

31 May 2010

Z10080A Bypass/Transfer Relay

Assembly, Installation and Operational Notes

Introduction

Clifton Laboratories amplifier products, such as the Z10040B Norton Amplifier, are equipped with an input protection relay that disconnects the amplifier from the input connector and shunts the input connector to ground through a low value resistor when power is removed from the amplifier. In some cases, it is useful to instead bypass the amplifier, *i.e.*, connect the input to the output when the amplifier is unpowered. The Z10080A is simple add-on module performing the bypass function.

In addition, the Z10080A may be used to bypass other devices, such as the Z10020A band reject filter, or non-Clifton Laboratories products. In the case of high performance filters, such as the Z10020A, however, ultimate filter rejection may be degraded due to relay leakage.

Specifications

Specification	Value
Size	1.25 inches x 1.25 inches (32mm x 32mm)
Isolation (between open contacts)	70 dB at 1 MHz, 40 dB at 32 MHz
Loss (between closed contacts)	Typically less than 0.2 dB
Maximum Power	100 mw (receive only)
Operate/Release Time	Typically 5 ms
Connectors	Standard 3-pin header, spacing 0.1" or direct solder. Outside two pins ground; center pin active.
Power Required	12V DC at 10mA typical.

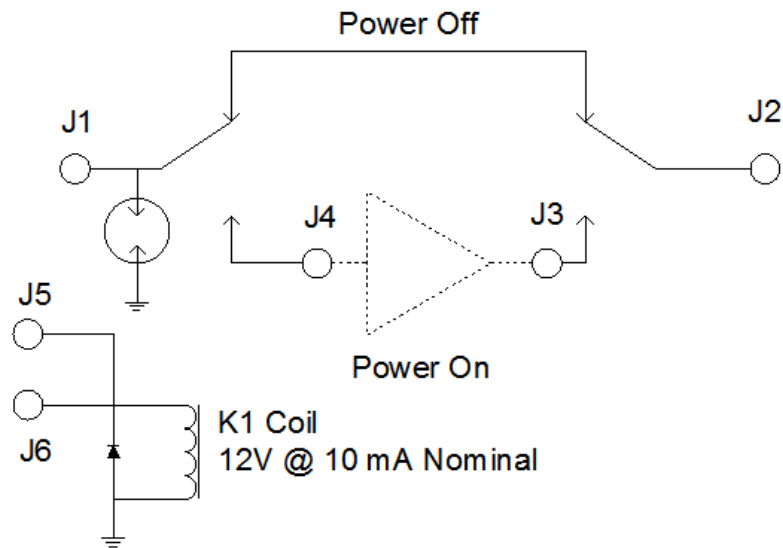
Typical performance measurements provided at Appendix 1

Operation

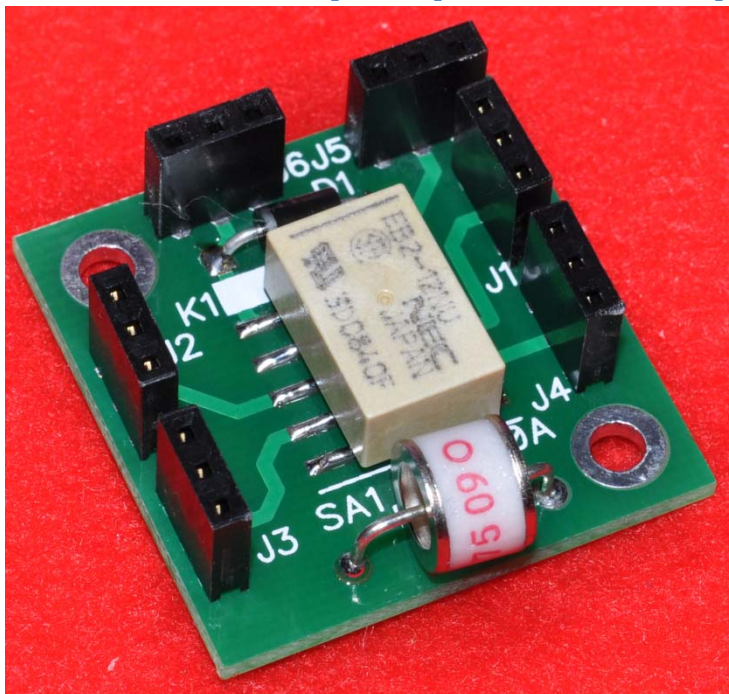
When power is removed from the Z10080A, relay K1 connects J1 to J2. J4 and J3 are disconnected and float. When power is applied, J1 connects to J4 and J2 to J3. If the amplifier or other device to be bypassed is connected with its input to J4 and output to J3, the Z10080A will thus switch the device into the circuit when powered up, and bypass it when power is removed.

For easy connection, the relay coil is connected to both J5 and J6. This simplifies a plug-compatible connection to other Clifton Laboratories amplifiers and filters.

The Z10080A has provisions for a spark gap (“gas trap”) on J1, the input connection. A diode is provided across K1’s coil for polarity protection.



Z10080A, shown with optional pin connectors and optional gas trap.

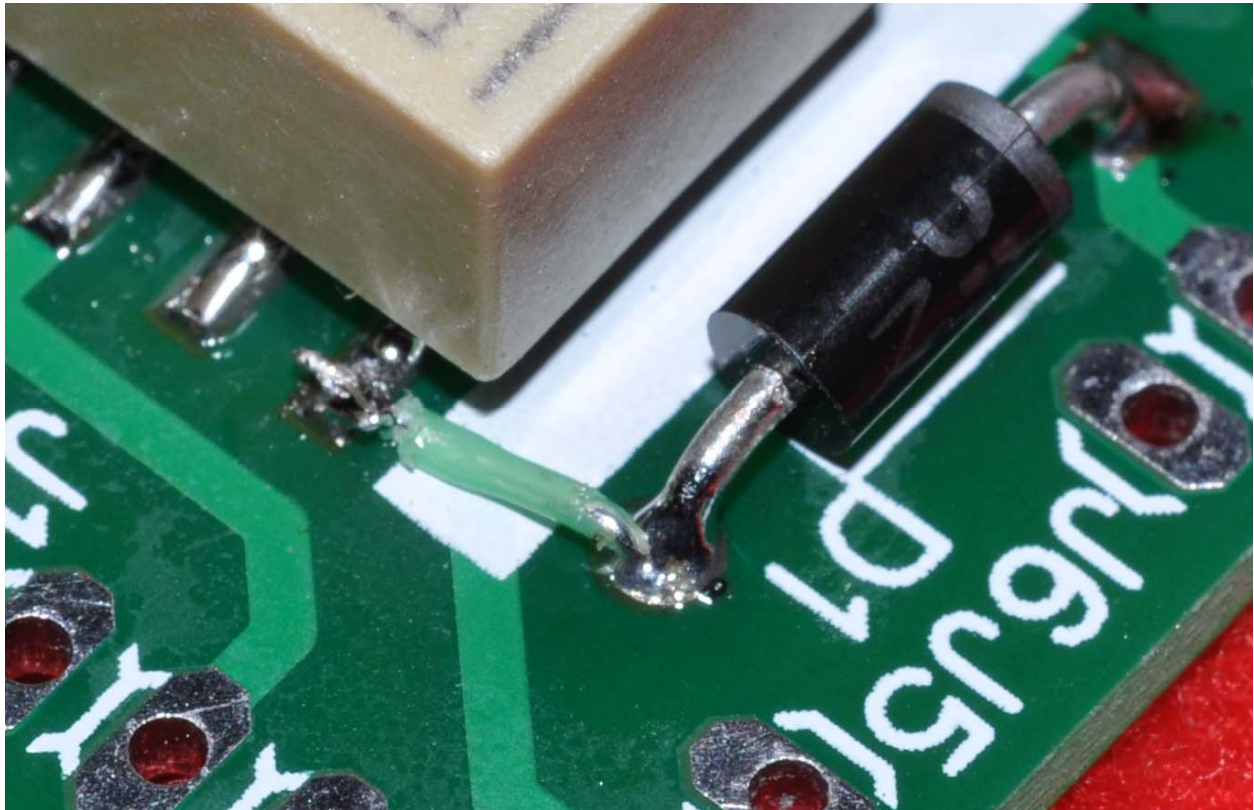


Assembly

Install K1 first. Tin one corner pad and hold K1 in place whilst reflowing the solder on the tinned pad. Verify that K1's pins are centered on the pads and solder the remaining pins. If necessary, touch up the original pin.

Install D1, observing the polarity. Diode bar marking to the silk screen bar marking.

Install a jumper between K1, pin 10 and the ground side of D1 as illustrated in the photograph below.

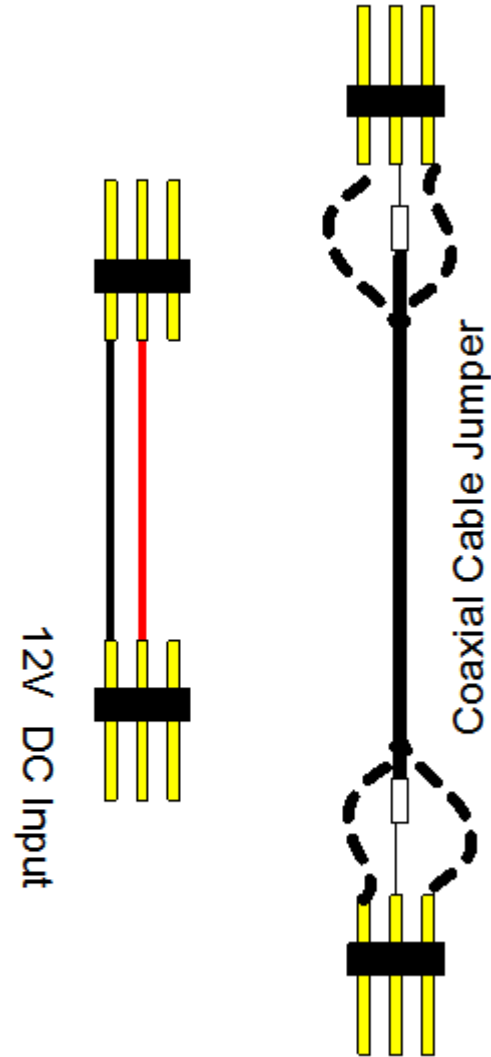
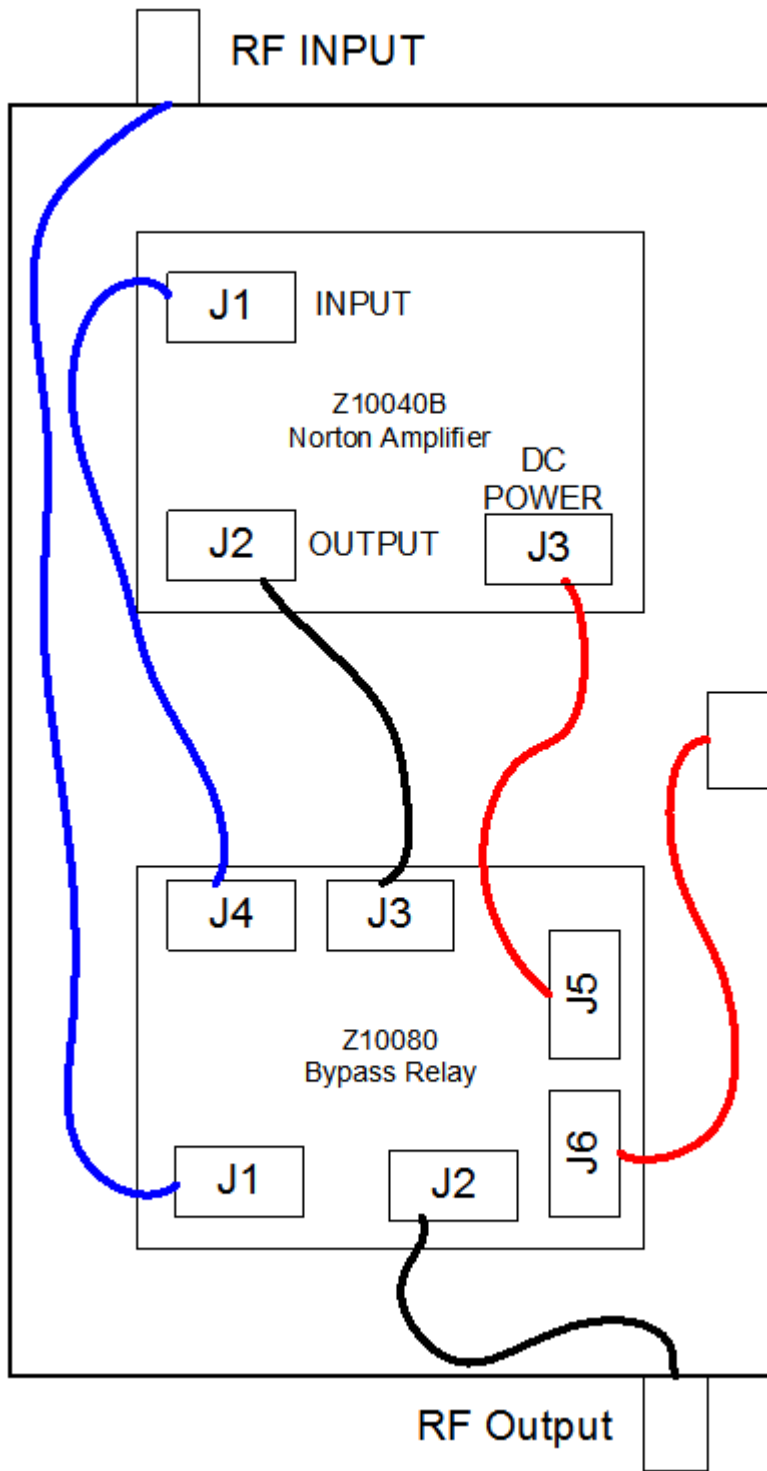


If used, install SA1 (gas trap). If used, install connectors J1 through J6.

Typical Connection

A typical connection of the Z10080A to a Z10040B Norton Amplifier is illustrated below.

Depending upon the size of the enclosure, it may not be possible to install the Z10080A with connectors on the Z10080A board as insufficient vertical clearance exists. In this case, install stub cables to the Z10080A as illustrated later in this document. In either case, the Z10040B's wiring harness may be reused.

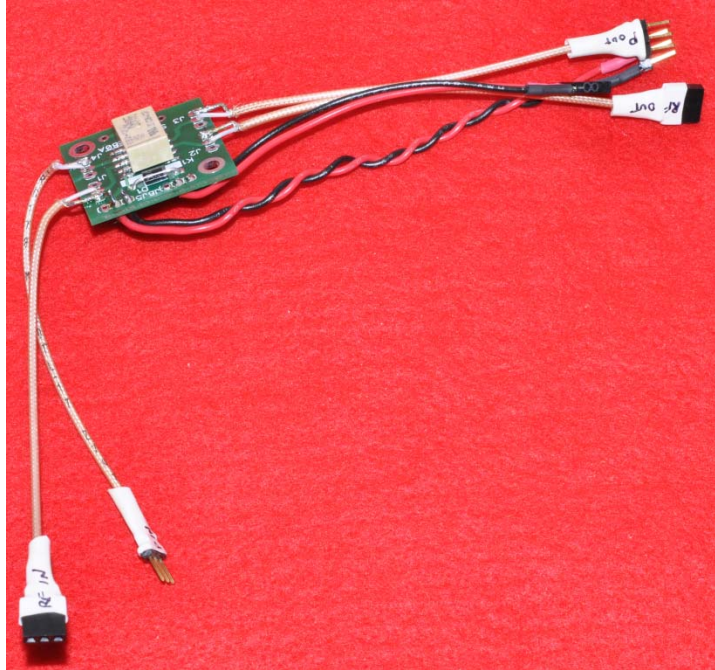


The jumper cables can be assembled as illustrated. Comb the coaxial cable braid and form it into approximately equal sections, soldering one to each of the outside pins. The center conductor attaches to the center connector pin.

Extension Cables

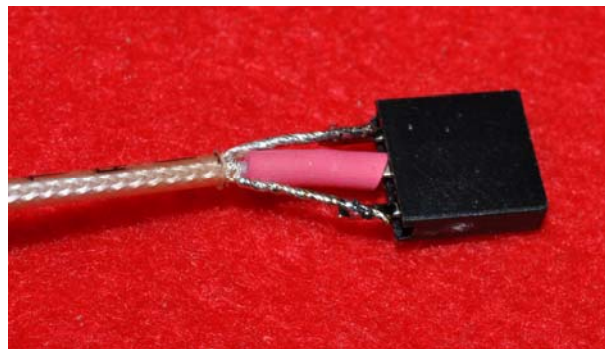
In many cases, including the standard Clifton Laboratories Z10040 die cast enclosure, installing the bypass will be easier if the board is equipped with extension cables as illustrated at the right.

Six cables are required for a Z10040B, as in the normal Clifton Laboratories recommended connection arrangement:



Wire Type	Purpose	Z10080A Port	Connector
Red & Black	DC power from power source	J6	3 pin socket (female)
Red & Black	DC power to Z10040 amplifier	J5	3 pin plug (male)
RG-178 coax	RF in (from input RF connector on enclosure)	J1	3 pin socket (female)
RG-178 coax	RF out (from output RF connector on enclosure)	J2	3 pin socket (female)
RG-178 coax	Amplifier Output	J3	3 pin plug (male)
RG-178 coax	Amplifier Input	J4	3 pin plug (male)

Female connectors are assembled as illustrated in the photo at the right. Comb the braid into two approximately equal groups and twist. Tin. Strip a short length of insulation from the center conductor and tin. Slide a short length of heat shrink tubing over the center conductor. Solder the center conductor to the center pin. Slide the shrink tubing down to the connector and apply heat.

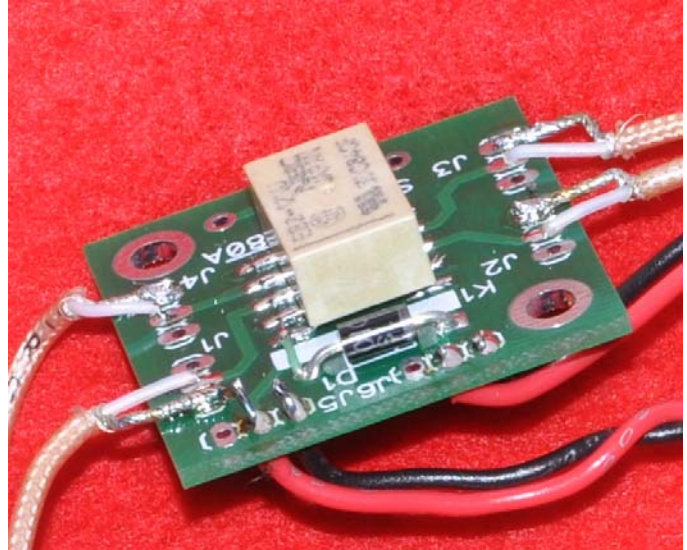


Then slide a short length of large diameter shrink tubing over the connector and shrink. It's helpful to write an identifier on the large shrink tubing after installation.

The male three pin connectors are installed in a similar fashion.

In many cases, it's better to solder the Z10080A end of these cables in a quasi-surface mount fashion, where the cable center conductor and shield do not go through the pad holes, but rather are installed on top of the pad, at extending from the board as illustrated in the photo.

How you attach the cables to the Z10080A board depends upon how much clearance you have in the enclosure and where you decide to mount the Z10080A board.

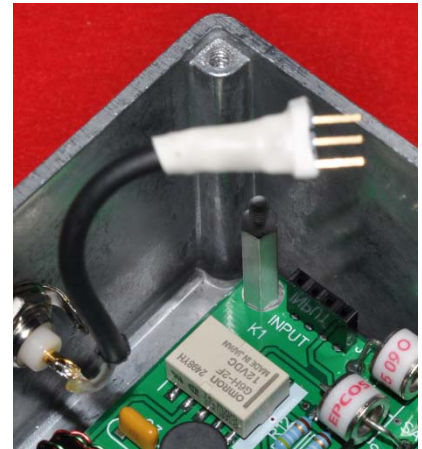


Installation In the Z10040 Enclosure

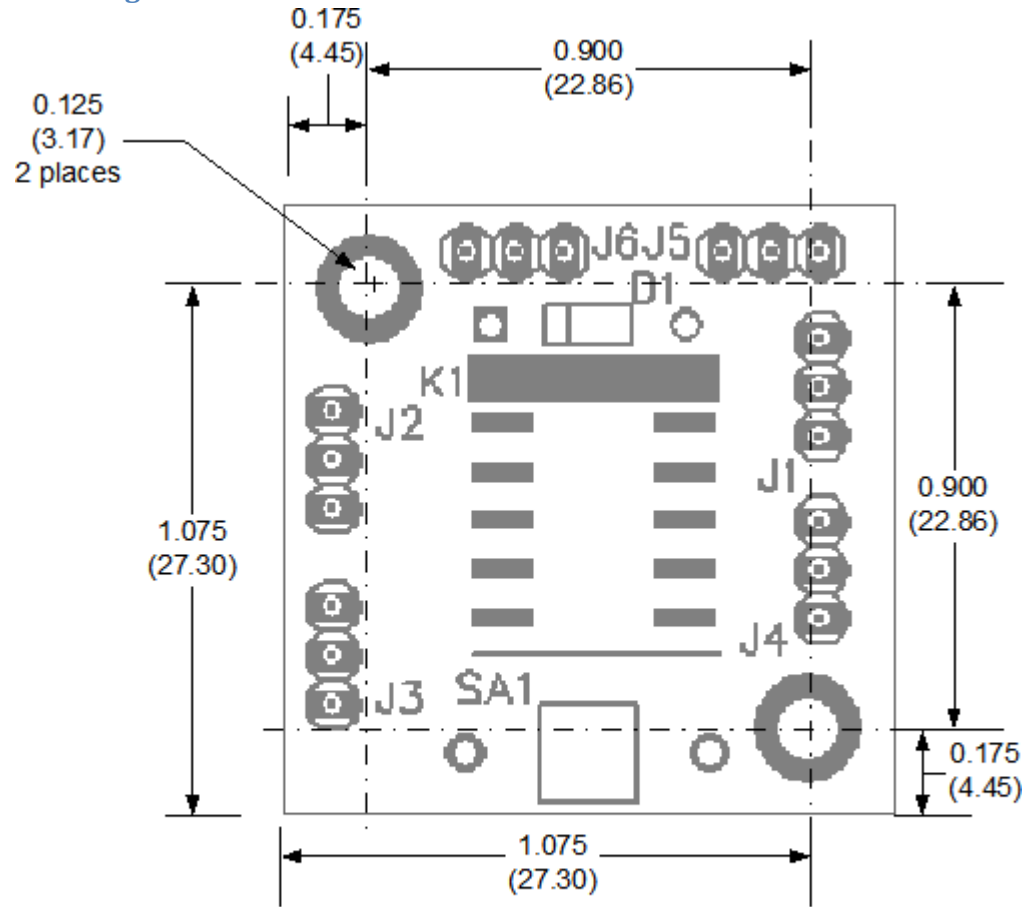
The photo at the right shows a typical mounting arrangement; one of the 4-40 mounting screws is removed and replaced with a male-female 4-40 stand-off.

Other arrangements are possible, such as mounting the Z10080A board to the side of the enclosure, or even to the lid. The photo below shows the Z10080A installed on the stand-off and plugged into the Z10040B connectors.

When the Z10080A is unpowered, the gas trap protection of the Z10040 is bypassed. If this is of concern, an optional gas trap may be installed on the Z10080A board.



Mounting Dimensions



**Z10080A Mounting Hole
Dimensions inches & (mm)**

Parts List

All versions

Reference ID	Description	Quantity
None	Z10080A Printed Circuit Board	1
K1	Relay, Omron G6H-2F DC12 or NEC EB2-12NU	1
D1	1N4007 or similar	1
None	Jumper wire, No. 30	2 inches

Option 1: 3-pin headers on Z10080A PCB and double ended extension cables

Reference ID	Description	Quantity
J1,J2,J3,J4,J5 & J6	3-pin 0.1 inch header sockets	6
Red & Black hookup wire	12 inches red & black	1 piece red, one piece black, each 12 inches long
RG-178 coax cable	24 inches sub-mini Teflon coax cable	24 inches
None	Male header pins	24 pins
None	Small diameter heat shrink tubing red	2 inches
None	Small diameter heat shrink tubing black	2 inches
None	Large diameter heat shrink tubing	6 inches

Option 2: Solder cables to Z10080A board

Reference ID	Description	Quantity
None	3-pin 0.1 inch header sockets	3
None	Male header pins	9
Red & Black hookup wire	12 inches red & black	1 piece red, one piece black, each 12 inches long
RG-178 coax cable	24 inches sub-mini Teflon coax cable	24 inches
None	Small diameter heat shrink tubing red	2 inches
None	Small diameter heat shrink tubing black	2 inches
None	Large diameter heat shrink tubing	6 inches

Option 3: Stand-off Mounting Hardware

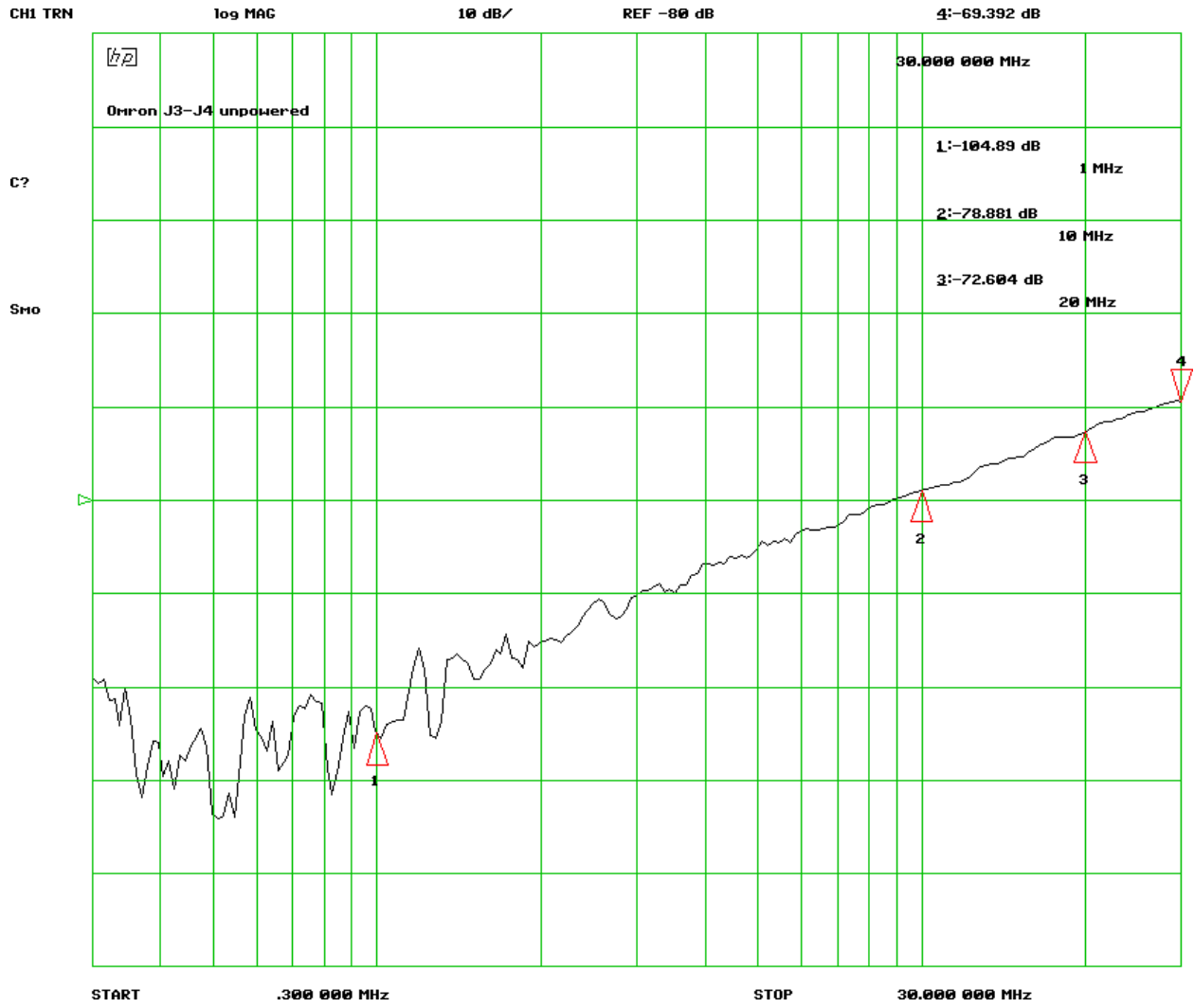
Reference ID	Description	Quantity
None	½ inch long, male-female standoff, 4-40 threaded	1
None	4-40 small pattern hex nut	1
None	4-40 split lock washer	1

Option 4: Gas trap

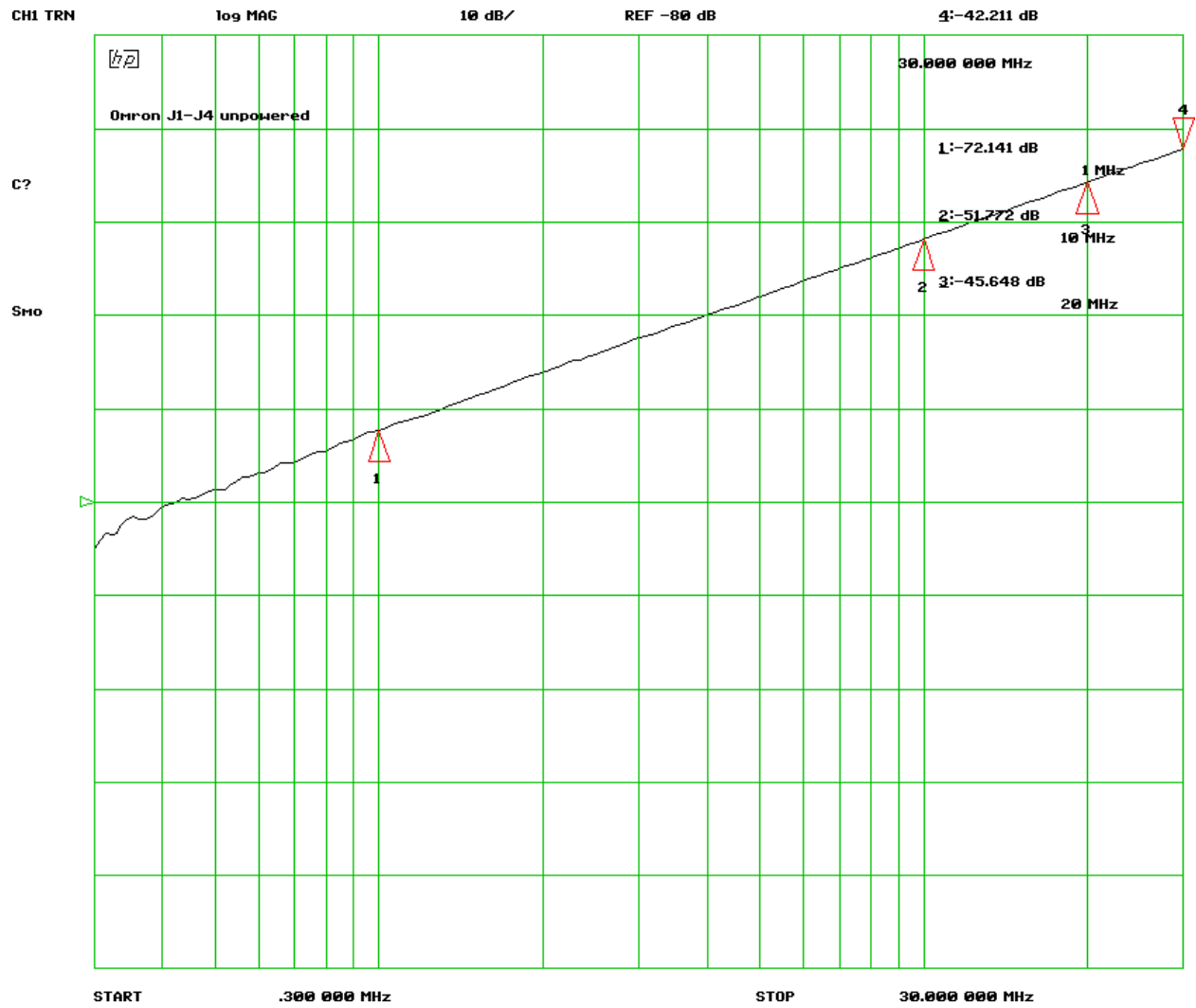
Reference ID	Description	Quantity
SA1	75 volt through hole gas trap	1

Appendix 1 Typical Performance Measurements

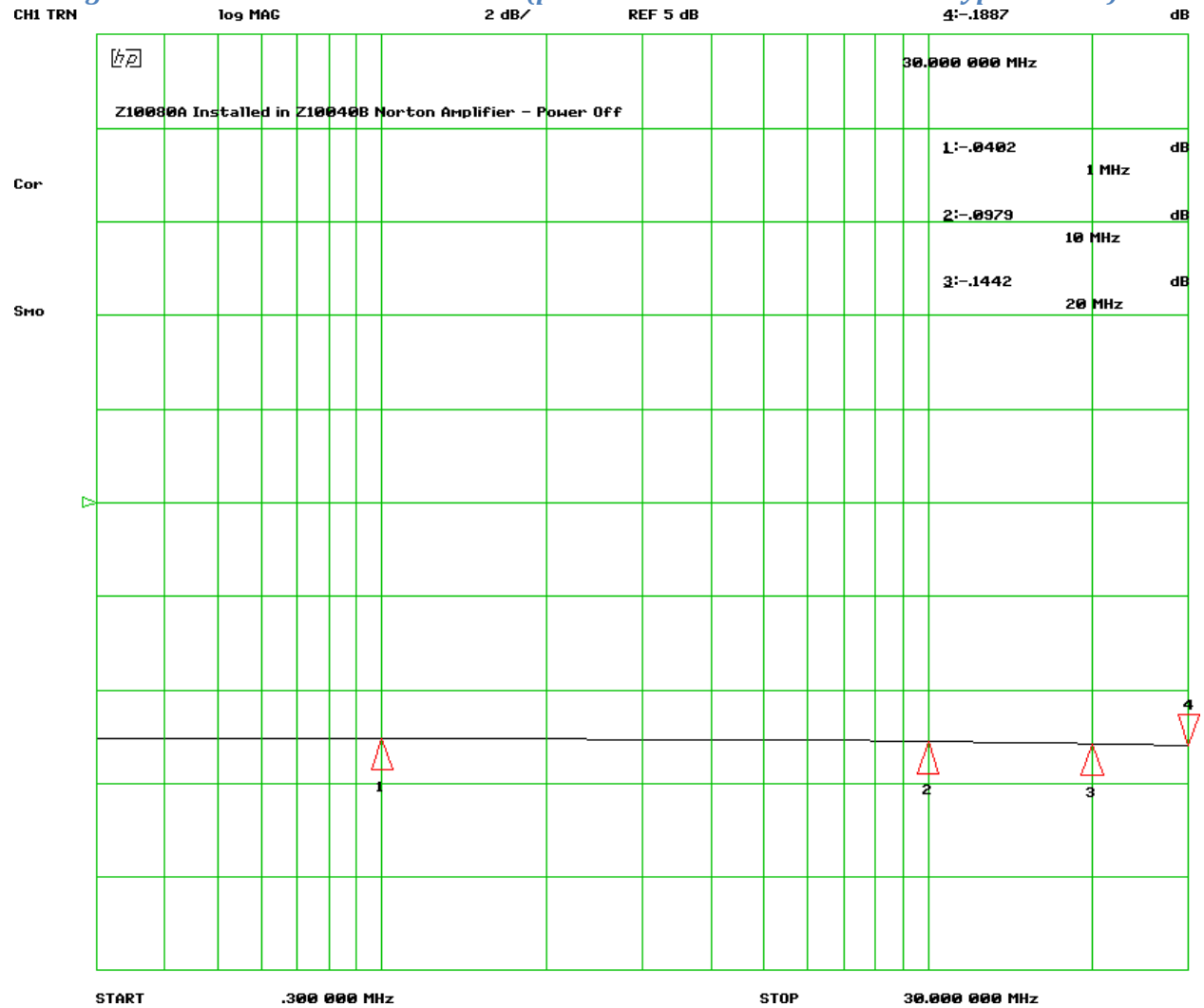
J3-J4 Isolation (relay unpowered)

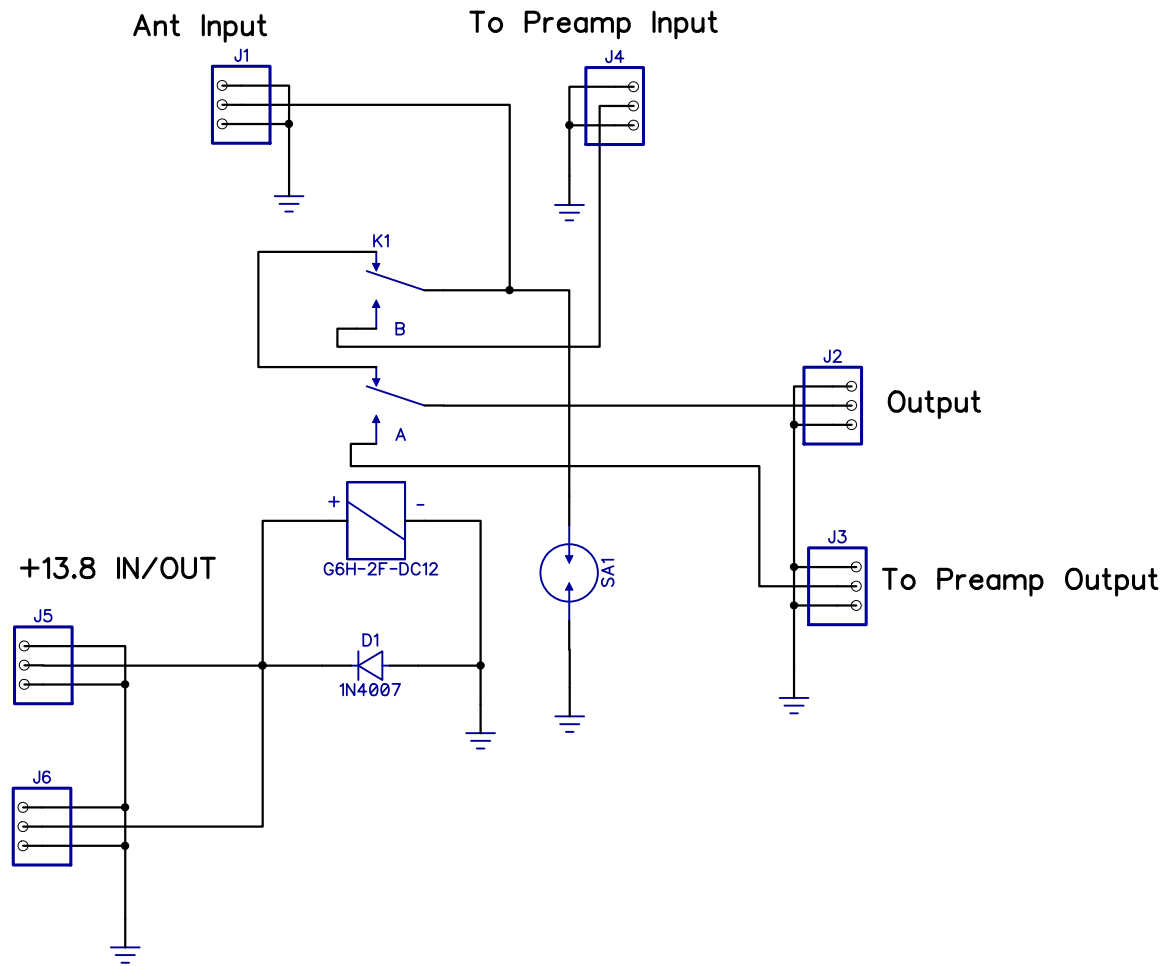


J1-J4 Isolation (relay unpowered)



Through Loss when Installed in Z10040B (power removed so Z10080A is in bypass mode)





Clifton Laboratories

Z10080A RF Transfer Relay

SIZE A	FSCM NO.	DWG NO.	REV
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SCALE: NONE	14 April 2010	Sheet 1
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