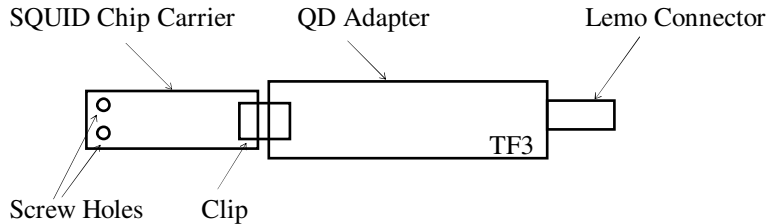# SQUID Chip Pre-screening Procedure

## 1. Assembly

1.1  Attach SQUID chip carrier to QD adapter. Secure chip with screw holes side up into side of adapter with "TF3" written on it.



1.2  Wrap kapton tape around chip carrier and adapter to secure them in place.

1.3  Attach QD cable to the Lemo connector of QD adapter.

1.4  Check resistance at 9 pin Winchester connector on the cable. The typical readings are:

A-C:    10.8$\Omega$
B-D:    9.5K$\Omega$
F-J      59$\Omega$
H-K:    9.5K$\Omega$

*The resistance should  be within 20%.

1.5 Check that no pin will short with ground.

1.6 Place SQUID carrier and adapter set  into a thin niobium can.

1.7 Tie wire on can onto cable, making sure that no tension is placed onto the lemo connector.

1.8 Wrap lead foil around can. Place Kimwipes around lead foil so that the niobium can will be secure when placed into outer $\mu$ metal can.

1.9 Place into an outer $\mu$ metal can.

1.10 Secure wire from cable onto outer can, making sure not to put tension on cable.

## 2. Cool Down

2.1  Check helium level in dewar with liquid Helium dipstick. Do helium transfer If the level is less than 6 inches.

2.2 Lower SQUID into dewar slowly. Use Kimwipes to block the opening of the dewar. Typically this step will take about 20-30 minutes.

**3. Tune Up**

3.1 Connect Cable to Quantum Design 5000 electronics. Ground the cable to the dewar.

3.2 Turn electronics on.

3.3 Push button "3" and set configurations to be:

Range:   5s
Amp:     1×
Select:  Out
Test:    Off
Reset:   Off
Yams:    Off

3.4 Tune up SQUID by pushing "TUNE".

3.5 If "Good Tune" record tuning up number.
If " Bad Tune" do the following:
1) Press configuration button.
2) Choose " Individual Channel Configuration".
3) Change "Test" to ON, "RESET" to ON, "Select" to TUNE.
4) Decrease the bias to zero by pressing the "DEC" button.
5) Increase the bias by pushing "INC" until the output voltage reaches the maximum.
6) Use a jeweler screw driver to adjust the "Mod" at the back of the electronics until the output voltage reaches the maximum.
7) Use a jeweler screw driver to adjust the "Gain" at the back of the electronics until the output voltage get into the range of 2.5V to 3.5V.
8) Set "Test" and "Reset" back to OFF. Change the "SELECT" to OUT. Repeat from step 3.4.

**4. Noise Measurement**

4.1 Hook up output of QD electronics to input A of preamplifier SR560. Connect the output of the preamplifier to BNC #1 in the wall.
Preamplifier setup:

LPF:           0.3Hz
DB/OCT:        12
Coupling:      DC
Source:        A
Gain:          1×100
Gain Mode:     Low Noise

 If preamplifier is overloaded (red light shows), decrease the gain.

4.2 Open WORKBENCH in the computer. Open "Log1.WBW" and input a new file name.

4.3 Start experiment. Take data for 2 hours.

4.4 Run Matlab and take PSD graph. Print out the graph and take the noise reading at 5 mHz.

4.5 Do flux flush if the noise reading is high. Repeat from step 3.4.

**5. Warm Up**

5.1 Turn off electronics. Disconnect the cable of electronics from SQUID.

5.2 Take SQUID set out of the dewar and put a plastic bag over  the μ-metal can. Cover and lock the dewar.

5.3 Disassemble the SQUID set when it is warmed up.