

APPLICATION NOTE CCL-2

Printed Circuit Board (PCB) CCL-2a / PS-2a (Revision A)

The CCL-2a portion of the CCL-2a / PS-2a combination printed circuit board (PCB) employs the Comprobe TIP-120* style downhole CCL amplifier, with current limiting for stable operation at elevated temperatures. The PS-2a portion of the board is intended for use in GO COSMOS tools in conjunction with the CCL-2a circuit. This versatile PCB has multiple applications as described below.

*The TIP-122 Darlington transistor is a higher voltage version of the TIP-120; its use results in a more “bullet proof” circuit.

GO / GOI / MLS COSMOS TOOL APPLICATIONS

The CCL-2a / PS-2a PCB is installed in GO COSMOS tools principally to improve CCL response, replacing the horrible stock GO downhole CCL amplifier. It is a direct replacement for the GO tool power distribution and CCL board assembly 02-9205-07 (PCB marked 02-9205-75). The board is designed for stock low voltage operation, or for modified high voltage operation, making COSMOS tools compatible with high voltage tool strings.

LOW VOLTAGE (40 VOLT) OPERATION

1. Omit zener diode D1, and install jumper at “J1” for low voltage operation.
2. If the tool has positive pulses, omit D2 and install jumper at “J2” (unlabeled next to D2), or if diode protection is desired, connect the line driver to the “L” terminal rather than the diode protected line (see 4 below).
3. Connect the line to the “L” terminal (also bottom feed-thru if present).
4. Connect the line driver to the middle or right diode protected line terminals for negative pulse tools, or positive pulse tools with J2 replacing D2; connect the line driver to the “L” terminal for positive pulse tools with D2 diode protection in place.
5. Connect ground to either ground terminal.
6. Connect the CCL coil to the “CCL” terminal.

7. Connect the 36 volt lead(s) to the “HB+” terminal.
8. Connect the 10 volt lead(s) to the “LB+” terminal.
9. No jumper at “J4”.

HIGH VOLTAGE (120 VOLT) OPERATION

1. Cut jumper trace “J3” (trace on solder side of board).
2. If tool has positive pulses, omit D2 and install jumper at “J2” (unlabeled next to D2).**
3. Connect the line to the “L” terminal (also bottom feed-thru if present).
4. Connect the middle line terminal to the “+” side of a 1.5k Ω , 10 watt resistor shunted (bypassed) with a 2-4 μ f, 150 volt capacitor (either side if capacitor is nonpolar).
5. Connect the right line terminal to said resistor/capacitor “-” side with line driver to same right line terminal (either side if capacitor is nonpolar).
6. Connect ground to either ground terminal.
7. Connect the CCL coil to “CCL” terminal.
8. Connect the 36 volt lead(s) to “HB+” terminal.
9. Connect the 10 volt lead(s) to “LB+” terminal.
10. If R24 is not necessary to control pulse height (if zeners and an extra higher voltage capacitor are added to the line driver circuit), omit R24 and install jumper at “J4” with line driver to middle line terminal, or to the “L” terminal for positive pulses.**
11. No jumper at “J1”.

If series diode protection is desired for a positive pulse tool, the 1.5k Ω , 10 watt resistor **and D2 must be shunted with a 2-4 μ f, 150 volt capacitor (move D2 if necessary). If R24 is omitted, and the line driver is connected directly to line through a higher voltage capacitor, without other modification, pulse heights will be excessive.

CCL APPLICATIONS ONLY

Using only the CCL-2a portion of the PCB, a compact downhole CCL amplifier assembly is created; its mounting centers are identical to the GO COSMOS gamma ray preamplifier PCB. It can be operated at low or high voltage in accordance with tool requirements.

1. Cut at the dashed line and discard the PS-2a portion of the PCB.
2. Cut jumper trace "J3" (trace on solder side of board).
3. Install jumper from the right mounting land to the farthest lower right square terminal pad, making said position a ground terminal.
4. For 120 volt operation, install D1; for 30-50 volt operation, omit D1 and install jumper at "J1".
5. Connect the line to the "L" terminal.
6. Connect ground to either ground terminal.
7. Connect the CCL coil to the "CCL" terminal.
8. No jumper at "J2".