

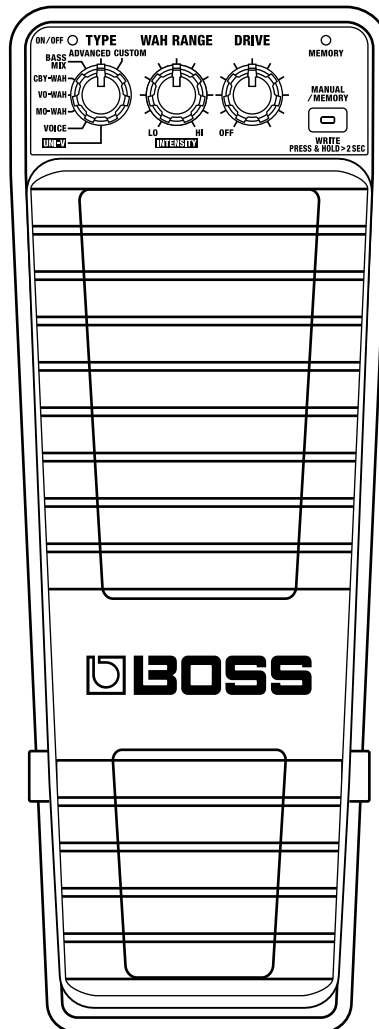
# PW-10

V-WAH

## SERVICE NOTES *Issued by RJA*

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# SPECIFICATIONS

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## PW-10: Pedal Wah

- Nominal Input Level  
-20 dBu
- Input Impedance  
1 M ohm
- Nominal Output Level  
-20 dBu
- Output Impedance  
1 k ohm
- Recommended Load Impedance  
10 k ohm or greater
- Controls  
Pedal  
Toe Switch  
Heel Switch  
MANUAL/MEMORY Button  
TYPE Knob  
WAH RANGE Knob  
DRIVE Knob
- Indicators  
ON/OFF Indicator  
MEMORY Indicator
- Connectors  
INPUT Jack  
OUTPUT Jack  
AC Adaptor Jack
- Power Supply  
DC 9V: Dry Battery (R6/LR6 (AA) type) x 6  
AC Adaptor
- Current Draw  
55 mA

\* *Expected battery life under continuous use:*  
Carbon: 14 hours  
Alkaline: 38 hours  
These figures will vary depending on the actual conditions of use.

- Dimensions  
100 (W) x 270 (D) x 100 (H; max.) mm  
3-15/16 (W) x 10-11/16 (D) x 3-15/16 (H; max.) inches

- Weight  
1.3 kg / 2 lbs 14 oz (including batteries)

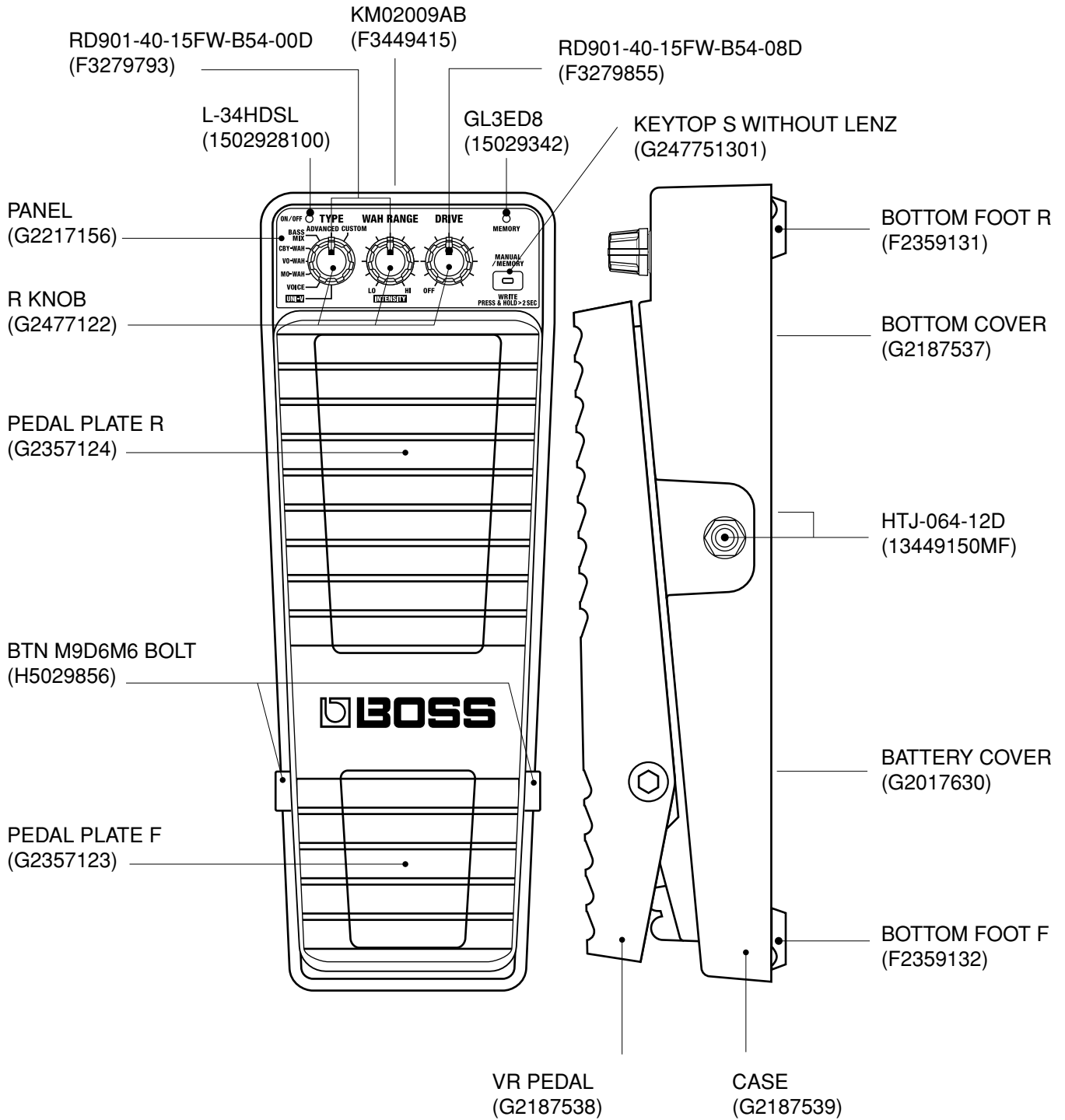
- Accessories  
Owner's Manual English (#G6017356)  
Dry battery (LR6 (AA) type) x6 (#\*\*\*\*\*)

- Options  
AC Adaptor (PSA-series)

\*  $0\text{ dBu} = 0.775\text{ Vrms}$

\* *In the interest of product improvement, the specifications and/or appearance of this unit are subject to change without prior notice.*

# LOCATION OF CONTROLS

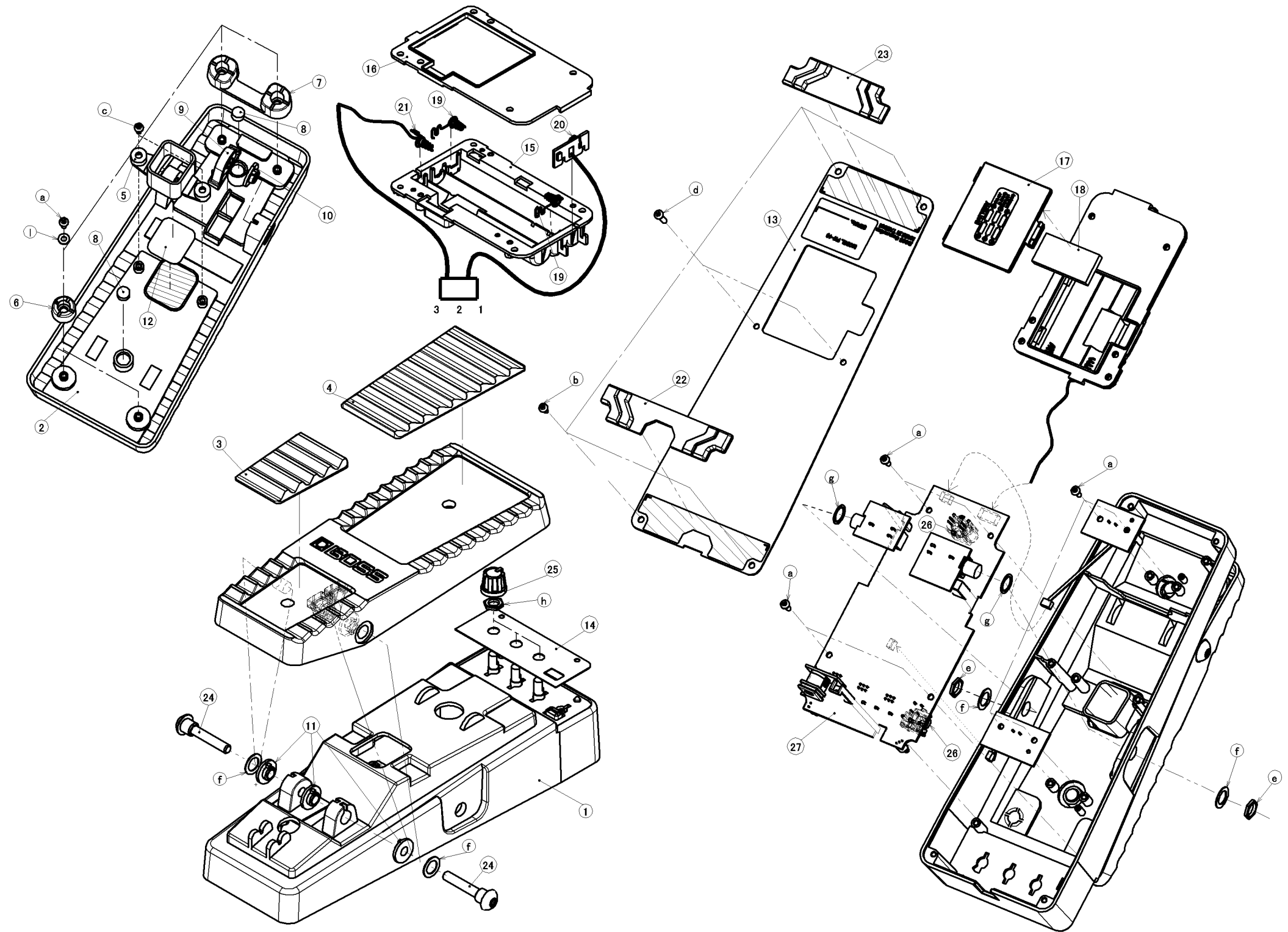


**EXPLODED VIEW PARTS LIST**

**EXPLODED VIEW**

**[Parts]**

No.	Part Code	Part Name	Q'ty
1	G2187539	CASE	1
2	G2187538	VR PEDAL	1
3	G2357123	PEDAL PLATE F	1
4	G2357124	PEDAL PLATE R	1
5	G2199504	MIRROR ESCUTCHEON	1
6	G2357122	REAR CUSHION	2
7	F2359130	FRONT CUSHION	1
8	G2357115	PEDAL FOOT	2
9	H5039550	VR PEDAL NUT	1
10	G2567153	BOLT HOLDER BLACK	1
11	G214711901	BOLT HOLDER WHITE	3
12	G2507326	MIRROR LABEL	1
13	G2187537	BOTTOM COVER	1
14	G2217156	PANEL	1
15	G2017631	BATTERY CASE	1
16	G2017632	BATTERY PLATE	1
17	G2017630	BATTERY COVER	1
18	F2569153	BATTERY CUSHION	1
19	G2177304	BATTERY TERMINAL +/-	2
20	G2177121	BATTERY TERMINAL +	1
21	G2177306	BATTERY TERMINAL -	1
22	F2359131	BOTTOM FOOT R	1
23	G2359132	BOTTOM FOOT F	1
24	H5029856	BTN M9D6M6 BOLT	2
25	G2477122	R KNOB	3
26	G247751301	VGA KEYTOP WITHOUT LENZ	1
27	75D723P000	PWB ASSY	1
28	G2199502	LED GUIDE	1



**[Screw]**

No.	Part Code	Part Name	Q'ty
a	H5019110	PAN HEAD 3x6 TAPPING-2 B1 ZC	12
b	H5029325	PAN HEAD 3x6 TAPPING-2 B1 BZC	4
c	H5029333	PAN HEAD 3x8 TAPPING B1 BZC	2
d	H5019153	PAN HEAD 3x12 TAPPING B1 BZC	2
e	H5039510	JACK NUT M9x12x2	2
f	H5039112	JACK WACHER M9 FENI (D14 D9.2 T0.5)	4
g	H5039205	INTERNAL TOOTH WASHER M9	2
h	H5039521	VR NUT M7	3
i	H5039111	WASHER D8 D3 T0.5 ZC	4

# PARTSLIST

**SAFETY PRECAUTIONS:**

The parts marked  $\Delta$  have safety-related characteristics. Use only listed parts for replacement.

**CONSIDERATION ON PARTS ORDRING**

When ordering any parts listed in the parts list, please specify the following items in the order sheet.

	QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER
Ex.	10	22575241	Sharp Key	C-20/50
	15	2247017300	Knob (orange)	DAC-15D

Failure to completely fill the above items with correct number and description will result in delayed or even undelivered replacement.

NOTE: The parts marked # are new. (initial parts)

<b>CASING</b>					<b>Q'ty</b>
#	G214711901	BOLT HOLDER	WHITE		3
#	G2567153	BOLT HOLDER	BLACK		1
#	G2017631	BATTERY CASE			1
#	G2017630	BATTERY COVER			1
#	F2569153	BATTERY CUSHION			1
#	G2017632	BATTERY PLATE			1
#	G2187537	BOTTOM COVER			1
#	H5029856	BTN M9D6M6 BOLT			2
#	G2187539	CASE			1
#	G2199504	MIRROR ESCUTCHEON			1
#	G2507326	MIRROR LABEL			1
#	G2217156	PANEL			1
#	G2187538	VR PEDAL			1
#	H5039550	VR PEDAL NUT			1
<b>KNOB,BUTTON</b>					
	G2477122	R-KNOB			3
	G247751301	KEYTOP S WITHOUT LENS			1
<b>SWITCH</b>					
	01780101	SKQKAB	TACT SWITCH	SW1	1
	13129778	SKQKAH	TACT SWITCH	SW2,SW3	2
<b>JACK, EXT TERMINAL</b>					
	13449150MF	HTJ-064-12D	PHONE JACK (STEREO)	JK2,JK1	2
	F3449415	KM02009AB	ADAPTOR JACK	JK3	1
<b>DISPLAY UNIT</b>					
	1502928100	L-34HDSL	LED (RED)	LED2	1
#	F5029150	L-53SF4C	LED (INFRA-RED)	LED3	1
	15029342	GL3ED8	LED	LED1	1
<b>PWB ASSY</b>					
#	75D723P000	PWB ASSY			1
<b>IC</b>					
#	02896890	MN101C539 V1.00	IC (MASK CPU)	IC4	1
	02565501	TC220CCA0AF-B01(MR3)	IC (DSP)	IC5	1
	02451434	AK4552VT	IC (AD/DA)	IC1	1
	F5179604	CAT24WC02J	IC (EEPROM)	IC7	1
	15289148	M5218AFP	IC (OP AMP)	IC3	1
	00452301	NJM2100M	IC (OP AMP)	IC2,IC6	2
	01906156	S-8520E33MC-BJS-T2	IC (DC-DC REGULATOR)	IC9	1
#	F5209150	S-80130ALMC-JAP-T2	IC (RESET)	IC10	1
<b>TRANSISTOR</b>					
	15319108	2SC-3324GR-TE85R	TRANSISTOR	Q3	1
	15319107	2SC4116-GR(TE85R)	TRANSISTOR	Q9,Q14	2
#	F5329530	2SK879Y	FET TRANSISTOR	Q2,Q4	2
	15329103	2SK880GR-TE85R	FET TRANSISTOR	Q1	1
	F5139608	IRF7606	POWER MOS FET	Q10	1
#	F5229720	L-51P3C	PHOTO TRANSISTOR	Q8	1
	15329521	RN1307(TE85R)	TRANSISTOR	Q6,Q5	2
	15329533	RN2307(TE85R)	TRANSISTOR	Q11,Q12,Q13	3

<b>DIODE</b>					
#	F5339138	1SS355	DIODE	D1,D2	2
	F5339137	SS14 VF=0.45V	DIODE	D4,D5	2
<b>RESISTOR</b>					
#	F2569127	MINISMDC075	POLY SWITCH	R62	1
	00566867	RPC05T 100 J	MTL.FILM RESISTOR	R10	1
	00567023	RPC05T 101 J	MTL.FILM RESISTOR	R44,R70	2
	00567156	RPC05T 102 J	MTL.FILM RESISTOR	R7,R37,R51	3
	00567289	RPC05T 103 J	MTL.FILM RESISTOR	R1,R3,R8,R27,R28,R35,R39,R40,R50,R55,R66,R67	14
	00567412	RPC05T 104 J	MTL.FILM RESISTOR	R6,R9,R38,R42,R43,R47,R58,R61	8
	00567556	RPC05T 105 J	MTL.FILM RESISTOR	R2,R4,R5,R24,R26,R31,R36	7
	00567290	RPC05T 123 J	MTL.FILM RESISTOR	R45,R46,R49,R52,R53,R54	6
	00567301	RPC05T 153 J	MTL.FILM RESISTOR	R12	1
	00567067	RPC05T 221 J	MTL.FILM RESISTOR	R32	1
	00567190	RPC05T 222 J	MTL.FILM RESISTOR	R48	1
	00567323	RPC05T 223 J	MTL.FILM RESISTOR	R14	1
	00567334	RPC05T 273 J	MTL.FILM RESISTOR	R34	1
	00566934	RPC05T 330 J	MTL.FILM RESISTOR	R60	1
	00567345	RPC05T 333 J	MTL.FILM RESISTOR	R23,R30,R72	3
	00567101	RPC05T 391 J	MTL.FILM RESISTOR	R33	1
	00567367	RPC05T 393 J	MTL.FILM RESISTOR	R17,R21,R22	3
	00567389	RPC05T 563 J	MTL.FILM RESISTOR	R13,R15,R18,R19,R25,R29,R71	7
	00567134	RPC05T 681 J	MTL.FILM RESISTOR	R41	1
	01011856	RPC05T 0R0 J	MTL.FILM RESISTOR	R56	1
	F5429365	10K OHM F RANK (1%)	CHIP RESISTOR	R20	1
	F5429386	150K F (1608TYPE)	CHIP RESISTOR	R16	1
	F5419706	CRN34104J	RESISTOR ARRAY	RA2,RA1	2
<b>POTENTIOMETER</b>					
#	F3279855	RD901-40-15FW-B54-08D W/11 CL	ROTARY POT. 50KB	VR1	1
	F3279793	RD901-40-15FW-B54-00D	ROTARY POT.	VR2,VR3	2
<b>CAPACITOR</b>					
#	F5349704	ECPUI474MA5 0.47	MYLAR CAPACITOR (SUBMICRON)	C1	1
#	01674690	ECJ1VF1E683Z	CHIP CAPACITOR (1608TYPE)	C40	1
#	F5369605	CSM 1/50V	CHIP CAPACITOR	C2,C3,C13,C19	4
#	F5369544	CSM 10/16V	CHIP CAPACITOR	C4,C5,C12,C16,C17,C38,C54,C65,C66,C67,C68	11
#	F5369570	CSM 100/16V	CHIP CAPACITOR	C22,C36,C49,C51,C53,C58,C63	7
#	F5369527	CSM 47/16V	CHIP CAPACITOR	C26	1
	01674701	ECJ1VF1E104Z 0.1UF/16VK	CERAMIC CAPACITOR(CHIP)	C6,C15,C18,C20,C21,C23,C24,C25,C27,C28,C29,C	28
	01674512	ECJ1VB1H222K	CERAMIC CAPACITOR	C9	1
	01674556	ECJ1VB1H472K	CERAMIC CAPACITOR	C70	1
	01674334	ECUV1H101JCV	CERAMIC CAPACITOR	C10,C11	2
	01674201	ECUV1H180JCV	CERAMIC CAPACITOR	C41	1
	01674212	ECUV1H220JCV	CERAMIC CAPACITOR	C34,C35,C42	3
<b>INDUCTOR, COIL, FILTER</b>					
#	F5409114	NFM4516P13C204F	EMI FILTER	C57	1
	12449384	SBT-0115W	EMI FILTER	L2	1
	F2449209	SLF7032T-151MR29-2(150UH)	COIL	L3,L4	2
<b>CRYSTAL, RESONATOR</b>					
	F5299108	HC-49SM 8MHZ	CRYSTAL	X1	1
	02673278	CX-49G 11.2896MHZ	CRYSTAL	X2	1
<b>CONNECTOR</b>					
#	F3439160	53015-0210 2P P=2MM	CONNECTOR	CN11	1
#	F3439201	CONNECTOR	53015-0310 P=2MM	CN6	1
#	F3369001	CONNECTOR	53014-0210 P=2MM	CN9	1
<b>WIRING, CABLE</b>					
#	G3467254	BATTERY WIRING 3P	L1=205MM L2=90MM P=2MM		1
#	G3467255	SW WIRING 2P	L=75MM P=2MM		2
#	G3467257	FLAT CABLE 5P	L=65MM P=2MM		2
#	G3467253	FLAT CABLE 2P	L=120MM P=2MM		2
#	G3467256	FLAT CABLE 3P	L=100MM P=2MM		3
<b>SCREWS</b>					
	H5019110	SCREW M3x6	PAN HEAD TAPTITE-2 FEZC	BOARD (MAIN, SWx2), FRONT CUSHION, RUBBER FO	12

**SCREWS**

	H5029325	SCREW 3x6	PAN HEAD TAPTITE-2 BZC	BOTTOM (FRONT, REAR)	4
#	H5019153	SCREW 3x12	PAN HEAD TAPTITE B1 BZC	BOTTOM (CENTER)	2
#	H5029333	SCREW 3x8	PAN HEAD TAPTITE B1 BZC	MIRROR ESCT	2
	H5039510	NUT M9x12x2	FENI	JACK	2
	H5039521	VR ACCESSORY NUT M7		VR	3
	H5039112	WASHER M9		JACK, VR PEDAL NUT	4
	H5039205	WASHER 12.5x9.5x0.5/0.9	INTERNAL TOOTH FENI	JACK	2
#	H5039111	WASHER D8D3T0.5	ZC	FRONT CUSHION, RUBBER FOOT	4

**PACKING**

#	H267951201				1
#	G2537877				1
#	H2679502				1
#	G2627254	PACKING CASE LOWER			1
#	G2627253	PACKING CASE UPPER			1
#	G2267625	PAD			2
#	G2637103	UPPER PAD			1

**MISCELLANEOUS**

	G2177304	BATTERY TERMINAL (+/-)			2
#	G2177121	BATTERY TERMINAL (+)			1
	G2177306	BATTERY TERMINAL (-)			1
#	F2359132	BOTTOM FOOT F		BOTTOM COVER	1
#	F2359131	BOTTOM FOOT R		BOTTOM COVER	1
#	F2359130	FRONT CUSHION		PEDAL	1
#	G2199502	LED GUIDE			1
#	H2369453	LED SPACER	L=9MM LEDS-9		1
#	H2369452	LED SPACER	L=8.5MM LEDH-8.5		1
	G2357115	PEDAL FOOT	M8	PEDAL	2
#	G2357123	PEDAL PLATE F		PEDAL	1
#	G2357124	PEDAL PLATE R		PEDAL	1
#	G2357122	REAR CUSHION		PEDAL	2

**ACCESSORIES (Standard)**

#	G6017355	OWNER'S MANUAL	JAPANESE		1
#	G6017356	OWNER'S MANUAL	ENGLISH		1
#	*****	BATTERY	LR6 (AA) TYPE		6

# TEST MODE

## Required Items

1. Generator
2. Oscilloscope
3. Noise meter
4. Short plug (with a 47k ohm resistor built in)
5. Monitor speaker (with an amplifier built in)

## List of Test Items

1. DSP and EEPROM check
2. WAH RANGE volume check
3. DRIVE volume check
4. Pedal calibration
5. BYPASS check
6. CODEC (DAC L ch) check
7. CODEC (DAC R ch) check
8. CODEC (DAC MIX) check
9. CODEC (ADC L ch) check
10. CODEC (ADC R ch) check
11. CODEC (ADC MIX) check
12. Normal waveform check
13. Noise check
14. Battery operation check

## Entering the Test Mode

1. Set all the volume knobs to the left.
2. Connect a DC plug to the AC adaptor jack while pressing down the [MANUAL/MEMORY] button.  
(The MEMORY indicator blinks red.)
3. Press the [MANUAL/MEMORY] button twice while it is blinking red (for 2 seconds).  
(The MEMORY indicator lights up green, enabling to enter the first test item.)

Note: The test mode cannot be entered unless all the volume knobs are set to the left.

Note: The test mode cannot be entered unless the button is operated while the indicator is blinking red.

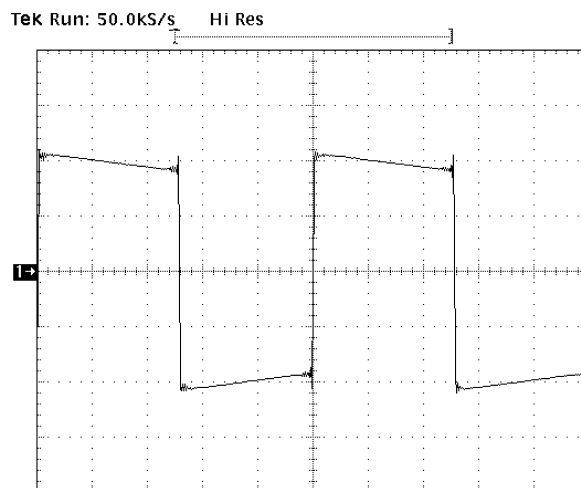
## Test Items

### 1. DSP and EEPROM check

1. After entering the test mode, DSP/EEPRO check is performed automatically.  
(The MANUAL/MEMORY indicator lights up green while checking.)
2. If no problem occurs, the "MANUAL/MEMORY" indicator lights up yellow after about 5 seconds and the "ON/OFF" indicator lights up red.
3. If any problem is present, the relevant indicator blinks in the following manner:

Indicator	behavior by	error type
MANUAL/MEMORY	blinking red:	DSP IRAM error
MANUAL/MEMORY	blinking yellow:	DSP ERAM error
MANUAL/MEMORY	blinking green:	DSP IPRAM error
ON/OFF	blinking red:	EEPROM error

4. Input a square wave (2000Hz, 400mVp-p) and check the output waveform (DSP through) with an oscilloscope.



### 2. WAH RANGE volume check

1. Input a square wave (2000Hz, 400mVp-p).
2. Turn the volume knob from the lowest position to the center and to the highest position.  
The "MANUAL/MEMORY" indicator should light up, changing the color from yellow to green and to red, in this order.
3. Operate the volume knob to check that the oscillation of the output waveform (DSP through) also changes from 0 to 400mVp-p or above.
4. After confirming that the indicator lights up red at the highest volume position, move on to [DRIVE] volume check.  
(In [DRIVE] volume minimum value detection, [WAH RANGE] volume maximum value detection is also performed. Leave the [WAH RANGE] volume knob set to the highest position.)

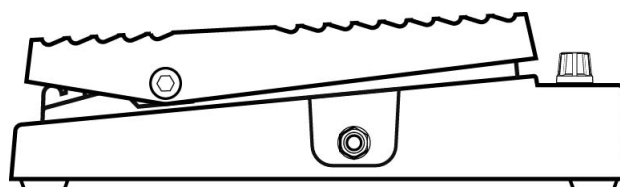
### 3. DRIVE volume check

1. Test in the same manner as for [WAH RANGE] volume check, and check how the "MANUAL/MEMORY" indicator behaves as well as how the output waveform (DSP through) changes.

### 4. Pedal calibration

1. Press the [MANUAL/MEMORY] button to proceed to the test items in the pedal calibration mode.  
(All indicators go off.)
2. Step down the pedal all the way back and hold it depressed.

Note: Accurate calibration cannot be performed if the pedal is off the base or depressed beyond that point.



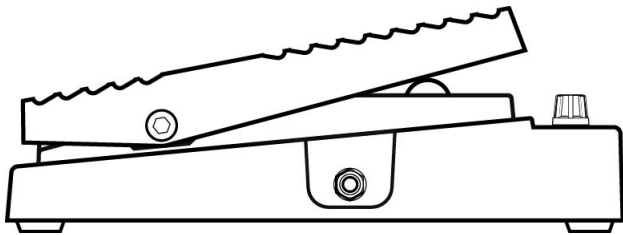
3. Press the [MANUAL/MEMORY] button and check that the "MEMORY" indicator lights up red.

Note: If the "MEMORY" indicator blinks red, go back to step 2 and check the pedal position, and then perform checking again. If the indicator blinks red each time checking is repeated, it indicates a faulty sensor circuit.



- Release the pedal so that the pedal stops at its initial pedal position.

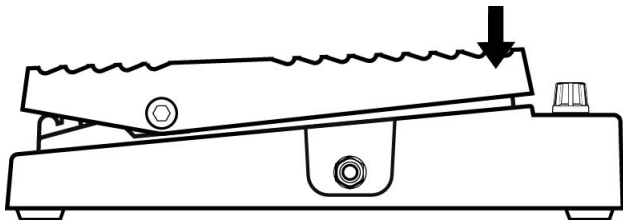
Note: Accurate calibration cannot be performed if the pedal is off the base or depressed beyond that point.



- Press the [MANUAL/MEMOY] button and check that the "MEMORY" indicator lights up green.

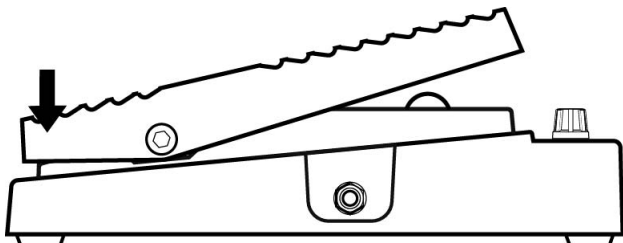
Note: If the "MEMORY" indicator blinks green, it indicates a faulty sensor circuit.

- Step down "the toe side" of the pedal hard and operate the switch on the toe side. Then check that the "MEMORY" indicator lights up yellow.



- Step down "the heel" of the pedal hard and operate the switch on the heel side. Then check that the "MEMORY" indicator lights up red.

Note: Factory Reset is being performed while the indicator is blinking red. Do not disconnect power from the unit.



- When completed, the "MEMORY" indicator lights up yellow, and the "ON/OFF" indicator lights up red.

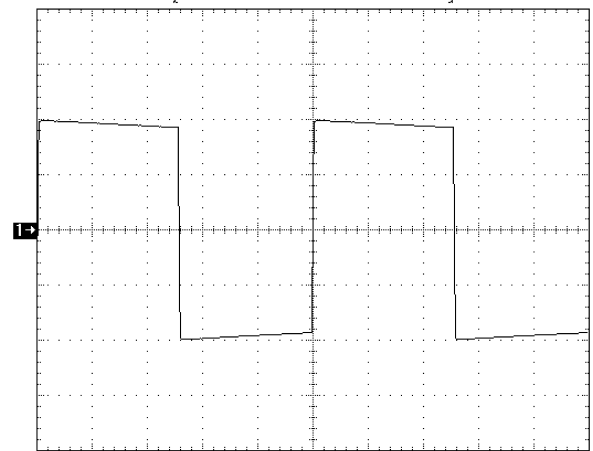
## 7. CODEC (DAC R ch) check

- Set the [TYPE] volume knob to 'VO-WAH.' (The "MEMORY" indictor lights up red.)
- Check the output waveform (DSP internal oscillation, R ch) with an oscilloscope.

## 5. BYPASS check

- Set the [TYPE] volume knob to 'VOICE.' (The "MEMORY" indictor lights up red.)
- Check the output waveform (analog bypass) with an oscilloscope.

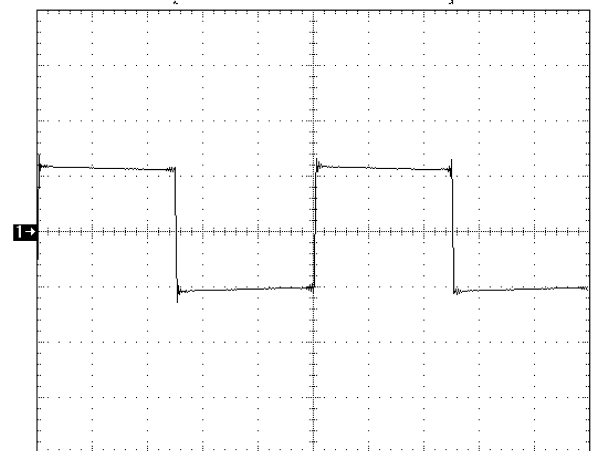
TeK Run: 50.0kS/s Hi Res

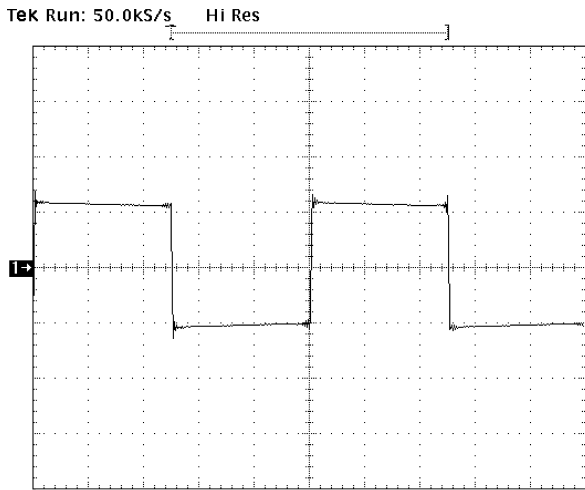


## 6. CODEC (DAC L ch) check

- Set the [TYPE] volume knob to 'MO-WAH.' (The "MEMORY" indictor lights up green.)
- Check the output waveform (DSP internal oscillation, L ch) with an oscilloscope.

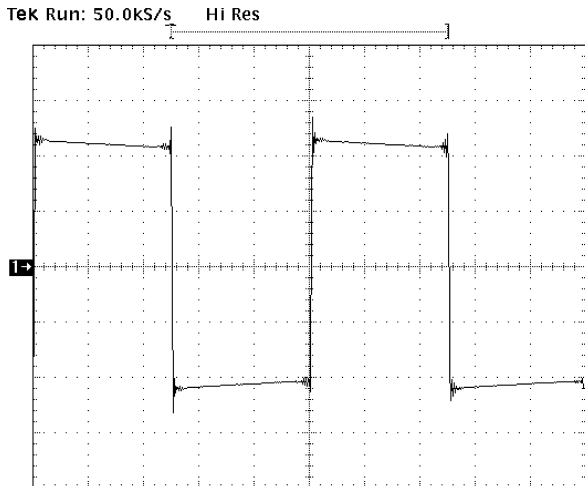
TeK Run: 50.0kS/s Hi Res





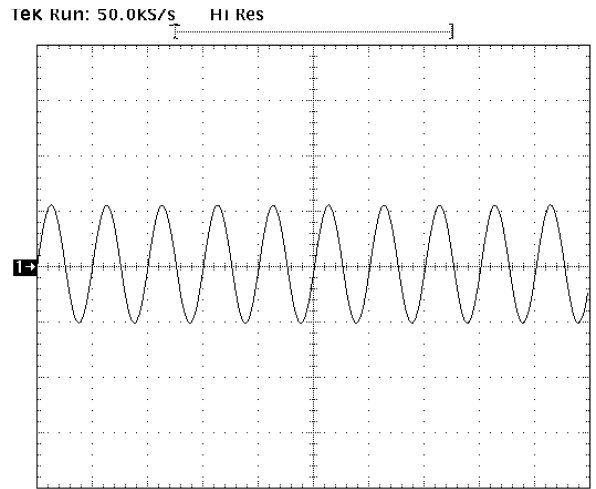
### 8. CODEC (DAC MIX) check

1. Set the [TYPE] volume knob to 'CBY-WAH.' (The "MEMORY" indicator lights up green.)
2. Check the output waveform (DSP internal oscillation, MIX) with an oscilloscope.



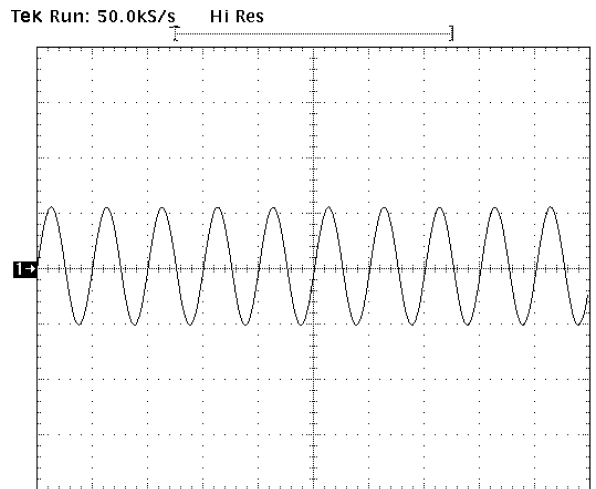
### 9. CODEC (ADC L ch) check

1. Input a sine wave (1kHz, -20dBm).
2. Set the [TYPE] volume knob to 'BASE MIX.' (The "MEMORY" indicator lights up red.)
3. Check the output waveform (ADC L ch) with an oscilloscope.



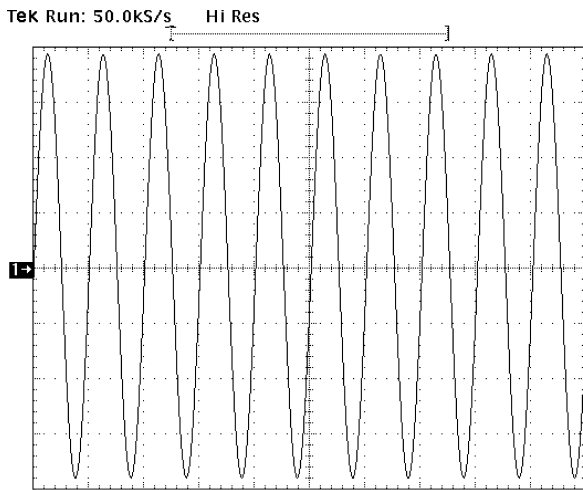
### 10. CODEC (ADC R ch) check

1. Set the [TYPE] volume knob to 'ADVANCED.' (The "MEMORY" indicator lights up green.)
2. Check the output waveform (ADC R ch) with an oscilloscope.

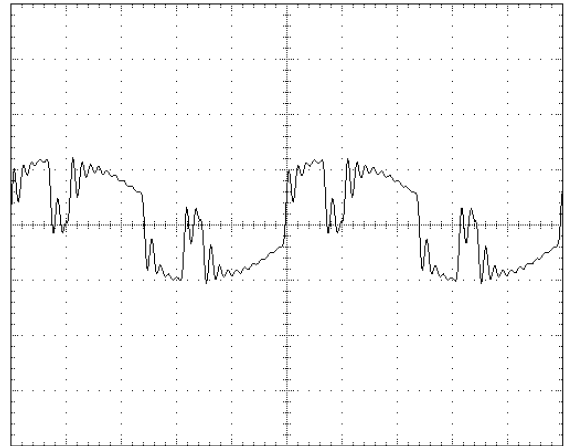
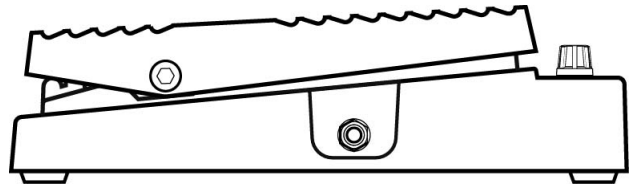


## 11. CODEC (ADC MIX) check

1. Input a sine wave (1kHz, +5dBm).
2. Set the [TYPE] volume knob to 'CUSTOM.' (The "MEMORY" indicator lights up red.)
3. Check the output waveform (AF-AD DSP through) with an oscilloscope.

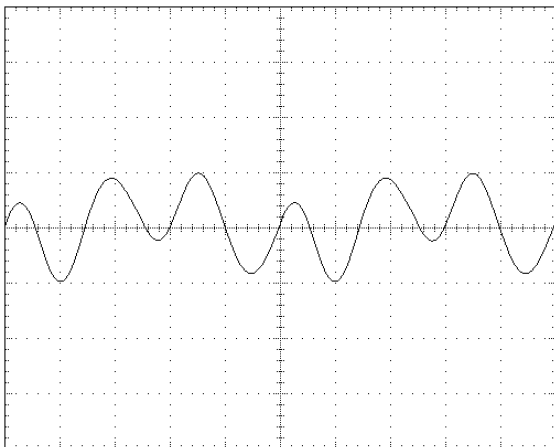
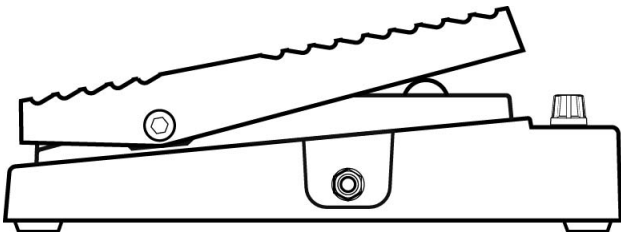


3. Step down the pedal and check that the waveform changes smoothly.
4. Check the waveform generated at the pedal position when it stops, using an oscilloscope.

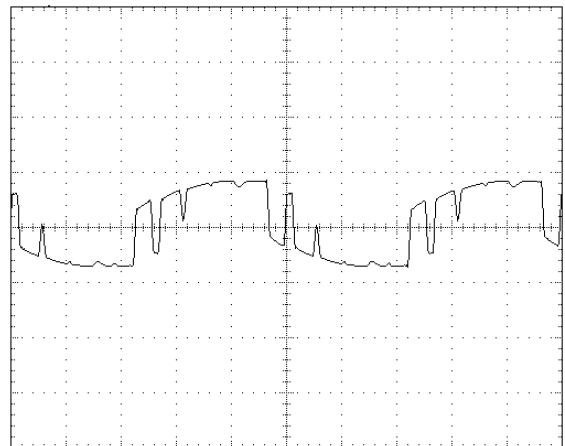


## 12. Normal waveform check

1. Input a sine wave (200Hz, 400mVp-p).
2. Power off and on the unit again to enter normal operations, and use an oscilloscope to check the waveform generated when the initial pedal position is restored.



5. Press the [MEMORY/MANUAL] button to check the waveform.



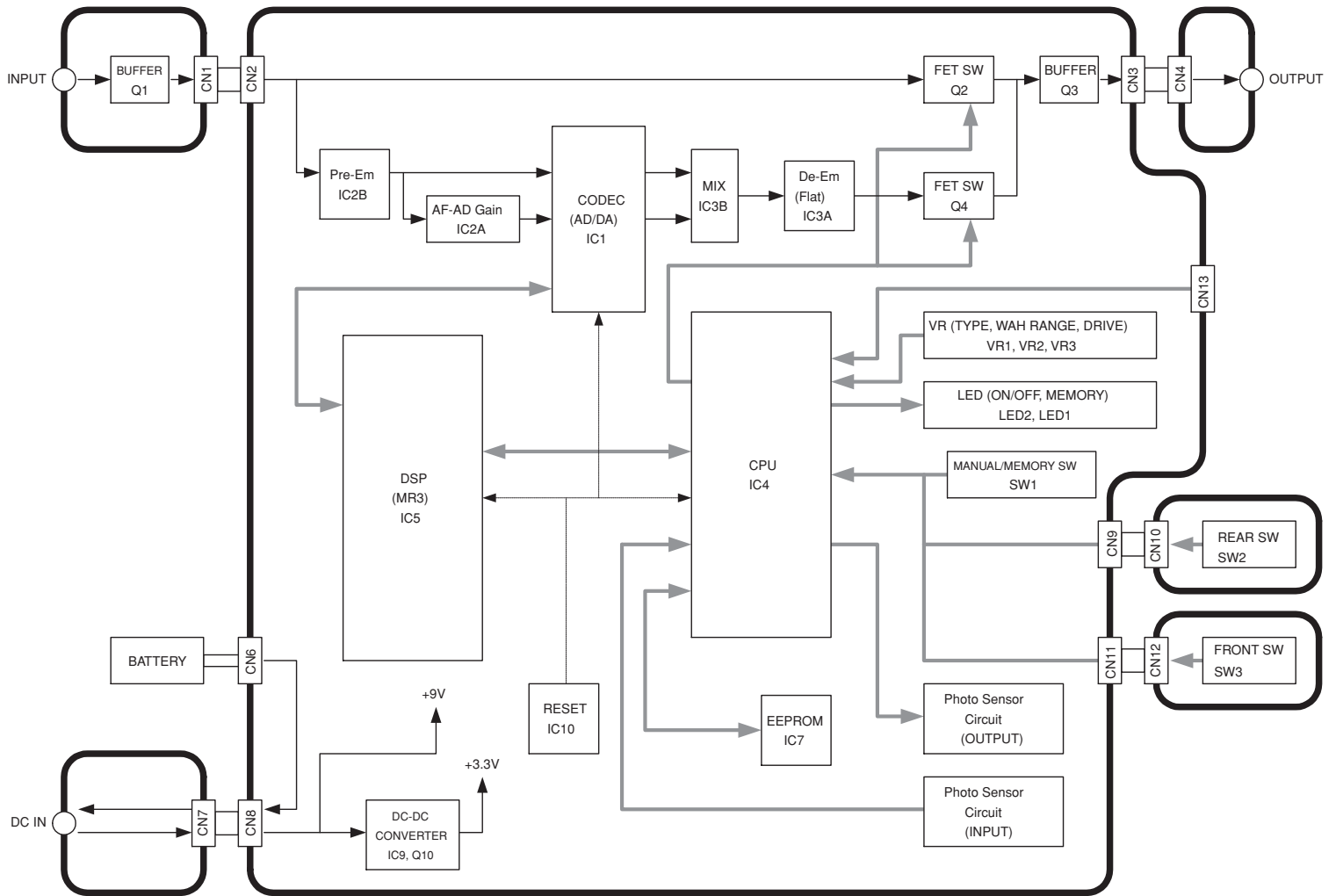
## 13. Noise check

1. Insert a 47 k ohm short plug into the INPUT jack.
2. Set the [TYPE] volume knob to 'ADVANCED,' the [WAH RANGE] volume knob to the central position and the [DRIVE] volume knob to 'OFF.'
3. Using a noise meter, check that the residual noise level is '-87dBm' or below.
4. Connect the monitoring speaker and check that no shock noise is generated.

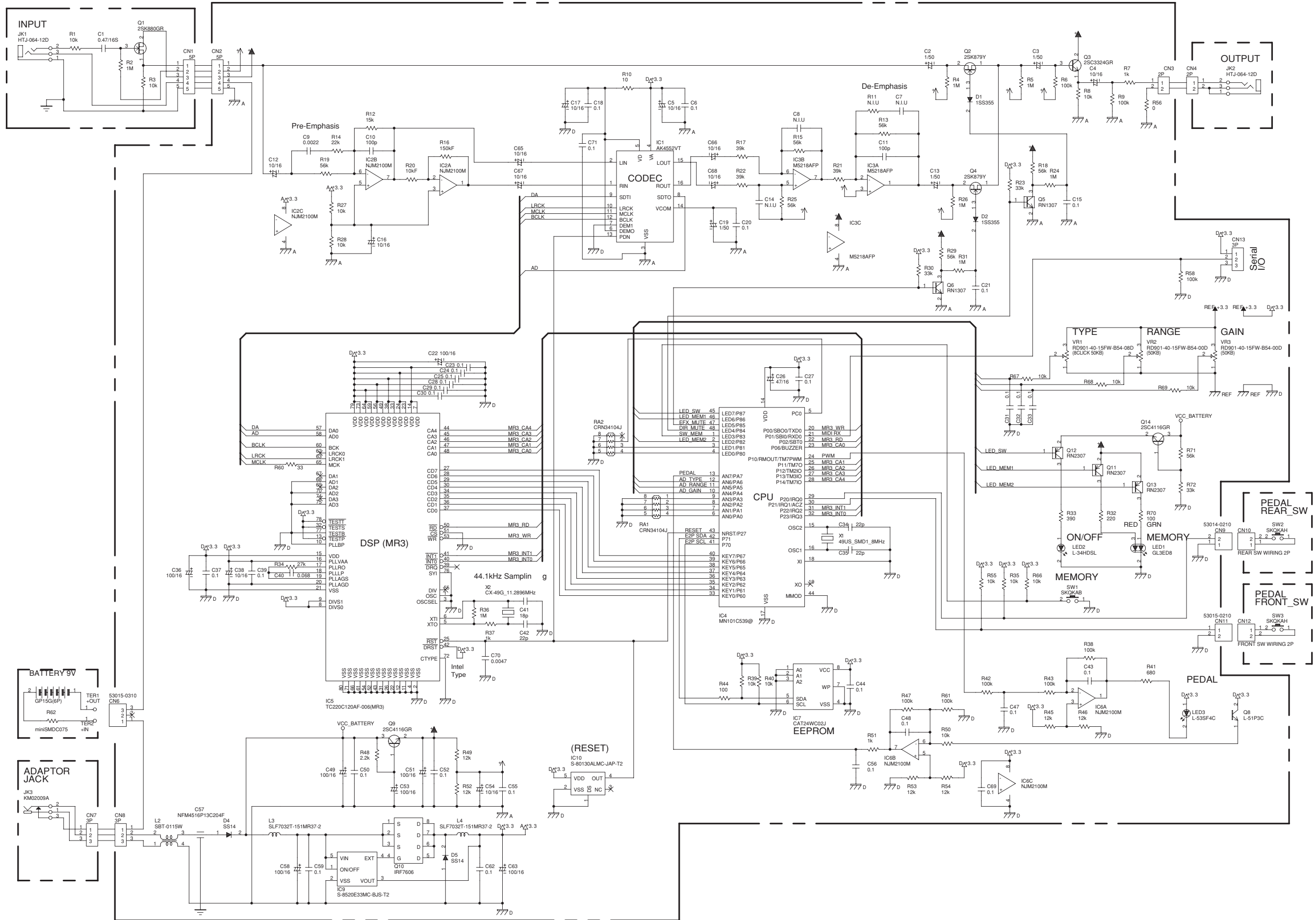
## 14. Battery operation check

1. Remove the DC plug and install a battery.
2. Insert a plug into the INPUT jack and check that power can be applied to the unit.
3. Next, check that the unit operates normally.  
This completes the test mode.

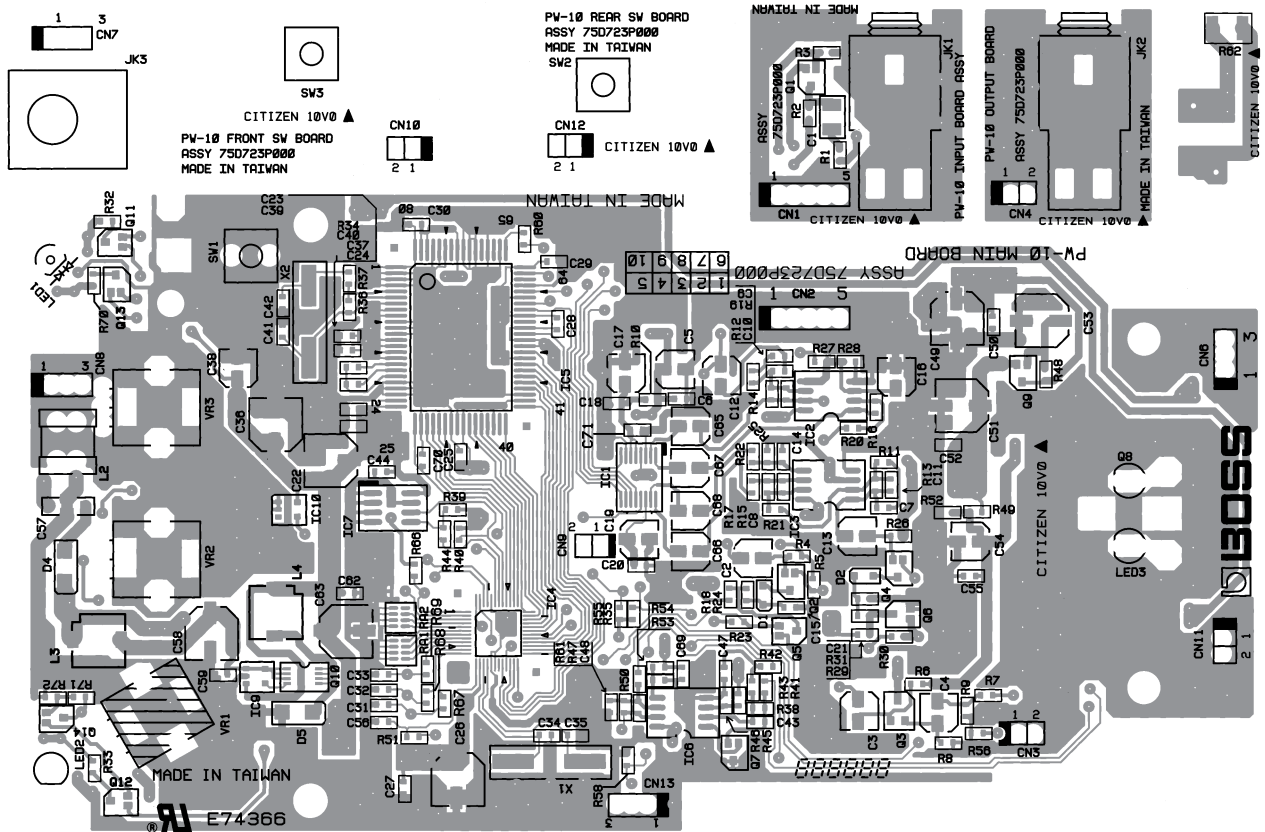
# BLOCK DIAGRAM



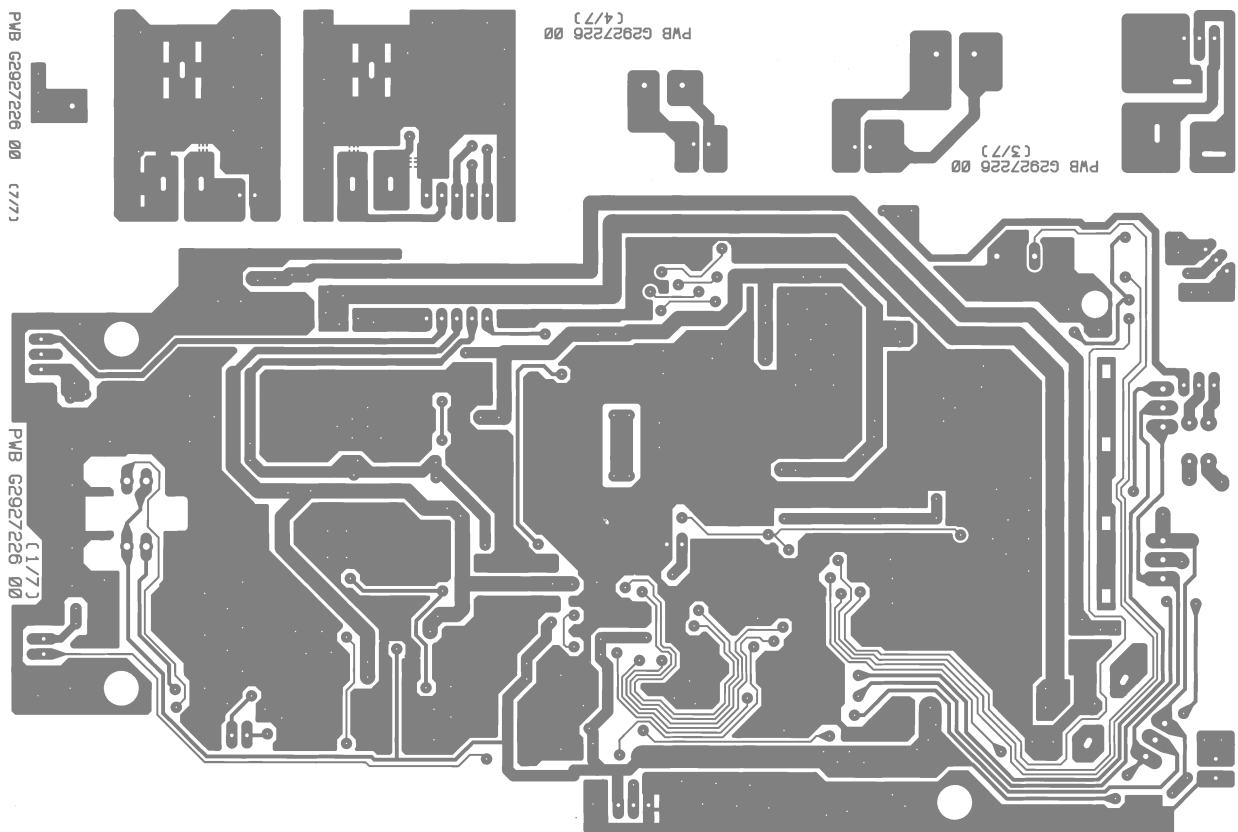
# CIRCUIT DIAGRAM



# CIRCUIT BOARD



View from components side



View from foil side