

## Evaluation Kit

### APPLICABLE PARTS (SOLD SEPARATELY)

- CD64GT (High Voltage Power Booster)

### INTRODUCTION

This easy-to-use kit provides a platform for the evaluation of the CD64 modular high voltage power booster. This kit can be used to analyze the standalone configuration of the CD64.

Construction will involve both surface mounting, and holes are provided to mount standard banana and BNC connectors for I/O. See Apex Microtechnology Accessories Information data sheet for selection of flat-backed heatsinks and thermal washers for this package.

**Figure 1: Schematic**

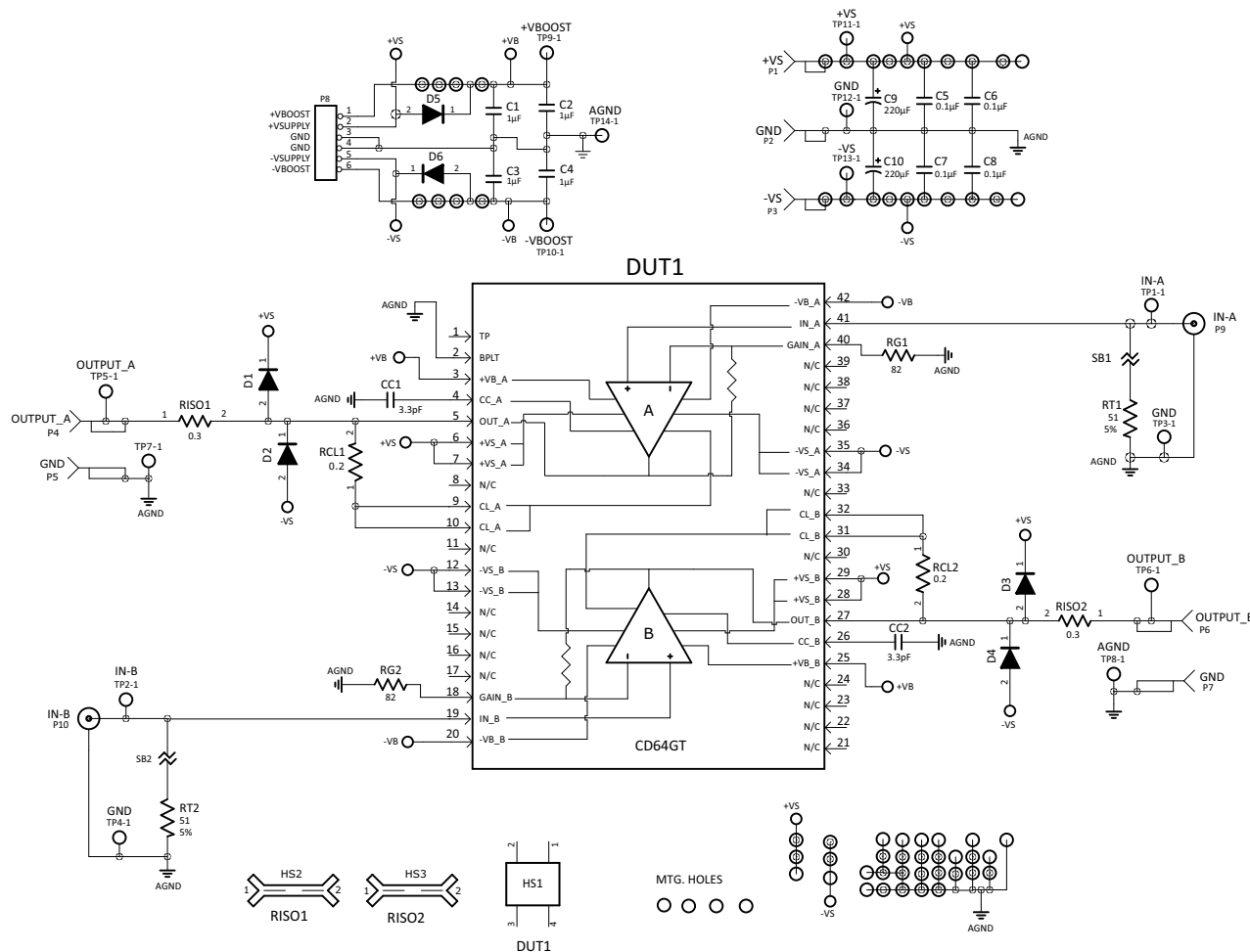
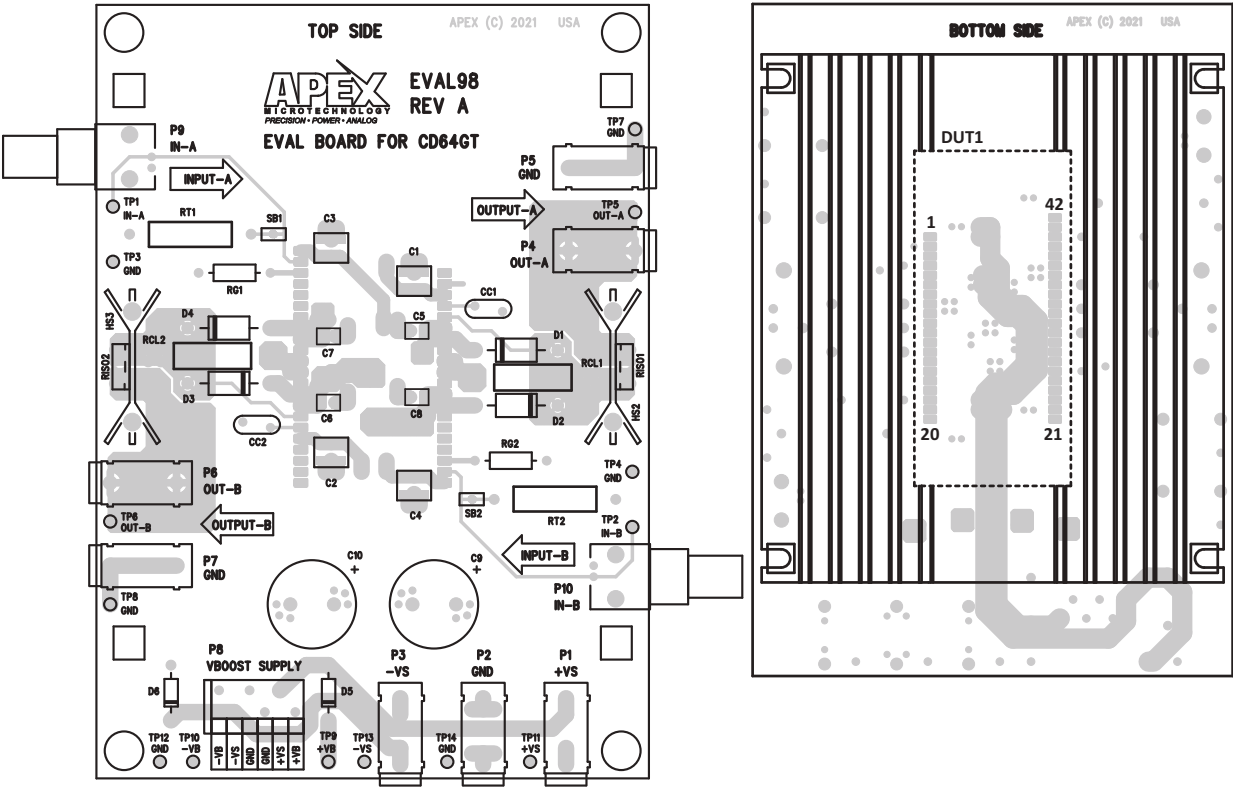


Figure 2: PCB Layout



## PARTS LIST

Reference	Manufacturer Part #	Description	QTY
<b><u>Printed Circuit Board</u></b>			
EVAL98	EVAL98	Printed Circuit Board	1
<b><u>Resistors</u></b>			
RT1, RT2	PR03000205109JAC00	51.1 $\Omega$ Input Termination Resistor	2
RCL1, RCL2	MOSX3CT521A0R2J	0.2 $\Omega$ , Current Limit Resistor	2
RISO1, RISO2	MP930-0.30-1%	0.3 $\Omega$ , TO-220, Load Isolation Resistor	2
RG1, RG2	CFR-50JB-52-82R	82 $\Omega$ , Gain Set Resistor	2
<b><u>Capacitors</u></b>			
C1-C4	1825B105K201N	1 $\mu$ F 200V, 1825, Bypass Capacitor	4
C5-C8	C1210V104KCRCTU	0.1 $\mu$ F, 500V, 1210, Bypass Capacitor	4
C9, C10	LGU2D221MELY	220 $\mu$ F, 200V, Bypass Capacitor	2
CC1, CC2	C317C339D2G5TA	3.3pF, 250V, C0G/NP0, 0603, Compensation Capacitor	2
<b><u>Diodes</u></b>			
D1-D4	MUR420RLG	Diode, Rectifier, 200V, 1A, Output Protection Diodes	4
D5, D6	MUR140RLG	Diode, Fast Recovery, 400V, 1A, Power Supply Sequencing Diodes	2
<b><u>Hardware</u></b>			
P1-P7	571-0100	Test Sockets, Banana Jacks	7
P8	1985234	6 position, 3.5mm spacing, Terminal Block for Boost Supplies	1
P9, P10	5226990-6	BNC Connector, Signal Input Connector	2
	S703-93-130-47-052100	Pin Receptacles, MS11, Strip of 30	2
TP1-14	5001	Test Point	14
HS1	HS40	HS40, Heatsink	1
	91772A106	Pan Head Screws 4-40 Thread, 1/4" Long, to fasten DUT to heatsink	4
	60SPG00001	Space Grommet, to fasten PCB to heatsink	4
	94997A350	#8 1" Screws, to fasten PCB to heatsink	4
RISO - fasteners	90272A107	4-40, .31", to fasten TO-220 resistors to heatsinks	2
RISO - fasteners	96537A120	4-40, Stainless Steel Nut	2
HS2, HS3	HS23	TO220, Heatsink	2
	91735A190	8-32, .25", to fasten standoff to PCB	4
	2221	8-32, 2" standoff	4



## BEFORE YOU GET STARTED

- All Apex Microtechnology amplifiers should be handled using proper ESD precautions.
- Always use the heat sink 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 operations levels allowed in the device data sheet.
- Check for oscillations.
- Please refer to Application Note, AN01 for general operating conditions.

## ASSEMBLY INSTRUCTIONS

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 **TOP SIDE** or the **BOTTOM SIDE**. The component side has the designators printed on that side. Unless otherwise specified, install components on the **TOP SIDE**. The majority of components are installed on the **TOP SIDE**.
2. A pin receptacle is supplied with this evaluation kit. Break it into strips 20 and 22 pins long. Two strip segments can be installed end on end if necessary. Insert the carrier strip through the **BOTTOM SIDE** and solder the cage jacks on the **TOP SIDE**. Once the cage jacks are soldered, remove the carrier strip, leaving only cage jacks soldered on the board.
3. Install SMT components first. **C1-C8** are all surface mount X7R capacitors used for power supply bypassing, particularly for higher frequencies.
4. The next components to solder are all through hole diodes and resistors in the desired circuit configuration, for the exception of the larger TO-220 package resistors, **RISO1** and **RISO2**.
5. After the smaller through hole circuit components have been installed, this is a good opportunity to install the test points, **TP1-TP14**.
6. The next components to solder on are the banana jack connectors, **P1-P7**.
7. Install the BNC connectors, **P9** and **P10**.
8. Install the six-pin terminal block connector **P8**.
9. Install the large electrolytic capacitors, **C9** and **C10**. Be sure to verify the proper polarity when installing.
10. Using the provided hardware, attach **HS2** and **HS3** to **RISO1** and **RISO2**. These assemblies will be installed next on to the board by soldering the resistor leads. Ensure that the resistor leads do not short against the heatsinks. Adding thermal grease between the resistors if available can improve the power dissipation of these components.
11. Install the standoffs on the corners of the PCB. The screws go in through the **TOP SIDE** and should allow the EK to hold the heatsink above the workstation surface.
12. On the **BOTTOM SIDE**, install the 4 grommets which will support the heatsink on the PCB.
13. Install a CD64 onto **HS1** using the provided hardware. Adding thermal grease between the resistors if available can improve the power dissipation of these components.
14. Plug in the CD64 and heatsink assembly into the **BOTTOM SIDE** of the PCB. Be sure to check the orientation of the part while installing since the part has asymmetrical pins. Use the provided hardware to screw in the heatsink into the grommets.

## SUGGESTED EVALUATION CIRCUIT DESCRIPTION

The circuit is configured as a single input power amplifier. This topology allows the user to evaluate each channel of the CD64 independently as a single ended driver or simultaneously operating in bridge mode. The circuit will accept a single ended input signal applied to either input. The voltage gain is approximately 25 Volts per Volt with the component values specified in the table. Please refer to the schematic diagram.

## TEST ASSEMBLY

### *EQUIPMENT NEEDED*

1. Power Supplies
2. Function Generator
3. Oscilloscope
4. Heatsink

## TEST SETUP

1. Connect the power supply to +VS and -VS ports, **P1** and **P3**. Refer to product datasheet for voltage specifications. If boost supplies are to be used connect them to the proper slots on **P8**.
2. Connect the BNC cable from the function generator to either **P9** or **P10**.
3. Do not insert the amplifier and heatsink assembly. Remove if inserted.
4. Power on the input signal and power supplies.
5. Measure voltages on all pins on the **TOP SIDE** to ensure that there is not short and to check that all the pins read correct voltages.
6. Mount the amplifier and heatsink assembly on the PC board. If connecting a resistor load, short **RISO1** and/or **RISO2** with a bus wire. If a piezo load is connected, connect a resistor for **RISO1** and **RISO2**.
7. Input and output waveforms can be checked on an oscilloscope by connecting it to the test points mounted on the board.
8. Begin the test with minimum values of input and supply voltages.

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## **NEED TECHNICAL HELP? CONTACT APEX SUPPORT!**

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