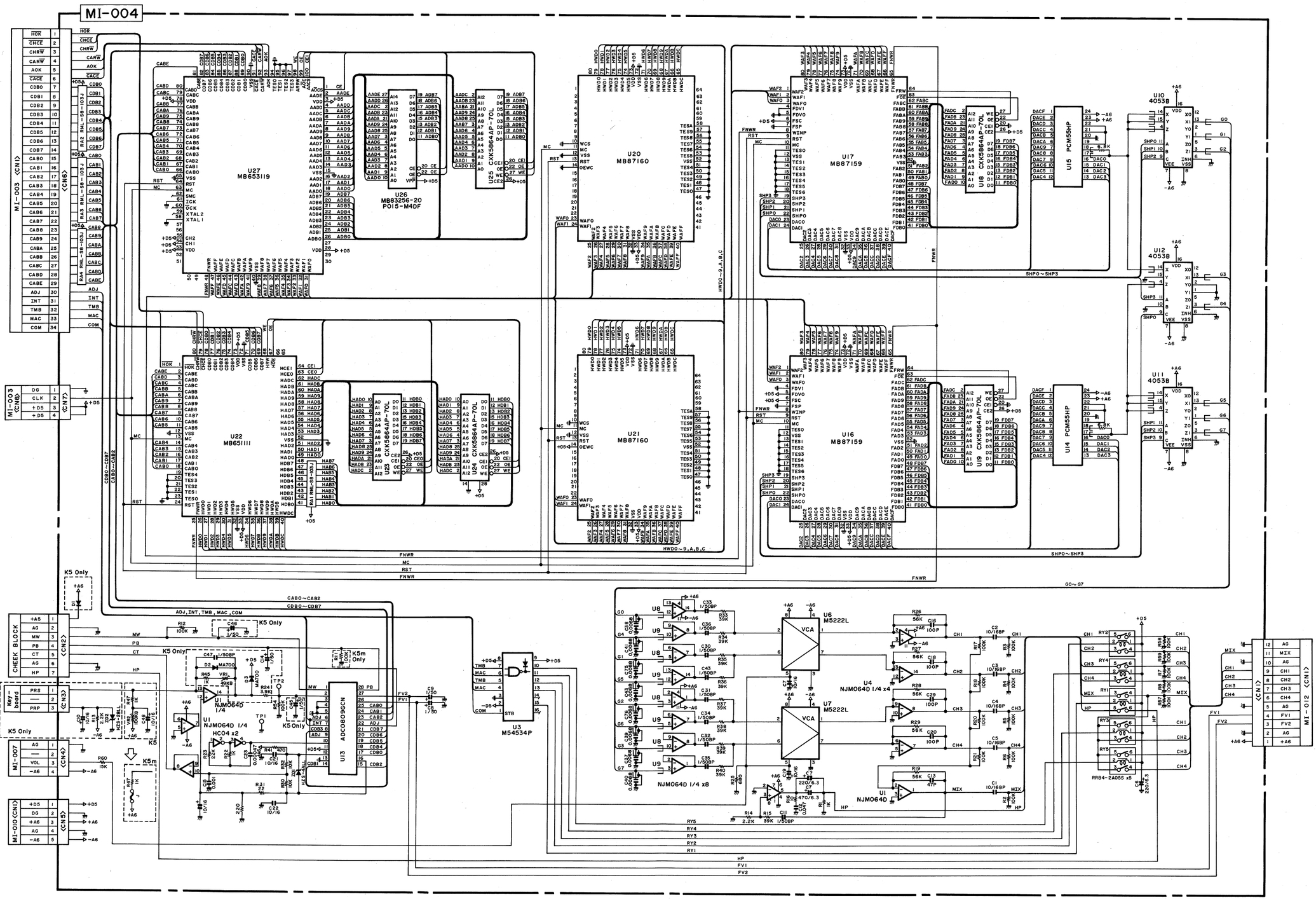
9. BLOCK DIAGRAM

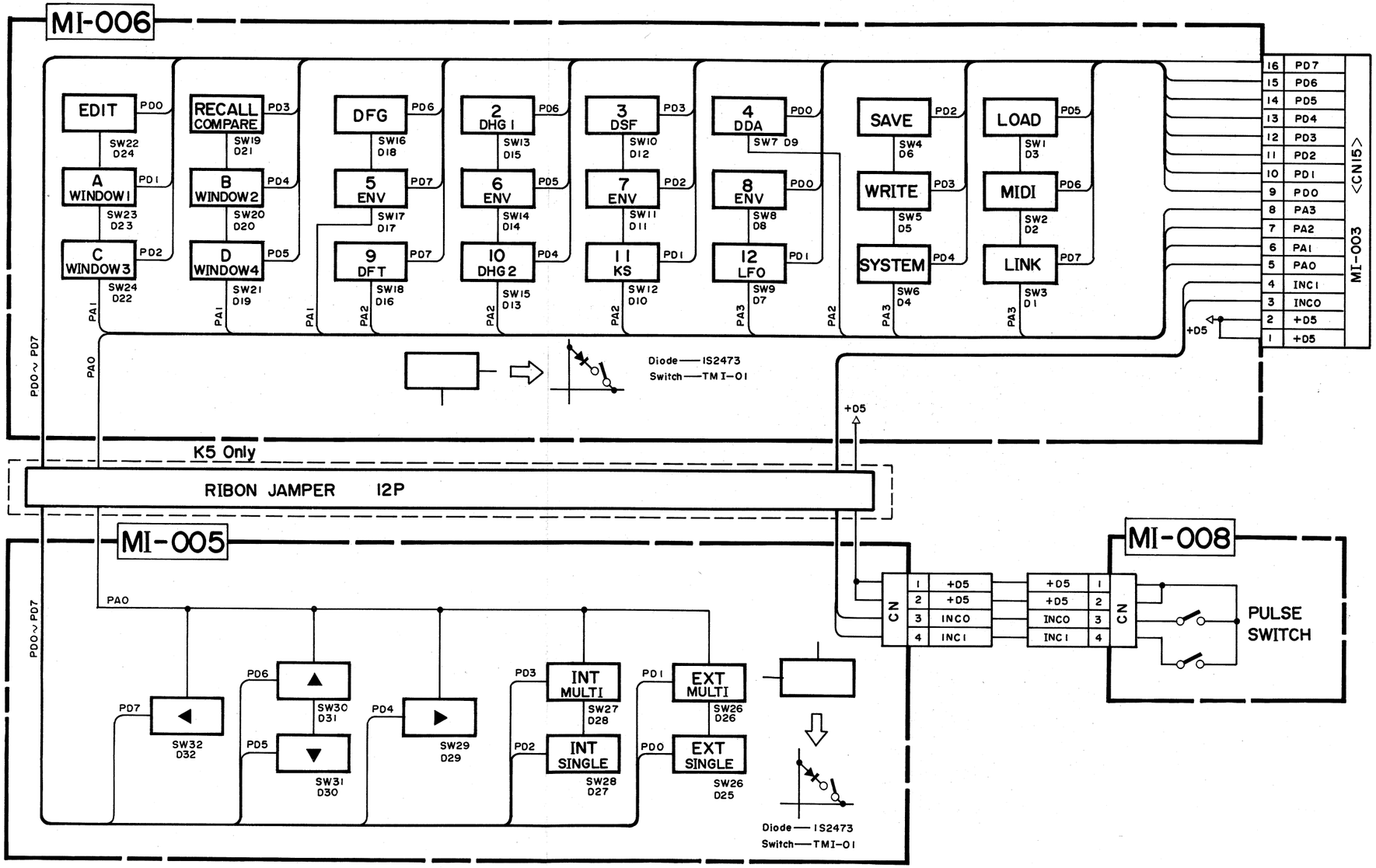


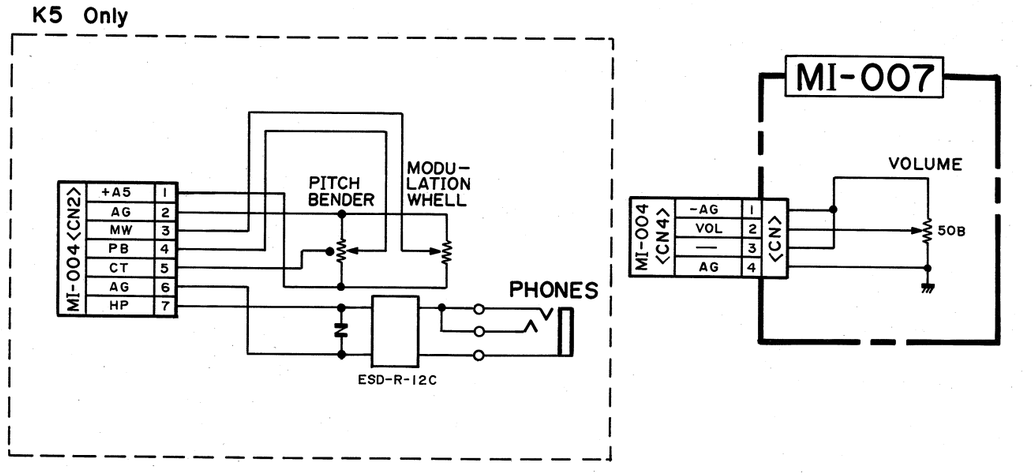
10. MI-003 CIRCUIT



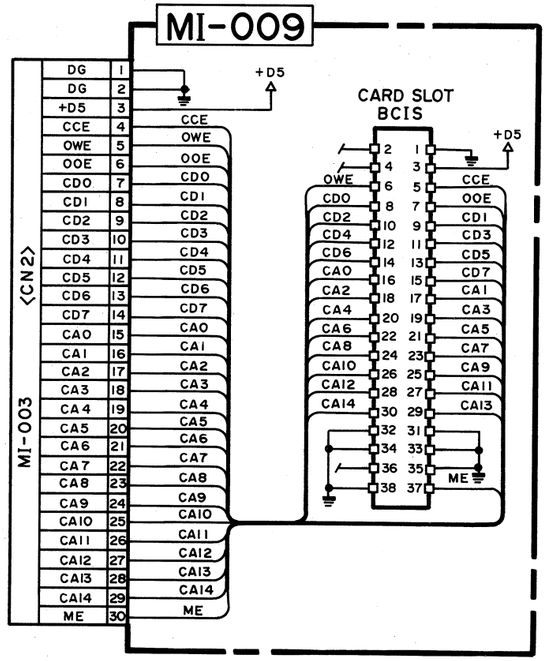
11. MI-004 CIRCUIT



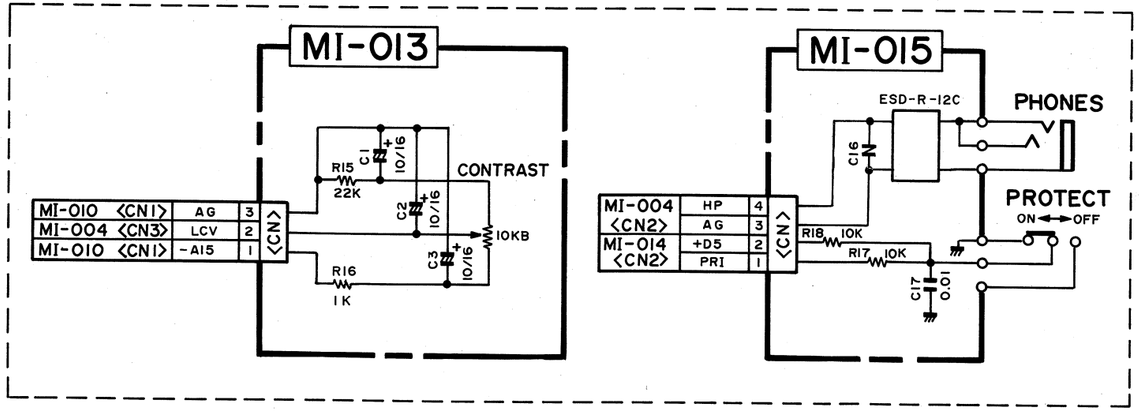

MI-006
EDIT
PD0
SW22
D24
A
WINDOW1
PD1
SW23
D23
C
WINDOW3
PD2
SW24
D22
RECALL
COMPARE
PD3
SW19
D21
B
WINDOW2
PD4
SW20
D20
D
WINDOW4
PD5
SW21
D19
DFG
PD6
SW16
D18
5
ENV
PD7
SW17
D17
9
DFT
PD7
SW18
D16
2
DHG1
PD6
SW13
D15
6
ENV
PD5
SW14
D14
10
DHG2
PD4
SW15
D13
3
DSF
PD3
SW10
D12
7
ENV
PD2
SW11
D11
11
KS
PD1
SW12
D10
4
DDA
PD0
SW7 D9
8
ENV
PD0
SW8
D8
12
LFO
PD1
SW9
D7
SAVE
PD2
SW4
D6
WRITE
PD3
SW5
D5
SYSTEM
PD4
SW6
D4
LOAD
PD5
SW1
D3
MIDI
PD6
SW2
D2
LINK
PD7
SW3
D1
PA1
PA0
PD0~PD7
+D5
Diode—IS2473
Switch—TMI-01
16 PD7
15 PD6
14 PD5
13 PD4
12 PD3
11 PD2
10 PD1
9 PD0
8 PA3
7 PA2
6 PA1
5 PA0
4 INC1
3 INC0
2 +D5
1 +D5
MI-003 <CN15>
K5 Only
RIBON JAMPER 12P
MI-005
PA0
PD0~PD7
PD7
SW32
D32
PD6
SW30
D31
PD5
SW31
D30
PD4
SW29
D29
PD3
INT
MULTI
SW27
D28
PD2
INT
SINGLE
SW28
D27
PD1
EXT
MULTI
SW26
D26
PD0
EXT
SINGLE
SW26
D25
Diode—IS2473
Switch—TMI-01
CN
1 +D5
2 +D5
3 INC0
4 INC1
+D5 1
+D5 2
INC0 3
INC1 4
MI-008
PULSE
SWITCH

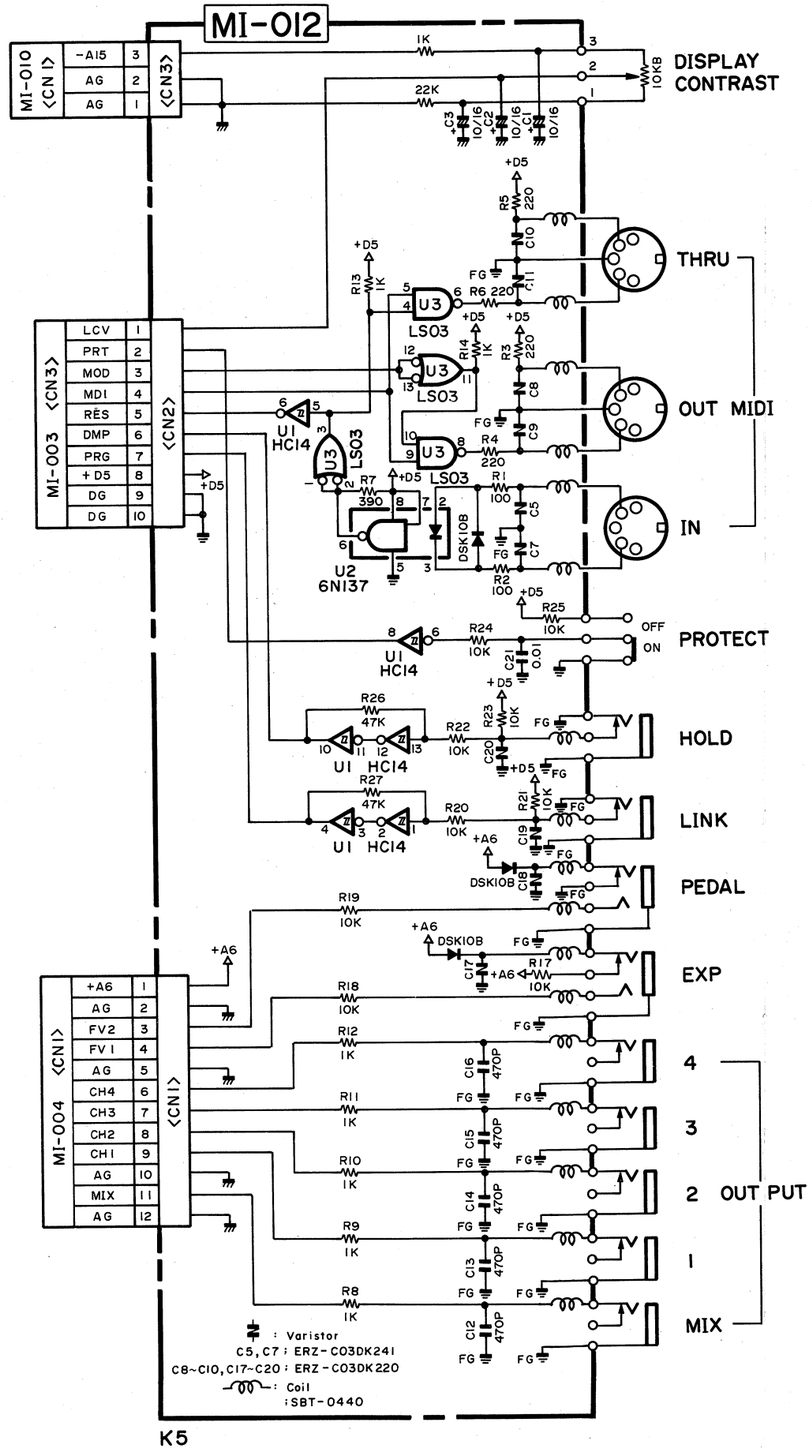

K5 Only
MI-004 <CN2>
+A5 1
AG 2
MW 3
PB 4
CT 5
AG 6
HP 7
PITCH BENDER
MODU-LATION WHELL
PHONES
ESD-R-12C

MI-007
MI-004 <CN4>
-AG 1
VOL 2
— 3
AG 4
<CN>
VOLUME
50B

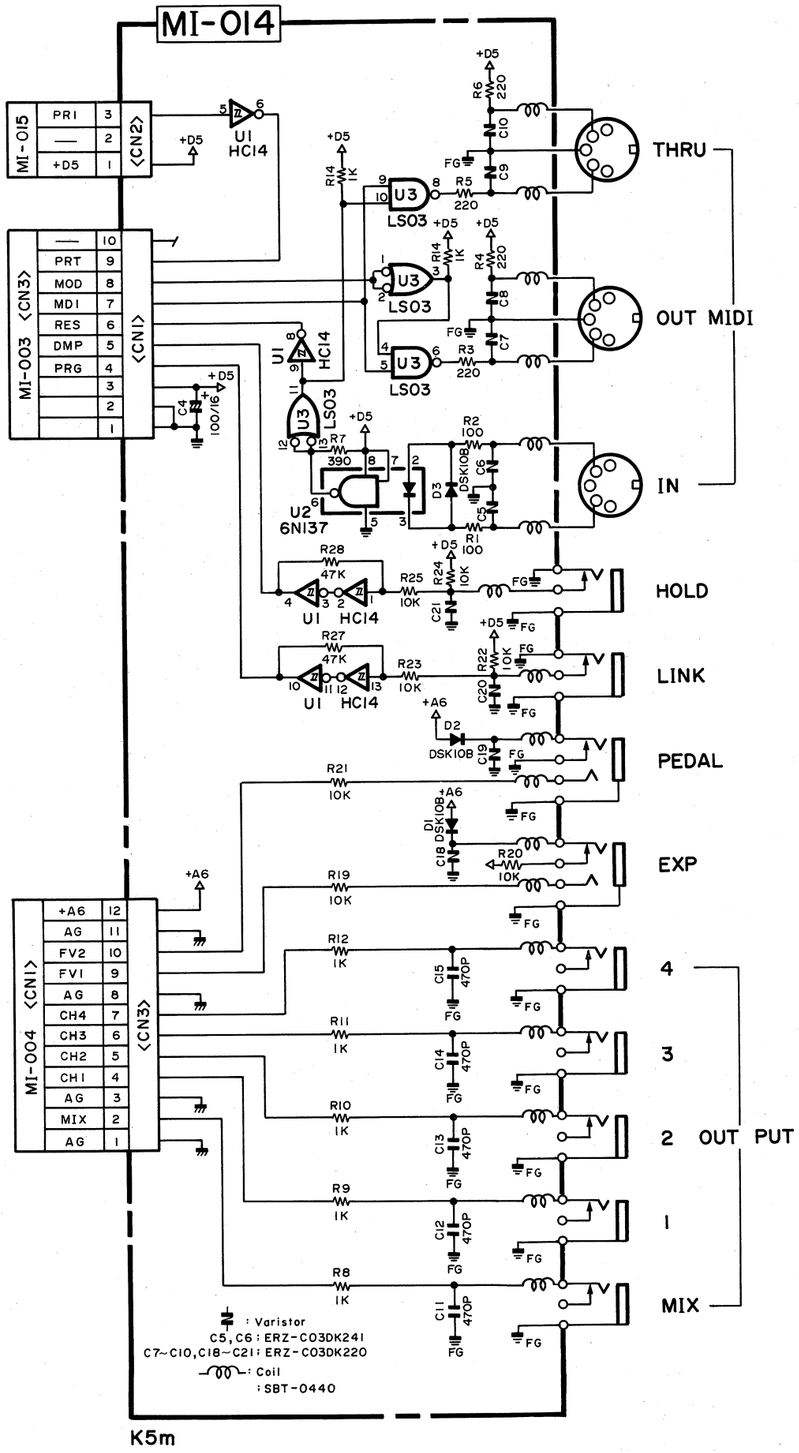

MI-009
MI-003 <CN2>
DG 1
DG 2
+D5 3
CCE 4
OWE 5
OOE 6
CDO 7
CD1 8
CD2 9
CD3 10
CD4 11
CD5 12
CD6 13
CD7 14
CAO 15
CA1 16
CA2 17
CA3 18
CA4 19
CA5 20
CA6 21
CA7 22
CA8 23
CA9 24
CA10 25
CA11 26
CA12 27
CA13 28
CA14 29
ME 30
+D5
CARD SLOT BCIS
ME

K5m Only


MI-013
MI-010 <CN1> AG 3
MI-004 <CN3> LCV 2
MI-010 <CN1> -A15 1
<CN>
R15 22K
C1 10/16
C2 10/16
C3 10/16
CONTRAST
10KB
R16 1K
MI-015
MI-004 <CN2> HP 4
AG 3
MI-014 <CN2> +D5 2
PRI 1
<CN>
ESD-R-12C
C16
PHONES
PROTECT
ON ↔ OFF
R18 10K
R17 10K
C17 0.01

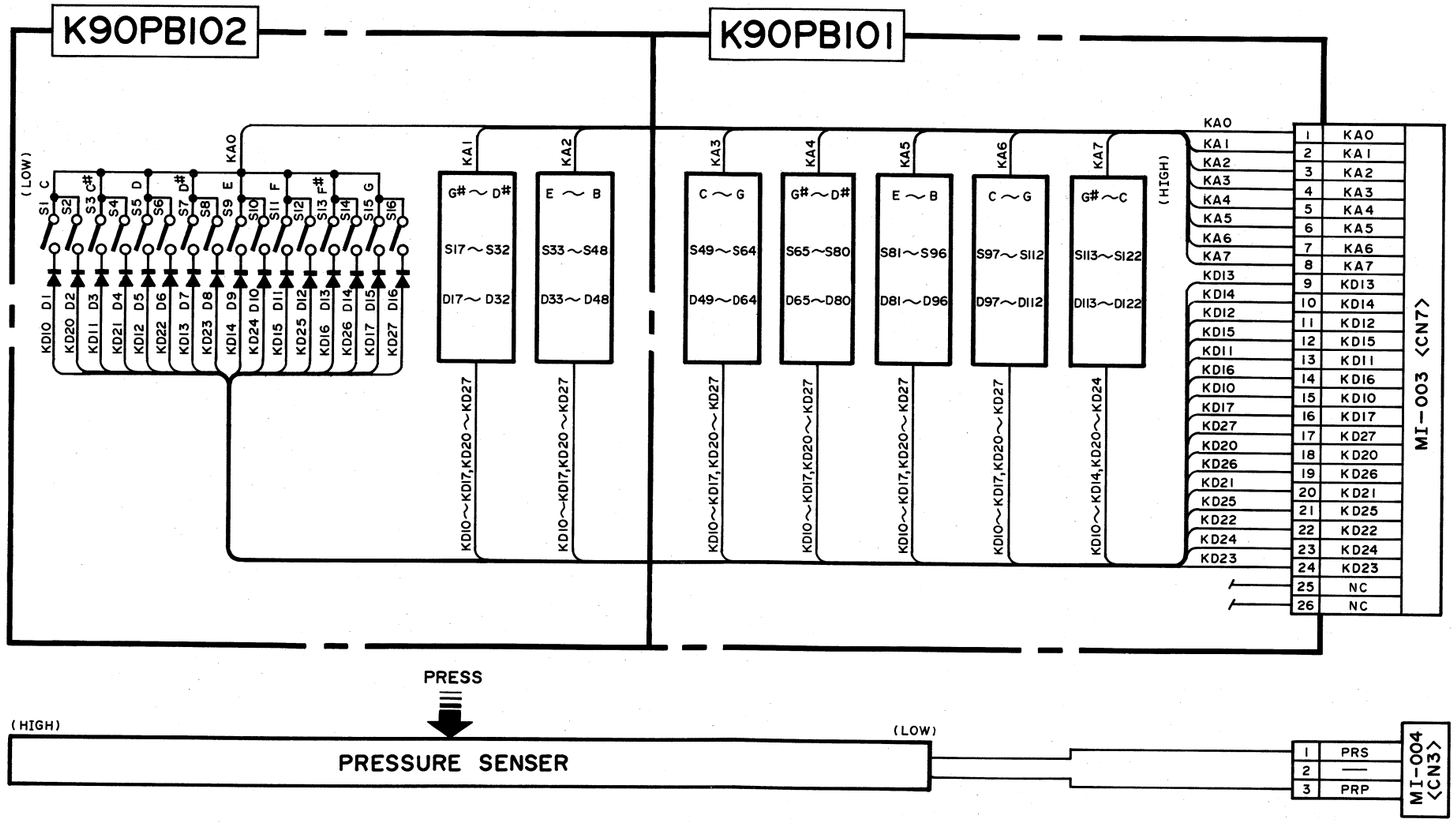

MI-012
MI-010 <CN1>
-AI5 3
AG 2
AG 1
<CN3>
1K
22K
10KB
DISPLAY CONTRAST
C3 10/16
C2 10/16
C1 10/16
+D5
R5 220
C10
C11
FG
THRU
R13 1K
U3 LS03
R6 220
R14 1K
R3 220
C8
C9
OUT MIDI
MI-003 <CN3>
LCV 1
PRT 2
MOD 3
MDI 4
RES 5
DMP 6
PRG 7
+D5 8
DG 9
DG 10
<CN2>
U1 HC14
R7 390
R1 100
C5
C7
DSK10B
U2 6N137
R2 100
IN
R25 10K
OFF
ON
PROTECT
R24 10K
C21 0.01
R26 47K
R22 10K
C20
HOLD
R27 47K
R23 10K
R20 10K
R21 10K
C19
LINK
+A6
DSK10B
C18
PEDAL
R19 10K
R17 10K
C17
EXP
R18 10K
MI-004 <CN1>
+A6 1
AG 2
FV2 3
FV1 4
AG 5
CH4 6
CH3 7
CH2 8
CH1 9
AG 10
MIX 11
AG 12
<CN1>
R12 1K
R11 1K
R10 1K
R9 1K
R8 1K
C16 470P
C15 470P
C14 470P
C13 470P
C12 470P
4
3
2 OUT PUT
1
MIX
: Varistor
C5, C7 : ERZ-C03DK241
C8~C10, C17~C20 : ERZ-C03DK220
: Coil
:SBT-0440

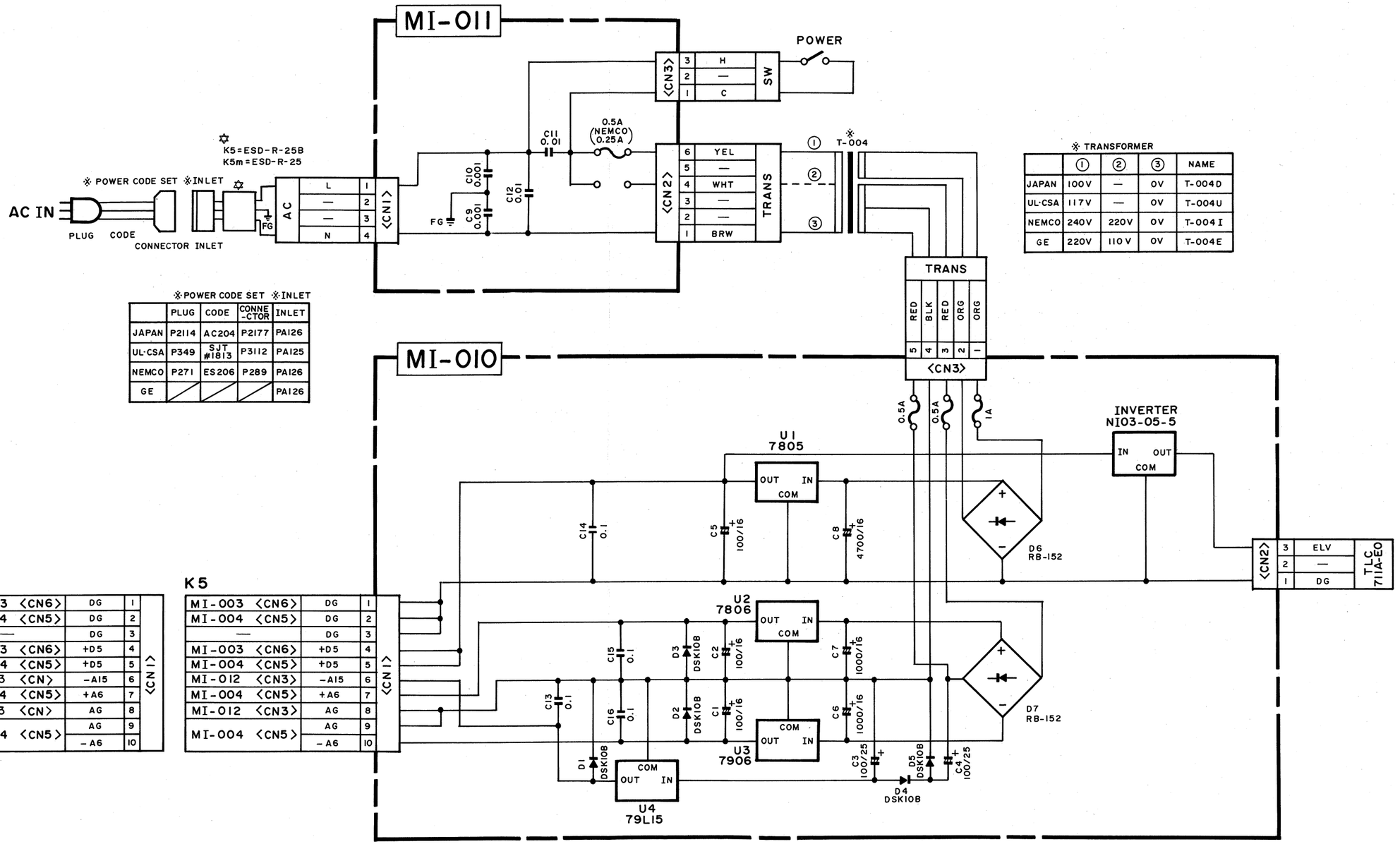
K5


MI-014
MI-015 <CN2>
PR1 3
— 2
+D5 1
U1 HC14
+D5
R6 220
C10
C9
FG
THRU
R14 1K
U3 LS03
R5 220
R4 220
C8
C7
OUT MIDI
R3 220
MI-003 <CN3>
— 10
PRT 9
MOD 8
MDI 7
RES 6
DMP 5
PRG 4
3
2
1
<CN1>
C4 100/16
R2 100
DSK10B
D3
C6
C5
IN
R1 100
U2 6N137
R7 390
R28 47K
R25 10K
R24 10K
C21
HOLD
R27 47K
R23 10K
R22 10K
C20
LINK
+A6
D2
DSK10B
C19
PEDAL
R21 10K
D1
C18
R20 10K
EXP
R19 10K
MI-004 <CN1>
+A6 12
AG 11
FV2 10
FV1 9
AG 8
CH4 7
CH3 6
CH2 5
CH1 4
AG 3
MIX 2
AG 1
<CN3>
R12 1K
R11 1K
R10 1K
R9 1K
R8 1K
C15 470P
C14 470P
C13 470P
C12 470P
C11 470P
4
3
2 OUT PUT
1
MIX
: Varistor
C5, C6 : ERZ-C03DK241
C7~C10, C18~C21 : ERZ-C03DK220
: Coil
:SBT-0440

K5m

15. K90PB102, K90PB101 CIRCUITS





※ TRANSFORMER

	①	②	③	NAME
JAPAN	100V	—	0V	T-004D
UL-CSA	117V	—	0V	T-004U
NEMCO	240V	220V	0V	T-004I
GE	220V	110V	0V	T-004E

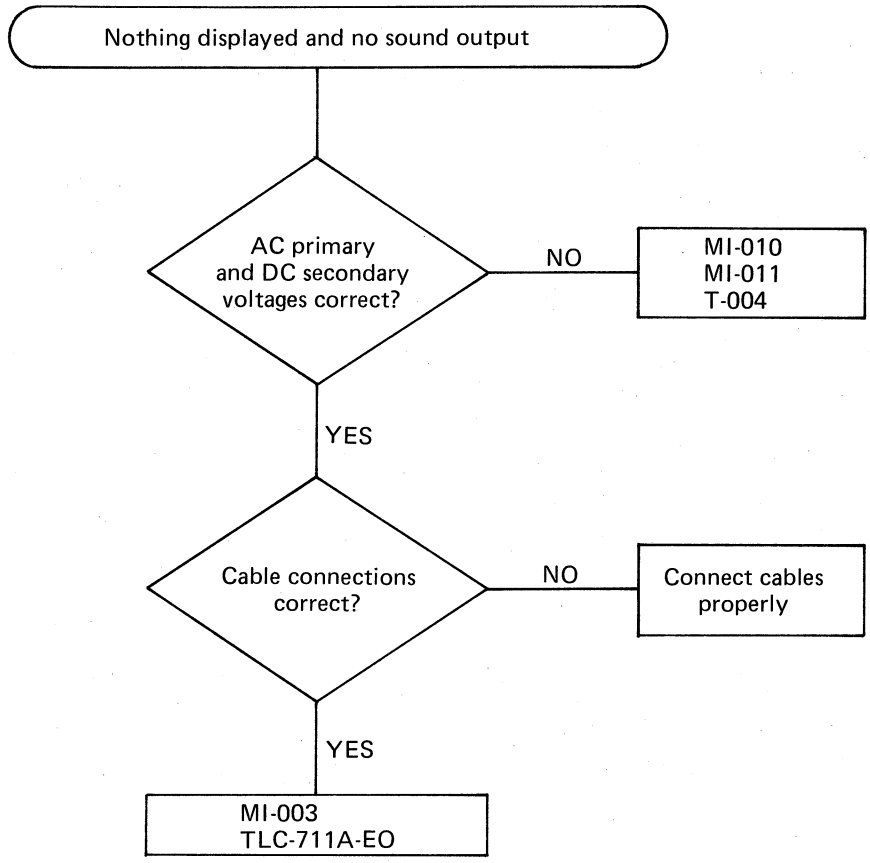
※POWER CODE SET ※INLET

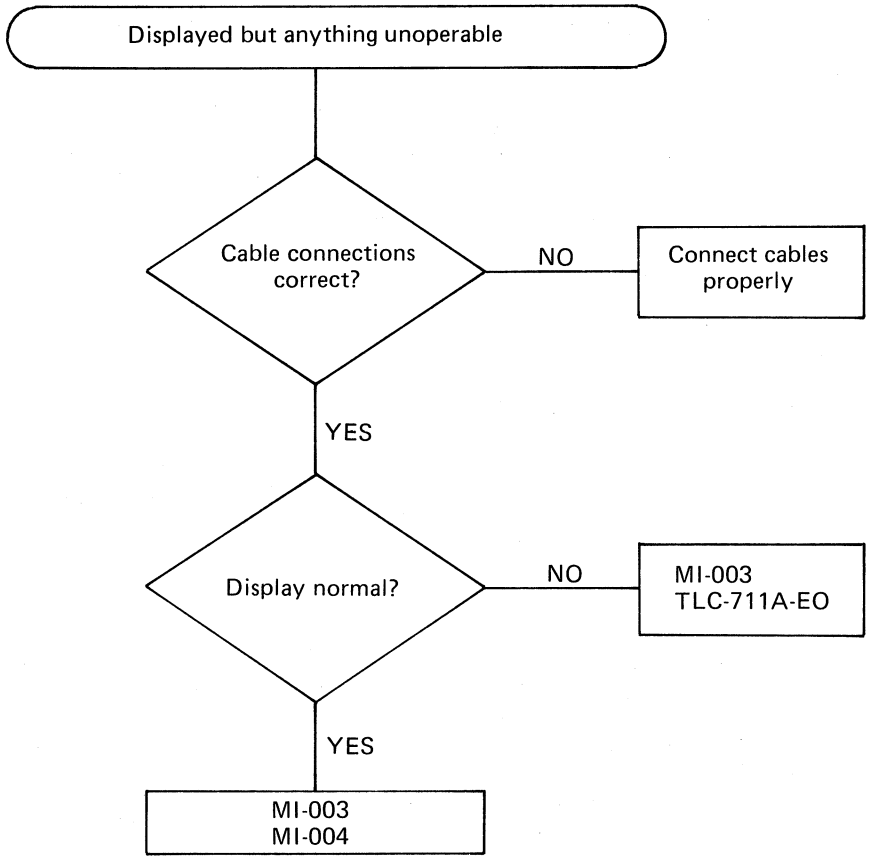
	PLUG	CODE	CONNE-CTOR	INLET
JAPAN	P2114	AC204	P2177	PAI26
UL-CSA	P349	SJT #1813	P3112	PAI25
NEMCO	P271	ES206	P289	PAI26
GE				PAI26

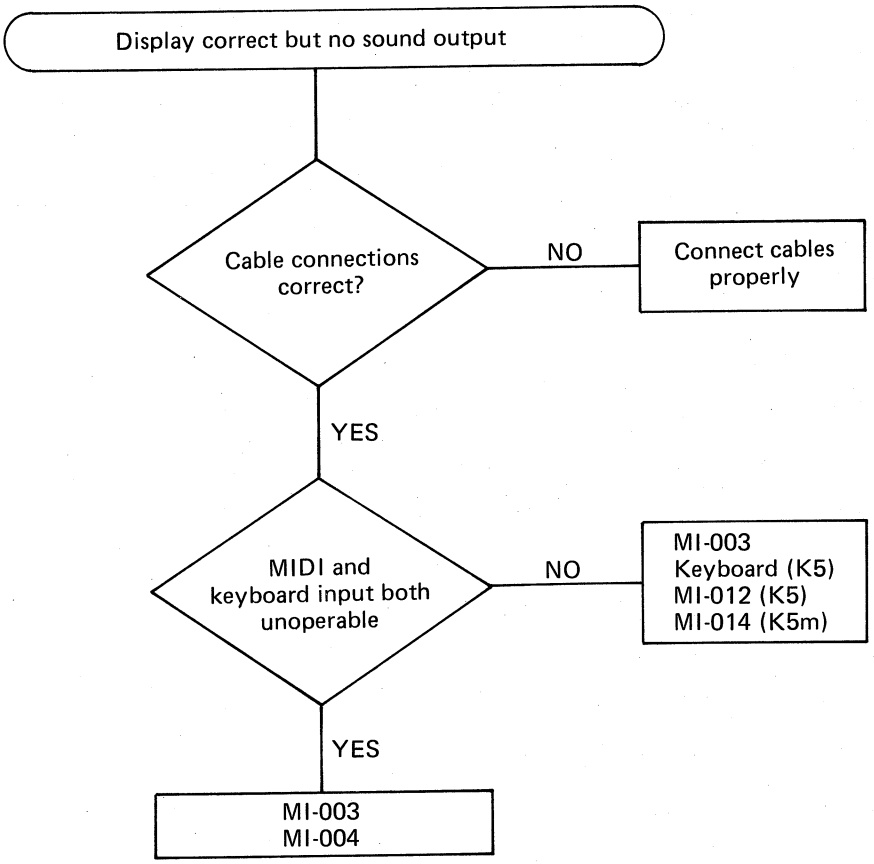
MI-003 <CN6>	DG	1	<CN1>
MI-004 <CN5>	DG	2	
—	DG	3	
MI-003 <CN6>	+D5	4	
MI-004 <CN5>	+D5	5	
MI-013 <CN>	-AI5	6	
MI-004 <CN5>	+A6	7	
MI-013 <CN>	AG	8	
MI-004 <CN5>	AG	9	
	-A6	10	

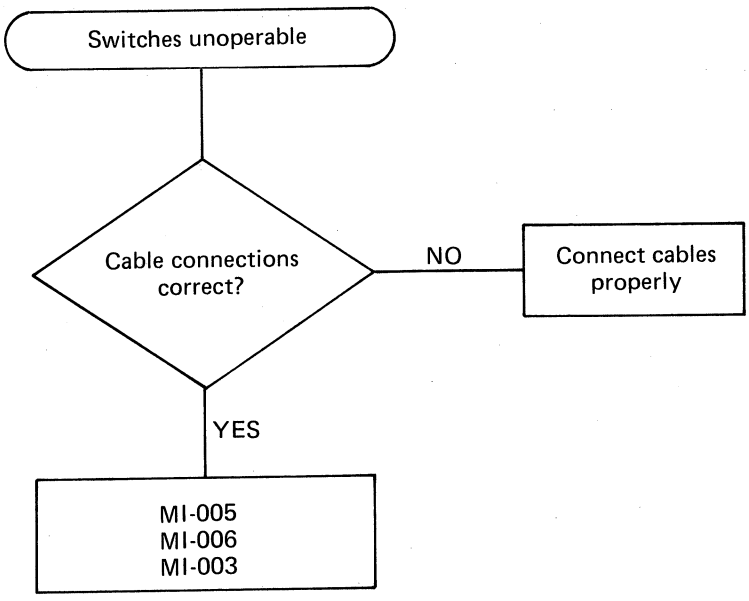
MI-003 <CN6>	DG	1	<CN1>
MI-004 <CN5>	DG	2	
—	DG	3	
MI-003 <CN6>	+D5	4	
MI-004 <CN5>	+D5	5	
MI-012 <CN3>	-AI5	6	
MI-004 <CN5>	+A6	7	
MI-012 <CN3>	AG	8	
MI-004 <CN5>	AG	9	
	-A6	10	

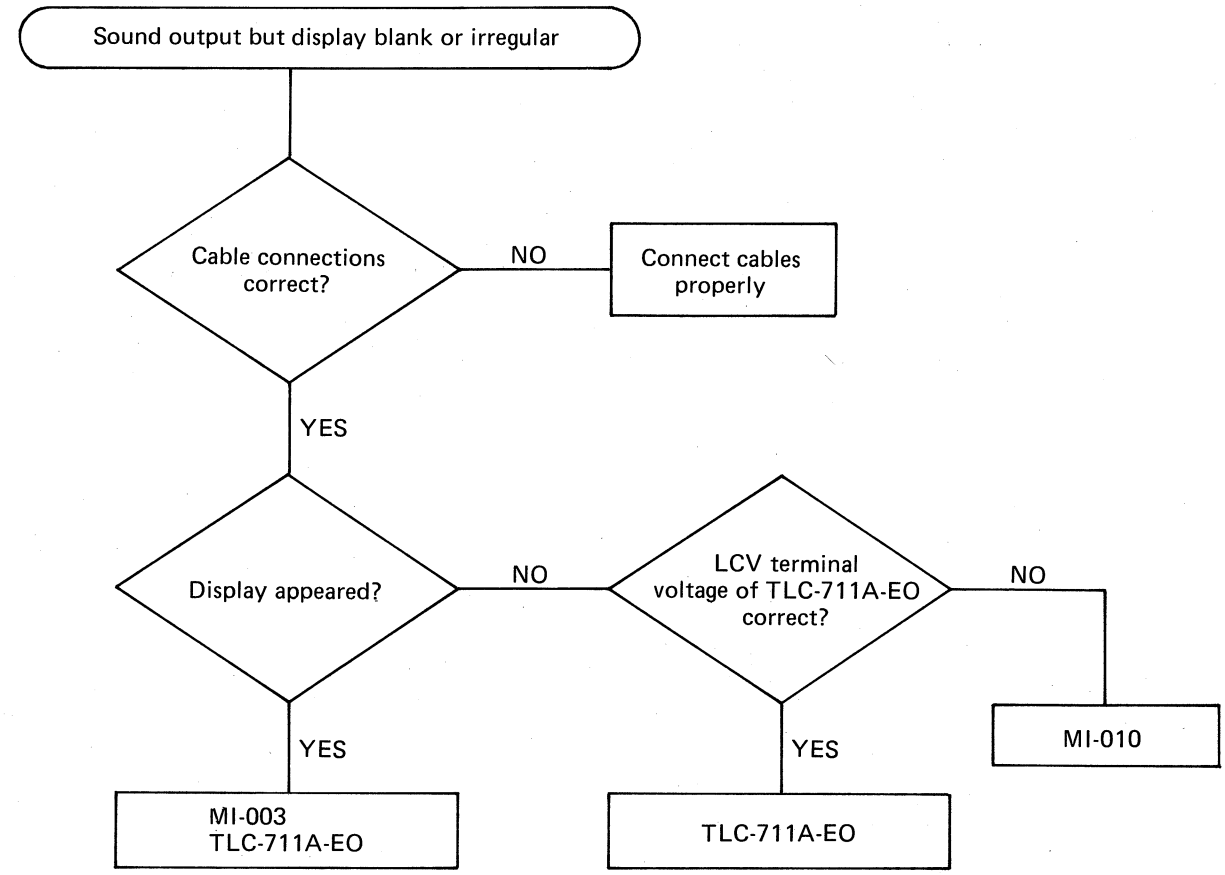
17. TROUBLESHOOTING

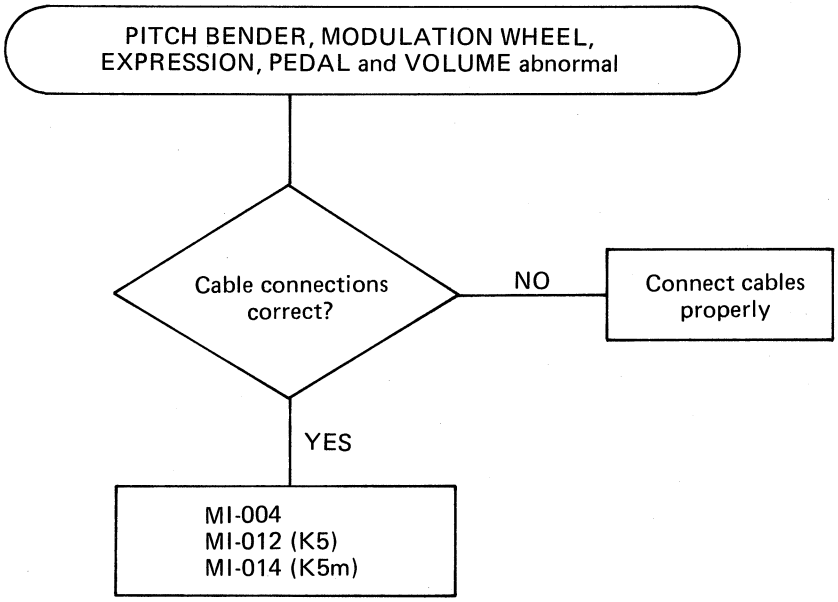





Display correct but no sound output
Cable connections correct?
NO
Connect cables properly
YES
MIDI and keyboard input both unoperable
NO
MI-003
Keyboard (K5)
MI-012 (K5)
MI-014 (K5m)
YES
MI-003
MI-004


Switches unoperable
Cable connections correct?
NO
Connect cables properly
YES
MI-005
MI-006
MI-003


Sound output but display blank or irregular
Cable connections correct?
NO
Connect cables properly
YES
Display appeared?
NO
LCV terminal voltage of TLC-711A-EO correct?
NO
MI-010
YES
YES
MI-003
TLC-711A-EO
TLC-711A-EO


PITCH BENDER, MODULATION WHEEL, EXPRESSION, PEDAL and VOLUME abnormal
Cable connections correct?
NO
Connect cables properly
YES
MI-004
MI-012 (K5)
MI-014 (K5m)

DIGITAL MULTI-DIMENSIONAL
SYNTHESIZER/MODULE

K5/K5m

PRINTED WIRING BOARD LAYOUT

KAWAI
Kawai Musical Instrument
Manufacturing Co., Ltd.

CONTENTS

1. MI-003, MI-004 PRINTED CIRCUIT BOARD 1
2. MI-005, MI-006, MI-007, MI-008, MI-009, MI-013, MI-015 PRINTED CIRCUIT BOARD 2
3. MI-010, MI-011 PRINTED CIRCUIT BOARD 3
4. MI-012, MI-014 PRINTED CIRCUIT BOARD 4

1. MI-003, MI-004 PRINTED CIRCUIT BOARD

MI-003

| MI-009 | | |

DIGITAL MULTI-DIMENSIONAL
SYNTHESIZER/MODULE

K5/K5m

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1. MI-003, MI-004 PRINTED CIRCUIT BOARD

MI-003

| MI-009 | | |