

# **KORG**

## **Analogue Synthesizer**

### **volca keys**

### **(volca-keys)**

# **SERVICE MANUAL**



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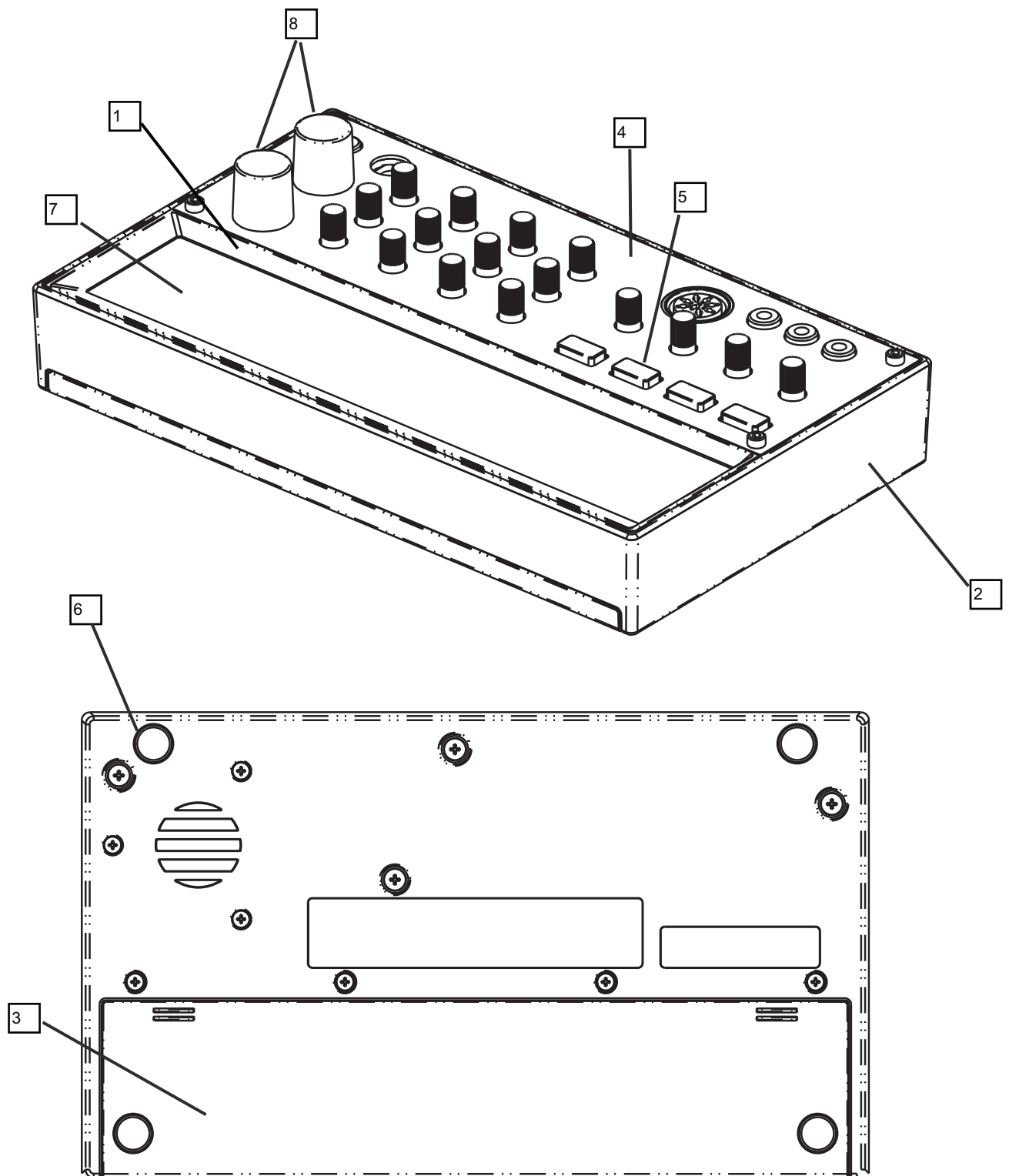
# **KORG**

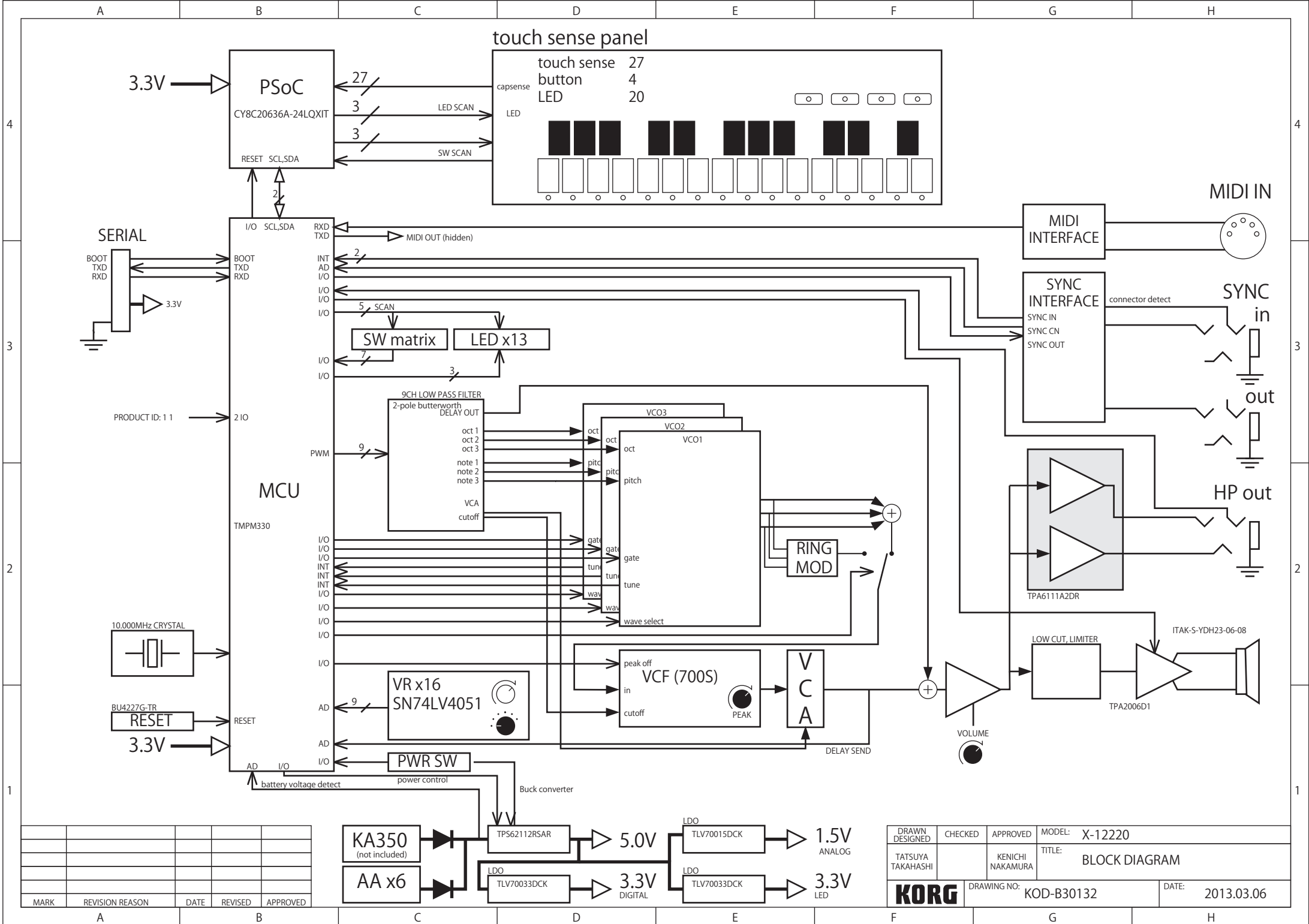
Issued: Oct. 21, 2013

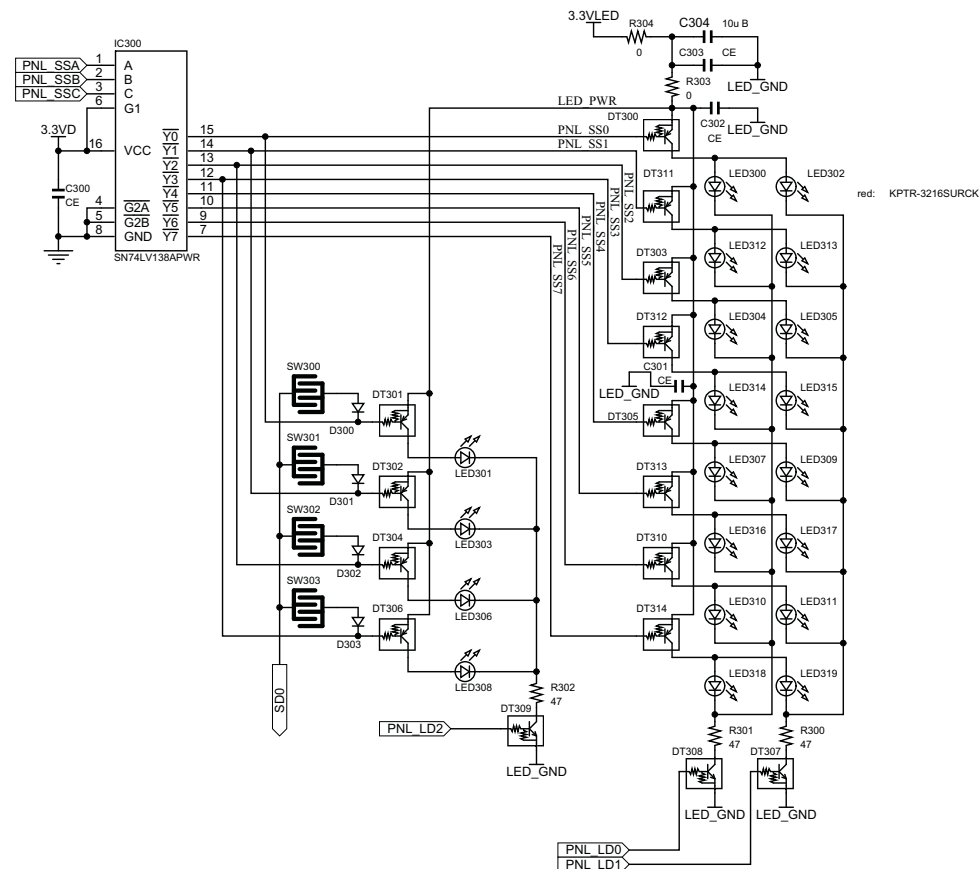
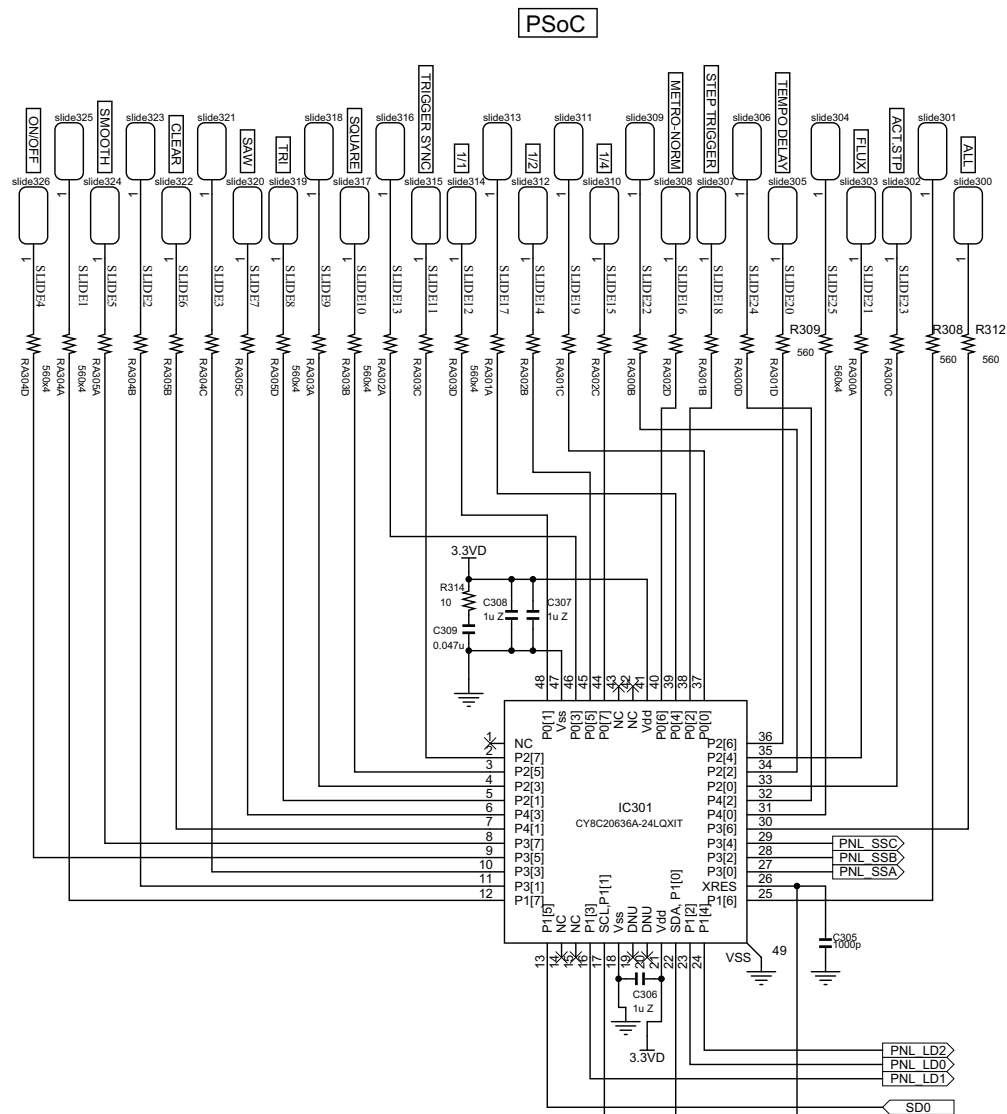
Ver. 1.0

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No	Code	Parts Name	QTY
1	510646800824	X12220 UPPER CASE E10301	1
2	510646800820	X12200 LOWER CASE E10302	1
3	510646800821	X12200 BATTERY COVER E20382	1
4	510640800503	X12220 TOP PANEL C30896	1
5	510500800037	X12220 RUBBER BUTTON E30650-2	1/2
6	510500800523	X12200 RUBBER LEG E40867	5
7	510646801535	X12220 SENSOR SHEET E40869	1
8	510646502391	X-6141 VR KNOB(V) E30498-2	2





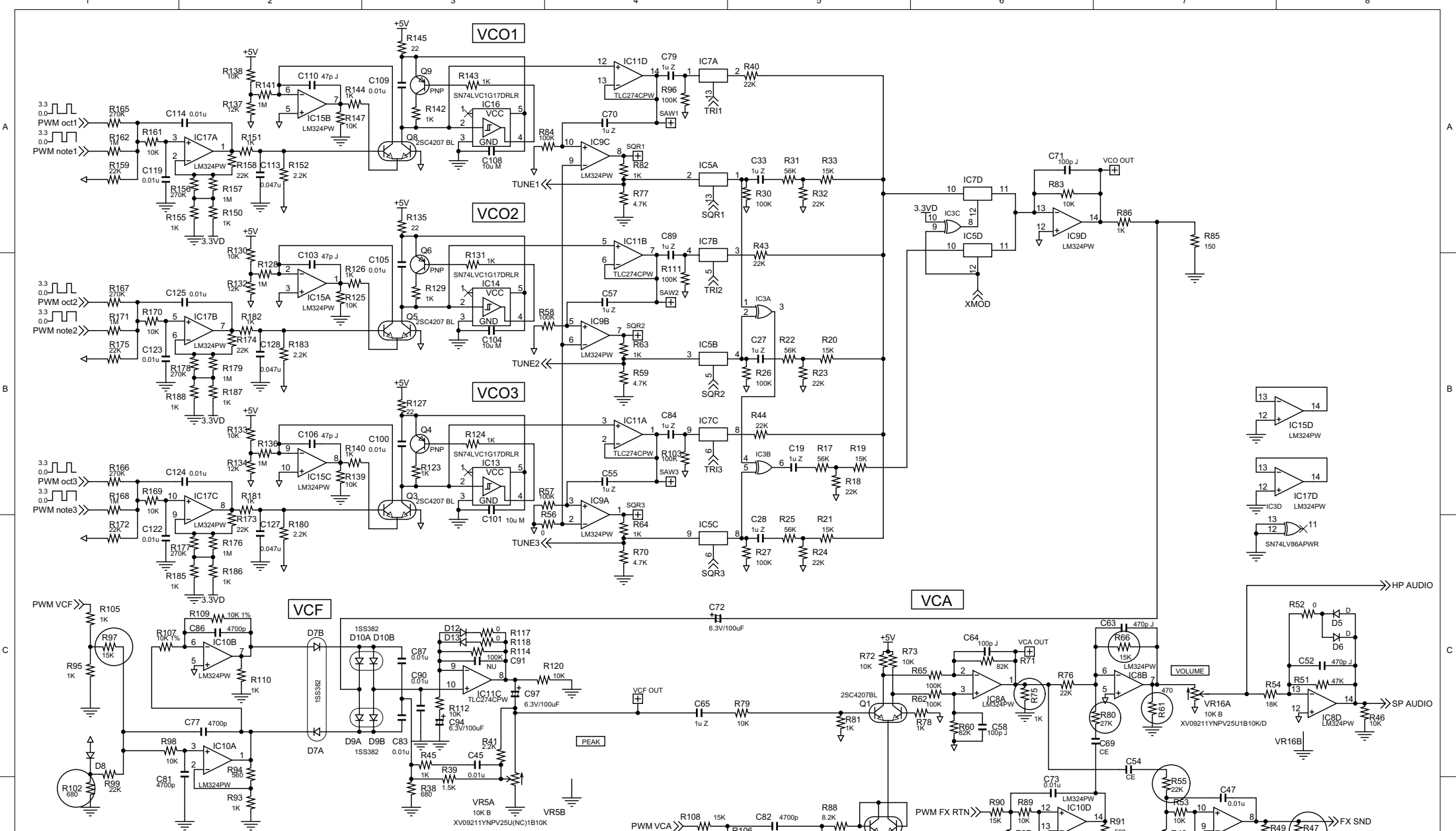


All ceramic capacitors are K rank unless specified otherwise

CE: 0.1uF Z  
D: 1S355ST(A)  
L: BLM18BD102SN1D (S)  
WD: MC2840-T12-1 (S)  
NPN: 2SC1623-T1B-A<L6/L7>(S)  
PNP: 2SA812-T1B-A M5-7 M6 RANK(S)  
FET: 2SK433-T12-1E (S)  
DTC: DTC114EUA T106 (S)  
DTA: DTA114EUA T106(S)

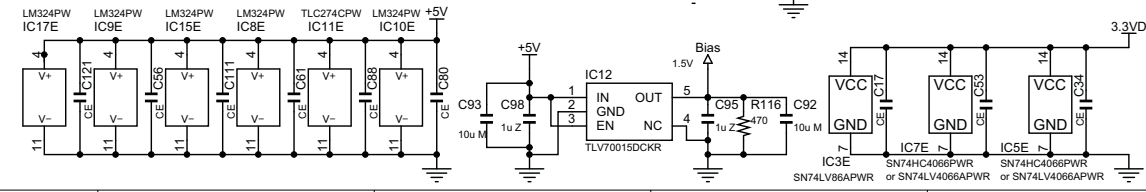
DRAWN	DESIGNED	CHECKED	APPROVED	MODEL: X-12220
TSE Kobayashi	Tatsuya Takahashi	Tatsuya Takahashi	Kenichi Nakamura	TITLE: PANEL SCHEMATIC 1/1 KLM-3202
DRAWING NO: KOD-A31000			DATE: 2013/03/20	

△				
MARK	REVISION REASON	DATE	REVISED	APPROVED



All ceramic capacitors are K rank unless specified otherwise  
CE: 0.1uF Z  
D: 1SS355ST(A)  
L: BLM18BD102SN1D(S)  
WD: MC2840-T112-1(S)  
NPN: 2SC1623-T1B-A-L6L7>(S)  
PNP: 2SA812-T1B-A-M5-7 M6 RANK(S)  
FET: 2SK433-T112-1E(S)  
DTC: DTC114EUA T106(S)  
DTA: DTA114EUA T106(S)

MARK	REVISAL	REASON	DATE	REVISED	APPROVED



DRAWN	DESIGNED	CHECKED	APPROVED	MODEL
TSE Kobayashi	Tatsuya Takahashi	Tatsuya Takahashi	Kenichi Nakamura	X-12220
TITLE: SCHEMATIC 1/3 KLM-3203 ANALOG				
DRAWING NO: KOD-A31001				DATE: 2013/03/20

A

B

C

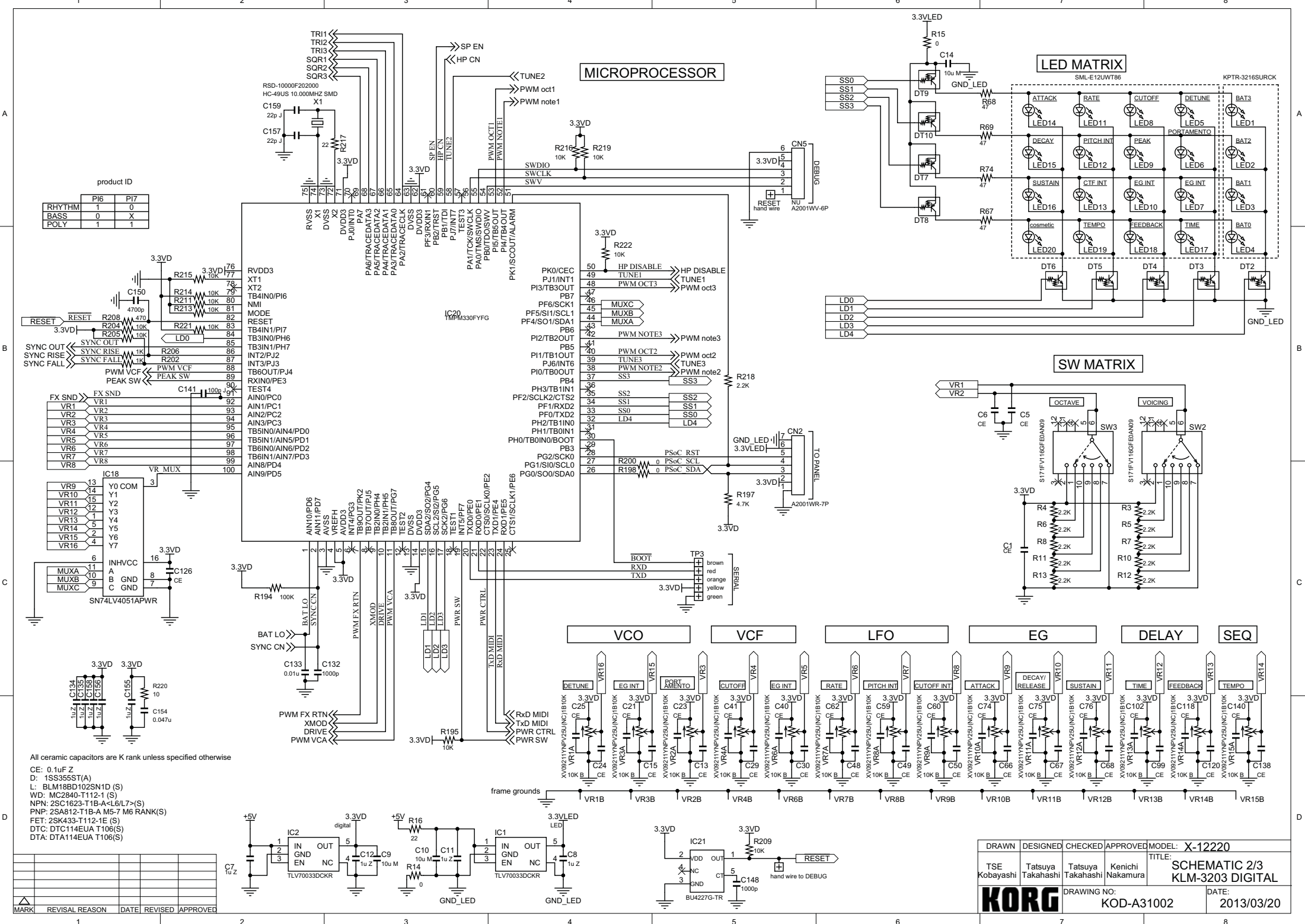
D

A

B

C

D



	PI6	PI7
RHYTHM	1	0
BASS	0	X
POLY	1	1

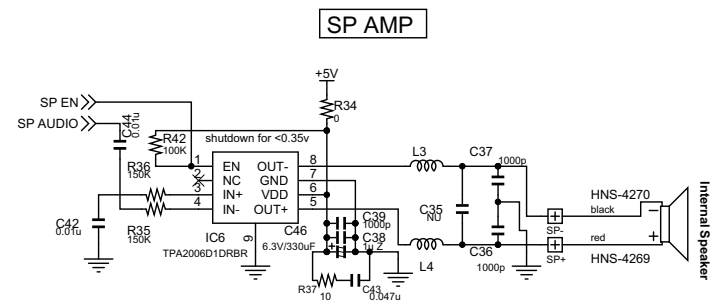
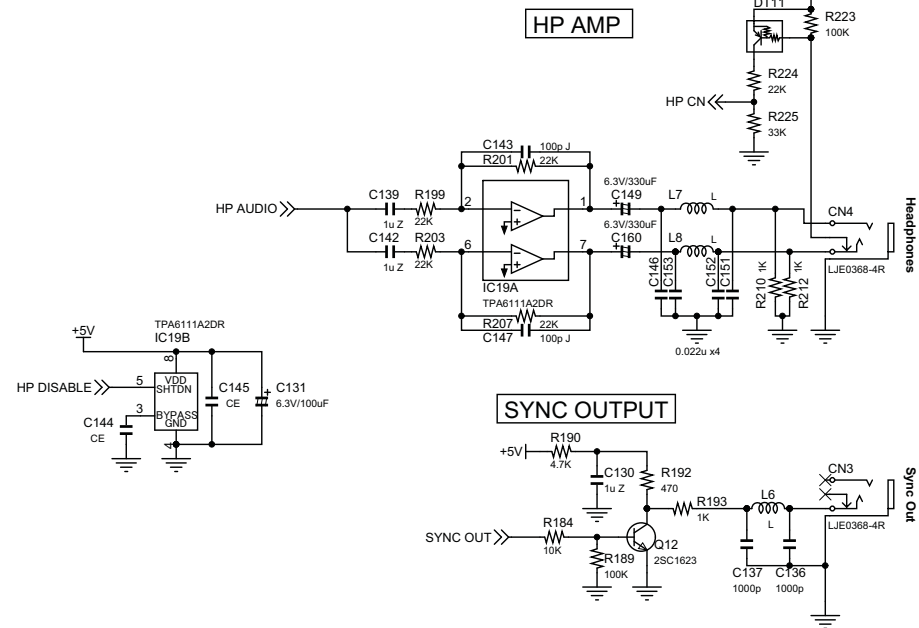
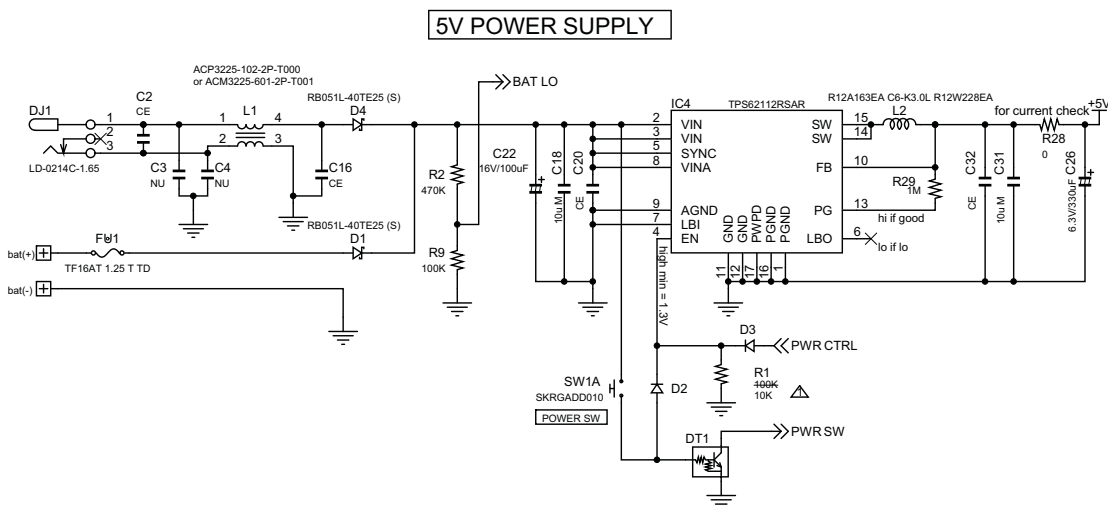
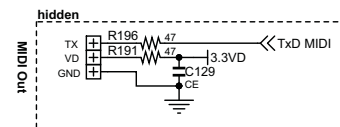
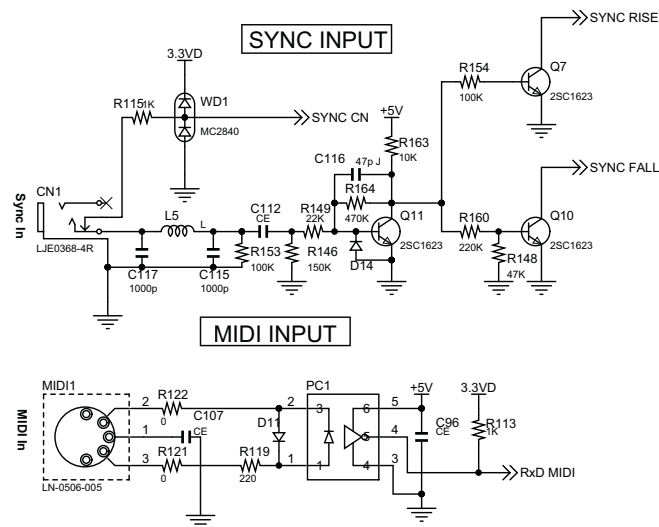
	VR9	VR10	VR11	VR12	VR13	VR14	VR15	VR16
Y0 COM	13	14	15	16	17	18	19	20
Y1	21	22	23	24	25	26	27	28
Y2	29	30	31	32	33	34	35	36
Y3	37	38	39	40	41	42	43	44
Y4	45	46	47	48	49	50	51	52
Y5	53	54	55	56	57	58	59	60
Y6	61	62	63	64	65	66	67	68
Y7	69	70	71	72	73	74	75	76

All ceramic capacitors are K rank unless specified otherwise

CE: 0.1uF Z  
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MARK	REVISION	REASON	DATE	REVISED	APPROVED

DRAWN	DESIGNED	CHECKED	APPROVED	MODEL: X-12220
TSE Kobayashi	Tatsuya Takahashi	Tatsuya Takahashi	Kenichi Nakamura	TITLE: SCHEMATIC 2/3 KLM-3203 DIGITAL
DRAWING NO: KOD-A31002				DATE: 2013/03/20

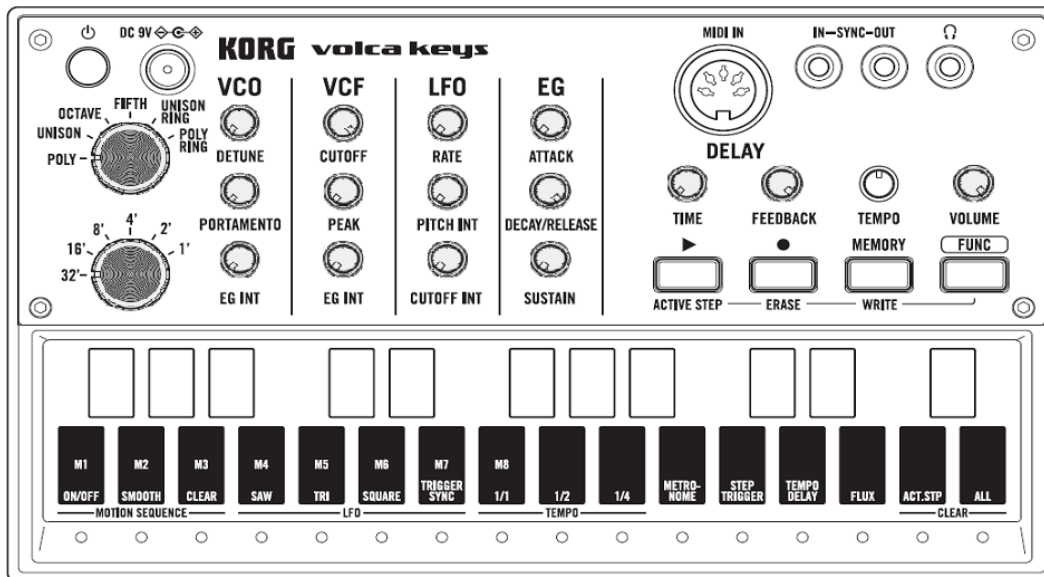
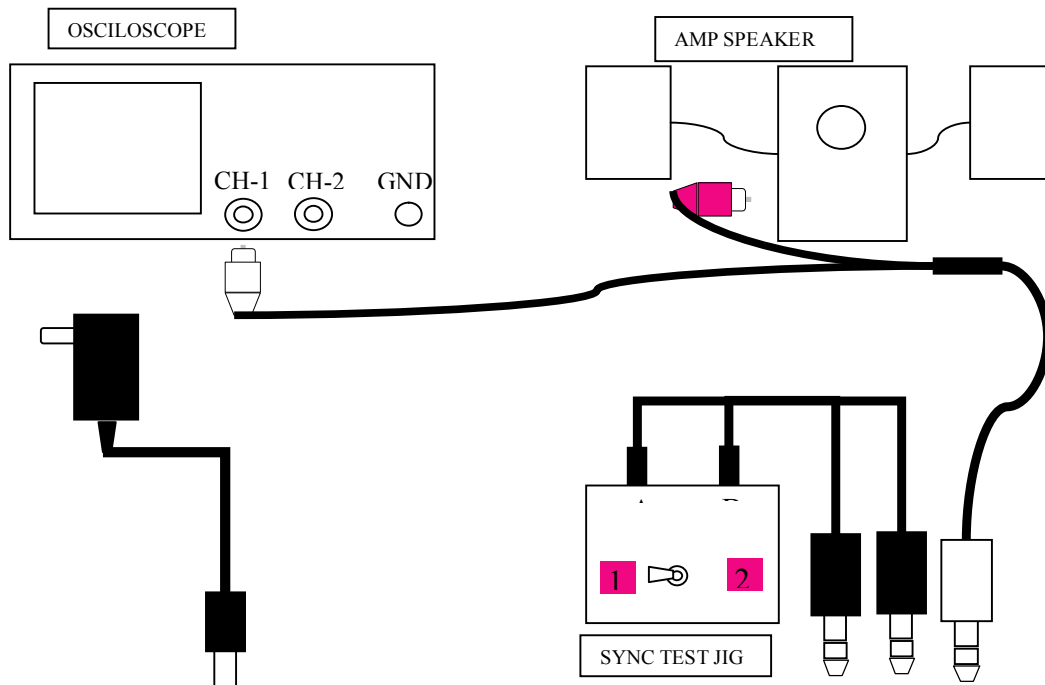


CE: 0.1uF Z  
D: 1SS355ST(A)  
L: BLM18BD102SN1D (S)  
WD: MC2840-T112-1 (S)  
NPN: 2SC1623-T1B-A<L6/L7>(S)  
PNP: 2SA812-T1B-A M5-7 M6 RANK(S)  
FET: 2SK433-T112-1E (S)  
DTC: DTC114EUA T106(S)  
DTA: DTA114EUA T106(S)

DRAWN	DESIGNED	CHECKED	APPROVED	MODEL: X-12220	
TSE Kobayashi	Tatsuya Takahashi	Tatsuya Takahashi	Kenichi Nakamura	TITLE: SCHEMATIC 3/3 KLM-3203 JACK	
<b>KORG</b>		DRAWING NO:		DATE:	
		KOD-A31003		2013/06/26	

[illegible]

## TEST MODE Setting



### Use equipment

SYNC TEST JIG (see schematic bellow)

Oscilloscope

Amp speaker

AC Adaptor KA350

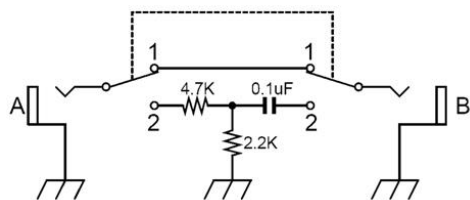
Battery LR6 x6

MIDI control Keyboard

AC Adaptor (USB 5V/500mA)

MIDI cable

## SYNC TEST JIG SCHEMATIC



### Oscilloscope setting.

VERTICAL: CH1 200mV/DIV, DC coupling

HORIZONTAL: 2.5mS/DIV

### How to start test mode

Set the rotary switch to UNISON.

Turn on the power while holding down the [Play],[Rec] and [FUNCTION] button.

### Summary of the test mode

There is a [stand-by state] and [test execution state] state at the time of inspection.

Usually it is in [test execution state], but it is in standby mode by interrupting the test all the LED blinks when an error occurs during the inspection.

With the exception of the error display and LED inspection, inspection number is displayed on the 7-segment LED.

### Test Mode Introduction

Inspection Number	Display	inspection item	
0	----	Internal inspection(Pin,ROM,Panel)	
1	---○	LED and button check	
2	--○-	Rotary switch check	
3	--○○	AD and knob inspection	
4	-○--	Synchronization function inspection	
5	-○-○	Audio check	*1)
6	-○○-	Audio PCB inspection	*1)
7	-○○○	Battery inspection	*1)
13	○○-○	Checking the tuner function	*1)
14	○○○-	Electrostatic sensor display	*1)
15	○○○○	Power off test	

\*1) This test is not required.

### Test Mode Operation

Operation in the [test execution state] state

[PLAY]+[MEMORY] button	Exiting the test running and return to the previous inspection.
[PLAY]+[FUNC] button	Exiting the test running and proceed to the next inspection.
[PLAY]+[REC] button	Exiting the test running and change to standby mode
[MEMORY] button	Return to the previous step.
[FUNC] button	Skip to the next step.

Operation in the standby state

[MEMORY] button	It returns to the previous inspection keep standby.
[FUNC] button	It proceeds to the next inspection keep standby.
[REC] button	To start the inspection in stand-by state
[PLAY]+[REC]button	error contents display

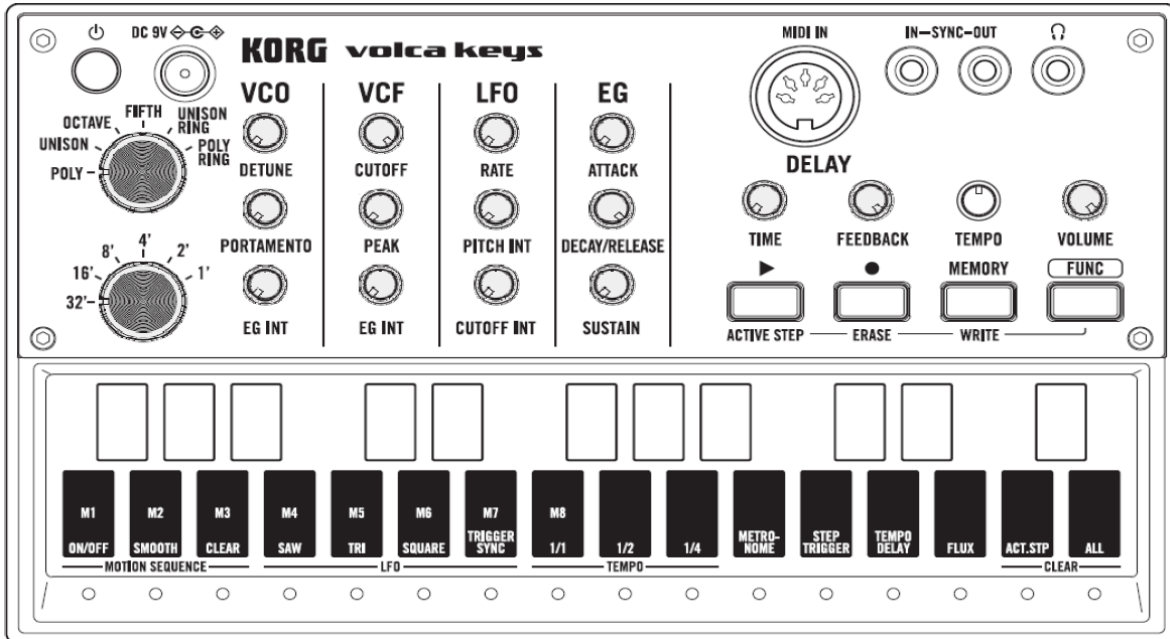
### 1. The appearance inspection

- (1) Place on a flat surface, make sure that there is no wobble.
- (2) Make sure that no scratch, cracks in the case and knob.
- (3) Make sure that the interruption of the silk printing, there is no bleeding.
- (4) Make sure that the lifting of the Volume, LED, Jack and Button etc., there is no slope.
- (5) Make sure that there is no other visible damage.

### 2. Launch Test mode

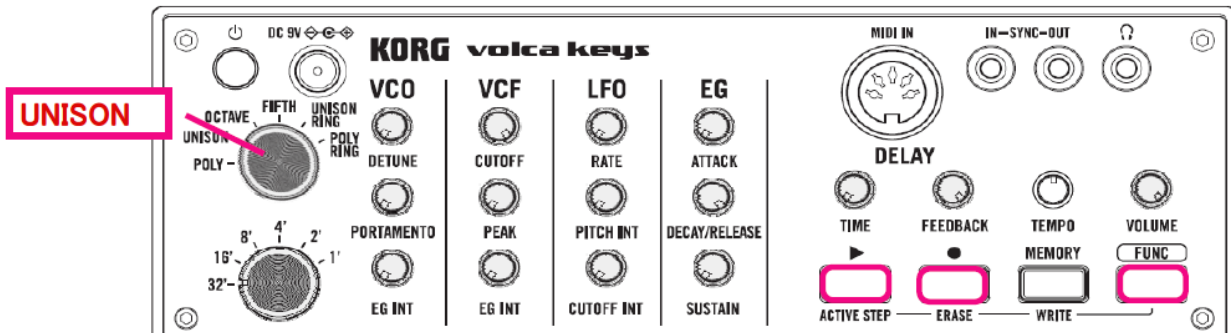
Connect the jig and products as setting figure.

Please do not connect the cable still in the [SYNC IN] and [SYNC OUT] terminal.



Make sure that matches the setting of product shipment.

After setting the rotary switch to UNISON position, turn on the power while holding down the [Play],[REC] and [FUNC] button.



Release the button after turning 3 knob of left side and decoration LED.

### 3. Internal inspection. (inspection No. 0)

The following checks are executed.

- (1) Pin check inspection
- (2) Delay A/D check
- (3) ROM check sum
- (4) Panel check sum
- (5) Self tuning inspection

Proceed to the next inspection automatically if the inspection passed.  
 It change stand-by state and NG state is displayed if the inspection NG  
 Please refer to the list of errors at the end of the "test mode description" about the error contents.

#### 4. LED and button check (inspection number 1)

##### 4-1. Confirmation of system version

Displays using the LED on the knob of the three-stage 4 in the left column and battery level LED in turn each version. (See following table)

BAT1	Upper knobs	Middle knobs	Lower knobs	Contents
-	---○	----	----	System version
○	---○	----	----	Panel version
Sys or Panel	major version	minor version1	minor version2	

(Note) This table shows the case of Version 1.00.

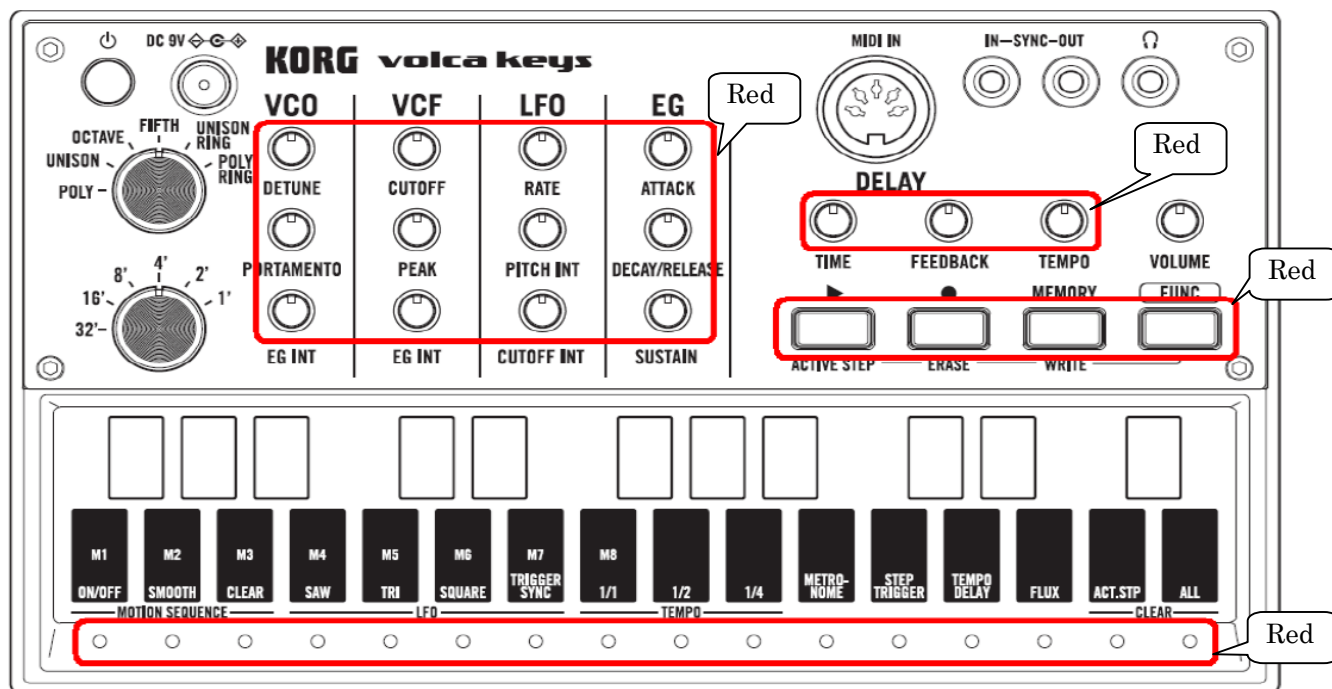
Check each version.

Push [FUNC] button to proceed next inspection after checking version

##### 4-2. Check the LED lights of all

Make sure that each LED is the following colors and that the LED is lit all.

Make sure that there is no LED that is off, the brightness of LED is uniform, and there is no difference in color tone.



knob&7seg	Red	Button & Battery	Yellow	Rear LED x4	Red
-----------	-----	------------------	--------	-------------	-----

Proceed to the next inspection by pushing [FUNC] button if the inspection passed.

#### 4-3. LED and button check

Following table is the order of inspection.

Please press the button on the cell to the right of the lit LED.

LED	Operation button
PLAY	PLAY
REC	REC
MEMORY	MEMORY
FUNC	FUNC

Proceed to the next inspection if the inspection passed.

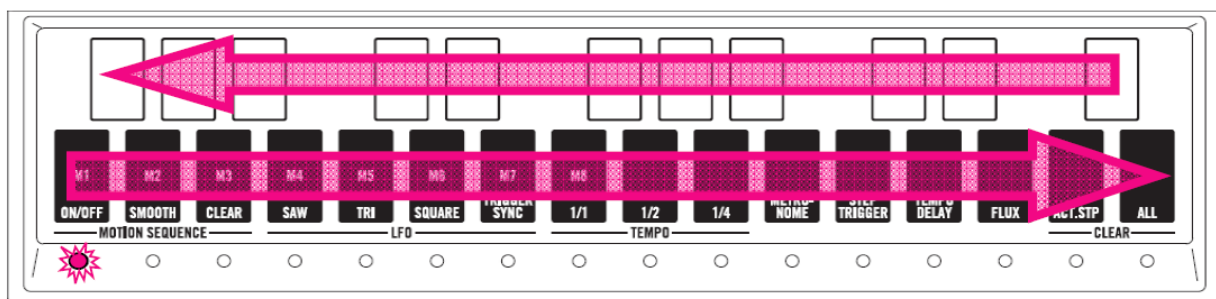
It change stand-by state and NG state is displayed if the inspection NG by pushing the button that is different from the target

Please refer to the list of errors at the end of the "test mode description" about the error contents.

#### 4-4 .Touch switch inspection

LED on the lower left touch switch is lit. Touch the left edge of the lower touch switch, by sliding your finger while the touch as it is to the lower right edge.

Touch the right edge of the upper touch switch, by sliding your finger while the touch as it to the upper left edge and release your finger across the right edge.



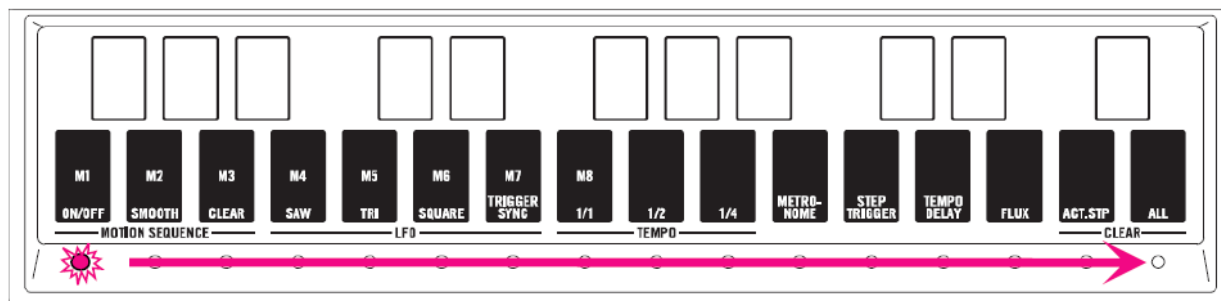
Proceed to the next inspection if the inspection passed.

It change stand-by state and NG state is displayed if the inspection NG by pushing the button that is different from the target

Please refer to the list of errors at the end of the "test mode description" about the error contents.

#### 4-5. Inspection sequential lighting touch switch LED

Make sure that the LED of the touch switch is lit one by one in order. (Repeat from the beginning it is lit until the end)



Proceed to the next inspection by pushing [FUNC] button if the inspection passed.

#### 4-6 Inspection lighting PEAK knob LED

Confirm that PEAK knob LED is blinking.

Proceed to the next inspection by pushing [FUNC] button if the inspection passed.

#### 5. Rotary knob inspection (inspection number 2)

Operate in the order of the following description inspection target rotary knob.

Turn the knob full right rotation and turn it full left rotation. If the knob is turned to the right edge already, turn to the right after you turn to the left a little.

Position of target knob is displayed on the LED of bottom of the touch switch.

Inspection target	operation	lighting
VOICE	Right edge to Left edge	EG SUSTAIN
OCTAVE	Right edge to Left edge	LFO CUTOFF INT

Make sure that the position which is displayed on the LED of bottom of the touch switch change in order.

note) Turning slowly when you turn the rotary switch.

Make sure that there is no catch and rub when you move the rotary knob.

Check the lighting of the LED with each click of the rotary switch.

Proceed to the next inspection automatically if the inspection passed.

It change stand-by state and NG state is displayed if the inspection NG

Please refer to the list of errors at the end of the "test mode description" about the error contents.

#### 6. AD and knob inspection (inspection number 3)

Operate in the order of the following description inspection target knob.

Turn the knob full right rotation and turn it full left rotation. If the knob is turned to the right edge already, turn to the right after you turn to the left a little.

Inspection target	operation
VCO DETUNE	Right edge to Left edge
VCO PORTAMENTO	Right edge to Left edge
VCO EG INT	Right edge to Left edge
VCF CUTOFF	Right edge to Left edge
VCF EG INT	Right edge to Left edge
LFO RAGE	Right edge to Left edge
LEF PITCH INT	Right edge to Left edge

Inspection target	operation
LFO CUTOFF INT	Right edge to Left edge
EG ATTACK	Right edge to Left edge
EG DECAY/RELEASE	Right edge to Left edge
EG SUSTAIN	Right edge to Left edge
TIME	Right edge to Left edge
FEEDBACK	Right edge to Left edge
TEMPO	Right edge to Left edge

A/D value of target knob is displayed on the LED of bottom of the touch switch.

Make sure that the value which is displayed on the LED of bottom of the touch switch change smoothly .

Make sure that there is no catch and rub when you move the knob.

Make sure at the same time that it is lit on target knob.

Proceed to the next inspection automatically if the inspection passed.

It change stand-by state and NG state is displayed if the inspection NG

Please refer to the list of errors at the end of the "test mode description" about the error contents.

## 7. Synchronization function inspection (inspection number 4)

Make sure the following points, please start the inspection.

The Sync. Cable is not connected.

Setting the sync. test jig is set to [1]

- (1) In a state where cable is not connected [SYNC IN] terminal is checked.  
If it detects connecting cable, the result is NG..  
LED on the [SYNC IN] knob and [VCF CUTOFF] knob is lit in the case of a pass.  
It change stand-by state and NG state is displayed.
- (2) Connect the sync. Cable.  
LED on the [EG SUSTIN] knob lights if it detect the cable is connected.  
It is a failed inspection in case LED on the [EG SUSTIN] does not lit.
- (3) Push [REC] button, it start loop check and LED on the [LFO CUTOFF INT] and [EG SUSTIN] is off.  
[VCF EG INT] lights.  
LED on the [EG SUSTIN] lights again in the case of a pass.  
It change stand-by state and NG state is displayed if the inspection NG
- (4) Change setting to [2] of the sync. test jig .  
Push [REC] button, it restart loop check.  
Proceed to the next inspection automatically if the inspection passed. Do not use the inspection here.  
It change stand-by state and NG state is displayed if the inspection NG

Please refer to the list of errors at the end of the "test mode description" about the error contents.

Lighting of the knob when it becomes as shown in the figure below, to turn off the power.

Push the power switch to power off.



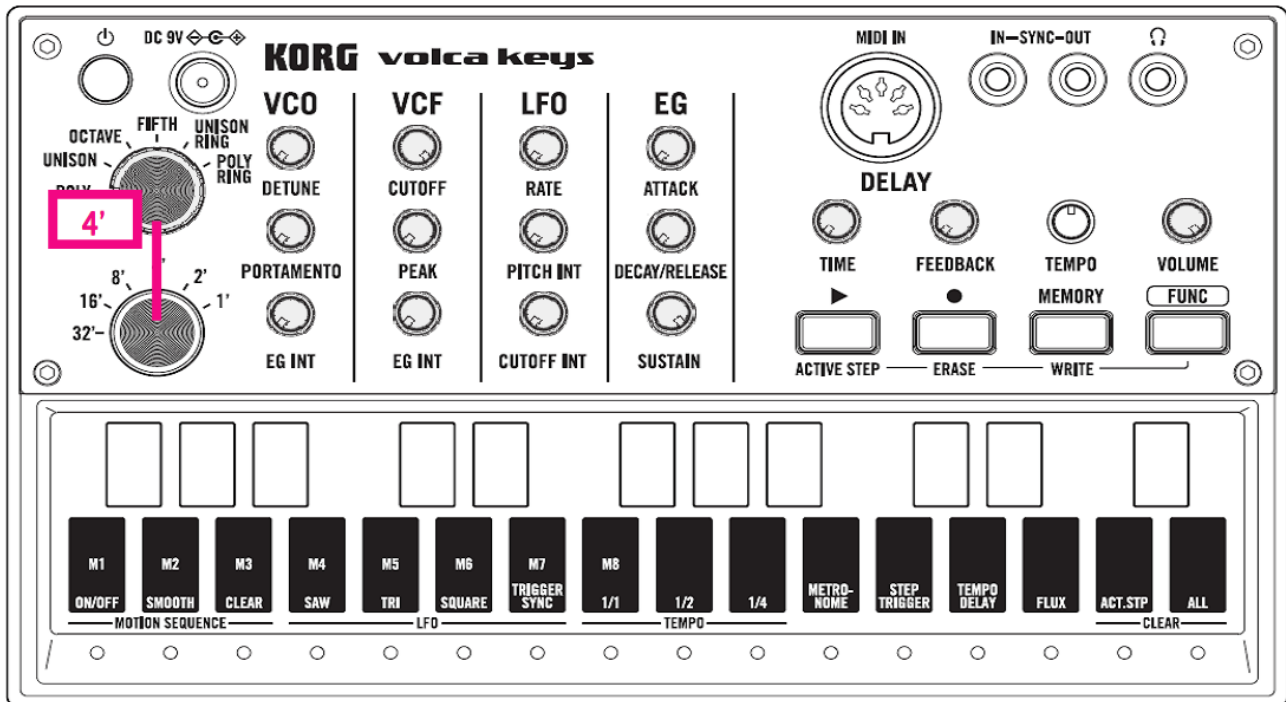
## 8. Sound check (In a state in which the user uses)

Set the knob [Octave] to 4'.

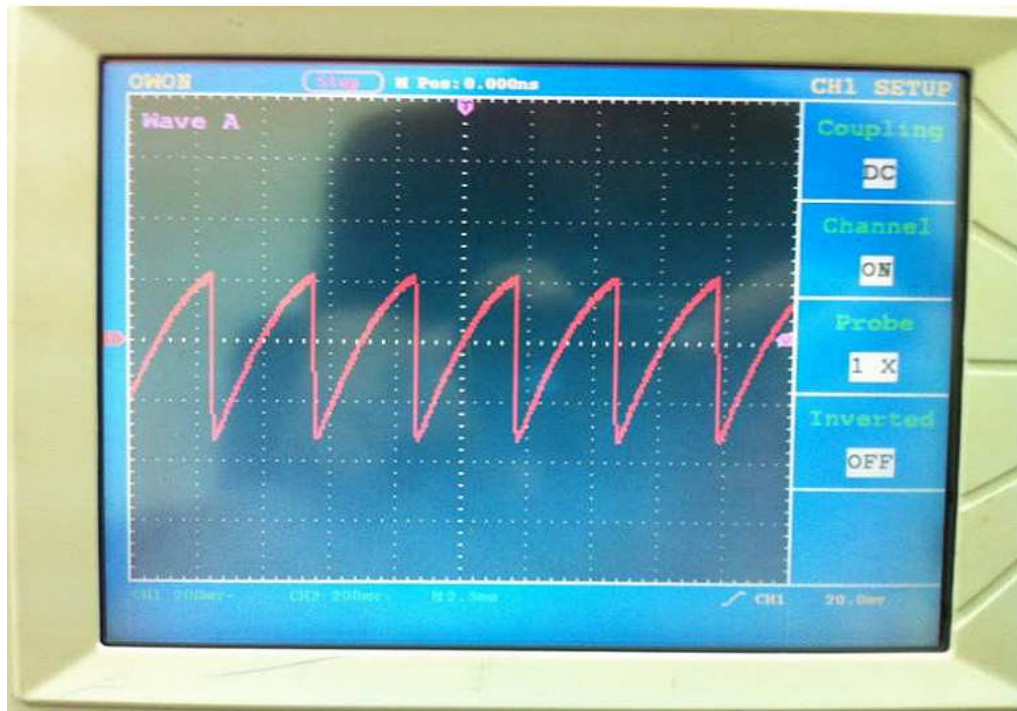
Turn the [VCF CUTOFF] knob to the right full (MAX position).

Turn the [EG SUSTING] knob to the right full (MAX position).

Turn the other knob to left full position



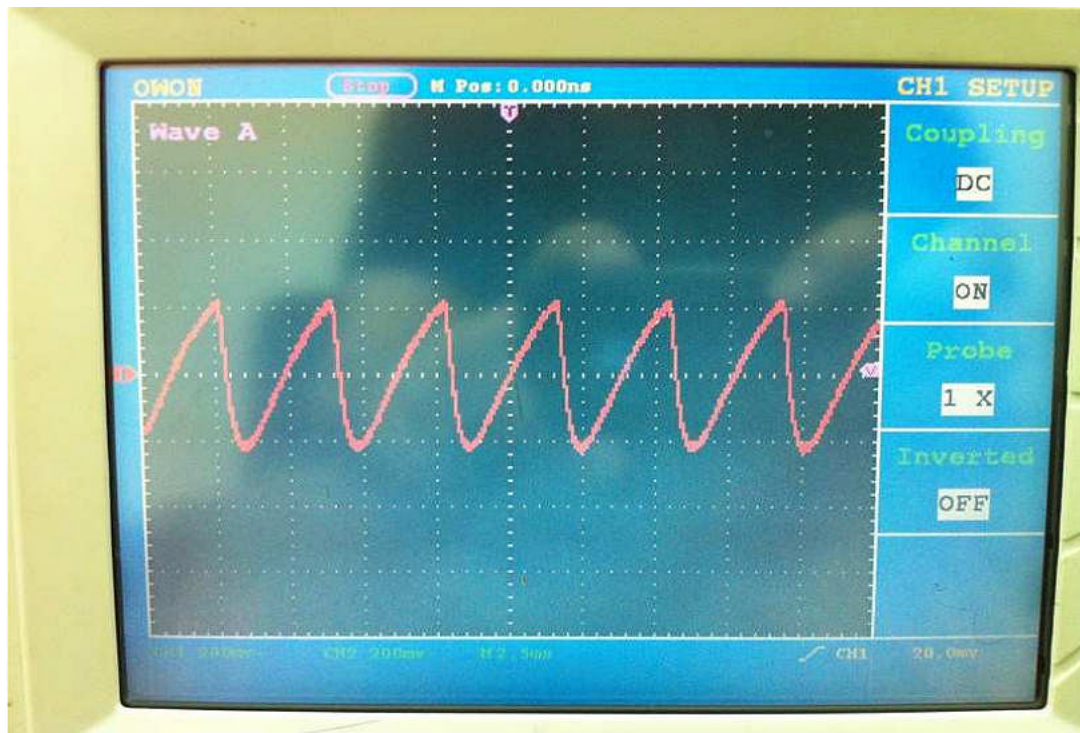
Touching the "M5" of touch pad, sound comes out from the amplifier.  
Please check the waveform on an oscilloscope.



Please turn to center position as follows: VCF [CUTOFF] knob.



Touching the "M5" of touch pad, sound comes out from the amplifier.  
Please check the waveform on an oscilloscope

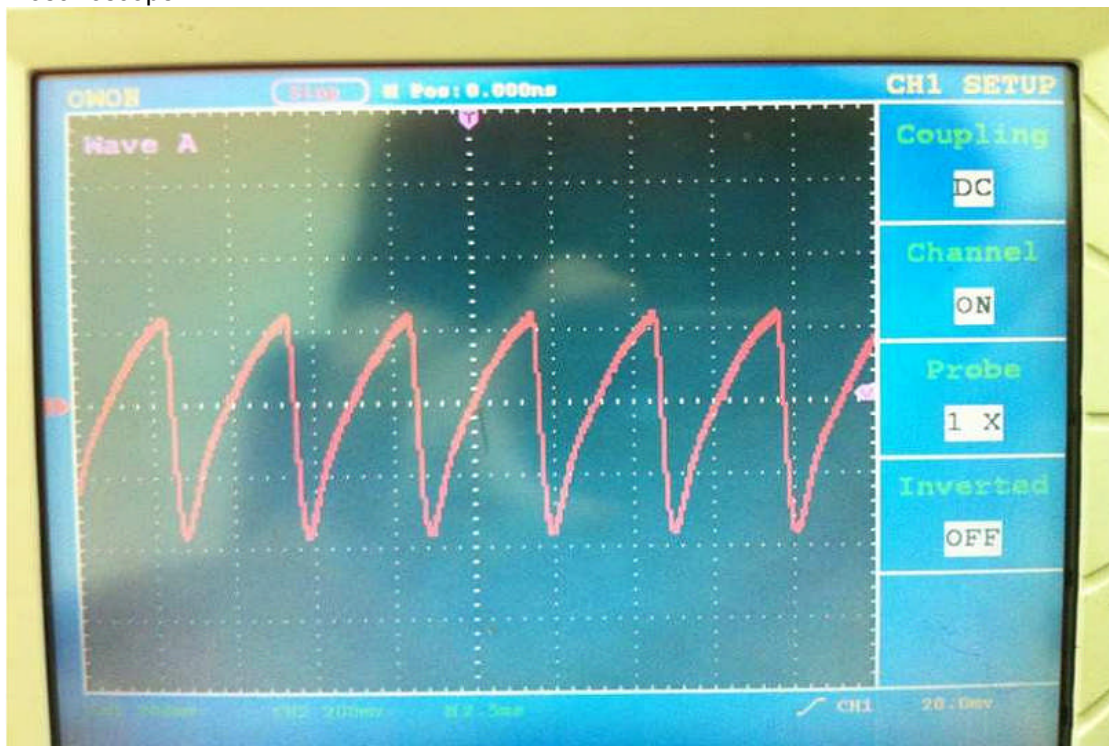


Note) Peaks and troughs of the waveform is rounded

Turn VCF [PEAK] knob to the center.



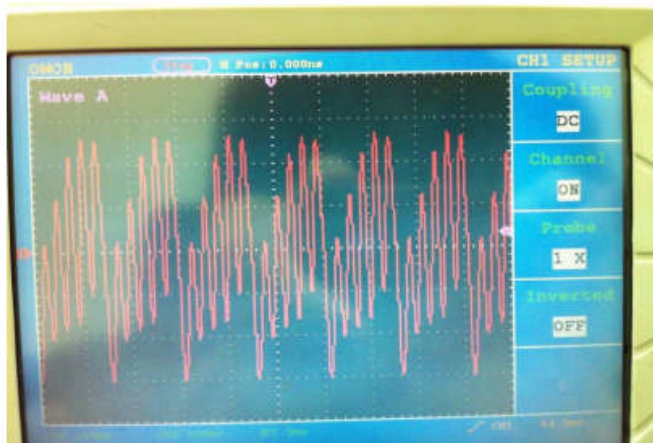
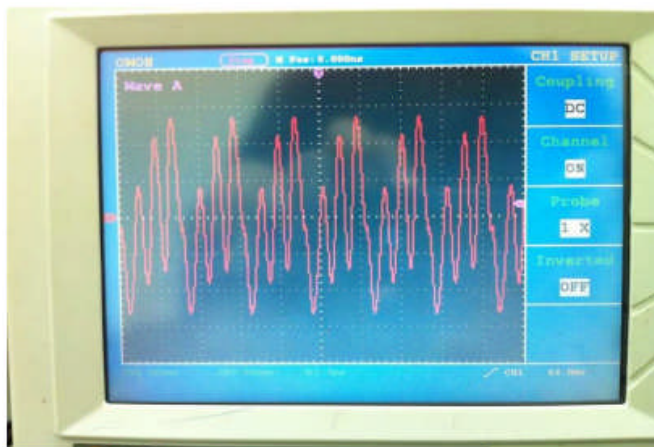
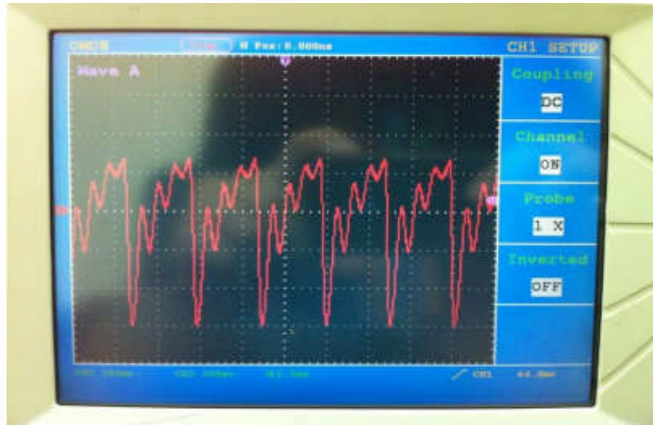
Touching the "M5" of touch pad, sound comes out from the amplifier. Please check the waveform on an oscilloscope.



Note) Waveform is extended in the vertical direction.

Check the waveform while turning to the right the VCF [PEAK] knob while touching the M5 of the touch pad.  
Turn to the position of the full right to the knob.

Please check the waveform on an oscilloscope and sound comes out from the amplifier.

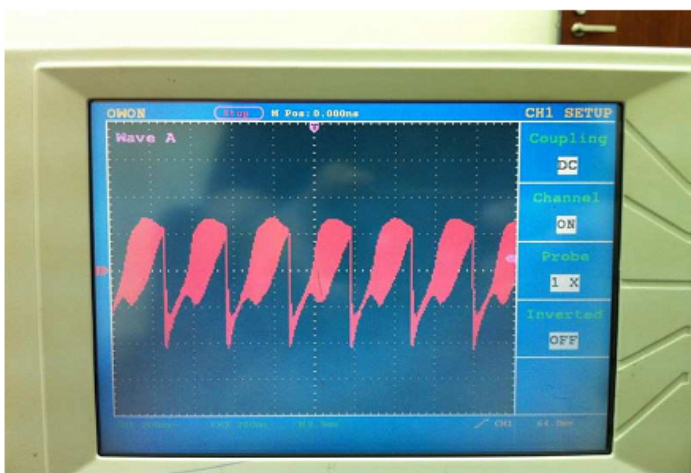


Please to observe the stop in RUN / STOP of the oscilloscope when the waveform is not synchronized.

Check the waveform while turning to the right the VCF [CUTOFF] knob while touching the M5 of the touch pad.  
Turn to the position of the full right to the knob.



Please check the waveform on an oscilloscope and sound comes out from the amplifier.



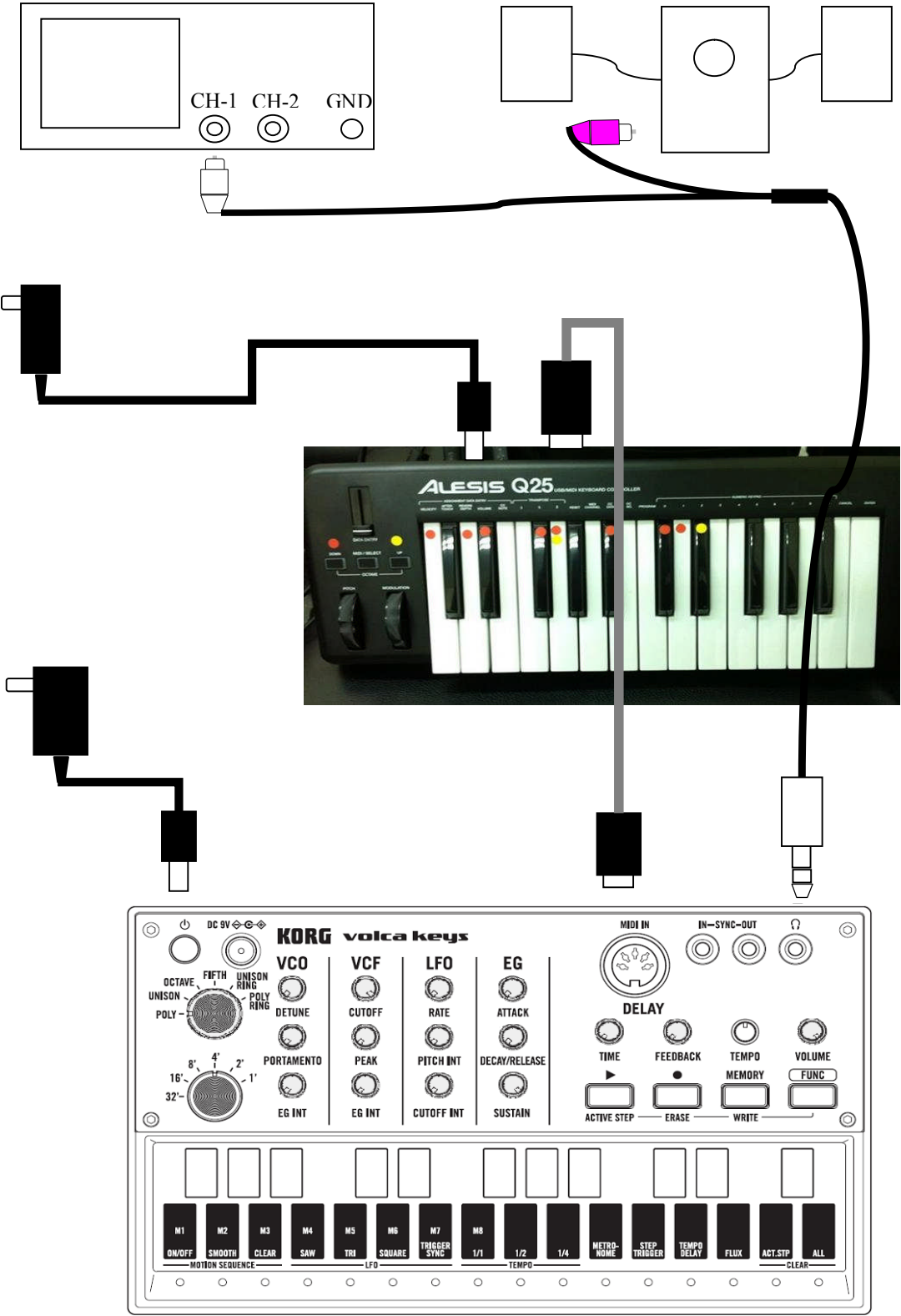
Please to observe the stop in RUN / STOP of the oscilloscope when the waveform is not synchronized.

MIDI CONTOROL KEYBOARD initialize setting

Setting

OSCILOSCOPE

AMP SPEAKER



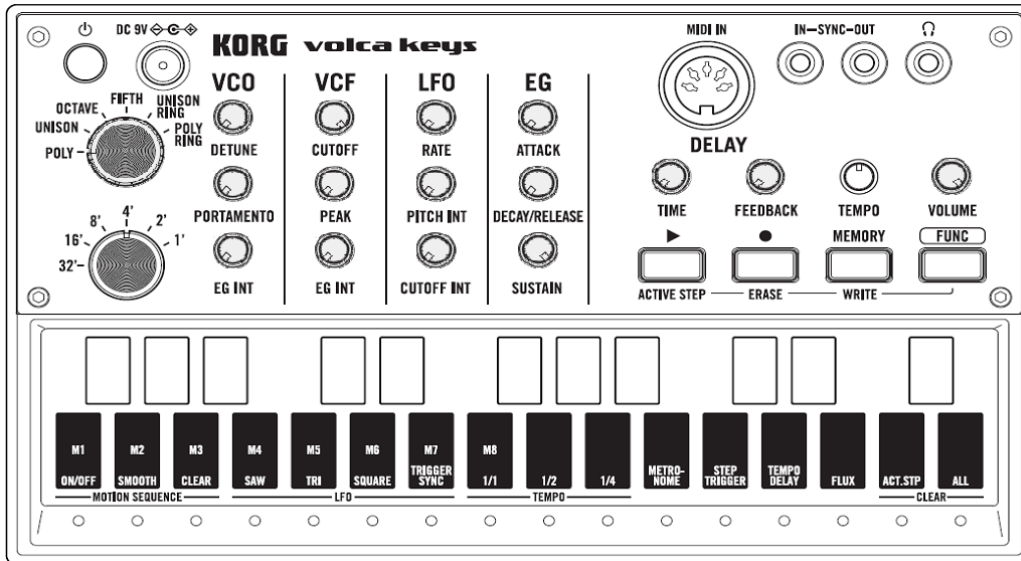
Connect USB cable to the MIDI control keyboard

Set the knob [Octave] to 4'.

Turn the VCF [CUTOFF] knob to the right full (MAX position).

Turn the EG [SUSTAIN] knob to the right full (MAX position).

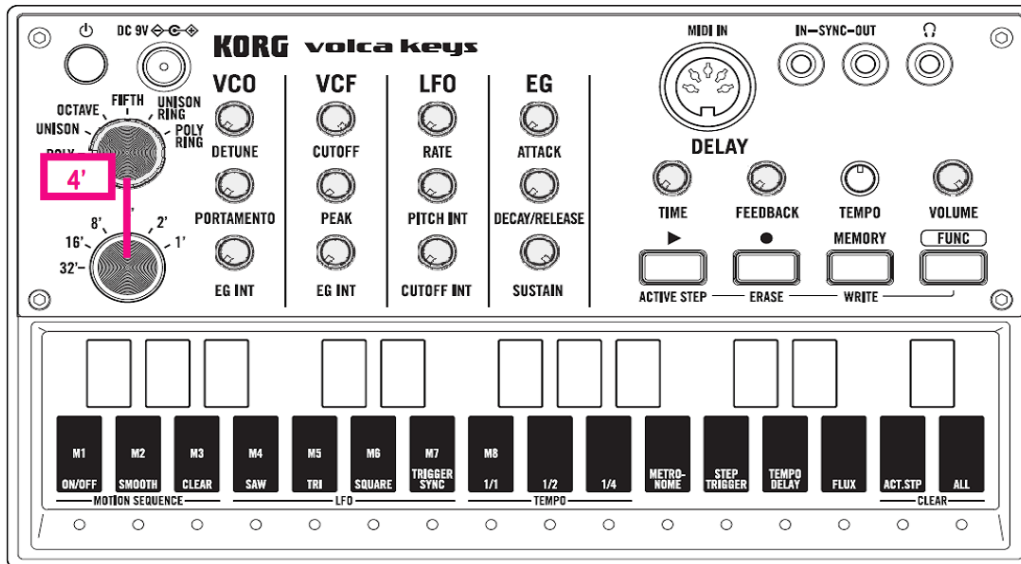
Turn the other knob to left full position



Make sure that you play the MIDI CONTROL KEYBOARD, volca keys will sound.

## Confirmation of speaker sound in battery drive

### Setting



### Check speaker sound in battery drive

Put six LR6 batteries in the battery box to unplug all the cables as shown above.

Turn on the power by pressing the power button.

Push PLAY[▶] button to start DEMO.

Make sure that the DEMO performance is sounding from the speakers.

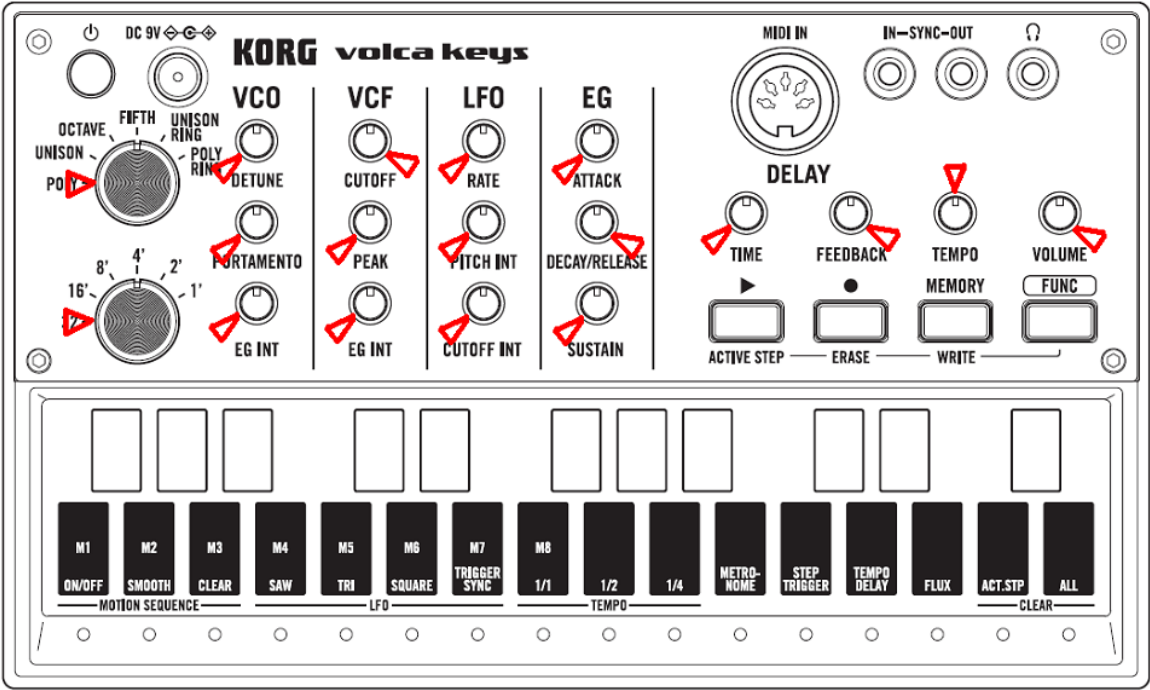
Connect the headphones, make sure that the sound from the speakers disappear.

Make sure that the sound is coming from both sides of the headphones.

If there is no problem, turn off the power by pressing the power button.

Set to ship setting the knobs, remove the batteries, test is complete.

Return the battery cover, make sure that there is no dirt on the surface appearance, to return to packing.



VCP		VCF		LFO	EG				
VOICE	DETUNE	CUTOFF	RATE	ATTACK	DECAY				
<b>POLY</b>	<b>MIN.</b>	<b>MAX.</b>	<b>MIN.</b>	<b>MIN.</b>					
OCTAVE	PORTA	PEAK	PITCH INT	DECAY	TIME	FEEDBACK	TEMPO	VOLUME	
<b>32'</b>	<b>MIN.</b>	<b>MIN.</b>	<b>MIN.</b>	<b>MAX.</b>	<b>MIN.</b>	<b>MAX.</b>	<b>MID.</b>	<b>MAX.</b>	
	EG INT	EG INT	CUTOFF INT	SUSTAIN					
	<b>MIN.</b>	<b>MIN.</b>	<b>MIN.</b>	<b>MIN.</b>					

Appendix error list

The common subject matter about the error display

If an error occurs during the inspection, all LED flashes, waiting to be entered.  
At this time, you can check the error content by simultaneously pressing the [PLAY] button the [REC] button.  
Each time of pressing two buttons ([PLAY] and [REC] ), inspection numbers, error information 1, error information 2 is displayed by order to the LED on the knob of the three-stage 4 in the left column.

Battery Level LED	the LED on the knob of the three-stage 4 in the left column
All off	Battry level
Lighting only the bottom	error information 1
Lighting only second from the bottom	error information 2

Content of the information will vary depending on the inspection number, please refer to the error table of another inspection.  
For operations other than those described here, please refer to "Operation in the standby state" and "test mode operation".

## Error Display list of internal inspection

(inspection numbers [----, ----, ----] )

(A) If the middle stage 4 LED is lit all on the left knob 3 stage 4 column

(A-1) If the middle stage 4 LED is lit like [oo-o] or [ooo-], the delay A/D error

(A-2) If the middle stage 4 LED is lit like [oooo] and lower stage [oo-o], the main ROM checksum error.

(A-3) If the middle stage 4 LED is lit like [oooo] and lower stage [ooo-], the panel ROM checksum error.

(A-4) If the middle stage 4 LED is lit like [oooo] and lower stage [oooo], self tuning error.

Please check the (PIN 38,39,40,42,48,49,52,53,58 etc. CPU) where relevant.

(B) Case except (A)

( error information 1)

The middle and lower stage 4 LED indicates the pin that detected the abnormaly.

( error information 2)

The middle and lower stage 4 LED indicates the abnormal cause.

(B-1) If the middle and lower stage 4 LED are all lit.

State of the pin that detected the abnormality is invalid.

(B-2) The case of (B-1) other than

The status is invalid between the pin adjacent.

Correspondence table of Pin number displayed as LED lit is shown below.[MIDDLE,LOWER]

LED	Pin	LED	Pin	LED	Pin	LED	Pin
[----, ----]	55	[--oo, -ooo]	2	[-o-o, ---o]	27	[o---, --o-]	42
[----, ---o]	56	[-o---, ----]	20	[-o-o, --oo]	6	[o---, --oo]	48
[----, --o-]	64	[-o---, ---o]	21	[-o-o, -o--]	15	[o---, -o-o]	53
[----, --oo]	65	[-o---, --oo]	89	[-o-o, -o-o]	16	[o---, -oo-]	79
[----, -o--]	66	[-o---, -o--]	23	[-o-o, -o-o]	17	[o---, -ooo]	83
[----, -o-o]	67	[-o---, -o-o]	24	[-ooo, ----]	30	[o--o, oooo]	70
[----, -oo-]	68	[-o---, -oo-]	25	[-ooo, ---o]	31	[o--o, ---o]	49
[----, -ooo]	69	[-o-o, oooo]	33	[-ooo, --o-]	32	[o--o, --o-]	86
[---o, ----]	54	[-o-o, ---o]	34	[-ooo, --oo]	36	[o--o, --oo]	87
[---o, --o-]	60	[-o-o, -o-]	35	[-ooo, -o--]	9	[o--o, -o--]	88
[---o, --oo]	29	[-o-o, --oo]	61	[-ooo, -o-o]	10	[o--o, -o-o]	8
[---o, -o--]	37	[-o-o, -o--]	44	[-ooo, -oo-]	84	[o-o-, ----]	50
[---o, -o-o]	41	[-o-o, -o-o]	45	[-ooo, -ooo]	85	[o-o-, ---o]	51
[---o, -oo-]	43	[-o-o, -oo-]	46	[o---, ----]	38	[o-o-, --o-]	7
[---o, -ooo]	47	[-oo-, ----]	26	[o---, ---o]	40		

Please check the CPU pins in question is not a short and adjacent Pin or Open,.

## Error Display List of LED / button test(inspection number [---o, --oo] )

## Error Display List of Touch pad check(inspection number [---o, -o--] )

※ message content is exactly the same inspection of the above two.

Please refer to the error display the following table also inspection of both.

When it detects the pressing of the button that is different from the assumption, it is an error.

Battery Level LED	the LED on the knob of the three-stage 4 in the left column
Lighting only the bottom	[MIDDLE , LOWER] is expected button number.
Lighting only second from the bottom	[MIDDLE , LOWER] is detected button number.

The following is a table of correspondence inspection button and display value.

[MIDDLE,LOWER]	Type	Name		[MIDDLE,LOWER]	Type	Name
[----,----]	touch	M1 ON/OFF		[---o,----]	touch	1/4
[----,---o]	touch	UPPER(1)		[---o,---o]	touch	UPPER(10)
[----,--o-]	touch	M2 SMOOTH		[---o,--o-]	touch	METRONOME
[----,--oo]	touch	UPPER(2)		[---o,--oo]	touch	STEP TRIGER
[----,-o--]	touch	M3 CLEAR		[---o,-o--]	rubber	UPPER(12)
[----,-oo-]	touch	UPPER(3)		[---o,-oo-]	rubber	TEMPO DELAY
[----,-ooo]	touch	M4 SAW		[---o,-ooo]	rubber	UPPER(13)
[----,ooo]	touch	M5TRI		[---o,ooo]	rubber	FLUX
[----,o--]	touch	UPPER(5)		[---o,o--]	rubber	ACT.STP
[----,oo-]	touch	M6 SQUARE		[---o,oo-]	rubber	UPPER(15)
[----,oo-]	touch	UPPER(6)		[---o,oo-]	rubber	ALL
[----,oo-]	touch	M7 TRIGGER SYNC		[---o,oo-]	rubber	FUNC
[----,oo--]	touch	M8 1/1		[---o,oo--]	rubber	MEMORY
[----,oo-]	touch	UPPER(8)		[---o,oo-]	rubber	REC
[----,ooo-]	touch	1/2		[---o,ooo-]	rubber	PLAY
[----,oooo]	touch	UPPER(9)				

#### Error Display List of Rotary switch inspection(inspection number [--o-])

(A) If (error information 1) the middle stage 4 LED is lit [o---]

It is error value to be tested A/D.

(A)-1 If (error information 2) the lower stage 4 LED is lit [-oo-],A/D value is abnormal.

Increase or decrease of the A/D is reversed.

(A)-2 If (error information 2) the lower stage 4 LED is lit [-ooo], A/D value is jumpy or reversed.

(B) If (error information 1) the middle 4 LED is lit [----]

Value change except target A/D has been detected.

Please check the CPU pin or knob around the target A/D or the A/D to change is detected.

About correspondence to be tested A/D display, please refer to the above table.

A/D a change is detected is indicated (error information 2) the middle and lower stage 4 LED.

Correspondence between the A/D of [MIDDLE,LOWER] see table below.

\*\*\*" Is a bit pattern."

[MIDDLE,LOWER]	knob name	pin No.	knob name	pin No.	knob name	pin NO.
[----,---o]			CUTOFF INT	CPU 99	FEED BACK	IC18 1
[----,--o-]	PITCH 2	CPU 92	DETUNE	IC18 4	TEMPO	IC18 5
[----,-o--]	PITCH 1	CPU 93	BATTERY	CPU 1	EG INT	IC18 2
[----,o--]	LFO INT	CPU 94	SYNC CN	CPU 2		
[---o,----]	CUTOFF EG INT	CPU 95	ATTACK	IC18 13		
[--o-,----]	DECAY/RE LEASE	CPU 96	DECAY	IC18 14		
[-o--,----]	ATTACK	CPU 97	SUSTAIN	IC18 15		
[o---,----]	TEMPO	CPU 98	DELAY TIME	IC18 12		

**Error Display List of A/D (knob) inspection**(inspection number [ --○○ ] )

(A) If (error information 1) the middle 4 LED is lit left edge.

It is error value (jump value of unexpected) to be tested A / D.

The following is a table of correspondence inspection A / D and [MIDDLE,LOWER].

[MIDDLE,LOWER]	knob name	pin No.
[?---, ○--○]	VCO DETUNE	IC18 4
[?---, --○○]	VCO PORTAMENT	CPU 94
[?--*, --○-]	VCO EG INT	IC18 2
[?---, -○--]	VCF CUTOFF	CPU 95
[?---, -○○○]	VCF EG INT	CPU 96
[?---, -○○-]	LFO RATE	CPU 97
[?---, -○○○]	LFO PITCH INT	CPU 98
[?---, ○---]	LFO CUTOFF INT	CPU 99
[?---, ○○--]	EG ATTACK	IC18 13
[?---, ○○-○]	EG DECAY/RELEASE	IC18 14
[?---, ○○○-]	EG SUSTAIN	IC18 15
[?---, ○○○○]	TIME	IC18 12
[?--○, ----]	FEED BACK	IC18 1
[?--○, ---○]	TEMPO	IC18 5

(A)-1 If (error information 2) the lower stage 4 LED is lit [ --○- ], Increase or decrease of the A / D is reversed.

(A)-2 If (error information 2) the lower stage 4 LED is lit [ -○-- ], A/D value is jumpy.

(B) If (error information 1) left edge of the middle 4 LED is not lit.

Value change except target A/D has been detected.

Please check the CPU pin or knob around the target A/D or the A/D to change is detected.

About correspondence to be tested A/D display, please refer to the above table.

A/D a change is detected is indicated (error information 2) the middle and lower stage 4 LED.

Correspondence between the A/D of [MIDDLE,LOWER] see table of "Error Display List of Rotary switch inspection" .

**Synchronization function inspection error table.**(Inspection Number [ -○-- ] )

If the error occurs in this test, please check A / D and the corresponding SYNC IN terminal and SYNC OUT terminal, and, (2, 85, 86, 87 CPU PIN) interrupt.

Error number table is shown below.

error information 1	error contents	error information 2
[----, ---○]	Connecting to Sync In terminal is detected at the time of entering the test	
[----, --○-]	Change of A/D except terminal of SyncIn is detected.	Interference A/D number. Please refer to the table number rotary switch inspection.
[----, --○○]	An error has occurred in the loop test for the first time.	the LED on the knob of the lower-stage in the left column ---○ Rise undetected during Rise inspection --○- Fall undetected during Fall inspection. -○-- Rise detected during Fall inspection. ○--- Fall detected during Rise inspection.
[----, -○--]	An error has occurred in the loop test for the second time.	

**Error Display a list of power-off test**(inspection number [ ○○○○ ] )

(note) (\*)After pressing the button, if the LED flashes

It can not complete the power-off operation.

Please check power switch, control pin (CPU PIN 22) etc..

## KORG volca-keys Parts List

Part Number	Category	Part Name	Location	Reference	QTY
510410523002	LOUD SPEAKER	ITAK-S-YDH23-06-08	Assembly		1
510C90853202	CIRCUIT ASS'Y BOARD	VOLCA-KEY KLM-3202/3	Assembly		1
510476800534	HARNESS	HNS-4267(Bat+)	Assembly		1
510476800535	HARNESS	HNS-4268(Bat-)	Assembly		1
510476800536	HARNESS	HNS-4269(SP+)	Assembly		1
510476800537	HARNESS	HNS-4270(SP-)	Assembly		1
510312511525	Chip LED	KPTR-3216SURCK	KLM-3202	[KLM-3202][TOP]LED300, LED301, LED302, LED303, LED304, LED305, LED306, LED307, LED308, LED309, LED310, LED311, LED312, LED313, LED314, LED315, LED316, LED317, LED318, LED319	20
510470524628	HARNESS	HNS-4273	KLM-3202	[KLM-3202][TOP]CN300	1
510100521007	FUSE	TF16AT 1.25 T TD	KLM-3203	[KLM-3203][TOP]FU1	1
510300512008	TRANSISTOR	2SC4207BL	KLM-3203	[KLM-3203][TOP]Q1, Q2, Q3, Q5, Q8	5
510300522504	TRANSISTOR	2SC1623B-T1B-AT L6/L7 RANK	KLM-3203	[KLM-3203][TOP]Q7, Q10, Q11, Q12	4
510310511506	SCHOTTKY DIODE	RB051L-40TE25 (S)	KLM-3203	[KLM-3203][TOP]D1, D4	2
510310512501	DIODE	1SS355 T/R	KLM-3203	[KLM-3203][TOP]D2, D3, D5, D6, D8, D11, D12, D13, D14	9
510312511525	Chip LED	KPTR-3216SURCK	KLM-3203	[KLM-3203][TOP]LED1, LED2, LED3, LED4	4
510312512017	Chip LED	SML-E12UWT86	KLM-3203	[KLM-3203][TOP]LED5, LED6, LED7, LED8, LED9, LED10, LED11, LED12, LED13, LED14, LED15, LED16, LED17, LED18,	16
510320514030	RESET IC	BU4227G-TR	KLM-3203	[KLM-3203][TOP]IC21	1
510320516125	AUDIO ASSP	TPA6111A2DR	KLM-3203	[KLM-3203][TOP]IC19	1
510320516126	DC-DC Converter	TPS62112RSAR	KLM-3203	[KLM-3203][TOP]IC4	1
510320516168	OPAMP	LM324PWR	KLM-3203	[KLM-3203][TOP]IC8, IC9, IC10, IC15, IC17	5
510320516169	OPAMP	TLC274CPWR	KLM-3203	[KLM-3203][TOP]IC11	1
510320516170	LDO IC	TLV70015DCKR	KLM-3203	[KLM-3203][TOP]IC12	1
510320516175	LDO IC	TLV70033DCKR	KLM-3203	[KLM-3203][TOP]IC1, IC2	2
510320516176	POWER AMP IC	TPA2006D1DRBR	KLM-3203	[KLM-3203][TOP]IC6	1
510320520029	PHOTO COUPLER	PS9117A-F3-AX(M)	KLM-3203	[KLM-3203][TOP]PC1	1
510335522028	CRYSTAL	RSD-10000F202000	KLM-3203	[KLM-3203][TOP]X1	1
510360525003	ROTARY VR	XV09211YNPV25U(NC)1B10K	KLM-3203	[KLM-3203][TOP]VR1, VR2, VR3, VR4, VR5, VR6, VR7, VR8, VR9, VR10, VR11, VR12, VR13, VR14, VR15	15
510360525004	ROTARY VR	XV09211YNPV25U1B10K/D	KLM-3203	[KLM-3203][TOP]VR16	1
510370520506	ROTARY SW	S171FV116GFE0AN09	KLM-3203	[KLM-3203][TOP]SW2, SW3	2
510374520020	TACT SW	SKRGADD010	KLM-3203	[KLM-3203][TOP]SW1	1
510450524517	DC JACK	LD-0214C-1.65	KLM-3203	[KLM-3203][TOP]DJ1	1
510450524518	DIN JACK	LN-0506-005	KLM-3203	[KLM-3203][TOP]MIDI1	1
510450524519	PHONE JACK	LJE0368-4R	KLM-3203	[KLM-3203][TOP]CN1, CN3, CN4	3
510646800824		X12220 UPPER CASE E10301	HOOKUP1		1
510646800820		X12200 LOWER CASE E10302	HOOKUP2		1
510646800821		X12200 BATTERY COVER E20382	HOOKUP3		1
510646800822		X12200 SP ENCLOSURE E30648	HOOKUP4		1
510640800503		X12220 TOP PANEL C30896	HOOKUP5		1
510500800037		X12220 RUBBER BUTTON E30650-2	HOOKUP6		1/2
510646800825		X12200 BATTERY BOX E20386	HOOKUP7		1
510500800523		X12200 RUBBER LEG E40867	HOOKUP8		5
510646801535		X12220 SENSOR SHEET E40869	HOOKUP9		1
510640805010		X12200 BATTERY SPRING(W1)	HOOKUP10		4
510640805011		X12200 BATTERY SPRING(W2)	HOOKUP11		1
510640805012		X12200 BATTERY SPRING(+)	HOOKUP12		1
510640805013		X12200 BATTERY SPRING(-)	HOOKUP13		1
510646502391		X-6141 VR KNOB(V) E30498-2	HOOKUP14		2
					1
510470524501	HARNESS	HNS-4147	Accessories		1