

# Evaluation Kit for MP230FC, MP240FC Pin-Out

## INTRODUCTION

This easy-to-use kit provides a platform for the evaluation of linear power amplifiers circuits using the MP230FC/MP240FC pin out. With ample bread boarding areas it is flexible enough to analyze a multitude of standard or proprietary circuit configurations. Critical connections for power supply bypassing are pre-wired. Components not usually readily available in engineering labs are provided. External connection to the evaluation kit can be made via the terminal block and the banana jacks at the edges of the circuit board. Additionally, an optional BNC connector can be inserted into the hole at the edge of the board and wired to the number 5 terminal pad.

## BEFORE YOU GET STARTED

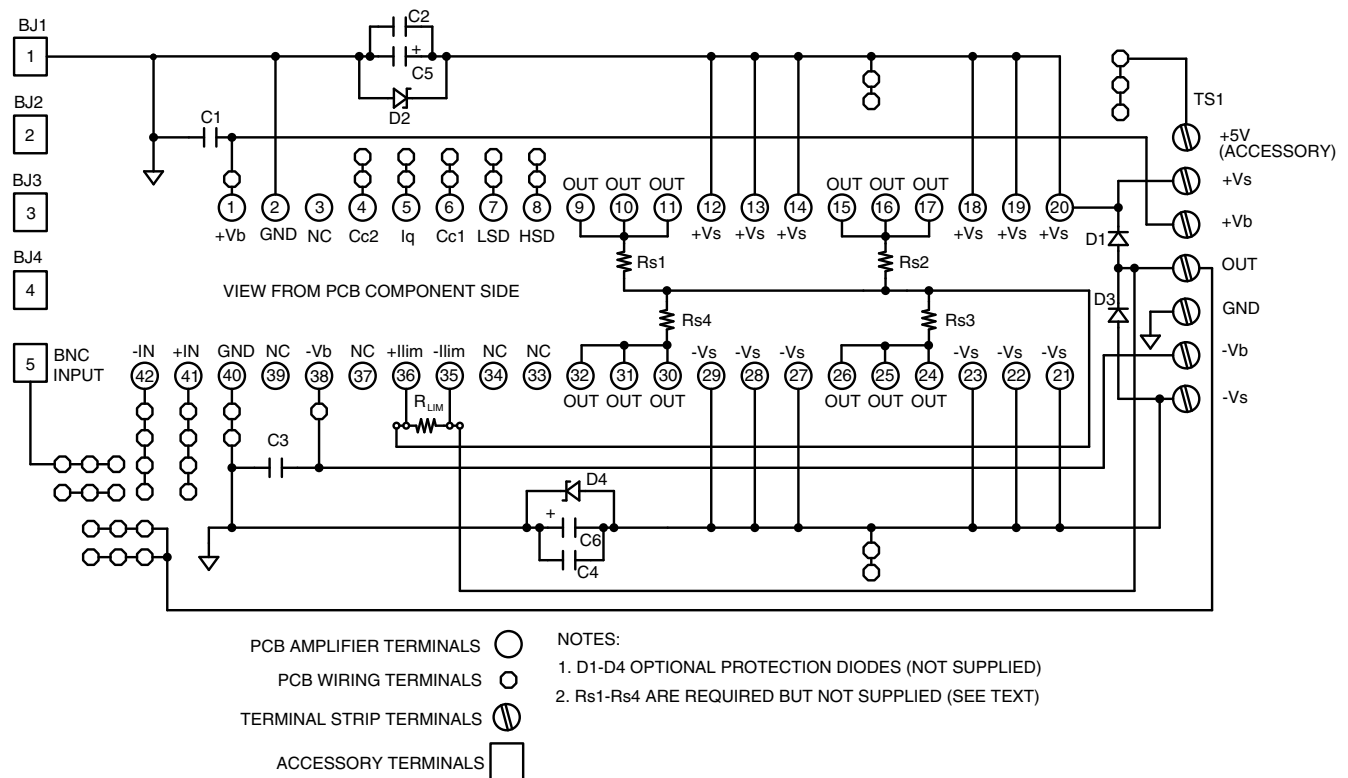
- All Apex Precision Power amplifiers should be handled using proper ESD precautions.
- Do not change connections while the circuit is powered.
- Initially set all power supplies to the minimum operating voltage allowed in the device data sheet.

## PARTS LIST

Ref	Apex Part #	Descrip/Vendor	Qty
NA	HS28	Heat Sink	1
NA	HS26	Heat Sink	1
NA	MS11	Cage jack strip	2
BJ1-4	BJ1	Banana Jack/ Deltron 164-6218	4
NA	EVAL45	PC Board	1
NA	60SPG00004	Spacer Grommets/ Micro Plastics	4
C1-4	OX7R105KWN	1uF Cap/ Novacap 1825B105K201N	4
TS1	TS02	Terminal Strip	1
C5,6*	EC05	2200uF 100V/ United Chemi-Con 82DA222M100KC2D	2
C5,6*	EC03	680uF 200V/ United Chemi-Con KMH200VN681M25MX40T2	2
RLIM*	CSR17	0.025 Ohm Resistor/ Isotek PBV-R025-1	1
RLIM*	CSR18	0.050 Ohm Resistor/ Isotek PBV-R050-1	1
RLIM*	CSR19	0.100 Ohm Resistor/ Isotek PBV-R100-1	1
Rs1-Rs4	NA	Separate purchase required See text.	4

\*Chosen per directions

FIGURE 1. EVAL45 Schematic



## ASSEMBLY

During assembly refer to Figure 3 and the data sheet for the product you are using, either the MP230FC or MP240FC.

1. Note that four balancing resistors, Rs1-Rs4, are required for this evaluation kit and that these resistors are not supplied. Each application will require different values and so these resistors must be purchased by the user before construction of the kit begins. See the recommendation in the product data sheet as to the type of resistor needed and a convenient source for purchasing the resistors. Do not be tempted to operate the amplifier without these resistors.
2. Note that each side of the circuit board is identified as either the "Component Side" or "DUT Side."
3. Locate the two pre-loaded 30-position cage jack carrier strips. Use wire cutters to cut off and discard 10 positions from one of the carrier strips. From the "DUT Side" of the PCB insert this carrier strip into the mounting holes for pins 1-20 of the amplifier and solder from the "Component Side" of the PCB. Be sure that the cage jacks are fully seated before soldering. Be careful that solder does not flow into the cage jack.
4. In a similar manner to step 3 cut off 8 positions from the remaining carrier strip, insert and solder into the mounting holes for amplifier pins 21-42.
5. Pull out and discard each of the carriers.
6. Solder the surface mount capacitors at C1, C2, C3, and C4 on the "Component Side" of the PCB.
7. Solder the surface mount balancing resistors that you purchased separately at Rs1-Rs4 on the "Component Side" of the PCB.
8. Mount the four horizontal banana jacks at locations BJ1-4 and a BNC connector, if desired (not supplied), to the PCB pad at location 5. Solder from the "DUT Side" of the PCB.
9. Mount the terminal strip to the "Component Side" of the PCB. Make sure the terminal strip is fully seated and solder the pins from the "DUT Side" of the PCB. Be sure to fill the mounting holes with solder.
10. Mount the electrolytic capacitors at C5 and C6 from the "Component Side" of the PCB. Match the polarity markings on the capacitor with the polarity markings on the PCB. Use the correct voltage capacitors for the product you are using: 100V capacitors for the MP230 and 200V capacitors for the MP240. Be sure the capacitors have snapped into the PCB and solder from the "DUT Side" of the PCB. Be sure to fill the holes with solder.
11. Several low ohm value resistors are provided with this evaluation kit: 0.025 ohm, 0.050 ohm and 0.100 ohm. These are used to implement current limiting in the output circuit. Select the value most appropriate for your application. Refer to the product data sheet to determine which resistor value you should use.
12. Mount the HS28 heat sink to the PCB and solder the mounting tabs of the heat sink.
13. Apply a thin layer of thermal grease on the back of the chosen current limiting sense resistor, insert the resistor into the PCB and mount the resistor to the HS28 heat sink using #4 screw and nut hardware (not supplied). Solder the leads of the current limiting resistor from the "DUT Side" of the board. Be sure to fill the mounting holes with solder.
14. Mount other components and wiring as needed to complete your application circuit using the pads and holes provided.
15. From the "DUT side" of the PCB snap the spacer-grommets into the holes at the four corners of the PCB. Notice that the holes are slightly rectangular and match the spacer-grommet's long and short sides to the holes in the PCB.
16. Apply a thin layer of thermal grease to the amplifier base. Position the amplifier over the mounting holes in the HS26 heat sink. Firmly push the amplifier onto the heat sink while slightly rotating the amplifier back and forth, ending with the mounting holes of the amplifier over the mounting holes in the heat sink.
17. Attach the amplifier to the heat sink with 4 4-40 X 1/2" male-female hex spacers (not supplied). These spacers serve as alignment pins and aide in the assembly of the PCB to the heat sink. Alternately, use 4-40 X 1/4" machine screws to mount the amplifier to the heat sink. Do not over-tighten the spacers or screws as this provides no thermal benefit and may break the hardware.
18. Place the PCB assembly onto the HS26 heat sink so that the four hex spacers come through the aligning holes near the four corners of the amplifier position in the PCB. Carefully lower the PCB assembly until the pins of the amplifier engage the cage jacks. Alternately, sight through the aligning holes in the PCB and match-up the PCB to the screws used to mount the amplifier. In either case be sure the pins of the amplifier are engaged with the cage jacks and then continue pushing the PCB assembly in the area between the amplifier's pins until the 4 spacer grommets at the four corners of the PCB touch the HS26 heat sink. At this point you may need to push the PCB down slightly in the area of the amplifier if the PCB is bowed.
19. Use #8 X 1" sheet metal screws (not provided) to mount the PCB to the heat sink at the four spacer-grommets.
20. Hook up power and signals as necessary. The amplifier is now ready for testing.

**FIGURE 2.**

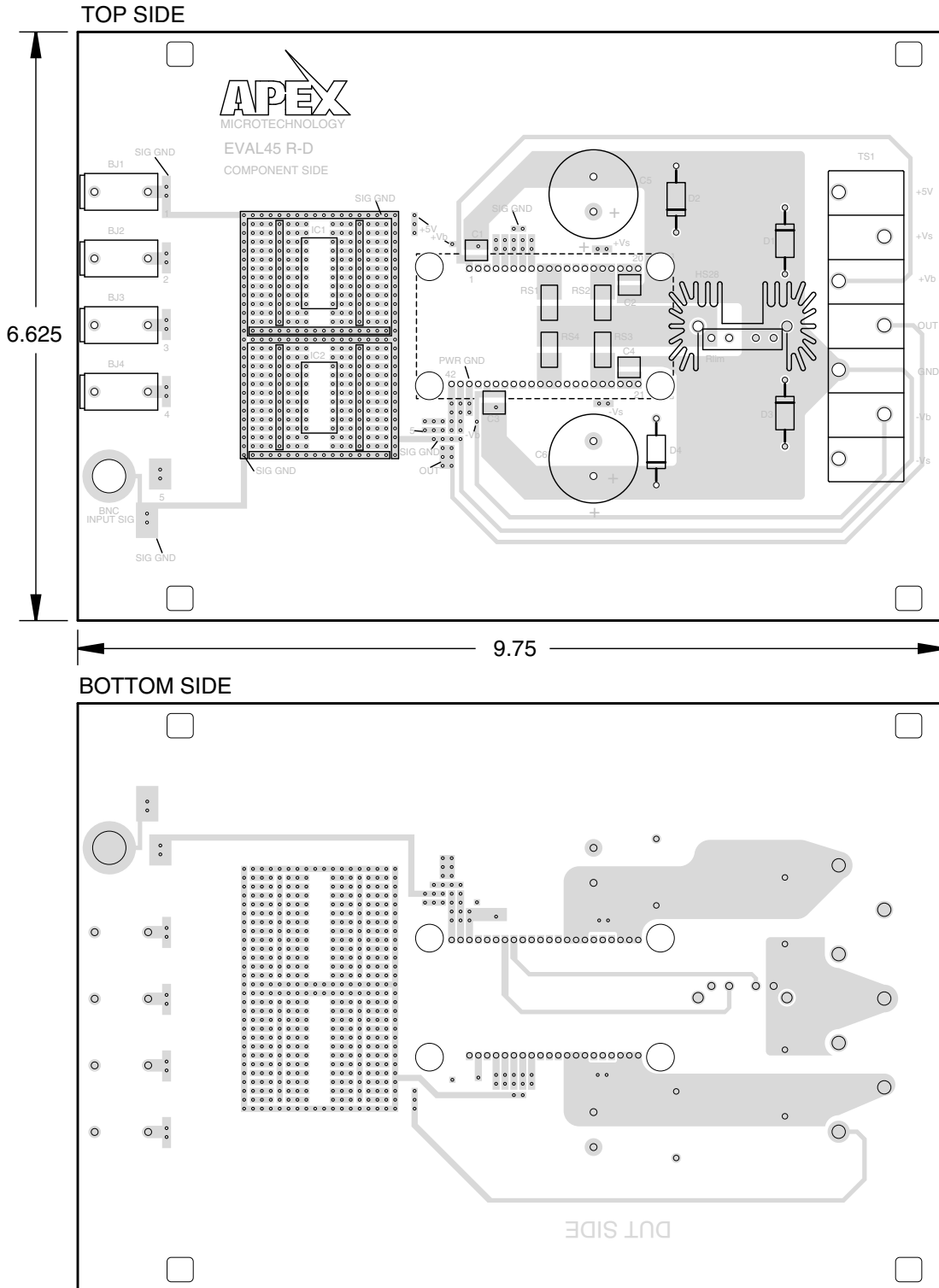
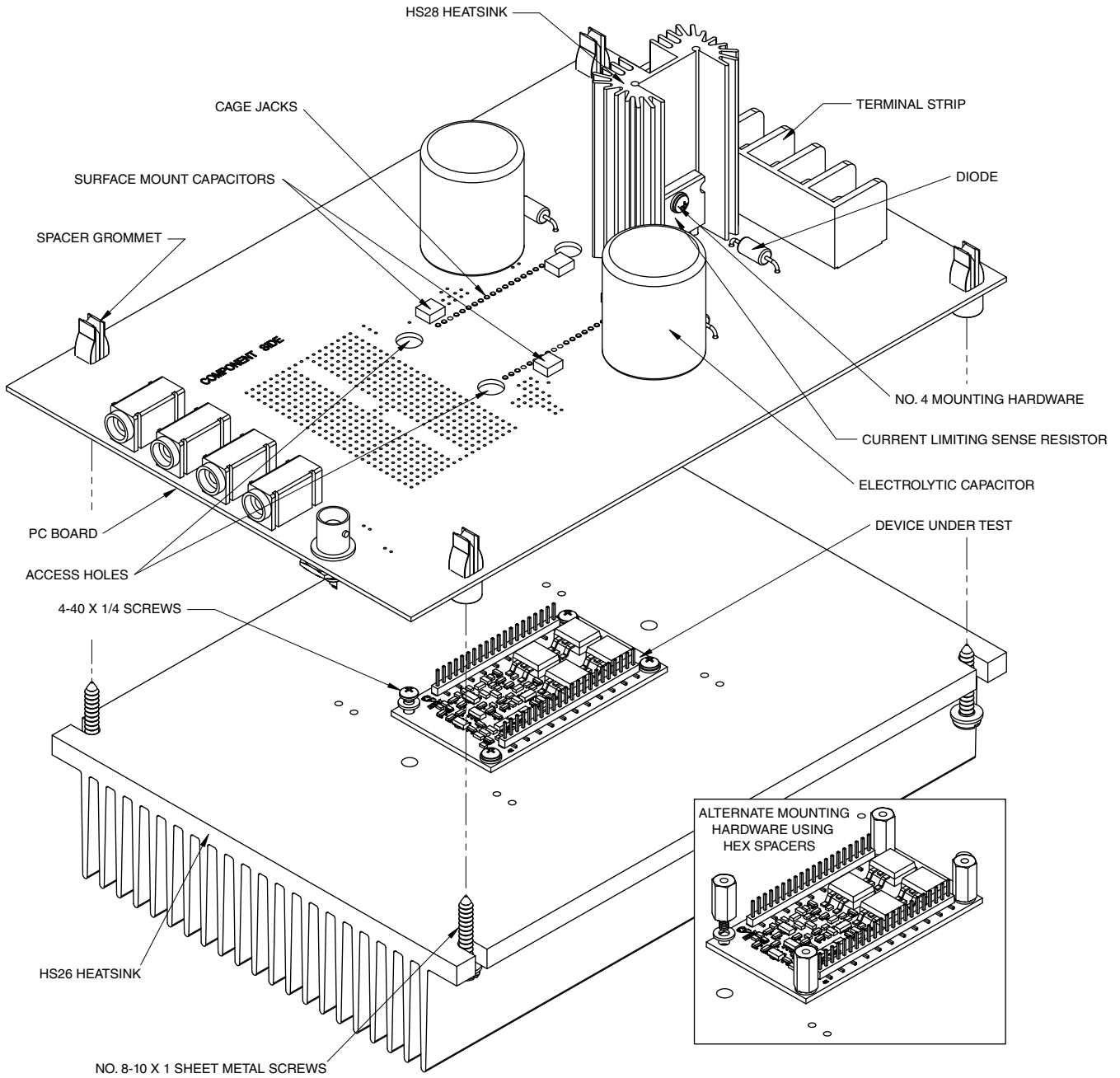


FIGURE 3.



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## **CONTACTING CIRRUS LOGIC SUPPORT**

For all Apex Precision Power product questions and inquiries, call toll free 800-546-2739 in North America.

For inquiries via email, please contact [apex.support@cirrus.com](mailto:apex.support@cirrus.com).

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