

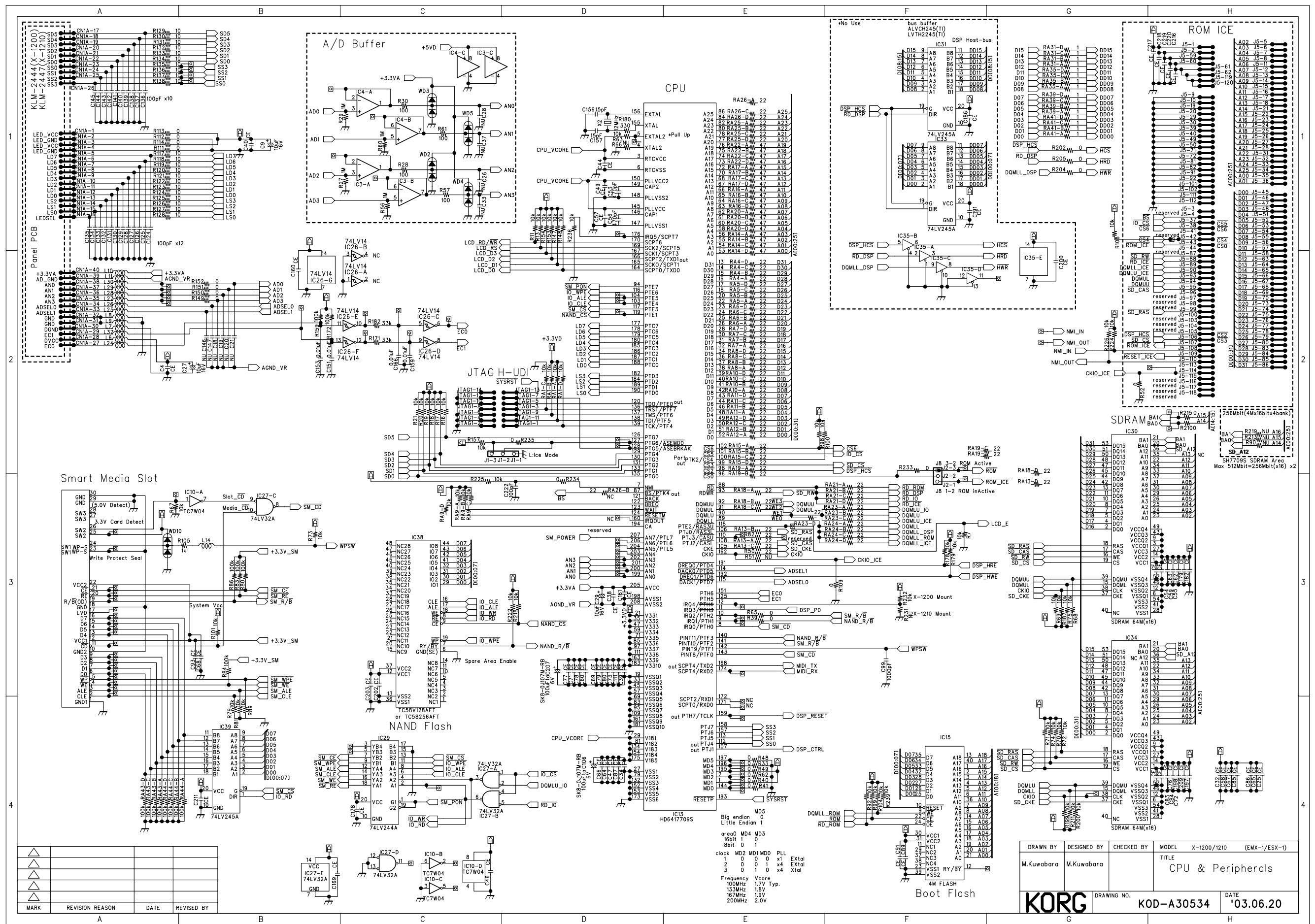
# *Service Manual*

# **EMX1**

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4th Edition  
Issued date: July 15, 2004  
Issued by: KORG INC.

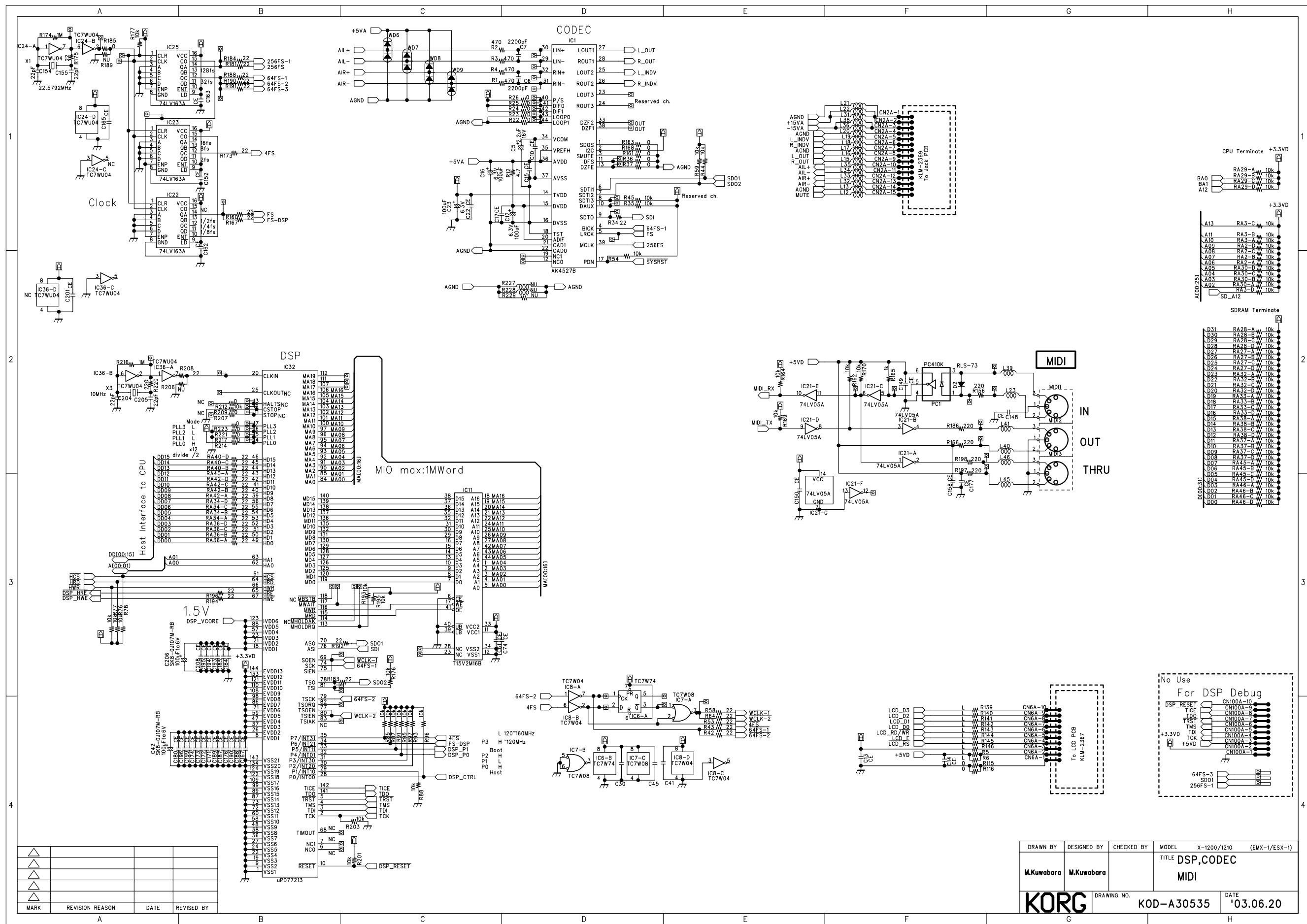


**CPU**

A35	86 RA26-C	22	A25
A34	84 RA26-D	22	A24
A23	82 RA25-A	22	A23
A22	80 RA25-B	22	A22
A21	78 RA25-C	22	A21
A20	76 RA25-D	22	A20
A19	74 RA25-E	22	A19
A18	72 RA25-F	22	A18
A17	70 RA25-G	22	A17
A16	68 RA25-H	22	A16
A15	66 RA25-I	22	A15
A14	64 RA25-J	22	A14
A13	62 RA25-K	22	A13
A12	60 RA25-L	22	A12
A11	58 RA25-M	22	A11
A10	56 RA25-N	22	A10
A9	54 RA25-O	22	A9
A8	52 RA25-P	22	A8
A7	50 RA25-Q	22	A7
A6	48 RA25-R	22	A6
A5	46 RA25-S	22	A5
A4	44 RA25-T	22	A4
A3	42 RA25-U	22	A3
A2	40 RA25-V	22	A2
A1	38 RA25-W	22	A1
A0	36 RA25-X	22	A0
D31	13 RA4-D	22	D31
D30	14 RA4-C	22	D30
D29	16 RA4-B	22	D29
D28	18 RA4-A	22	D28
D27	17 RA5-D	22	D27
D26	20 RA5-C	22	D26
D25	22 RA5-B	22	D25
D24	24 RA5-A	22	D24
D23	22 RA6-D	22	D23
D22	24 RA6-C	22	D22
D21	26 RA6-B	22	D21
D20	28 RA6-A	22	D20
D19	26 RA7-D	22	D19
D18	30 RA7-C	22	D18
D17	32 RA7-B	22	D17
D16	34 RA7-A	22	D16
D15	34 RA8-D	22	D15
D14	36 RA8-C	22	D14
D13	38 RA8-B	22	D13
D12	40 RA8-A	22	D12
D11	40 RA9-D	22	D11
D10	42 RA9-C	22	D10
D9	44 RA9-B	22	D9
D8	46 RA9-A	22	D8
D7	46 RA10-D	22	D7
D6	48 RA10-C	22	D6
D5	48 RA10-B	22	D5
D4	48 RA10-A	22	D4
D3	48 RA11-D	22	D3
D2	50 RA11-C	22	D2
D1	52 RA11-B	22	D1
D0	54 RA11-A	22	D0

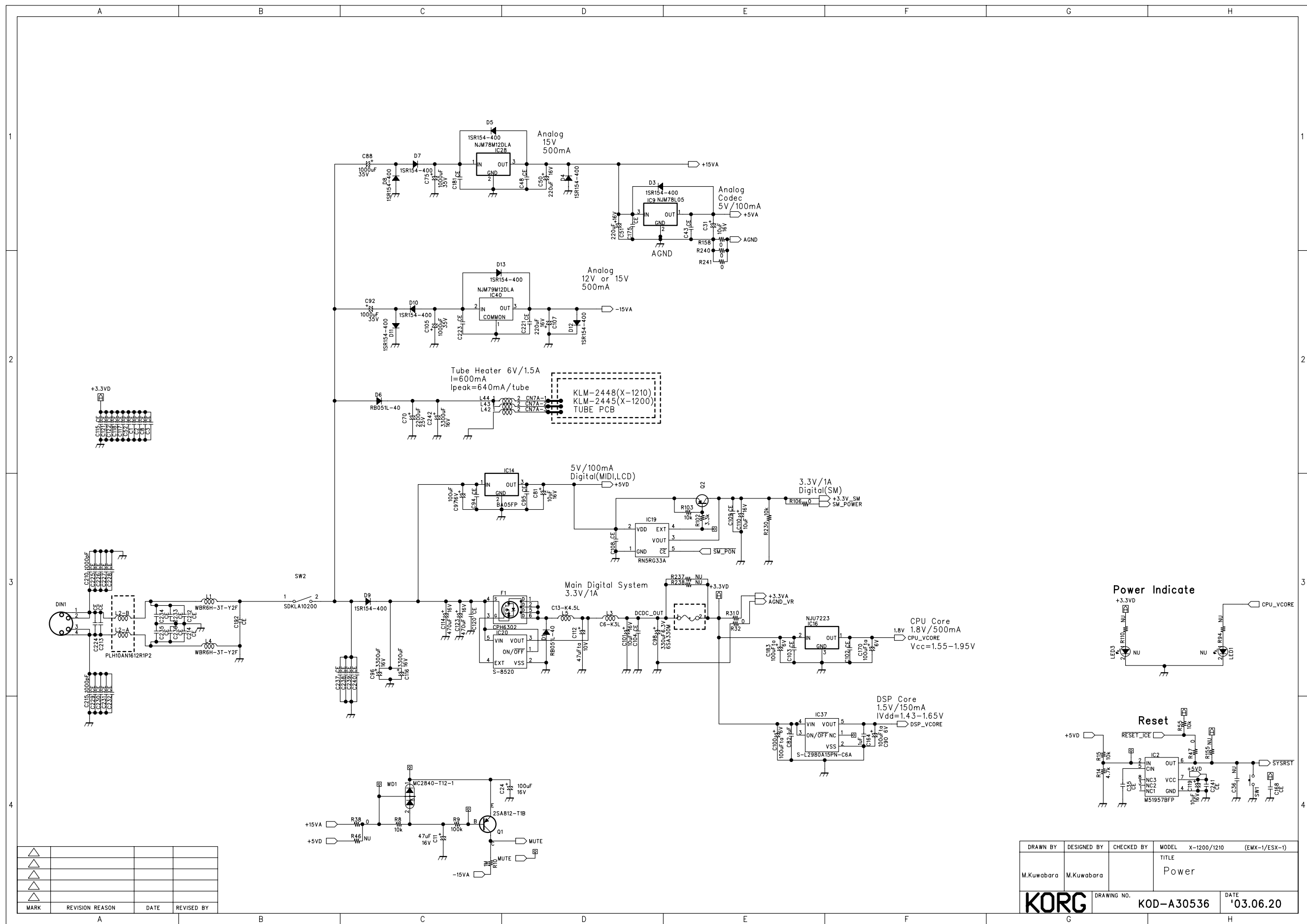
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M.Kuwabara	M.Kuwabara		TITLE	CPU & Peripherals
DRAWING NO.			KOD-A30534	DATE
				'03.06.20

MARK	REVISION	REASON	DATE	REVISED BY



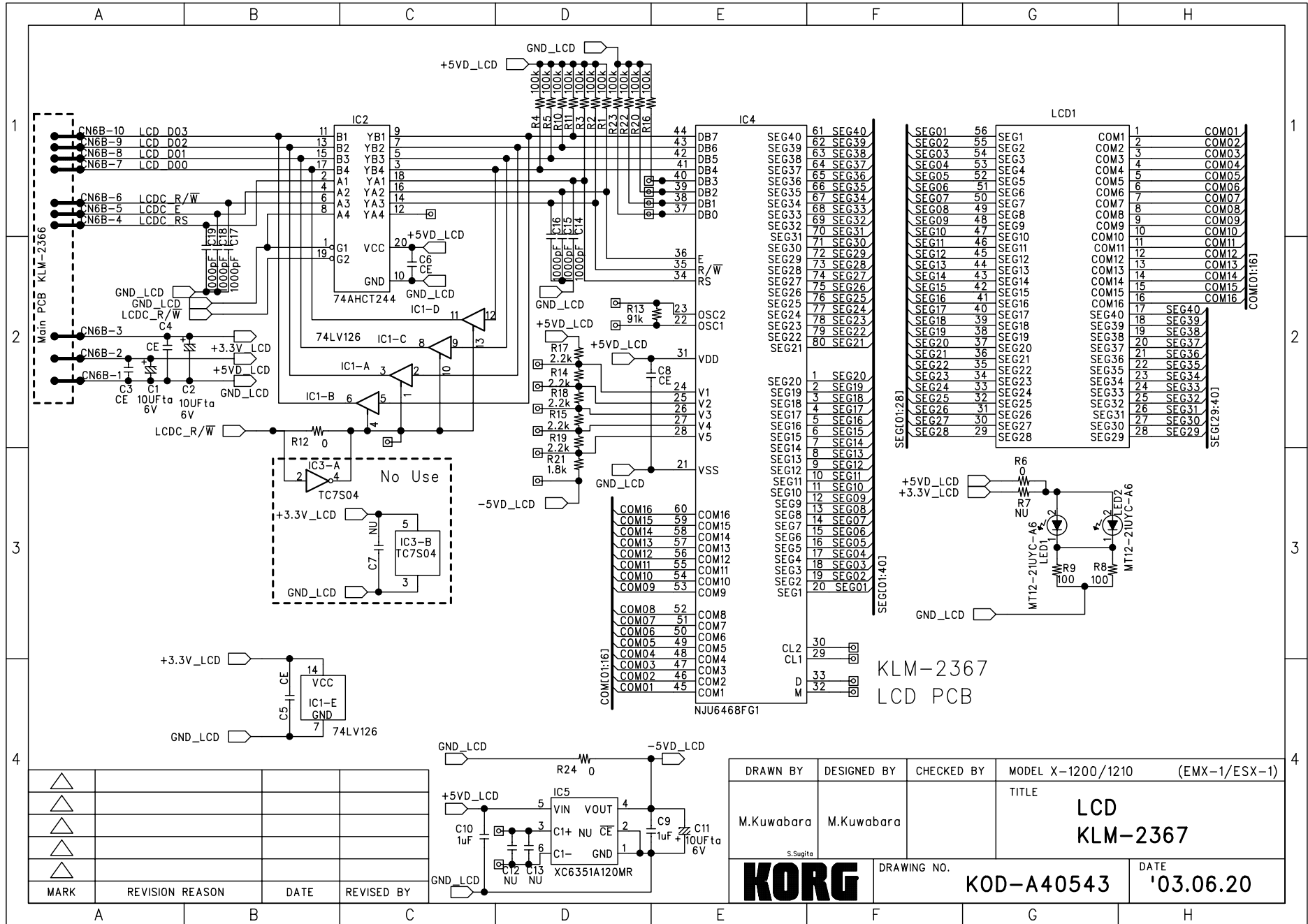
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M.Kuwabara	M.Kuwabara		TITLE	DSP, CODEC MIDI	
<b>KORG</b>		DRAWING NO.	KOD-A30535	DATE	'03.06.20

MARK	REVISION	REASON	DATE	REVISED BY
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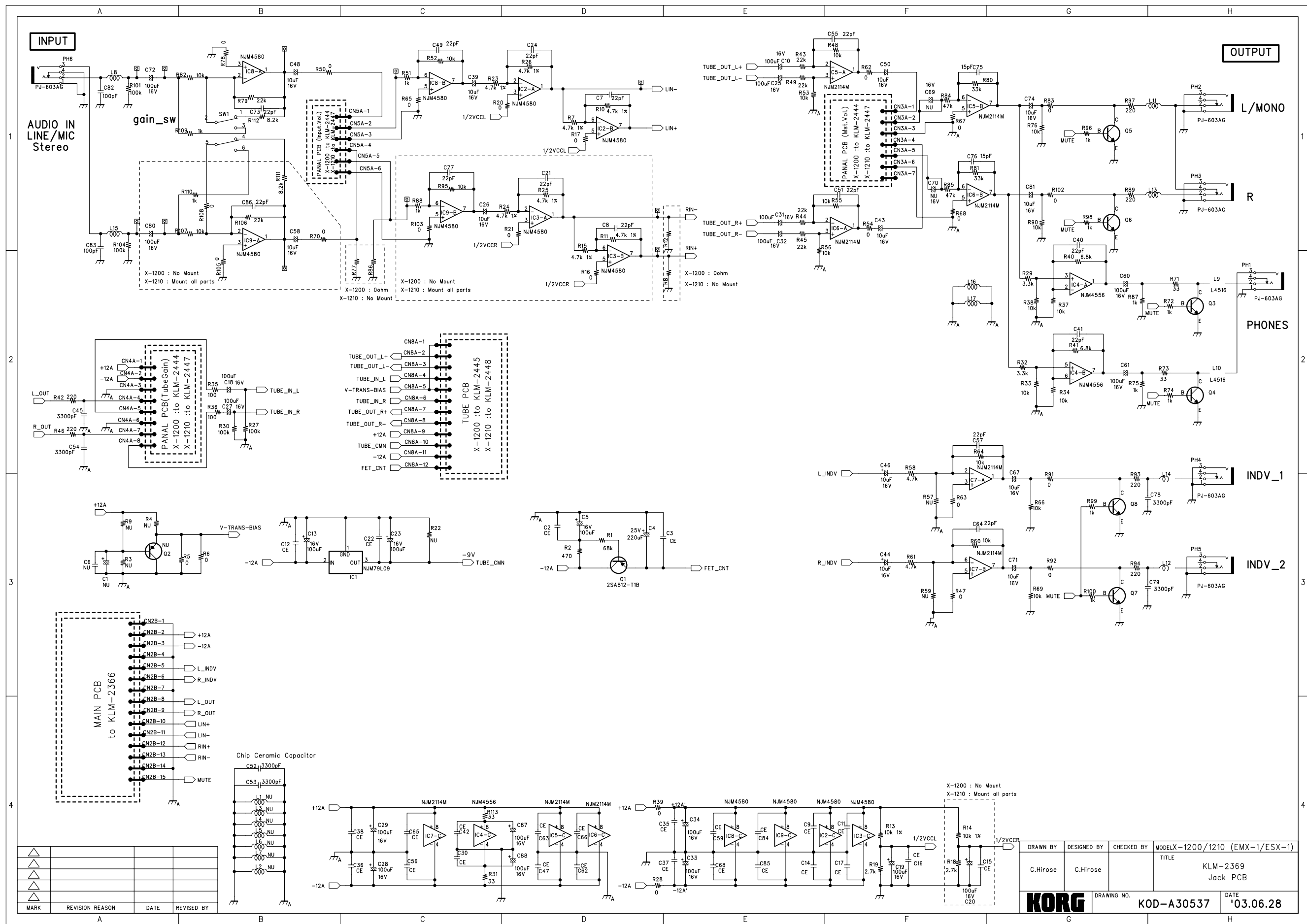
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			DATE	'03.06.20



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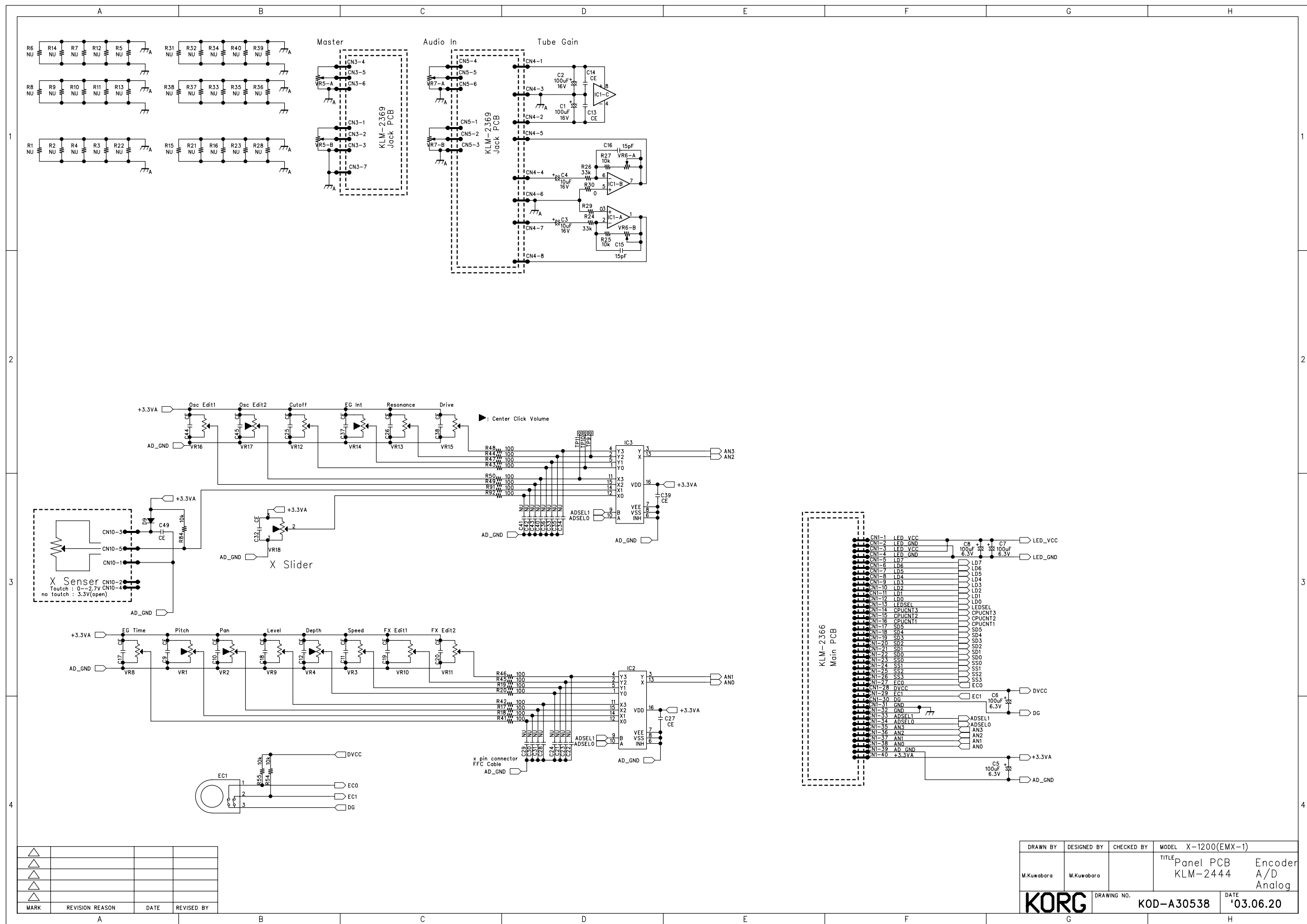
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KOD-A40543		'03.06.20	





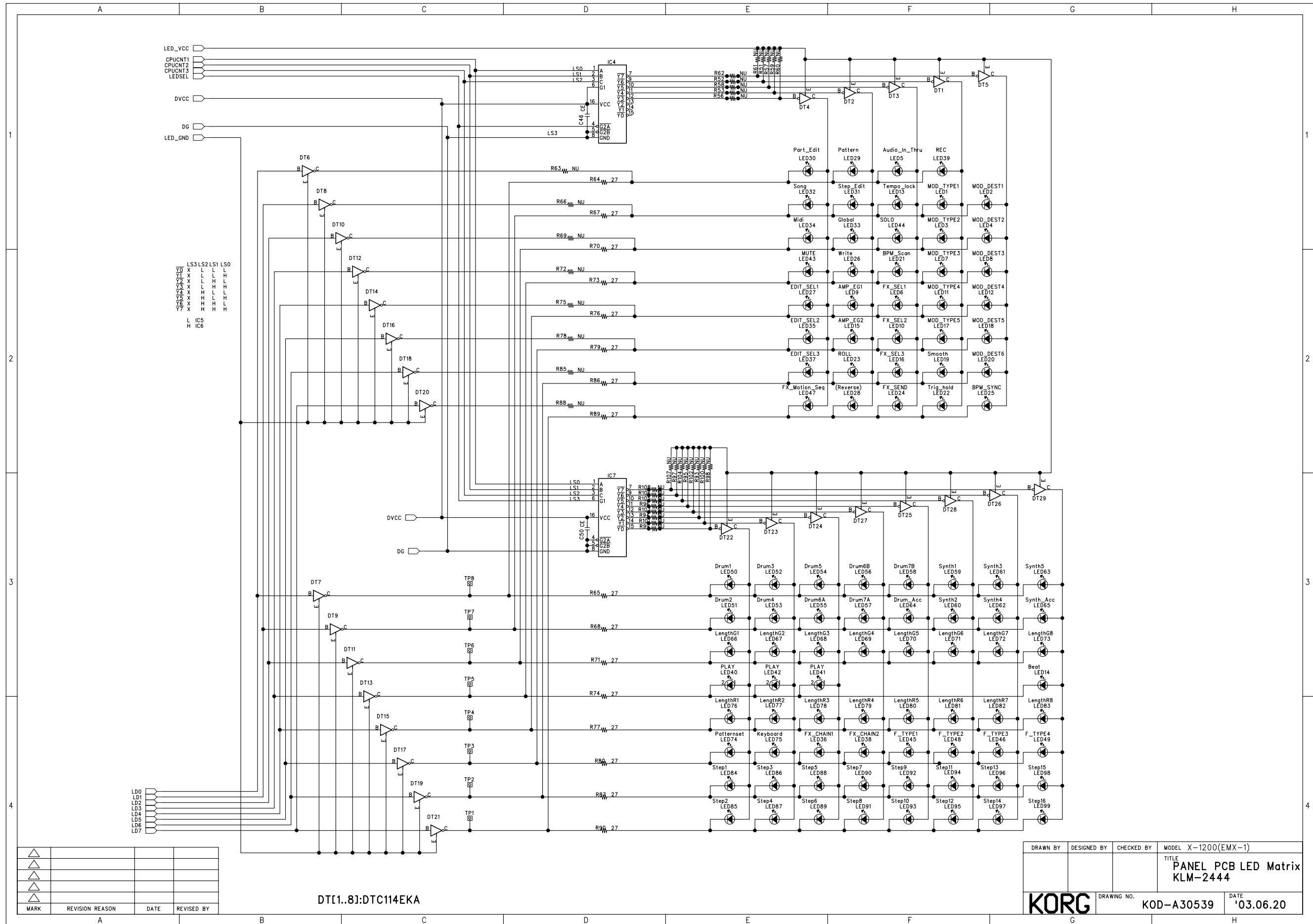
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C.Hirose	C.Hirose		TITLE
			KLM-2369
			Jack PCB
DRAWING NO.		DATE	
KORG		KOD-A30537	'03.06.28



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△				
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M.Kuwabara	M.Kuwabara		TITLE	Panel PCB Encoder A/D Analog
KORG			DRAWING NO.	KOD-A30538
			DATE	'03.06.20

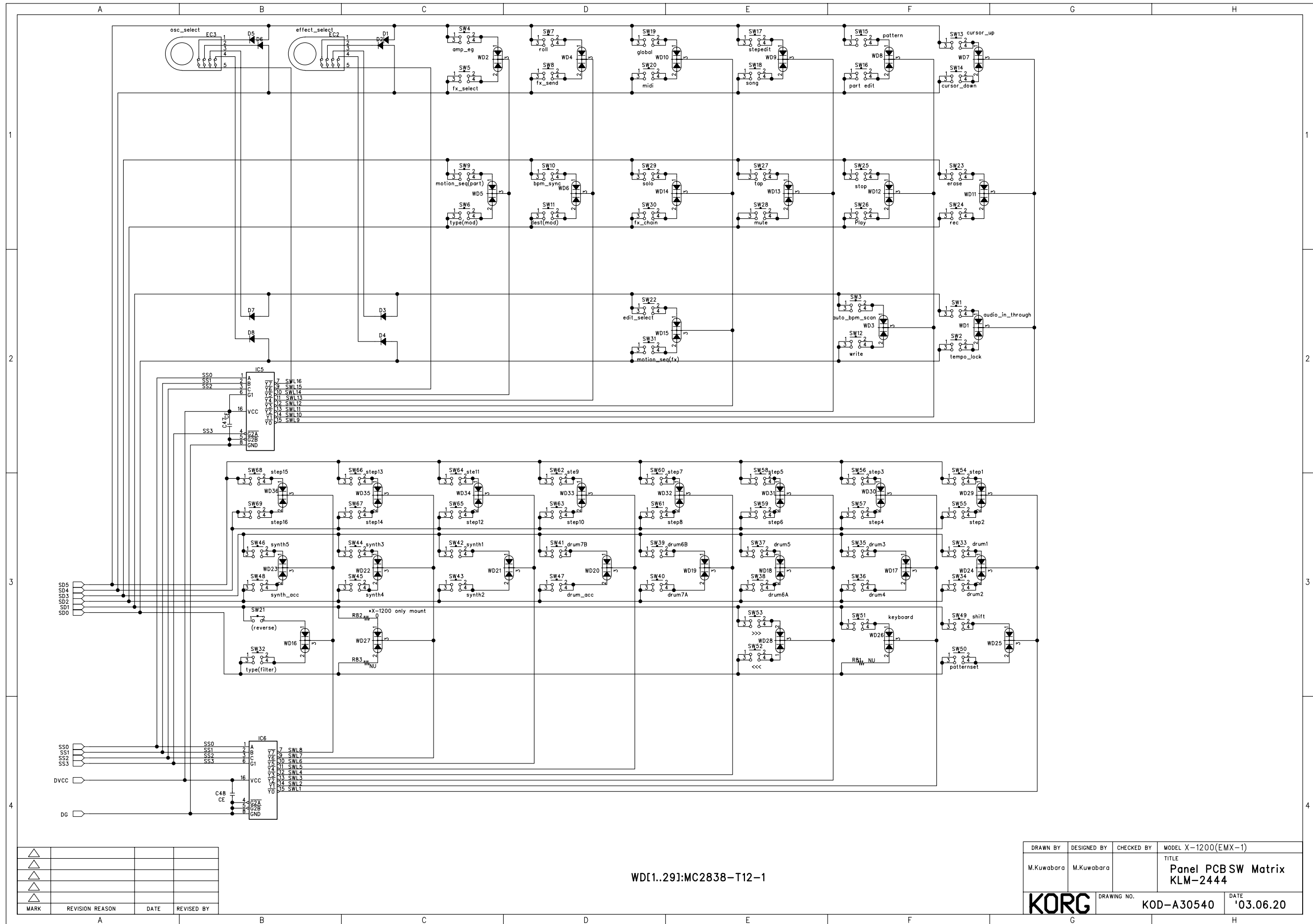


DT[1..8]:DTC114EKA

MARK	REVISION REASON	DATE	REVISED BY

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			TITLE PANEL PCB LED Matrix KLM-2444
KORG		DRAWING NO. KOD-A30539	DATE '03.06.20

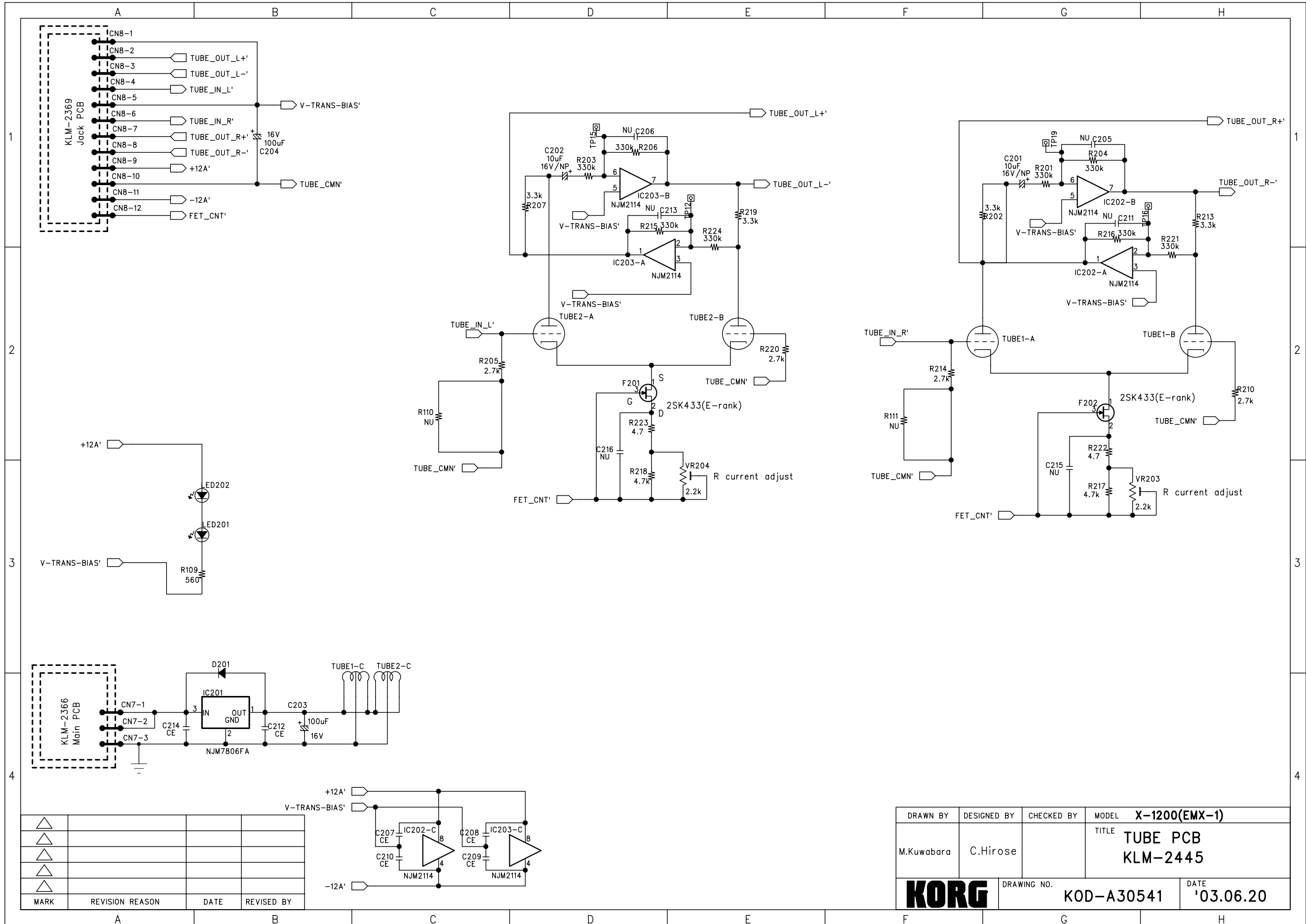




WD[1..29]:MC2838-T12-1

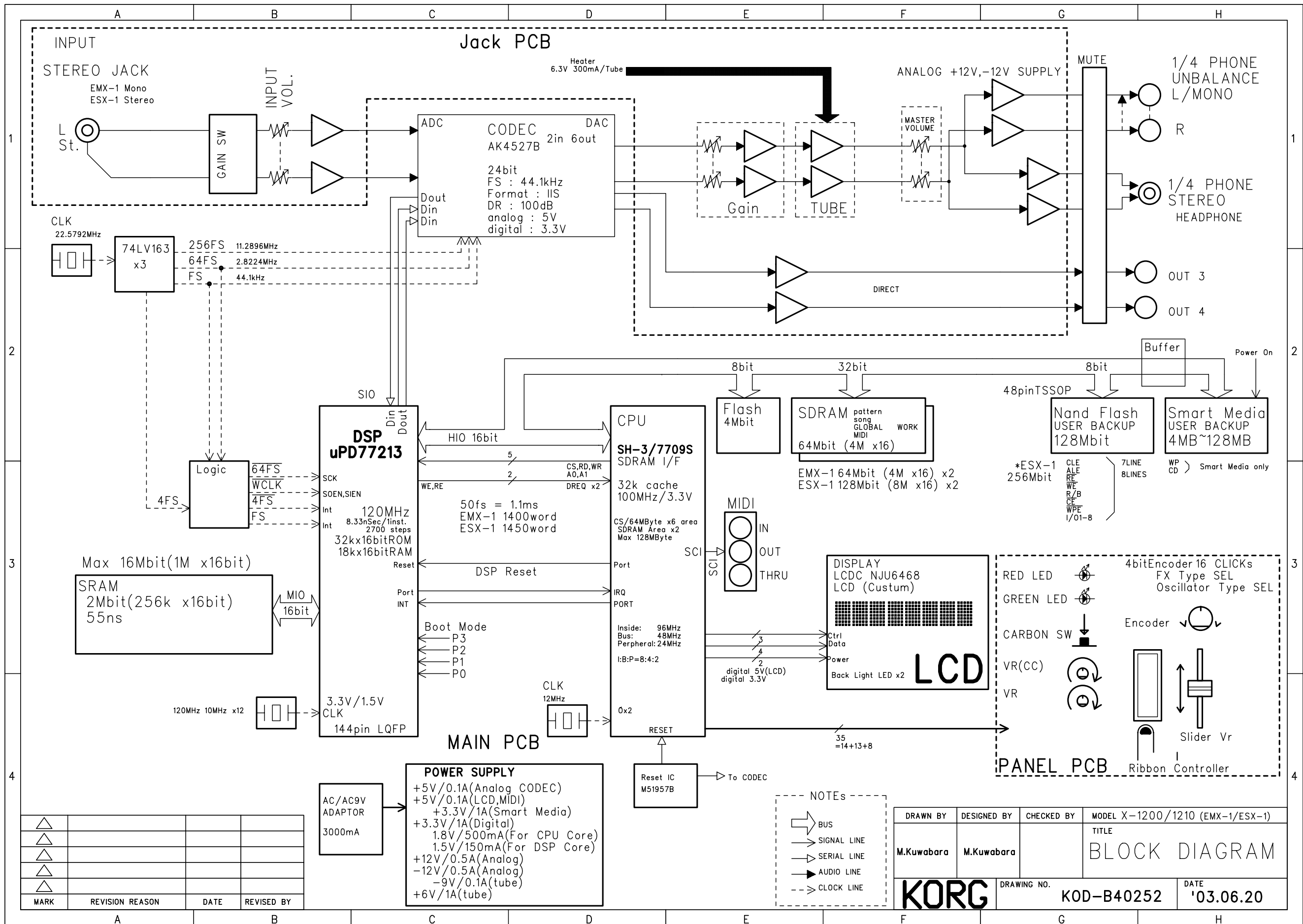
MARK	REVISION REASON	DATE	REVISED BY
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△			
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DRAWN BY	DESIGNED BY	CHECKED BY	MODEL X-1200(EMX-1)
M.Kuwabara	M.Kuwabara		TITLE
			Panel PCB SW Matrix
			KLM-2444
DRAWING NO.		DATE	
KORG		'03.06.20	
KOD-A30540			



DRAWN BY	DESIGNED BY	CHECKED BY	MODEL	X-1200(EMX-1)
M.Kuwabara	C.Hirose		TITLE	TUBE PCB KLM-2445
DRAWING NO.			KOD-A30541	DATE
KORG				'03.06.20

MARK	REVISION	REASON	DATE	REVISED BY



MARK	REVISION REASON	DATE	REVISED BY

- NOTES
- BUS
  - SIGNAL LINE
  - SERIAL LINE
  - AUDIO LINE
  - CLOCK LINE

DRAWN BY	DESIGNED BY	CHECKED BY	MODEL X-1200/1210 (EMX-1/ESX-1)
M.Kuwabara	M.Kuwabara		TITLE
			BLOCK DIAGRAM
DRAWING NO.		DATE	
KOD-B40252		'03.06.20	

**KORG**

A B C D E F G H

1

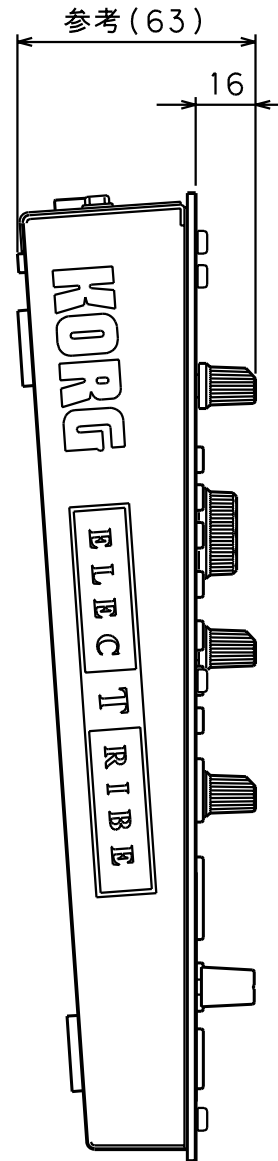
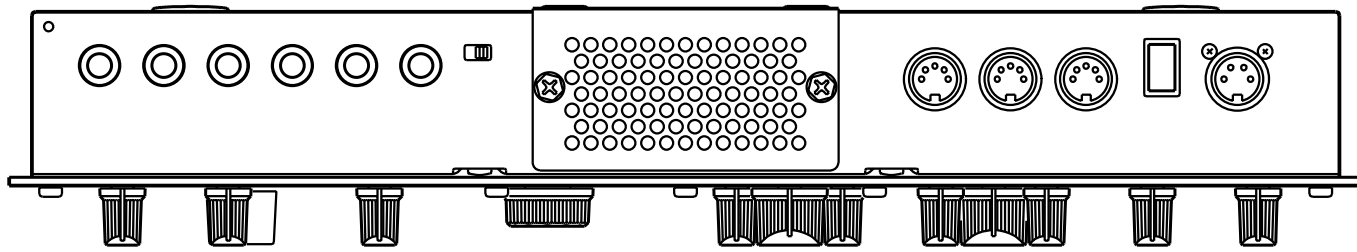
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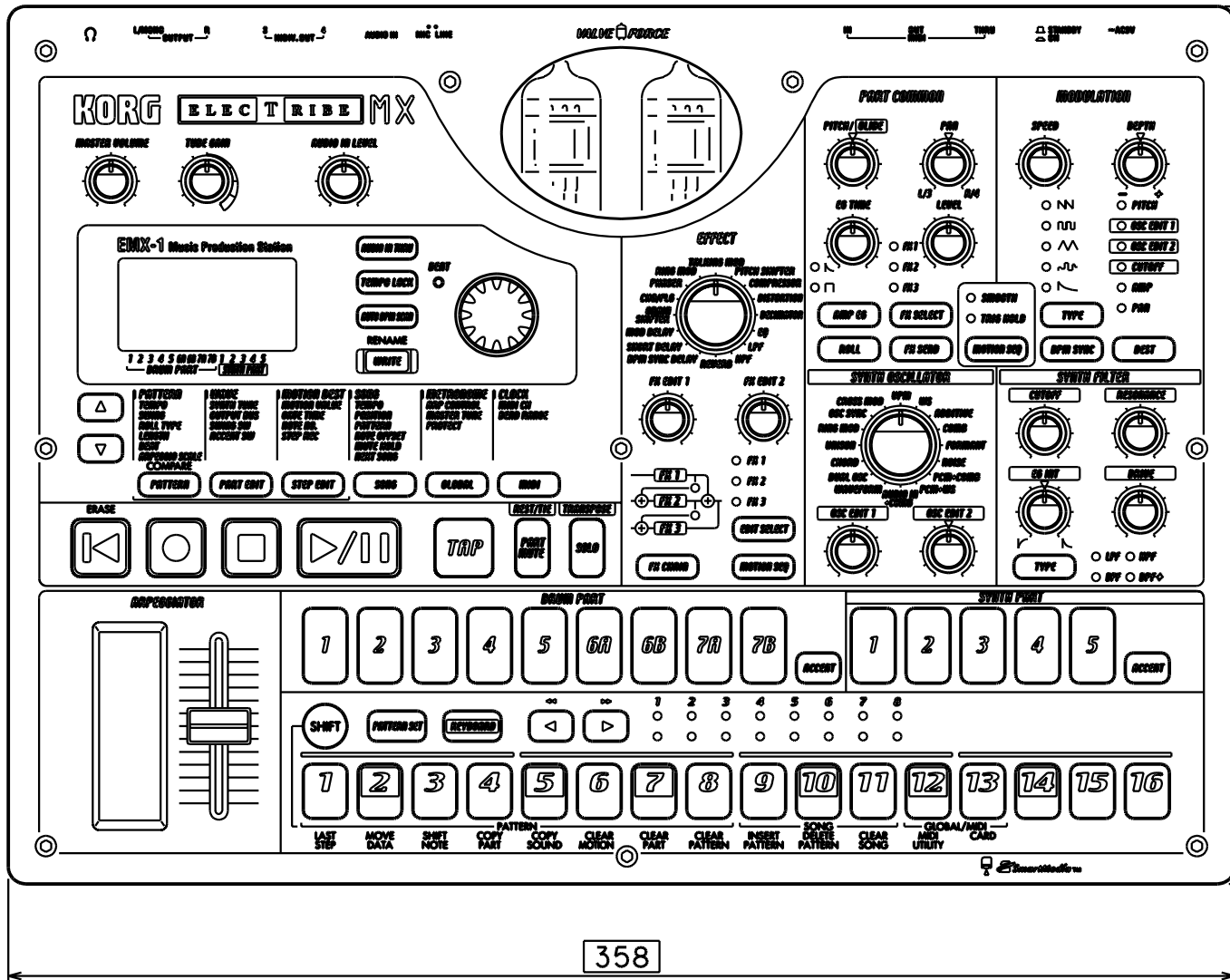
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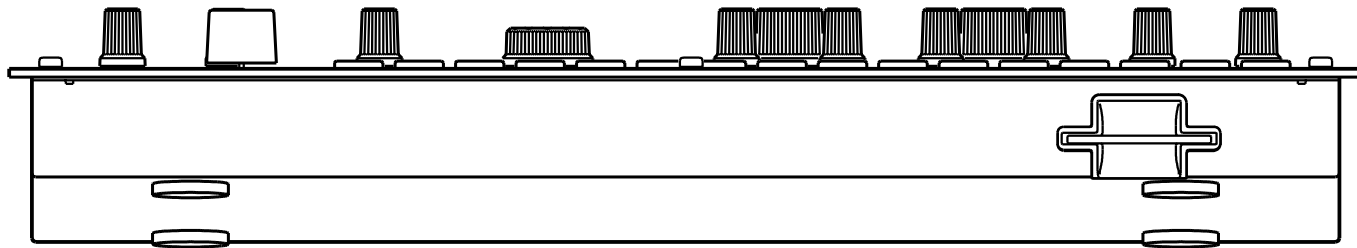


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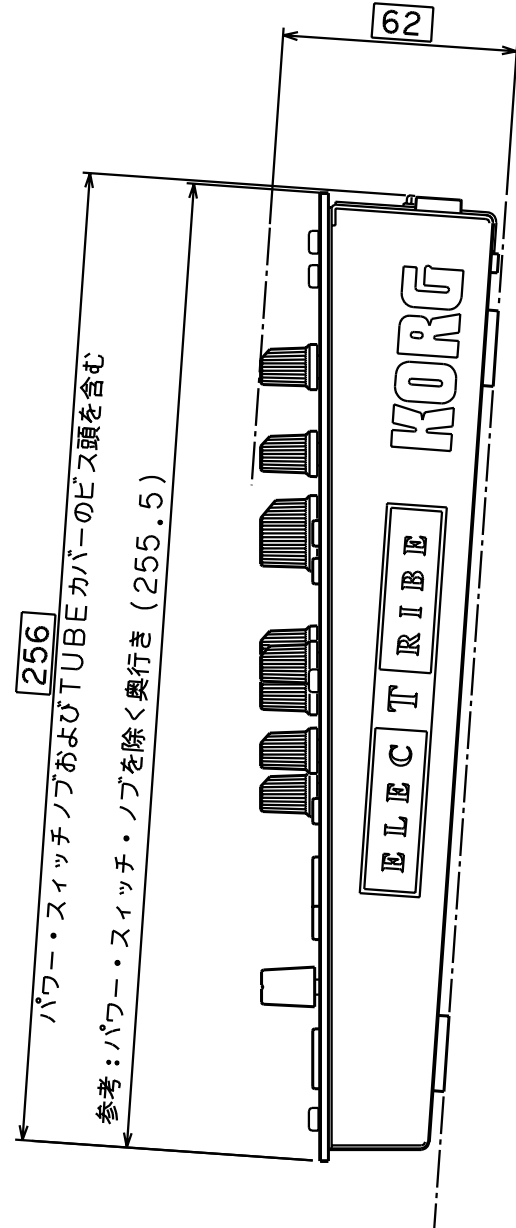
16



358



参考(256)



62

256  
 パワー・スイッチノブおよびTUBEカバのビス頭を含む  
 参考:パワー・スイッチ・ノブを除く奥行き(255.5)

公示寸法表

外形寸法	カタログ公表値	358(W) x 256(D) x 62(H)
	実測値	358(W) x 256.4(D) x 61.9(H)
製品重量	カタログ公表値	3.1kg
	実測値	3.05kg

REVISAL MARK	REVISAL REASON	REVISAL DATE	REVISED BY	APPROVED

1 X-1200	SPECIFICATION			EMX-1 外形図	PARTS No.
MODEL	DRAWN CHECKED APPROVED			TITLE	試作図
WEIGHT: *** (g)	中原	服部	安達	外形図	見積図面
	'03/04/10	'03/04/28	'03/04/28		金型発注図
<b>KORG</b> KORG INC.	SCALE	DRAWING No.		KOC-A30163	量産図面
	1/2				総合製作書用図

## EMX-1 Test Mode

How to start and operate the test mode:

ERASE + PATTERN & POWER ON: Internal test,

ERASE + STEP EDIT & POWER ON: Adjustment of valve circuit, L/R balance calibration, Tube gain balance measurement

SHIFT + DRUM PART 1 & POWER ON: Internal skip

SHIFT + DRUM PART 3 & POWER ON: Audio test

16: Proceed the test

SHIFT + 15: Re-executing the test

△ : ITEM UP

▽ : ITEM DOWN

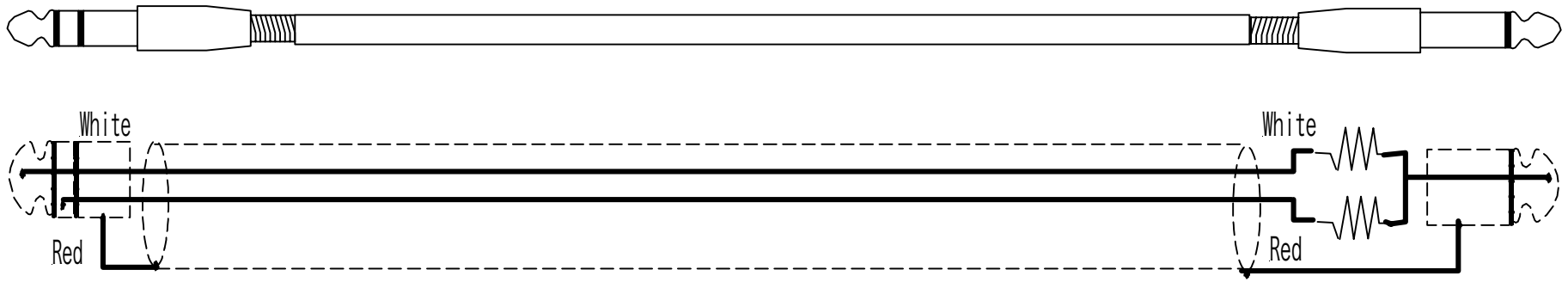
>> : STEP UP

<< : STEP DOWN

### NOTE:

To proceed the SmartMedia test, it is required to prepare a SmartMedia whose capacity is more than 16MB.

EMX-1 Valve & L/R Balance Adjust Cable

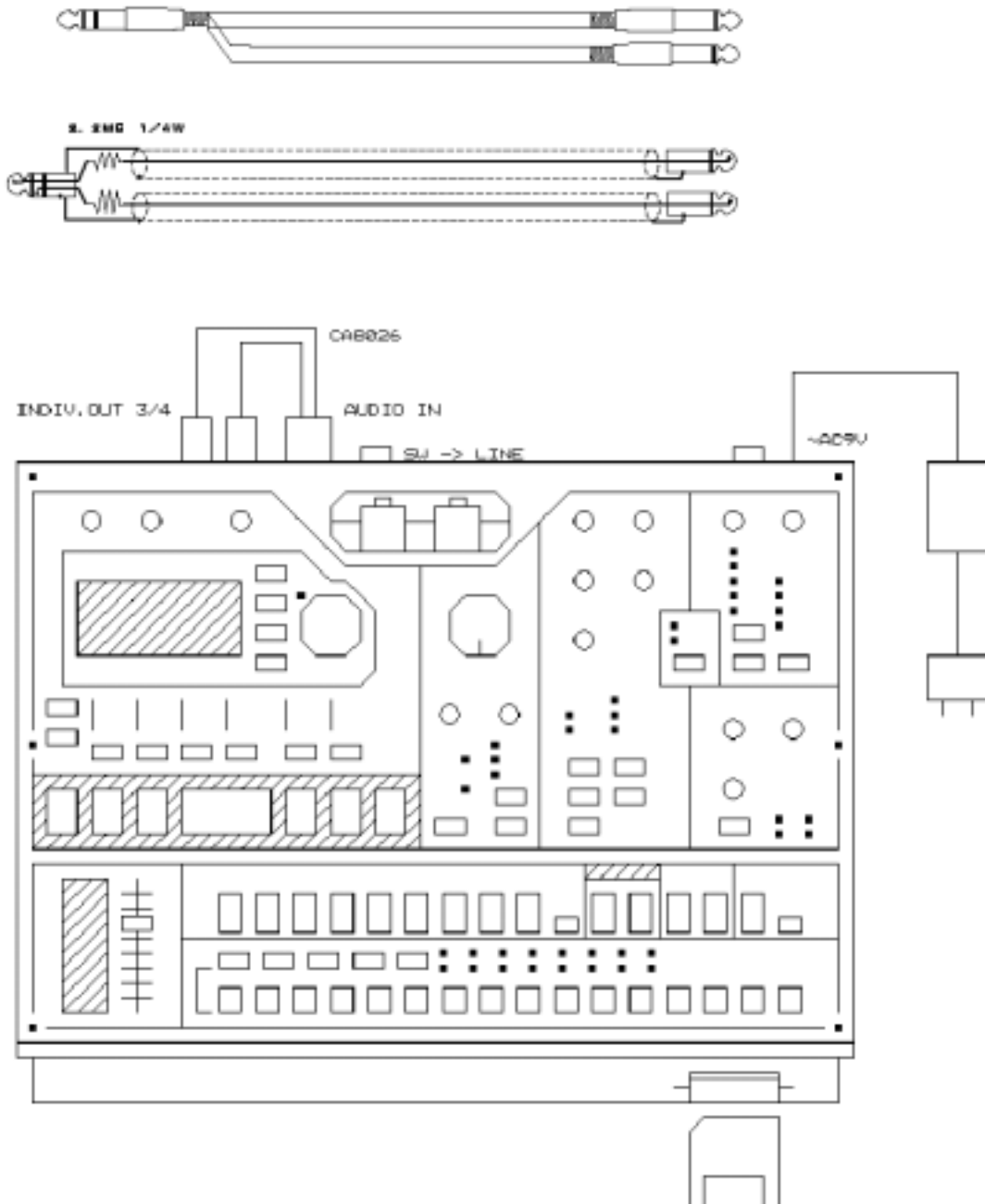


2.2M  $\Omega$  Metal Film Resistor x 2

Test Mode 1 (Internal test).

After replacing the main board, please take the following procedures firstly.

1. Connect the audio cable as follows:



2. Set up the volume knob and switches as follows:

[MASTER VOLUME] : MAX

[TUBE GAIN] : MIN

[AUDIO IN LEVEL] : MAX

[MIC/LINE] : LINE

[EFFECT] : REVERB

[SYNTH OSCILLATOR] : AUDIO IN + COMB

3. Insert the SmartMedia, which is supplied by Korg.

4. Press [ERASE] + [PATTERN] + [STANDBY] (POWER ON)

5. Executing Internal Device check start....

If the internal checking works correctly, it proceeds to the next steps automatically.

If "3>L MIC[16]" is displayed and stops for a while, please switch the MIC/LINE switch to "MIC".

6-1 Switch and LED check

Once "#PANEL" is displayed, all LED checks start. If OK, press [16].

Press switches indicated in the LED. (Start: [AUDIO IN] ..... End:[16])

6-2. Rotary encoder check <#R.Enc>

If [RE ->>1>-> +000] is displayed, rotate the Dial knob 24 steps to the right.

If [RE ->>1>-> +024] is displayed, press [16].

If [RE <-<1<<- -000] is displayed, rotate Dial knob 24 steps to the right.

If [RE <-<1<<- +024] is displayed, press [16].

6-3. Rotary select check <#R.Sel>

If [BPM SYNC EFFECT] is displayed, rotate EFFECT knob one by one clockwise.

(BPM SYNC --> SHORT DL --> ..... REVERB)



#### 6-4. A/D check <#ADC>

Rotate the knobs to "MIN --> MAX --> MIN".

NOTE: As for the knobs with (c) as below, rotate the knob to the center position and proceed to the next knob.

"MIN --> MAX --> MIN --> CENTER".

[PITCH/GLIDE(c)] -> [PAN(c)] -> [SPEED] -> [DEPTH(c)]  
->[EG TIME(c)] -> [LEVEL]-> [FX EDIT 1] -> [FX EDIT 2]  
->[CUTOFF] ->[RESONANCE] -> [EG INT(c)]  
->[OscEdit1] -> [OscEdit2(c)]

Then, the step proceeds to the slider of the arpeggiator.

#### 6-5. Ribbon check <#Ribbon>

Touch the Ribbon controller. Then <Ribbon \*\*\*> is displayed.

Drag upward on the Ribbon. If <Ribbon 127H> is displayed, OK.

Drag downward on the Ribbon. If <Ribbon 001LH> is displayed, OK.

Press [16].

#### 6-6. LCD Dot check <#LCD>

All the LCD dots light up. If no problem, press [16].

All the LCD dots turn off. If no problem, press [16].

Light up the LCD dots half by half alternatively.

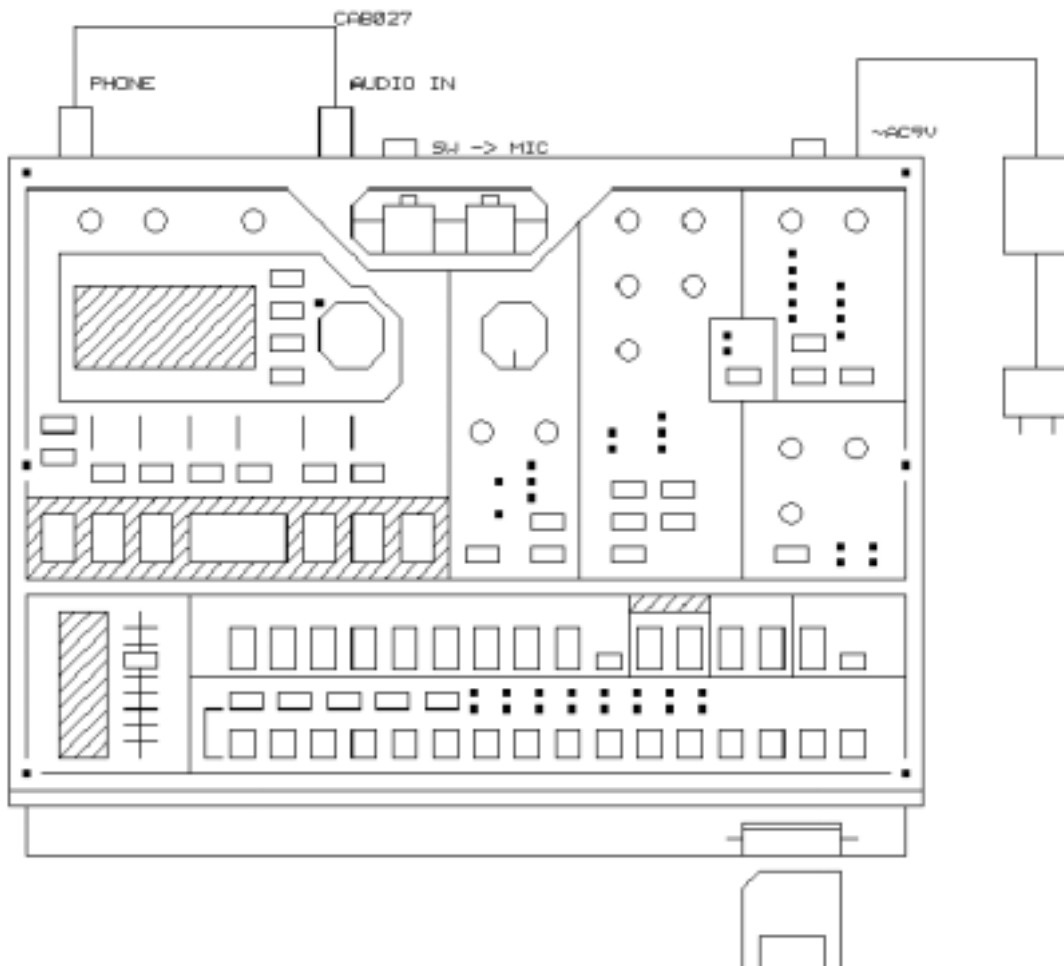
Turn off the STANDBY (POWER) switch.

Test Mode 2 (System Data Loading).

After replacing the main board, please take the following procedures secondly.

1. Turn the power ON while pressing ERASE and PARTEDIT. All system and preload data are loaded into the product.

2. Connect the stereo plug of the cable to PHONES and the monaural plug to AUDIO IN.



2. Insert the SmartMedia, which is supplied by Korg.

3. Turn the power on while pressing [ERASE] + [PART EDIT].

1. "<NAND> Fmt OK"
2. "<NAND> Init"
3. "<NAND> Format"
4. "<NAND> Sys Ld"
5. "<NAND> DSP Ld"
6. "<NAND> UserLd"

7."<NAND> UserLd"

8. "<NAND> Chking"

NOTE: If the step stops any of the above indications in the display, press [SHIFT]+[15].

If the system data is loaded correctly, "Valv Wup \*\*\*sec"(000-160sec) is indicated in the display.

If any other message is displayed such as "@@@@@ x:\$\$\$", it might be an error.

Wait until the tube test counter is displayed as "000sec" (approx 160 seconds later). Then, please proceed to the Tube calibration test.

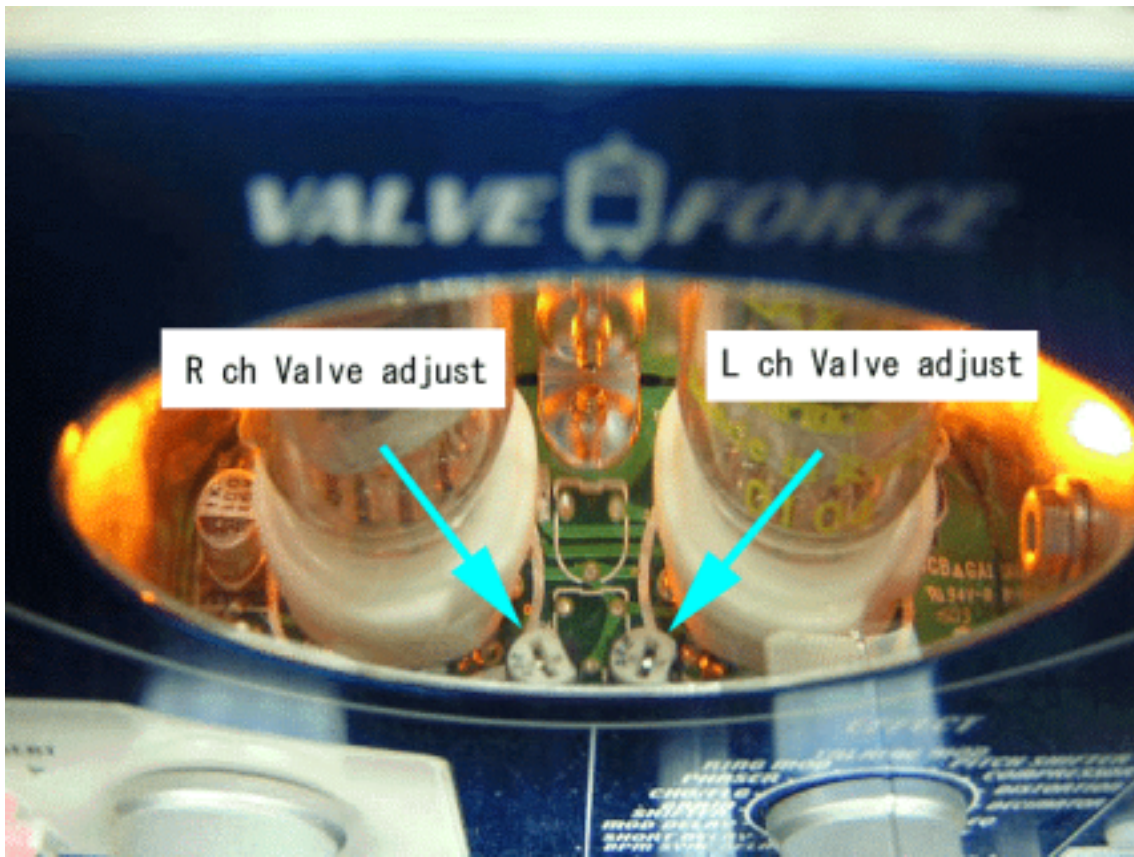
## EMX-1/ESX-1 Tube Calibration

- 1 . Connect the stereo plug of the cable (see fig.) to PHONES and the monaural plug to INPUT.
2. While pressing ERACE and STEP EDIT, turn the power on. “Valv Wup” is indicated as stand-by for pre-heating, and also the waiting time is indicated.

Set up the volume knob and switches as follows:

MASTER VOLUME : MAX  
TUBE GAIN : MIN  
AUDIO IN LEVEL : MAX  
MIC/LINE : MIC

3. “Ajust (L)” and a 4 digits figure are indicated in the LCD. If the value is less than 0010, the test is O.K.. Press the 16 knob at the right bottom. If the value is over it, it is required to adjust the valve. Adjust the variable resistors which correspond to the channels referring to the photo below.



4. As well as “Ajust(L)”, “Ajust (R)” and a 4 digits figure are indicated in the LCD. If the value is less than 0010, the test is O.K.. Press the 16 knob at the right bottom. If the value is over it, it is required to adjust the valve. Adjust the variable resistors which correspond to the channels referring to the photo above.

5. Once the balance of L/R is automatically adjusted, “ValvGMax GainMx” is indicated in the LCD. Turn the TUBE GAIN knob to MAX, and press the 16 knob.

6. Check the L/R balance of TUBE GAIN MAX, and return to the normal mode.

End.

PART CODE	PART NAME	NOTE	Q'TY
001236600	PCB ASSY KLM-2366 EMX-1	M.PART	1
001236700	PCB ASSY KLM-2367 EMX-1	M.PART	1
001236900	PCB ASSY KLM-2369 EMX-1	M.PART	1
001244400	PCB ASSY KLM-2444/45 EMX-1	M.PART	1
304000070	TR 2SA812-T1B (M5-7) (TS)	KLM-2369	1
304000070	TR 2SA812-T1B (M5-7) (TS)	KLM-2366	1
304010020	TR 2SB1120-F/G (TS)	KLM-2366	1
304020230	TR 2SC3661-TA/TB(3K) (TS)	KLM-2369	6
304020380	DIGITAL TR FP1L2Q-T1B (TS)	KLM-2444/45	13
304050140	DIGITAL TR DTC114EKA T146(TS)	KLM-2444/45	8
304060070	FET 2SK433-T12-1C (TS)	KLM-2444/45	2
304060250	FET CPH6302-TL(TS)	KLM-2366	1
312051600	LED SLP-190B-51	KLM-2444/45	8
312052300	LED SLP-290B-51	KLM-2444/45	9
314001400	DIODE RLS-73 TE-11 (TS)	KLM-2366	1
314001400	DIODE RLS-73 TE-11 (TS)	KLM-2444/45	9
314030600	DIODE 1SR154-400TE25(TS)	KLM-2366	10
314030700	DIODE RB051L-40TE25(TS)	KLM-2444/45	1
314030700	DIODE RB051L-40TE25(TS)	KLM-2366	1
315000500	DOUBLE DIODE MC-2840-T12-1(TS)	KLM-2366	10
315000600	DOUBLE DIODE MC2838-T12-1 (TS)	KLM-2444/45	36
320001610	IC UPD77213GJ-301-8EN	KLM-2366	1
320004688	IC HD6417709SF100B(S)	KLM-2366	1
320009103	IC NJU6468FG1-00	KLM-2367	1
320012317	IC MBM29LV004TC-90TN	KLM-2366	1
320018007	IC AK4527BVQ (S)	KLM-2366	1
324003071	IC TC58128AFT(EL)	KLM-2366	1
324007002	IC BA10358F-T1(2K) (TS)	KLM-2366	2
324007005	IC BA05FP-E2 (TS)	KLM-2366	1
324009004	IC NJM78L05UA-TE2 (TS)	KLM-2366	1
324009036	IC NJM4556AM-T1	KLM-2369	1
324009039	IC NJM4580M-TE1 (TS)	KLM-2369	2
324009041	IC NJM79L09UA-TE1(TS)	KLM-2369	1
324009048	IC NJM2114M-TE2 (TS)	KLM-2369	3
324009048	IC NJM2114M-TE2 (TS)	KLM-2444/45	3
324009051	IC NJM78M12DLA-TE1(TS)	KLM-2366	1
324009052	IC NJM79M12DLA-TE1(TS)	KLM-2366	1
324017009	IC RN5RG33AA-TR (TS)	KLM-2366	1
324017021	IC EM638165TS-10(TS)	KLM-2366	2
324021014	IC SN74LV138ANS-EL (TS)	KLM-2444/45	4
324021103	IC SN74LV32APWR (TS)	KLM-2366	1
324021105	IC SN74LV245APWR (TS)	KLM-2366	1
324021109	IC SN74LV244APWR (TS)	KLM-2366	1
324021114	IC SN74LV05APWR (TS)	KLM-2366	1
324023008	IC S-8520F33MC-BNS-T2(TS)	KLM-2366	1
324046004	IC T15V2M16B-55S (44TSOP2)	KLM-2366	1
334000600	PHOTO COUPLER PC-410K (TS)	KLM-2366	1
335012200	XTAL OSC HC-49US 22.5792MHZ	KLM-2366	1
350002222	SEMI FIXED VR RH0615C J3 2.2K	KLM-2444/45	2
370004500	ROTARY ENCODER EC16B242041SA	KLM-2444/45	1
370005700	4BIT ENCODER REB161PVB20FHGRY1	KLM-2444/45	2
375014800	PSW SDKLA10200	KLM-2366	1
404000500	CHIP INDUCTOR BLM21B102SPT TS	KLM-2369	8

PART CODE	PART NAME	NOTE	Q'TY
404001070	CHIP INDUCTOR BLM11B102SPT:TS	KLM-2366	48
415004500	TOUCH SHEET FS-MR048-08 10KS	M.PART	1
454012707	DIN SOCKET DJ-004-C	KLM-2366	1
454012709	DIN SOCKET DS-05-02(W/OUT SW)	KLM-2366	3
474029500	SM CONNECTOR CN015R-3013-0	KLM-2366	1
620018200	POWER SW KNOB KOC-E40224	M.PART	1
644003000	X-507 GND SPRING KOC-C46014	M.PART	1
646077600	X-0400 BL PLATE KOC-E40525	M.PART	1
*12AX7EH	VACUUM TUBE 12AX7EH	KLM-2444/45	2
*312X120000	LED MT-12-21 UYC-A6 (YELLOW)	KLM-2367	2
*312X120001	CHIP LED SML-212VTT86 (RED)	KLM-2444/45	78
*312X120002	CHIP LED KM2520MGC03 (GREEN)	KLM-2444/45	3
*312X120003	CHIP LED SML-212YT (YELLOW)	KLM-2444/45	2
*313X120000	LCD DLC-90102G4GF	M.PART	1
*324X040005	IC TC7WHU04FK	KLM-2366	2
*324X040006	IC TC7WH04FK	KLM-2366	2
*324X040007	IC TC7WH74FK	KLM-2366	1
*324X040008	IC TC7WH08FK	KLM-2366	1
*324X120000	IC M51957BFP-600C (TS)	KLM-2366	1
*324X120001	IC S-L2980A15PN-C6ATF	KLM-2366	1
*324X120002	IC NJU7223DL1-18	KLM-2366	1
*324X120003	IC HD74LV163A	KLM-2366	3
*324X120004	IC HD74LV14A	KLM-2366	1
*324X120005	IC SN74LV126APWR	KLM-2367	1
*324X120006	IC SN74AHCT244PWR	KLM-2367	1
*324X120007	IC SN74LV4052ANS (TS)	KLM-2444/45	2
*324X120008	IC NJM7806FA	KLM-2444/45	1
*335X120000	CRYSTAL OSC HC-49US 12.00MHZ	KLM-2366	1
*335X120001	CRYSTAL OSC HC-49US 10.00MHZ	KLM-2366	1
*362X120000	VR R1111NOA-V1B103FH00-00 10KB	KLM-2444/45	9
*362X120001	VR R1111NOA-V1B103FH01-00 10KB	KLM-2444/45	5
*362X120002	VR R1111RGOA-V1B103FH00 10KBX2	KLM-2444/45	2
*362X120003	VR R1111GOA-V1B503FH00 50KBX2	KLM-2444/45	1
*365X120000	SVR RS45111C6008 10KB	KLM-2444/45	1
*373X150000	SLIDE SW SK-22D06G8	KLM-2369	1
*404X040001	CHIP INDUCTOR C6-K3.0L 10UH	KLM-2366	1
*404X120001	CHIP INDUCTOR BLM41PG102SN1D	KLM-2366	3
*404X120002	CHOKE COIL WBR6H-3T-Y2F	KLM-2366	2
*404X120003	CHOKE COIL PLH10AN1112R6P2B	KLM-2366	1
*404X120004	CHIP INDUCTOR C13-K4.5L 22UH	KLM-2366	1
*404X120005	CHIP INDUCTOR BLM41PG102SN1	KLM-2369	2
*405X120000	AC ADAPTER KA-161E 100V	M.PART 100JP	1
*405X120001	AC ADAPTER KA-163E 120V	M.PART 117EX	1
*405X120001	AC ADAPTER KA-163E 120V	M.PART 117US	1
*405X120001	AC ADAPTER KA-163E 120V	M.PART 117CN	1
*405X120002	AC ADAPTER KA-165E 240V	M.PART 240AU	1
*405X120003	AC ADAPTER KA-169E 230V	M.PART 230GE	1
*405X120003	AC ADAPTER KA-169E 230V	M.PART 230FR	1
*405X120003	AC ADAPTER KA-169E 230V	M.PART 230UK	1
*405X120003	AC ADAPTER KA-169E 230V	M.PART 230WG	1
*454X120000	PHONE JACK PJ-603AG	KLM-2369	6
*464X120000	CHIP FUSE 0433.750NR	KLM-2366	1
*471X120000	PIN HEADER JS-1125-3	KLM-2366	1

PART CODE	PART NAME	NOTE	Q'TY
*471X120001	PIN HEADER JS-1125-10	KLM-2366	1
*471X120002	PIN HEADER JS-1125-15	KLM-2366	1
*471X120003	FLAT CABLE CONNECTOR BA-40R	KLM-2366	1
*471X120004	PIN HEADER JS-1125-6	KLM-2369	1
*471X120005	PIN HEADER JS-1125-8	KLM-2369	1
*471X120006	PIN HEADER JS-1125-12	KLM-2369	1
*471X120007	PIN HEADER JS-1125-7	KLM-2369	1
*471X120008	FPC CONNECTOR 5597-05APB	KLM-2444/45	1
*475X120000	HARNESS HNS-3215 BOARD IN	KLM-2367	1
*475X120001	HARNESS HNS-3214 BOARD IN	KLM-2369	1
*475X120002	HARNESS HNS-3219 BOARD IN	KLM-2444/45	1
*475X120003	HARNESS HNS-3217 BOARD IN	KLM-2444/45	1
*475X120004	HARNESS HNS-3218 BOARD IN	KLM-2444/45	1
*475X120005	HARNESS HNS-3220 BOARD IN	KLM-2444/45	1
*475X120006	HARNESS HNS-3216 BOARD IN	KLM-2444/45	1
*475X120007	HARNESS HNS-3213 BOARD IN	KLM-2444/45	1
*480X120000	TUBE SOCKET 9PINPCG2C9-Y	KLM-2444/45	2
*500X040000	INTER CONNECTOR YP L58XH6.0XW2	M.PART	2
*500X851003	X-8510 URETHANE-LEG F40709	M.PART	4
*575X120000	LED SPACER LEDH-6	KLM-2444/45	1
*575X120001	LED HOLDER KOC-E30318	KLM-2444/45	1
*580X120000	X-1200 LENS SHEET KOC-F41050	M.PART	2
*620X120000	X-1200 PATTERN KEY KOC-E30294	M.PART	1
*620X120001	X-1200 PART KEY KOC-E30295-1	M.PART	1
*620X120002	X-1200 EDIT KEY KOC-E30296-1	M.PART	1
*620X120003	X-1200 SELECT KEY-M KOC-E30297	M.PART	1
*620X120004	X-1200 SLIDER KNOB KOC-E40557	M.PART	1
*620X120005	X-1200 VR KNOB-S KOC-E30312	M.PART	17
*620X120006	X-1200 VR KNOB-L KOC-E30313	M.PART	2
*620X120007	X-1200 ENCODER KNOB KOC-E30301	M.PART	1
*630X040000	X-0400 REFLECTION SHEET F40971	M.PART	1
*630X040001	X-0400 SHEET KOC-F40972	M.PART	1
*630X120000	X-1200 LCD WINDOW KOC-E30311-1	M.PART	1
*630X120001	X-1200 TUBE LENS KOC-E30302	M.PART	1
*641X120000	X-1200 PANEL KOC-C20392	M.PART	1
*641X120001	X-1200 PANEL CHASSIS C20394	M.PART	1
*641X120002	X-1200 BOTTOM CASE KOC-C20395	M.PART	1
*641X120003	X-1200 TUBE BRACKET C30598	M.PART	1
*641X120004	X-1200 TUBE COVER KOC-C41286	M.PART	1
*641X120005	X-1200 TOUCH SHEET BRACKET	M.PART	1
*646X120000	X-1200 SW FRAME KOC-E10206	M.PART	1
*646X120001	X-1200 SM SLOT KOC-E20224	M.PART	1