EK30

Evaluation Kit

APPLICABLE PARTS (SOLD SEPARATELY)

- PA07
- PA08
- PA85
- PA88
- PA96

勝 特 力 材 料 886-3-5753170
胜特力电子(上海) 86-21-34970699
胜特力电子(深圳) 86-755-83298787
Http://www.100y.com.tw

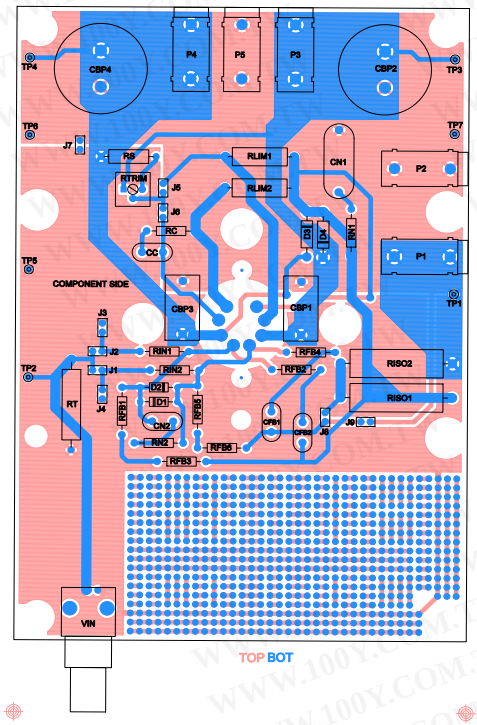
INTRODUCTION

This easy to use kit provides a platform with good circuit board layout and grounding to evaluate Power Amplifiers PA07, PA08, PA09, PA85, PA88, and PA96. With additional prototype area, it is flexible enough to analyze a multitude of standard or proprietary circuit configurations. All components are provided with the kit. Similar circuitry is used for evaluation and the circuit for a particular package can be changed using jumpers. External connections to the evaluation kit can be made through the connectors at the edges of the circuit. The circuit provides an input line termination of 50 Ω.

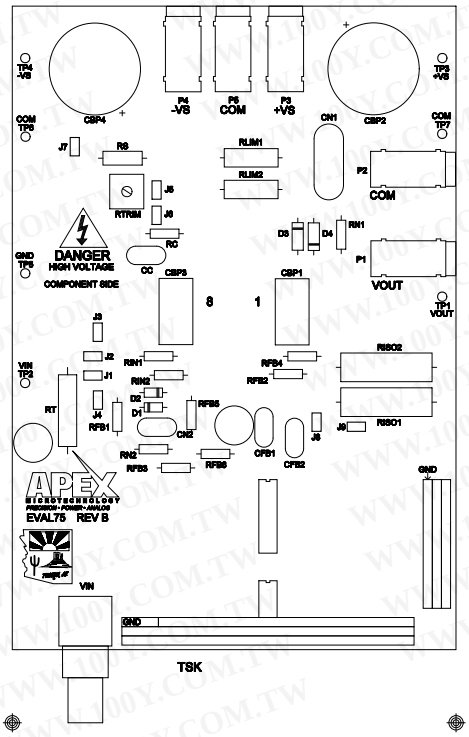
The PA07 and PA09 are configured for a gain of 12. The PA08 and PA96 are configured for a gain of 21. The PA85 and PA88 are configured for a gain of 53. This evaluation kit provides flexibility for modifying the gain, in inverting or non-inverting mode.

Figure 1: PCB Layout

Composite



Component Side



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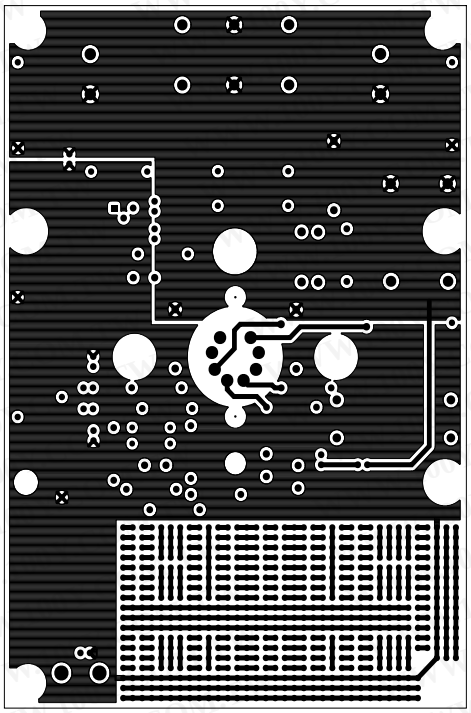
Top Metal Layer



Bottom Metal Layer

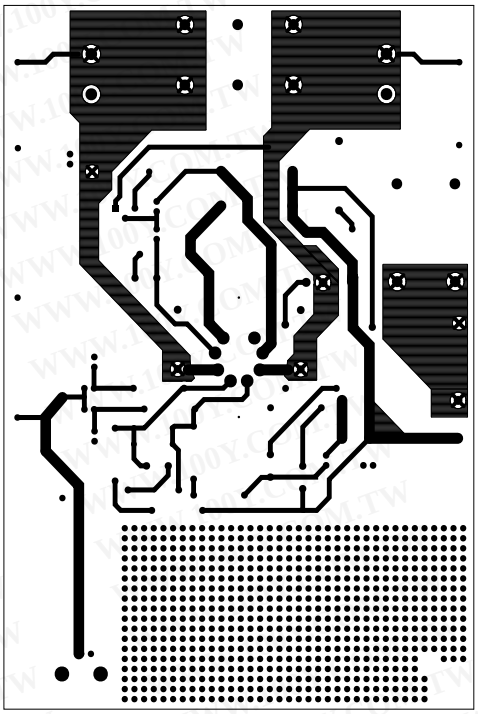
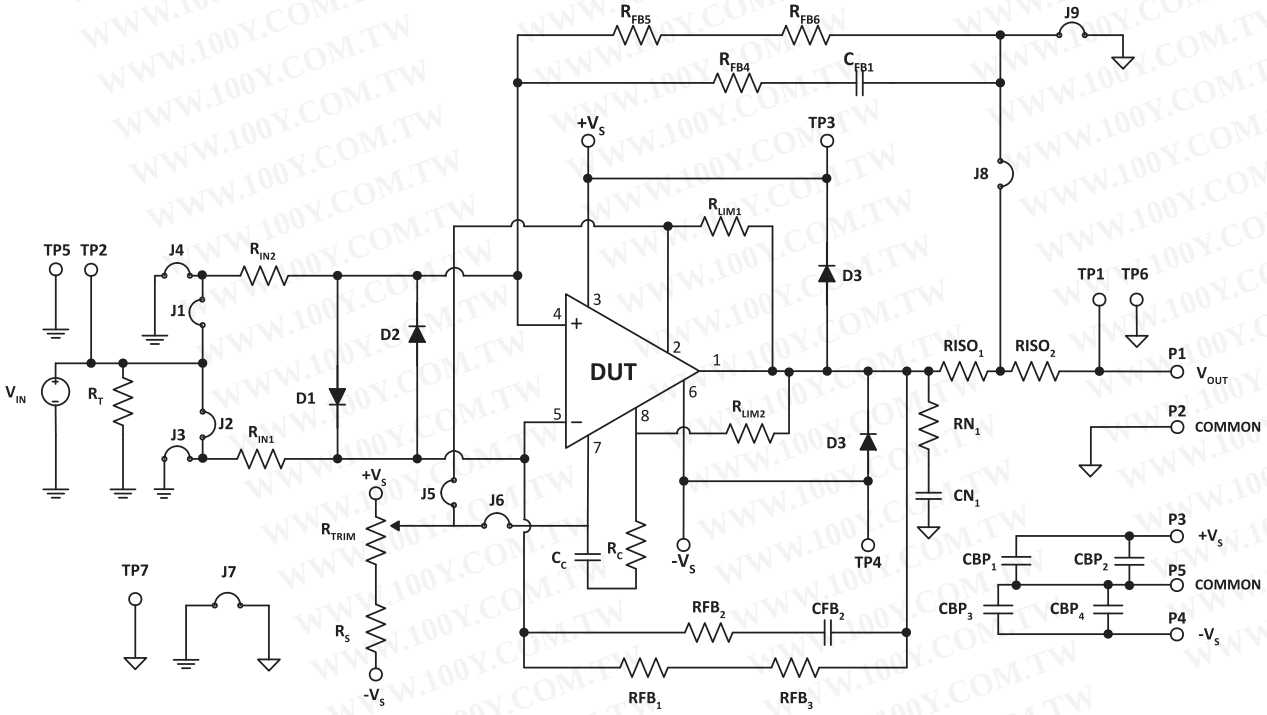


Figure 2: Complete PCB Schematic Diagram



PARTS LIST

Reference	Manufacturer Part #	Description	Qty
Resistors			
RT	PR03000205109JAC00	51 Ω, 3W, 5%	1
RIN, RIN2	RN60D1801FB14	1.8 kΩ, 1/4W, 1%	2
RFB1-A, RFB3-A	CMF5510K000FKEA	10 kΩ, 1/4W, 1%	2
RFB1-B, RFB3-B	RN60D1802FB14	18 kΩ, 1/4W, 1%	2
RFB1-C, RFB3-C	RN60D4702FB14	47 kΩ, 1/4W, 1%	2
RLIM1-A, RLIM2-A	ERX-3SJR22V	0.22 Ω, 3W, 5%	2
RLIM1-B	ERX-3SJR68	0.68 Ω, 3W, 5%	1
RLIM1-C, RLIM2-C	ERX-3SJ4R7	4.7 Ω, 3W, 5%	2
RLIM1-D	PR01000101109JR500	11 Ω, 1W, 5%	1
RTRIM	3386T-1-502LF	5 kΩ, 1/2W	1
RS-A	CMF55267K00FHEB	267 kΩ, 1/2W, 1%	1
RS-B	PR02000207503JR500	750 kΩ, 2W, 5%	1
RIS01, RIS02		0 Ω, Wire Jumper	2
Printed Circuit Board			
EVAL 75	EVAL 75	Printed Circuit Board	1
Capacitors			
CC-A	CD15CD050DO3F	MICA, 5pF	1
CC-B	CD15CD100JO3F	MICA, 10pF	1
CC-C	CD15ED330JO3F	MICA, 33pF	1
CBP1, CBP3	DME6P22K-F	FILM, 0.22uF	2
CBP2, CBP4	381LX221M400J452	ALUM, 220uF	2
Diodes			
D1, D2	1N4148-T	Switching Diode	2
D3, D4	MUR160G	Rectifier, Ultra Fast	2
Hardware			
	HS02	Heatsink, PA08, PA88	1
	HS14	Heatsink, PA07, PA09, PA85, PA96	1
	TW03	Thermal Washer (Pack of 10 Pcs)	1
	MS03	Socket, TO-3	1
	146510CJ	BNC Connector, PC Mount	1
	571-0100	Banana Jacks, PC Mount	5
	91735A190	Screw, Panhead, #8 X 0.25”	4
	91735A192	Screw, Panhead, #8 X 0.375”	4
	91841A009	Nut, Hex, #8	4
	8426	Spacer, Hex, with Stud, #8 X 0.375”	4
	8413	Spacer, Hex, with Stud, #6 X 0.375”	4
	2221	Standoff, Hex, #8 X 2.00”	4

Reference	Manufacturer Part #	Description	Qty
	91735A151	Screw, Panhead, #6 X 0.75”	2
	91841A007	Nut, Hex, #6 X 5/16”	6
	91735A146	Screw, Panhead, #6 X 0.375”	4
Miscellaneous			
	TFT20018NA005-6"	Tubing, Teflon, #18AWG, 6 Inches	1
	SPC02SVJN-RC	Jumper, Slip On	10
	PRPC002SADN-RC	Header, Connector	10
	5001	Test Point, PC Mini	10

Table 1 identifies the components that should be installed in the schematic for a particular Power Amplifier. The top row lists all the Power Amplifiers. The “X” indicates components which are common to all six op amp models. N/A means that the component should not be installed. The letters A, B, C, D indicate the specific type of component to be selected from the parts list above. The parts list shows all the components that are supplied with the kit.

TABLE 1

	PA07	PA08	PA09	PA85	PA88	PA96
RT	X	X	X	X	X	X
RIN1, RIN2	X	X	X	X	X	X
D1, D2, D3, D4	X	X	X	X	X	X
RC	N/A	N/A	0Ω	0Ω	0Ω	0Ω
CC	N/A	N/A	C	A	B	B
RFB1	A	B	A	C	C	B
RFB3	A	B	A	C	C	B
RLIM1	A	C	N/A	C	D	B
RLIM2	A	C	N/A	N/A	N/A	N/A
RS	A	B	A	N/A	N/A	N/A
RTRIM	X	X	X	N/A	N/A	N/A
RISO1, RISO2	X	X	X	X	X	X
CBP1, CBP2, CBP3, CBP4	X	X	X	X	X	X

BEFORE YOU GET STARTED

- All Apex Microtechnology amplifiers should be handled using proper ESD precautions.
- Always use the heat sink and thermal washers included in this kit.
- Always use adequate power supply bypassing.
- Do not change the connections while the circuit is powered.
- Initially set all power supplies to the minimum operation levels allowed in the device data sheet.
- Check for oscillations.
- Please refer to Application Note, AN01 for general operating considerations.

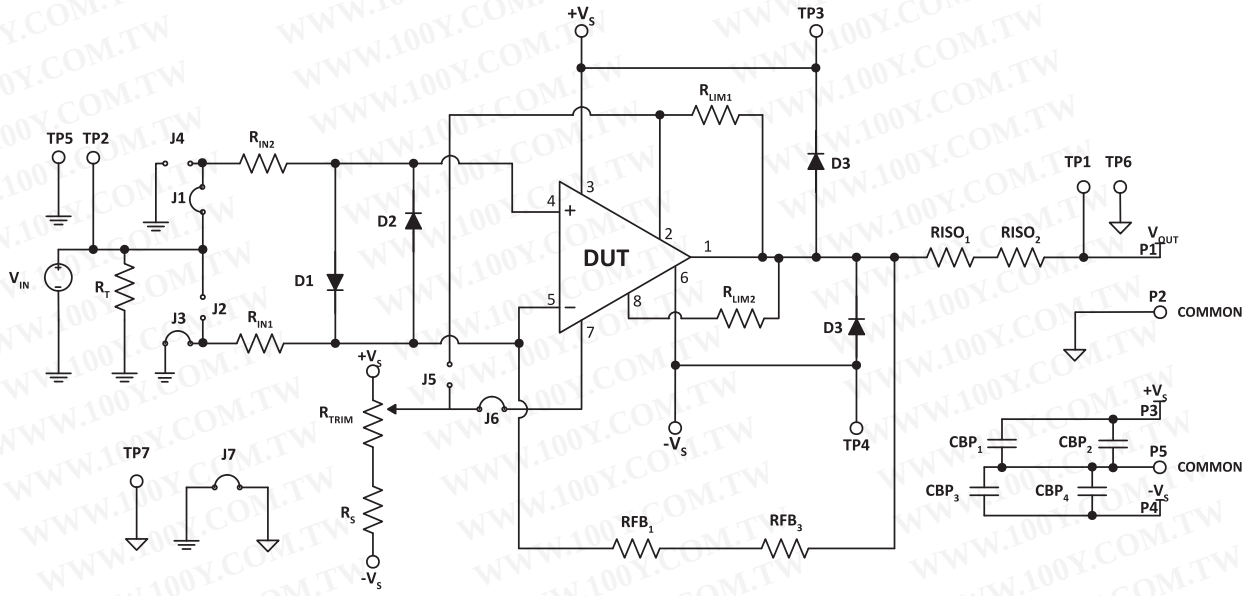
ASSEMBLY

During the assembly, please refer to the circuit schematics, assembly drawings, and the data sheet of the part being used on the evaluation kit.

1. Note that each side of the circuit board is identified as either the component side or the DUT side. The component side has the reference designators printed on that side.
2. All the components (except the mating socket) are installed on the component side of the board and soldered on the DUT side.
3. A T0-3 socket (MS03) is supplied with this kit. The MS03 socket incorporates two cavities to retain the #6 x 5/16” nuts (91841A007). Insert one #6 nut into each cavity. Make sure the nuts are fully seated into the cavities. (Using #6 x 0.75” screws (91735A151) provided with the kit, mount the socket on DUT side of the board.)
4. Two heat sinks are provided with this kit. Use the larger heat sink (HS14) for power amplifiers PA07, PA09, PA85, and PA96. Attach the heat sink to the board from the DUT side, using #8 x 0.375” screws (91735A192). Refer to the assembly drawings for the correct way to attach the heat sink. This is done to keep the socket tightly mounted to the board, to provide support, and eliminate stress so that the socket pins do not move while being soldered from the component side. Once the socket pins are soldered, the socket is now attached to the board; remove the heat sink and all the screws.
5. First install all the smaller components on the board. This is done because it becomes difficult to install a smaller part on the board once all the larger components are installed.
6. Refer to the table 1 for the components to be soldered for a specific Power amplifier.
7. Some components are common for all the power amplifiers (RT,RIN1,RIN2,D1,D2,D3,D4,RISO1,RISO 2,CBP1,CBP2,CBP3,CBP4). Install these parts first.
8. Ensure that the orientation of the electrolytic capacitors (EC07) and the diodes match the circuit schematic drawing.
9. Mount the BNC connector provided with the kit (146510CJ) and solder it to the board. Also, mount the banana jacks (571-0100) provided with the kit.
10. Attach the appropriate heat sink (HS02 for PA08, PA88 and HS14 for PA07, PA09, PA85, and PA96) to the board from the DUT side, as in **STEP 4**.
11. Stand offs (#8 Hex, 91841A009) are also provided with the kit. Install the # 8 x 0.25”screws (91735A190), provided with the kit, from the component side. Attach the standoffs to these screws on the corners of the board. Refer to the assembly drawings while installing the standoffs.
12. Cut the Teflon tubing into 8 pieces, each of length 0.121 (1/8 of an inch) inches approximately. These pieces go onto the pins of the Power Amplifier before inserting it into the socket. The Teflon tubing is used to insulate the pins from the heat sink and make sure that the PA is tightly fixed into the socket. An Exacto knife works well for this.
    NOTE The Teflon pieces should not be longer than the suggested length. If the pieces are longer, they may interfere in the seating of the part to the heat sink and create a gap between the heat sink and the part body.

13. Ten thermal washers (TW03) are provided with the kit. The thermal washer is used between the part and the heat sink. A new washer must be used for each mounting. Mount the Power amplifier to the socket using the thermal washer provided with the kit and secure with the #6 screws.
14. Connect the external connections via the BNC connector and the banana jacks. Hook up power supply and input signals as necessary. The amplifier is now ready for testing.

Figure 3: PA07, PA08, PA09 Circuit Configuration Diagram



FOR PARTS PA07 AND PA08: (J1, J3, J6) (REFER TO TABLE 1 FOR SPECIFIC COMPONENT VALUES)

(Refer to Figure 3)

1. These two parts do not require a compensation capacitor or a compensation resistor.
2. Now, to set the gain for both the parts, please refer to the table in the parts list for the correct feedback resistors, (RFB1 and RFB3). Install these resistors on the component side of the board.
3. Please refer to the parts table for choosing the correct current limiting resistor (RLIM1 and RLIM2) and install these resistors on the component side of the board.
4. The potentiometer, RTRIM is also provided along with the kit. Install the potentiometer and the series resistor, RS on the component side.
5. Place jumpers J1, J3 and J6 only.

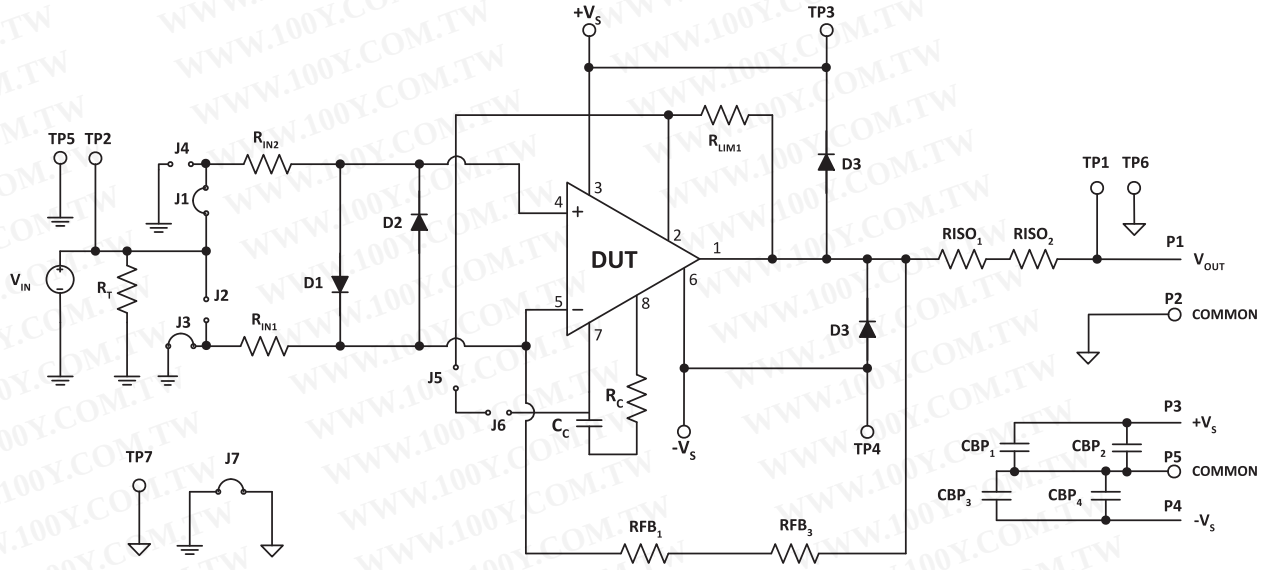
FOR PART PA09: (REFER TO TABLE 1 FOR SPECIFIC COMPONENT VALUES)

(Refer to Figure 3)

1. Install the compensation capacitor, CC which is provided in the kit.
2. Install feedback resistors RFB1 and RFB3.
3. Install potentiometer, RTRIM and the series resistor, RS.
4. Place Jumpers J1, J3 and J5.

Notes: **a)** For PA09, place J5 jumper, and omit J6 jumper.
b) Do not install RLIM1 and RLIM2

Figure 4: PA85, PA88, PA96 Circuit Configuration Diagram

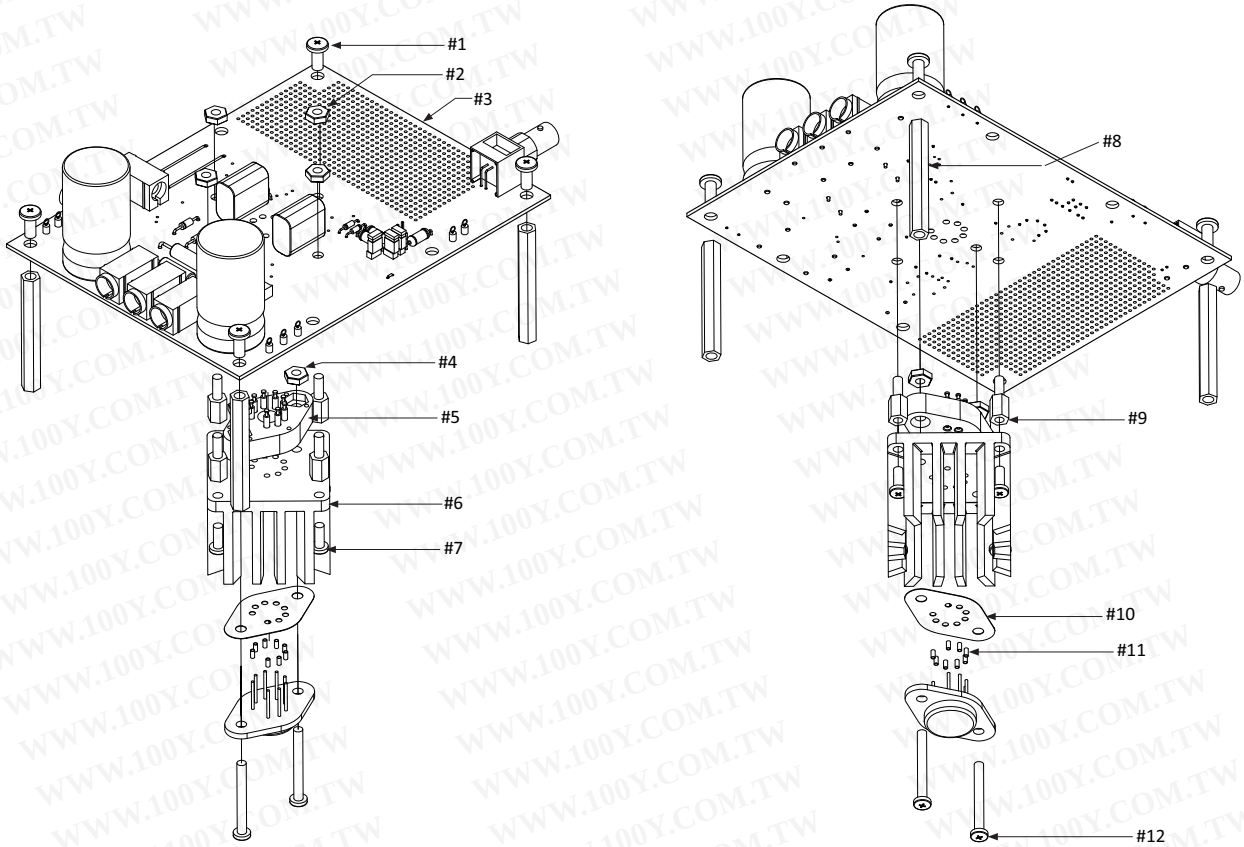


FOR PARTS PA85, PA88, AND PA96: (REFER TO TABLE 1 FOR SPECIFIC COMPONENT VALUES)

(Refer to Figure 4)

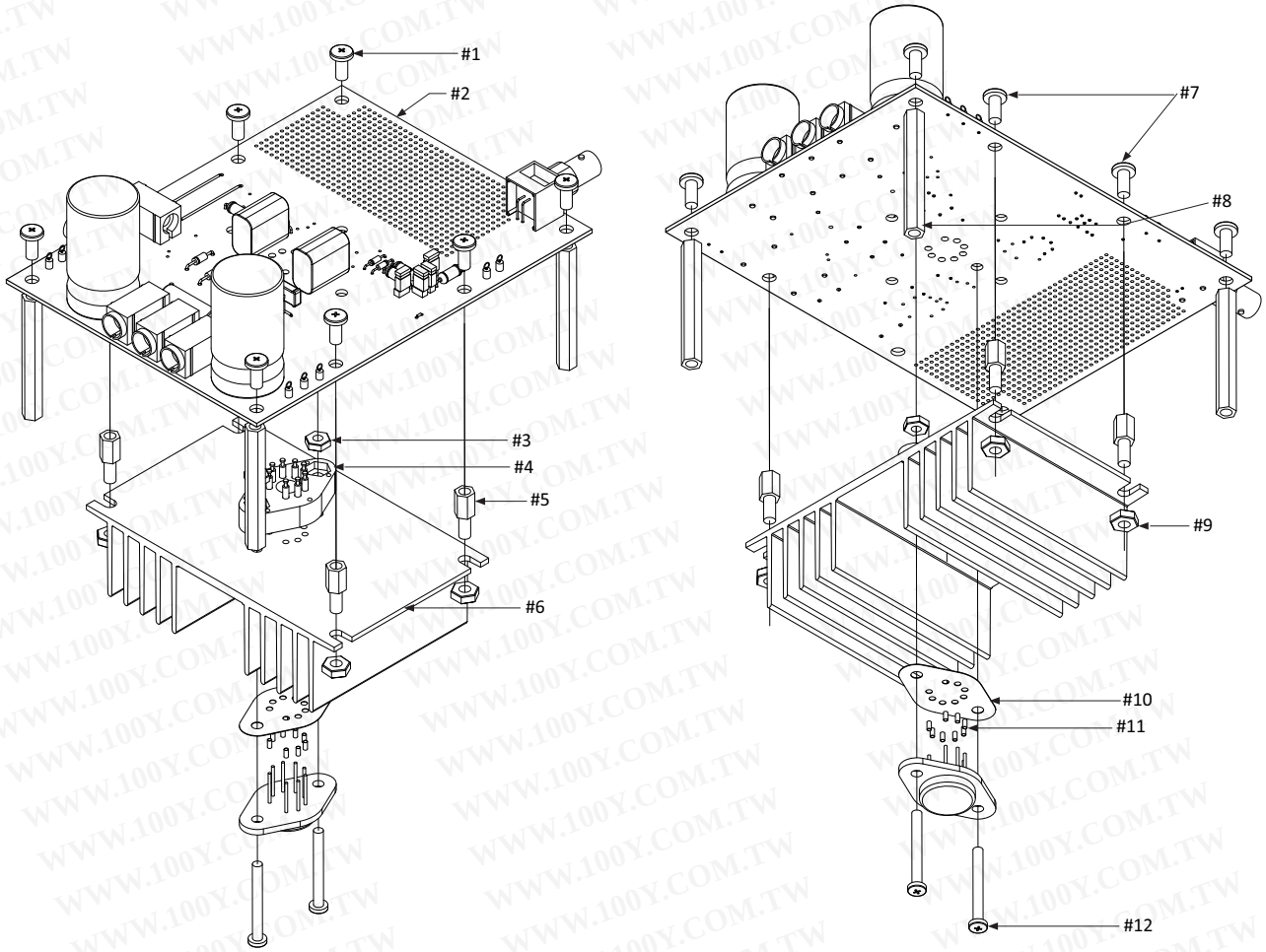
1. Install the compensation capacitor CC.
2. Install the feedback resistors, RFB1 and RFB3.
3. Install current limiting resistor, RLIM1.
4. Place Jumpers J1 and J3.

Figure 5: PA08, PA88 Assembly Diagram



1. 4 X #8 X 0.375" SCREW
2. 4 X #6 HEX NUT
3. 2 X EVAL 75 PCB
4. 2 X #6 HEX NUT
5. 1 X MS03 SOCKET
6. 1 X HS02 HEATSINK
7. 4 X #6 X 0.375" SCREW
8. 4 X #8 X 2" HEX STANDOFF
9. 4 X #6 X 0.75" SPACER
10. 1 X TW03 THERMAL WASHER
11. 8 X TEFLON TUBING
12. 2 X #6 X 0.75" SCREW

Figure 6: PA07, PA09, PA85, PA96 Assembly Diagram



1. 4 X #8 X 0.375" Screw
2. 1 X EVAL 75 PCB
3. 2 X #6 Hex NUT
4. 1 X MS03 SOCKET
5. 4 X #8 X 0.375" HEX SPACER
6. 1 X HS14 HEATSINK
7. 4 X #8 X 0.25" SCREW
8. 4 X #8 X 2" HEX STANDOFF
9. 4 X #8 HEX NUT
10. 1 X TW03 THERMAL WASHER
11. 8 X TEFLON TUBING
12. 2 X #6 X 0.75" SCREW

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