

SERVICE MANUAL

VOX VT40+



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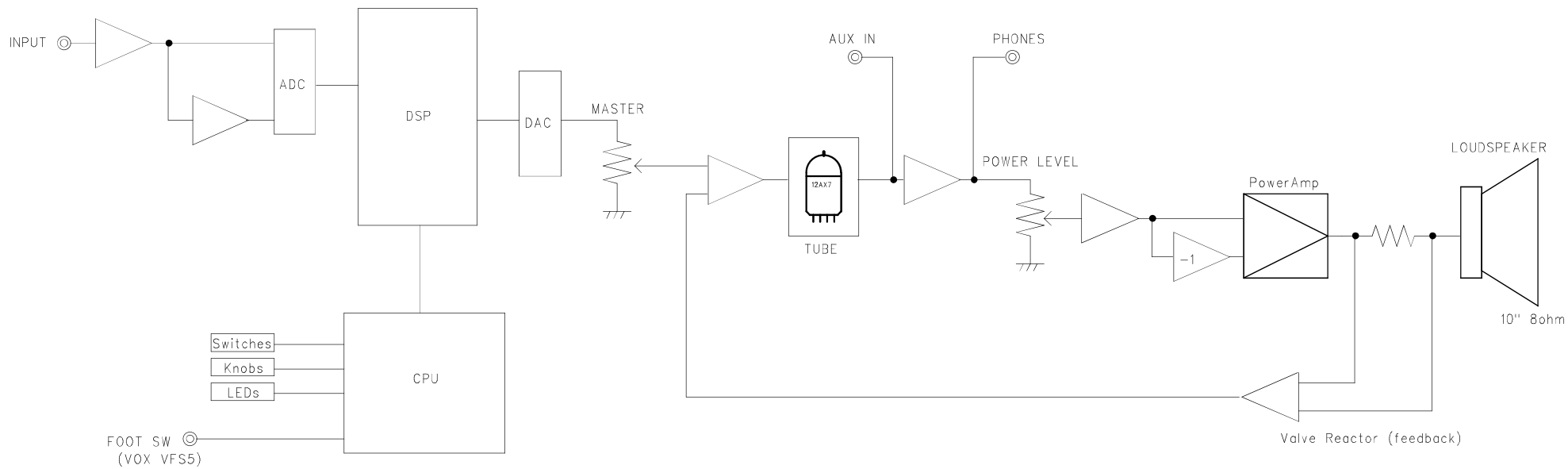
VT40+

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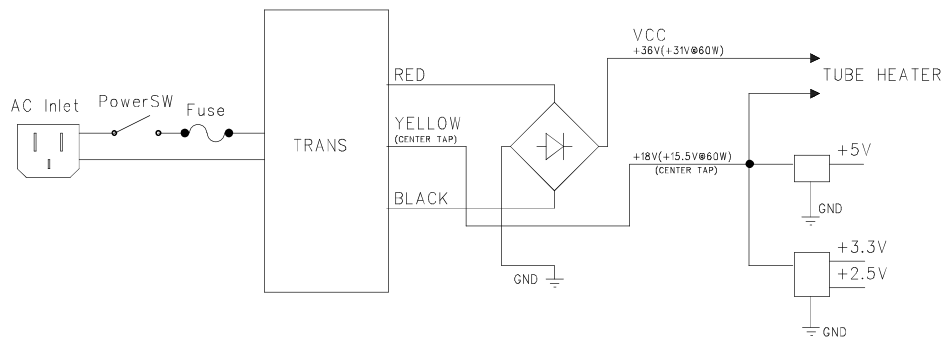


Issued: Dec.02, 2010
Ver.1.0
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VOX VT40+
BlockDiagram

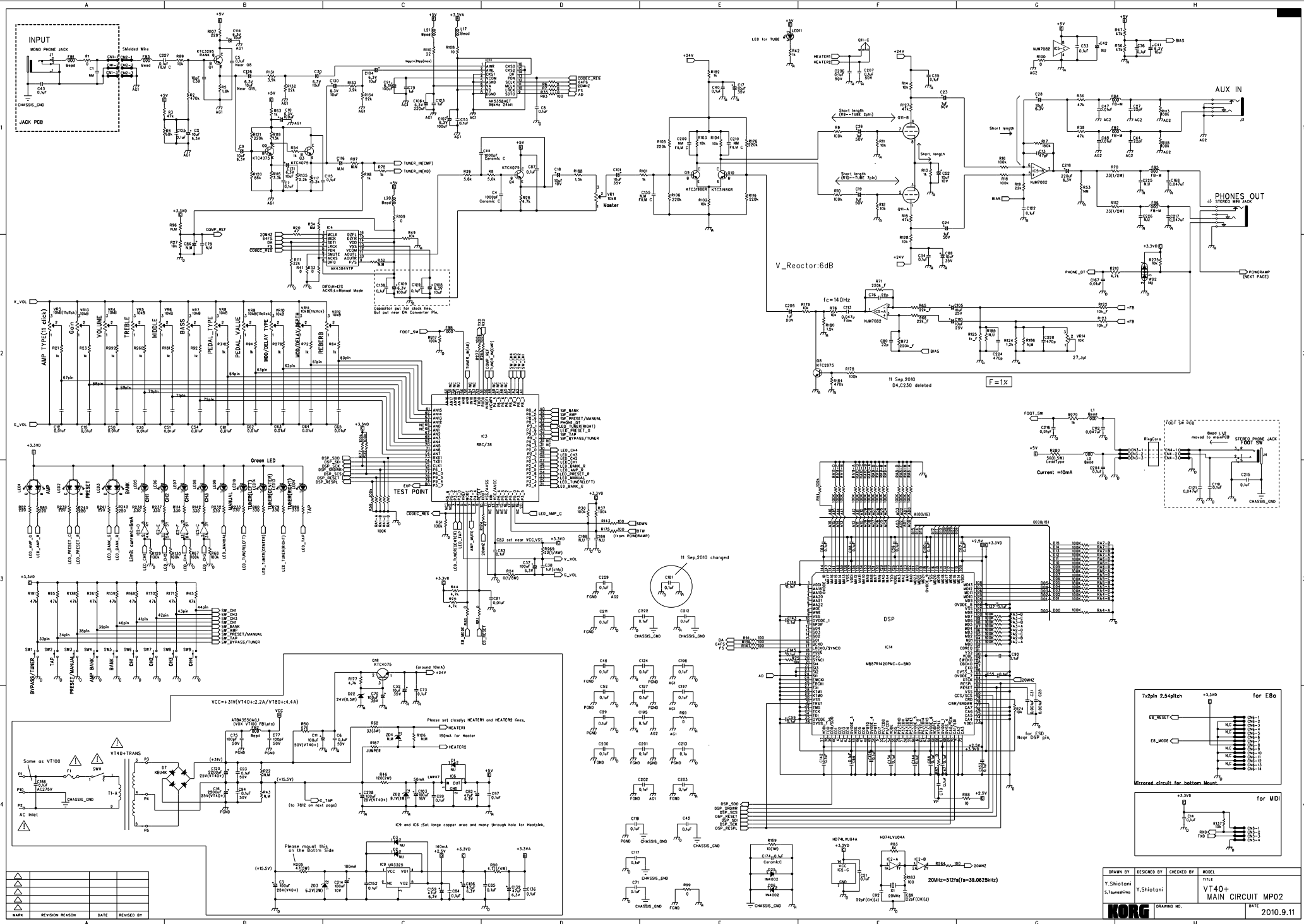


POWER SUPPLY



MARK	REVISION	REASON	DATE	REVISED BY
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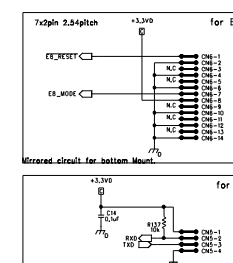
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL	VOX VT40+
S.TSUNASHIMA			TITLE	BlockDiagram
KORG			DRAWING NO.	DATE
				11.Nov,2010

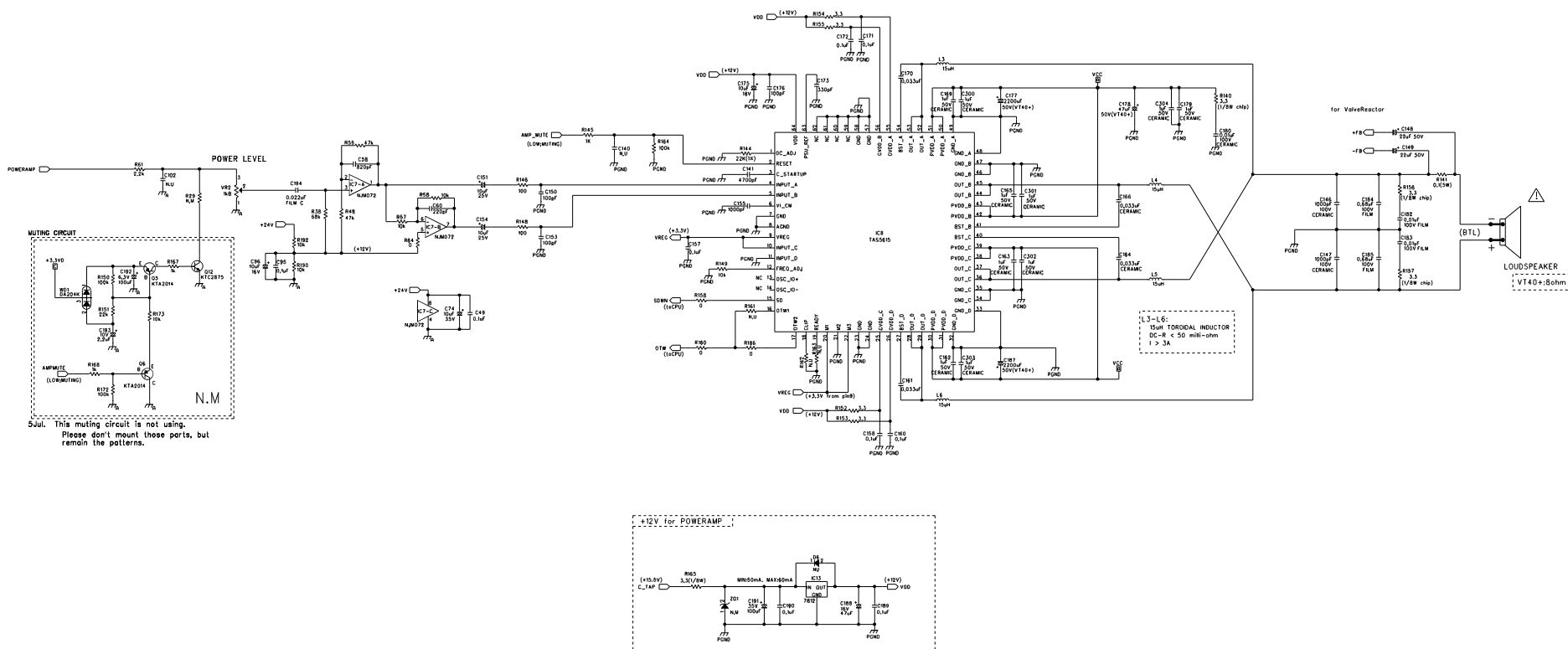


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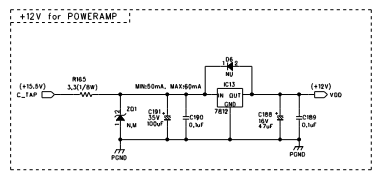
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL
Y.Shiojani	S.Tanahashi	Y.Shiojani	VT40+ MAIN CIRCUIT MP02
DRAWING NO.	DATE		2010.9.11

KORG





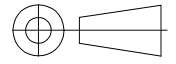
Sujl. This muting circuit is not using.
Please don't mount those parts, but remain the patterns.



MARK	REVISION REASON	DATE	REVISED BY

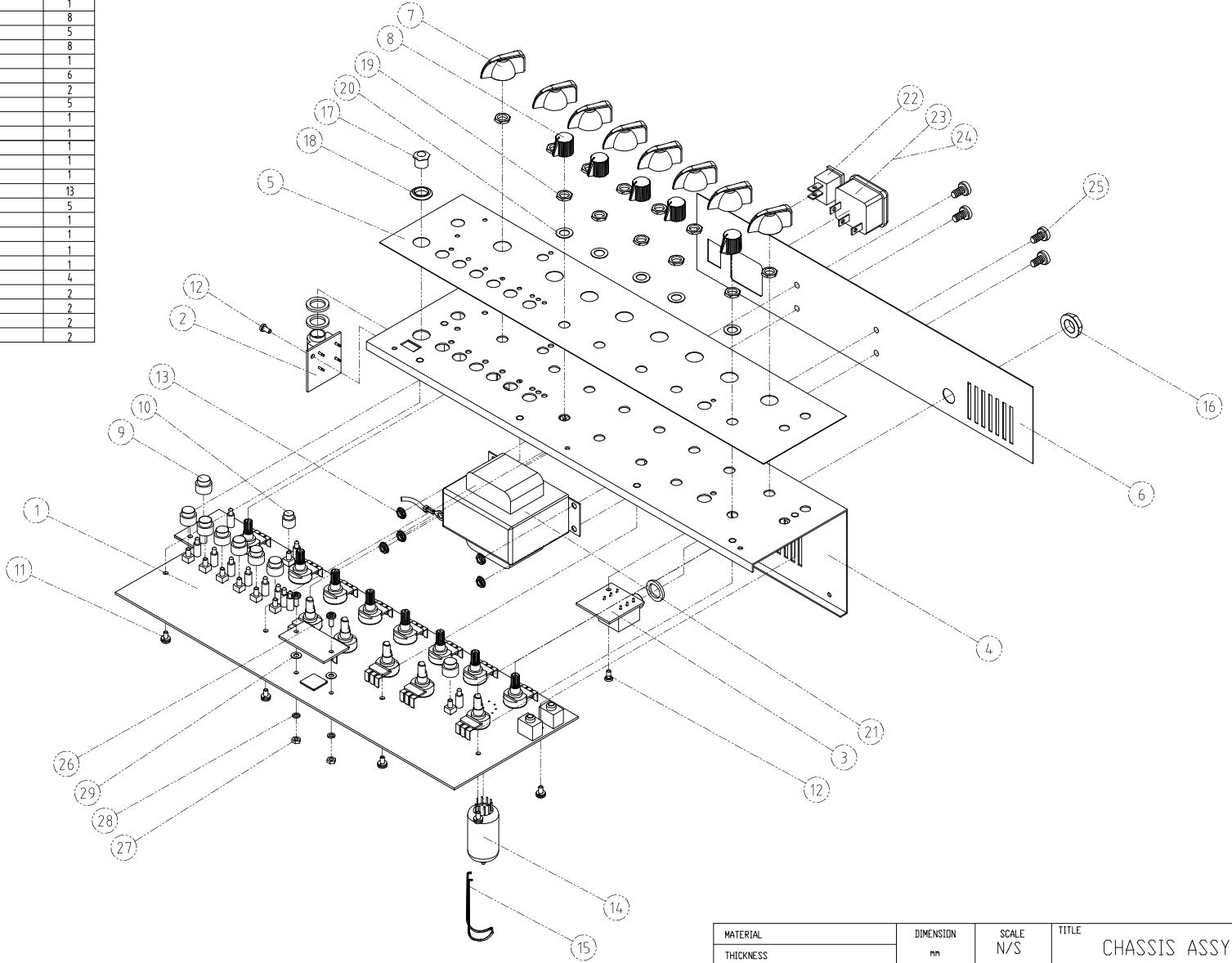
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL
S.Tanigahara	S.Tanigahara		VT40+ MAIN CIRCUIT MP02
KORG			DRAWING NO. KOD-A***** DATE **.*.***

DWG. NO. ASSY0290-01



THIRD ANGLE PROJECTION

NO	DESCRIPTION	SPECIFICATION	Q'TY
1	MAIN PCB ASS'Y	VT40+	1
2	JACK PCB ASS'Y	VT40+	1
3	FOOT S/W PCB ASS'Y	VT40+	1
4	MAIN CHASSIS	386X105X95 EGI 1#	1
5	FRONT PANEL	PVC 0.51 376X80 HAIRLINE BLACK	1
6	REAR PANEL	PS 0.51 336X66 BLACK	1
7	VOLUME KNOB	ABS (CREAM(CHIKENHEAD))	8
8	VOLUME KNOB-SMALL	ABS BLACK(KNOB0050)	5
9	TACK KNOB "A"	NBR φ9	8
10	TACK KNOB "B"	NBR φ7	1
11	SCREW	MBSSW 3X6 NI	6
12	SCREW	TPDS 3X6 NI	2
13	FRANGE NUT	M4 NI	5
14	TUBE	12AX7AC5	1
15	TUBE RETAINER	12AX7R(SPR0012)	1
16	JACK NUT	ABS BK	1
17	JACK NUT	CR(BPJ)	1
18	JACK WASHER	ABS BK(BPJ)	1
19	VOLUME NUT	M7 NI	13
20	VOLUME WASHER	φ7 NI	5
21	TRANS	VT40+	1
22	POWER SWITCH	RL3-421-H-0-BK	1
23	INLET	SC-8F-21	1
24	FUSE		1
25	SCREW	MBS 4X10 BK	4
26	SCREW	MBS 3X8 NI	2
27	NUT	M3 NI	2
28	SPRING WASHER	φ3 NI	2
29	FIBER WASHER	φ3	2



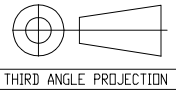
REV. NO.	REV. DATE	DESCRIPTIONS OF REVISION
C		
B		
A		

MATERIAL	DIMENSION	SCALE	TITLE	SHEET
THICKNESS	mm	N/S	CHASSIS ASSY	10F1
FINISH	MODEL	VT40+	DWG. NO.	VER.
			ASSY0291-01	A
TOLERANCE UNLESS NOTE		DRAWN	DATE	 KIMANSON Kimanson Instruments CD, Ltd.
DIMENSIONAL		S.Y. OH	2010.10.08	
HOLE CENTERS		CHECKED	DATE	
DIAMETERS		APPROVED	DATE	
ANGULAR				

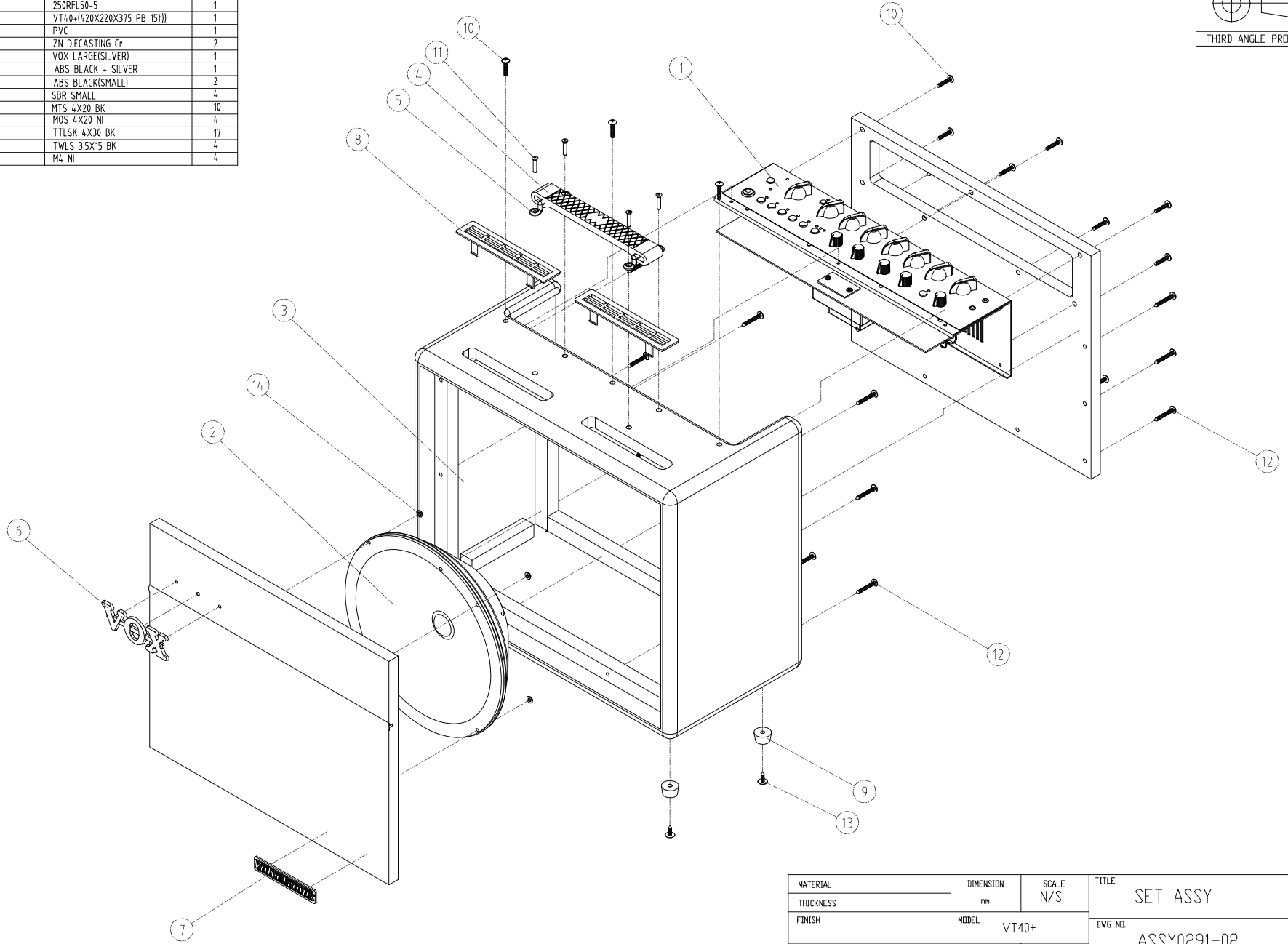
ASSY0291-02

DWG.NO.

NO	DESCRIPTION	SPECIFICATION	Q'TY
1	CHASSIS ASS'Y	VT40+	1
2	SPEAKER	250RFL50-5	1
3	CABINET ASS'Y	VT40+(420X220X375 PB 15H)	1
4	HANDLE BAR	PVC	1
5	HANDLE EDGE	ZN DIECASTING Cr	2
6	BRAND MARK	VOX LARGE(SILVER)	1
7	VALVETRONIX	ABS BLACK + SILVER	1
8	VENT GRILL	ABS BLACK(SMALL)	2
9	RUBBER FOOT	SBR SMALL	4
10	SCREW	MTS 4X20 BK	10
11	SCREW	MOS 4X20 NI	4
12	SCREW	TTLISK 4X30 BK	17
13	SCREW	TWLS 3.5X15 BK	4
14	FRANGE NUT	M4 NI	4



THIRD ANGLE PROJECTION



REV. NO.	REV. DATE	DESCRIPTIONS OF REVISION
C		
B		
A		

MATERIAL	DIMENSION	SCALE	TITLE	SHEET
THICKNESS	mm	N/S	SET ASSY	10F1
FINISH	MODEL	VT40+	DWG NO.	VER.
			ASSY0291-02	A
TOLERANCE UNLESS NOTE	DRAWN	DATE	 Kimanson Instruments CD, Ltd.	
DIMENSIONAL	S.Y. OH	2010.11.01		
HOLE CENTERS	CHECKED	DATE		
DIAMETERS	APPROVED	DATE		
ANGULAR				

VOX VT20+/40+/80+/120+ testing instruction

Nov 15, 2010 fushimi@korg.co.jp

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2. Test mode

2.1. How to boot

Power on with switch indicated below being pushed to enter respective mode.

Release all switches after confirming the mode to be tested is correctly selected. Then enter the mode.

Modes	Switch to boot (●) Initial status (● :lit, ■ :blink)
Internal test-> Control surface test.	
Audio test	

2.2. Internal test

In order to do switch test, connect VFS5 optional footswitch before boot the mode.

Item(s) below automatically will be inspected.

When NG occurred, LEDs lit/blink as below.

Test item	NG Indication (● :lit, ■ :blink)
CPU-DSP I/F	

Press PRESET SW and BANK SW together to check an NG item again after NG occurred.

Press PRESET SW and TUNER/BYPASS SW together to skip NG item and enter to next mode.

When internal test finished, mode shifts to control surface test mode automatically.

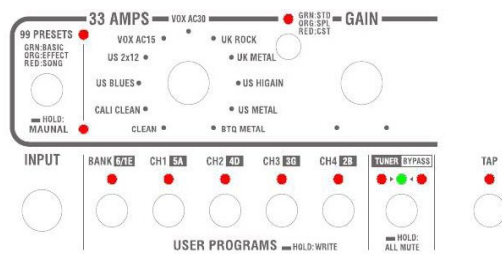
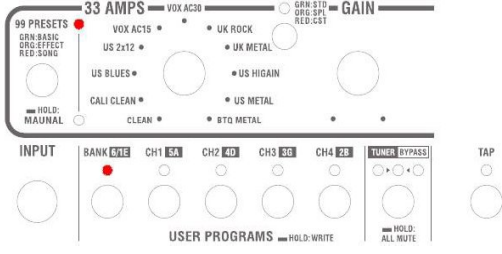
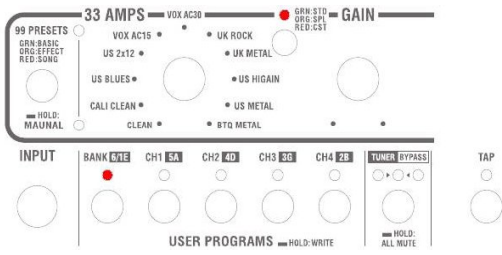
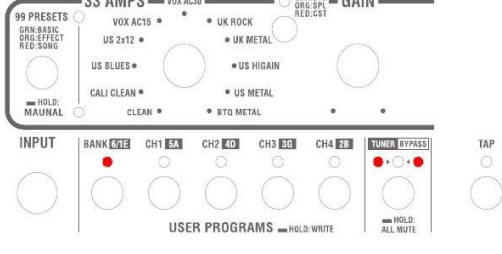
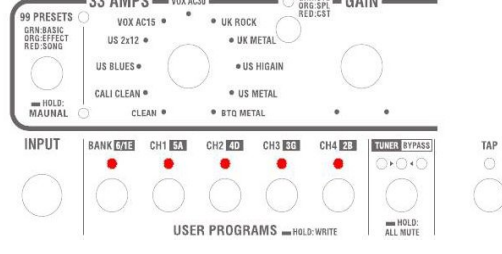
2.2.1. CPU-DSP I/F

CPU reads DSP register data to check wiring between CPU and DSP.

2.3. Control surface test

Control surface and indicators are checked as below order.

Audio loop will be tested along with PHONES jack switch in test item 4.

	Test item	Initial status (<input checked="" type="checkbox"/> :lit, <input type="checkbox"/> :blink)
1	Switch & LED	
2	11-clicks VR	
3	VR (non-click)	
4	PHONES Jack, Audio Loop	
5	Reload (DATA FLASH Initialization)	

---- Remarks ----

- In the initial status of switch & LED test, status of VFS5 is indicated on BANK, CH1~4 LED.
- Press BANK or TUNER SW when unit is initial status to choose each test mode.
- DSP will be muted except in test mode4.

2.3.1. Switch & LED

Check all LEDs are lighting (except green LEDs on PRESET, AMP, BANK)
 Press TAP SW to check other switches and LEDs.

---- Remarks ----

- When BANK LED is blinking, BANK LED on VFS5 is green.
 Then press BANK SW on VFS5 to make LED turn red.
- When either CH1,CH2,CH3,CH4 LEDs is blinking, CH SW on VFS5 is being pushed.
 Release switches and make CH1~4 LEDs lit.

Check functions of all LEDs and switches in order.

1. Check LEDs in below chart lit correctly (others must not)
2. LED pattern change by pushing respective switch as below.

When all tests finished, enter to the next test automatically.

LED	Switch
PRESET (RED)	PRESET
PRESET (GREEN)	PRESET
MANUAL	PRESET
AMP (RED)	AMP
AMP (GREEN)	AMP
BANK (RED)	BANK
BANK (GREEN)	BANK
CH1	CH1
CH2	CH2
CH3	CH3
CH4	CH4
TUNER (LEFT)	TUNER/BYPASS
TUNER (GREEN)	TUNER/BYPASS
TUNER (RIGHT)	TUNER/BYPASS
TAP	TAP
BANK (RED), TAP	VFS5 BANK
BANK (GREEN), TAP	VFS5 BANK
CH1, TAP	VFS5 CH1
CH2, TAP	VFS5 CH2
CH3, TAP	VFS5 CH3
CH4, TAP	VFS5 CH4

---- Remarks ----

- All LED will blink when AMP TYPE knob turned during the test.
 Press TAP switch to back to initial status of switch & LED test.

2.3.2. 11 - clicks VR

Check all click point on VR knob(w/click) as following order.

1. AMP TYPE (33 AMPS)
2. PEDAL TYPE
3. MOD/DELAY TYPE

Start test of knobs from their max position (rightmost).

If knob was set max initially, move the knob and set max again.

After checking min(leftmost) test on next knob starts automatically.

(Next test starts after MOD/DELAY test completed)

1. Stop knob at click point. (make sure knob is set on the point)
2. Go to next click after checking TUNER(GREEN) LED lit.

----- Remarks -----

- CH1 ~CH4 LED status changes according to A/D value of target knob(simple meter).
- If click point that was to be tested was skipped mistakenly before TUNER(GREEN) LED lit, TUNER(LEFT/RIGHT) LED will blink.
Back to the click point to be tested then LED will go out and test can be re-started.
- If A/D value of other knob varied accidentally, error occurs and test stops with PRESET, BANK LED blink.
Press TAP to cancel error status and re-start test.

2.3.3. VR (non - click)

Check A/D value of each VR (non-click)in the following order.

1. GAIN
2. VOLUME
3. TREBLE
4. MIDDLE
5. BASS
6. VALUE (PEDAL)
7. DEPTH (MOD/DELAY)
8. REVERB

Do test with each knob.

When all knob tests finished, next test starts automatically.

1. Turn knob to max (rightmost), (If knob was set max initially, move the knob and set max again).
2. Make sure TUNER(GREEN) LED lit.
3. Turn knob to MIN(leftmost), (when MIN is detected, TUNER(GREEN) LED turn off and goes to next step).

----- Remarks -----

- CH1 ~CH4 LED status changes according to A/D value of target knob(simple meter).
- If A/D value of other knob varied accidentally, error occurs and test stops with AMP, BANK LED blink.
Press TAP to cancel error status and re-start test.

2.3.4. PHONES Jack, Audio Loop

CPU checks PHONES jack status. Signal level back to input by sending 1kHz sine wave from DSP will be checked.

1. Set "MASTER" max.
2. Connect PHONES jack and INPUT jack via mono cable.
Check TAP LED lit when INPUT jack was connected to PHONES jack.
3. Press TAP switch (level check start).

When level check completed, next test will start automatically.

Output and input level (OK range) on each channel is a following.

(Each value corresponds to the one, when max signal input/output to/from DSP is set 1.0.

Test items	Output Ch (output level)	Input Ch (OK range)
DSP SI1R (Clean Ch)	DSP SO1L (0.015478)	DSP SI1R (0.35+-7dB)
DSP SI1L (Gain Ch)	DSP SO1L (0.001949)	DSP SI1L (0.35+-7dB)

---- Remarks ----

- When error occurs, PRESET, BANK, TUNER(LEFT/RIGHT) LED all blink and the test stops.
PRESET LED color indicated which channel is causing error.
(GREEN: Clean Ch, RED: Gain Ch).
Press TAP switch to cancel error status and re-start test.

2.3.5. Reload (DATA FLASH Initialization)

Initialize all data such as USER PROGRAM and data on DATA FLASH.

Press TAP switch to start initialize. (BANK LED changes to green).

When initialize succeed, a unit will be goes to normal mode automatically.

---- Remarks ----

- When initialize failed, BANK, CH1-4 LED blink.
Press tap switch to back to first step of "Reload".

2.4. Audio test

This is a bypass mode to through INPUT signal and output directly.

DSP input channel can be switched by pressing PRESET switch.

Power amp mute On/Off(AMP_MUTE L/H) can be switched by pressing AMP switch.

Status of PHONES jack, VFS5 switch are shown on TAP LED, BANK,CH1-4 respectively.

Switch	Function	LED	Status
PRESET	DSP input L/R switch	PRESET=RED	L (Gain Ch)
		PRESET=GREEN	R (Clean Ch)
AMP	AMP_MUTE L/H switch	AMP=GREEN	High
		AMP=RED (Blink)	Low
PHONES Jack	PHONES jack status	TAP Off	Open (not connected)
		TAP On	Close (connected)
VFS5	VFS5 status	BANK=RED	BANK LED on VFS5 = RED
		BANK=GREEN	BANK LED on VFS5 = GREEN
		CH1 On	CH1 is pushed
		CH2 On	CH2 is pushed
		CH3 On	CH3 is pushed
		CH4 On	CH4 is pushed

No.	Input mode	Load		Measurement	Input Condition	Analyzer setting	Standard Value	
1	Input	Phones 33ohm R	Normal CH (DSP R) LED:99Preset= G	Output Level	1k/-40dBm		-17dBm±3	
2				Output Level	14k/-40dBm	1k Relative	-3.5dB±3	
3				Output Level	50/-40dBm	1k Relative	1k Relative	-1.5dB±3
4				Noise(MASTER=MAX)	GND	A filter	≤-60dBm	
5				Noise(MASTER=MIN)	GND	A filter	≤-70dBm	
6				Dist	1k/-40dBm		≤3%	
7				Dist	1k/-25dBm		≤10%	
8	Input	Phones 33ohm L	Gain CH (DSP L) LED:99Preset= R	Output Level	1k/-58dBm		-17dBm±3	
9				Output Level	14k/-58dBm	1k Relative	-3.5dB±3	
10				Output Level	50/-58dBm	1k Relative	1k Relative	-1.5dB±3
11				Noise	GND	A filter	≤-60dBm	
12				DIST	1k/-58dBm		≤3%	
13				Output Level	1k/-10dBm		-6.0dBm±3	
14	AUX/R	Phones 33ohm L	LED:99Preset= G	Output Level	15k/-10dBm	1k Relative	-2.0dB±3	
15				Output Level	50/-10dBm	1k Relative	1k Relative	-1.0dB±3
16				DIST	1k/-10dBm		≤1%	
17				LED:99Preset= G	15k/-10dBm		-8.0dBm±3	
18	INPUT	8 Ω SPEAKER	LED:99Preset= G	Hum Noise Rejection (MASTER=MIN)	GND	Audio Filter	≥-38dBm and hearing check (Adjust Trim) if possible ,adjusted noise level is ≥40dBm	
19	Input	SP OUT 8 Ω	Normal CH (DSP R) LED:99Preset= G	Output Level	1k/-40dBm		+9.5dB±3	
20				Output Level	10k/-40dBm	1k Relative	-2dB±3	
21				Output Level	50/-40dBm	1k Relative	1k Relative	-2dB±3
22				VR Effect (No Load)	1k/-40dBm	1k Relative	1k Relative	-5.5dB±1.5
23				Noise(MASTER=MAX)	GND	Audio filter	≤-34dBm	
24	Noise(MASTER=MIN)	GND	Audio filter	≤-37dBm				
25				Dist	1k/-25dBm		≤5%	
26				Output Level(MAX OUT)	1k/-16dBm		Adjust to 57W-62W by Master Volume	
27				Dist(MAX OUT)	1k/-16dBm	Notch Filter=1k	≤15% (Master Volume position keeps No.26)	

KORG VT40+ Parts List

⚠ = SAFETY CRITICAL COMPONENT.

EXP=EXPLODED VIEW Item No

Part Number	Category	Part Name	Location	EXP	Reference	QTY
530000001086	⚠ CHIP INDUCTOR	HH-1M2012-121	JACK		FB1	1
530000001116	WAFER	WAFER LWL0640 3P	JACK		CN1	1
530000001945	JACK	BPJ-BNB-P, 8MM	JACK		J1	1
530000001116	WAFER	WAFER LWL0640 3P	FOOT SW		CN4	1
530000001094	OP-AMP	NJM072 (SMT)	MAIN		IC7	1
530000000194	OP-AMP	IC NJU7082	MAIN		IC5	1
530000002347	IC	POWER IC TAS5615	MAIN		IC8	1
500324018020	DAC	AK4384ET-E2	MAIN		IC4	1
500324018021	ADC	AK5358AET-E2	MAIN		IC11	1
500320004748	IC	R5F21388AN101FP U1	MAIN		IC3	1
500320012334	DSP	MB87R1420PMC-G-BND	MAIN		IC14	1
530000000179	HEX INVERTER	IC 74LVU04DB	MAIN		IC2	1
530000001098	REGULATOR	UTC UR3325	MAIN		IC9	1
530000002307	REGULATOR	REGULATOR LM1117 5V	MAIN		IC6	1
530000002348	REGULATOR	REGULATOR KIA78L12F	MAIN		IC13	1
530000001948	CHIP TR	KTC3295	MAIN		Q1	1
530000000279	CHIP TR	TR KTC4075	MAIN		Q2,Q3,Q4,Q18	4
530000000275	CHIP TR	TR KTC2875	MAIN		Q8	1
530000000277	TRANSISTOR	TR KTC3198GR	MAIN		Q9,Q10	2
530000000150	DIODE	D 1N4002	MAIN		D25,D26	2
530000002349	ZENER DIODE	ZENER DIODE 1N5252B (1/2 24V)	MAIN		D22	1
530000002350	ZENER DIODE	ZENER DIODE 1N4739 (1W 9.1V)	MAIN		ZD2	1
530000002351	ZENER DIODE	ZENER DIODE 2EZ6.2D5 (2W 6.2V)	MAIN		ZD3	1
530000001103	LED	3O4HD-7	MAIN		LED11	1
530000000208	LED	LED RED 3M/M DLL-B5131Q	MAIN		LED4,LED5,LED6,LED7, LED8,LED9,LED10,LED13	8
530000002196	LED	DLL-B2131Q(G124)	MAIN		LED14	1
530000001102	LED	3RG9HW-2-A	MAIN		LED1,LED2,LED3	3
530000001225	LED SUPPORT	LED SUPPORT SW 4010 - 10MM	MAIN			9
530000001226	LED SUPPORT	LED SUPPORT SW 4009 - 9MM	MAIN			3
530000000804	BRIDGE DIODE	BRIDGE DIODE KBU4K	MAIN		D7	1
530000001380	CHIP INDUCTOR	HH-1M1608-600JT	MAIN		FB4,FB5,FB6,FB7,FB8, L1,L2,L17,L20,L21	10
530000002308	CHIP INDUCTOR	CHIP INDUCTOR HH-1M1608-121	MAIN		FB3	1
530000000802	BEAD CORE	BEAD CORE FBS3550A0 .T	MAIN		FB2	1
530000002352	INDUCTOR	RING COIL INDUCTOR 15UH 3A	MAIN		L3,L4,L5,L6	4
530000002309	CRYSTAL	CRYSTAL 20MHZ	MAIN		X1	1
530000002353	RESISTOR	CARBON RESISTOR 1/2W 33 OHM	MAIN		R70,R112	2
530000002354	RESISTOR	CARBON RESISTOR 1/2W 56 OHM	MAIN		R280	1
530000002355	RESISTOR	METAL OXIDE RESISTOR 1W 10 OHM	MAIN		R159	1
530000002356	RESISTOR	CARBON RESISTOR 2W 120 OHM	MAIN		R46	1
530000002357	RESISTOR	CARBON RESISTOR 3W 33 OHM	MAIN		R62	1
530000002358	RESISTOR	WIRE WOUND 5W 0.1 OHM	MAIN		R141	1
530000002317	RESISTOR	CEMENT RESISTOR 5W J 47	MAIN		R205	1
530000002318	VOLUME	SEMI VOLUME KVSF689AC103 (10K)	MAIN		VR14	1
530000000288	VOLUME	VR RV160-40-15S-B10K-C0	MAIN		VR1,VR4,VR5,VR6,VR7, VR9,VR11,VR12,VR13	9
530000002319	VOLUME	VOLUME VR RV160-40-15S-B1K-C0)	MAIN		VR2	1
530000000289	VOLUME	VR RV160-40-15S-B10K-C11 (11C)	MAIN		VR3,VR8,VR10	3

530000000265	SWITCH	TACK SW ATS-1230B (K=9.5MM)	MAIN		SW1,SW2,SW3,SW4,SW5, SW6,SW7,SW8,SW9	9
530000001101	TUBE SOCKET	GZC9-A	MAIN		Q11	1
530000002320	JACK	STEREO JACK CKX3.5-69	MAIN		J2,J3	2
530000002359	PCB ASS'Y	MAIN PCB ASS'Y VT40+	CHASSIS	1		1
530000002323	PCB ASS'Y	JACK PCB ASS'Y VT20+	CHASSIS	2		1
530000002324	PCB ASS'Y	FOOT S/W PCB ASS'Y VT20+	CHASSIS	3		1
530000002360	CHASSIS	MAIN CHASSIS(VT40+)386X105X95	CHASSIS	4	CHA0338	1
530000002361	PANEL	FRONT PANEL(VT40+) PVC 0.5T	CHASSIS	5	FPN0220	1
530000002362	PANEL	REAR PANEL VT40+(100V)PS 0.5T	CHASSIS	6	RPN0281	1
530000002363	PANEL	REAR PANEL VT40+(120V)PS 0.5T				
530000002364	PANEL	REAR PANEL VT40+(100V)PS 0.5T				
530000002365	PANEL	REAR PANEL VT40+(100V)PS 0.5T				
530000001126	KNOB	VOLUME KNOB CHIKEN HEAD CREAM	CHASSIS	7		8
530000001127	KNOB	ROUND KNOB	CHASSIS	8	KNOB0050	5
530000001124	KNOB	TACT KNOB "A" NBR 9PIE	CHASSIS	9	KNOB0047	8
530000001125	KNOB	TACT KNOB "B" NBR 7PIE	CHASSIS	10	KNOB0048	1
510465500501	TUBE	TUBE(VAIVE)12AX7AC5HG	CHASSIS	14		1
530000001117	TUBE RETAINER	TUBE RETAINER	CHASSIS	15	SPR0012	1
530000002366	TRANS	TRANS 100V=076-VT40+ J	CHASSIS	21		1
530000002367		TRANS 120V=076-VT40+ U				
530000002368		TRANS 230V=076-VT40+ E				
530000002369		TRANS 240V=076-VT40+ EF				
530000000761	SWITCH	POWER SW RL3-421	CHASSIS	22		1
530000000199	Inlet	INLET/FUSE HOLDER SC-8F-21	CHASSIS	23		1
530000000808	FUSE	FUSE T2.0AL 250V	CHASSIS	24		1
530000000806	FUSE	FUSE T1A L 250V				
530000002370	ASSY	CHASSIS ASS'Y VT40+(100V)	SET	1		1
530000002371		CHASSIS ASS'Y VT40+(120V)				
530000002372		CHASSIS ASS'Y VT40+(230V)				
530000002373		CHASSIS ASS'Y VT40+(240V)				
530000002374	SPEAKER	SPEAKER 250RFL50-5	SET	2		1
530000002375	ASSY	CABINET ASSY(VT40+)420X220X375	SET	3	CAB0406	1
530000000313	HANDLE	HANDLE ASS'Y	SET	4,5		1
530000000138		BRAND MARK VOX (LARGE) SILVER	SET	6		1
530000000854		BRAND MARK VALVETRONICS SILVER	SET	7		1
530000000767		VENT GRILL	SET	8		2
530000000252		RUBBER FOOT SBR SMALL	SET	9		4
500600006508	AC CORD	LY100JPVCTFLY35LY37(JP)	PACKING			1
530000000123		AC CORD 120V = KKP30-16A				
530000000124		AC CORD 230V = KKP4819R-16A				
530000000125		AC CORD 230V = KKP650-16A				
530000000126		AC CORD 240V = KKP550-16A				
530000002376		VT40+ BAFFLE ASS'Y				1