Sapphire Instruments Co., Ltd.

Calibration Procedure of SI-51

This procedure is for use by qualified service personnel to adjust SI-51 properly.

The equipments required are listed in Table 1.

No.	Item	Minimum Requirements
1	Power Supply	6 VDC/90mA or 9 VDC/ 330 mA mains adaptor or 4xAA cells or power lead
2	DMM	DC Accuracy < 0.5%
3	Function Generator	Maximum Frequency > 10 MHz Sine-wave Distortion < 1%
4	Oscilloscope	Bandwidth >= 20 MHz Accuracy <= 2 %

Table 1

This procedure is divided into following steps:

A. Prepare the probe for adjustment.

B. Adjust input bias voltage: VRA.

C. Adjust output offset voltage: VRC.

D. Adjust square-wave compensation for +input: VCA.

E. Adjust square-wave compensation for –input: VCB.

F. Adjust CMRR at 60 Hz: VRB.

G. Adjust CMRR at 1 MHz: VCB.

A. Prepare the probe for adjustment.

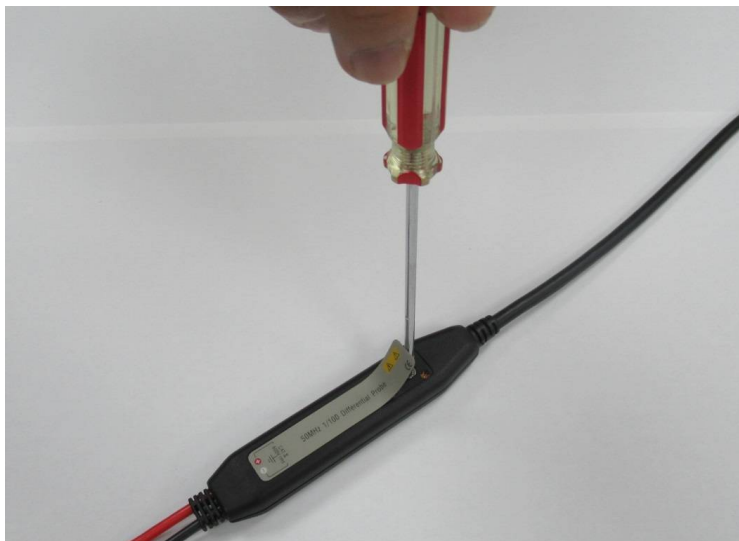   A-1. Use a small flat screwdriver to peel the both panels off, referring to Fig.1.

Fig.1

Fig.1a.

A-2. Loosen the four screws on the plastic cases. referring to Fig.1a.

A-3. Remove the plastic cases. Fig.2 shows the location of adjustments on topside and bottom side of the metal case.

A-4. Connect the power source.

A-5. Allow the probe and test equipments to warm up 20 minutes at an ambient temperature of 18 degree Celsius to 28 degree Celsius.

A-6. In order to make following operation easier, use one plastic case to support the metal case and the input head.
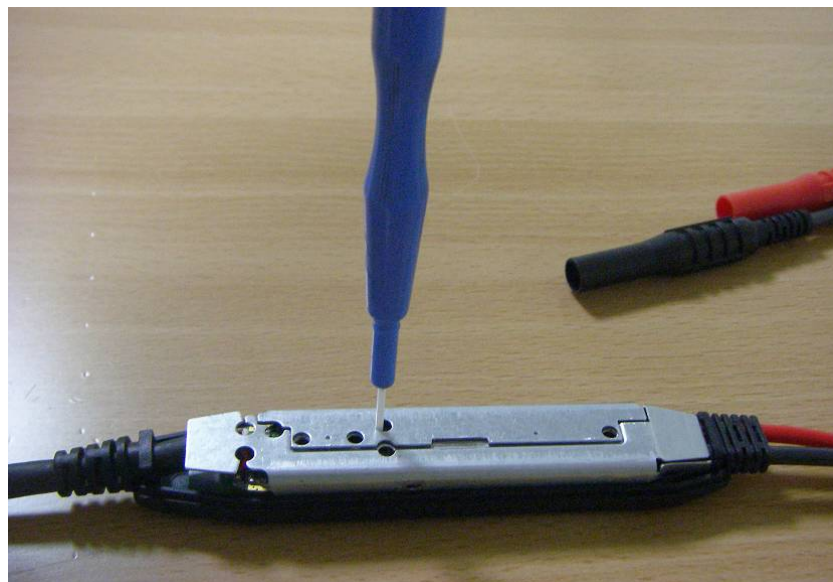

Top side
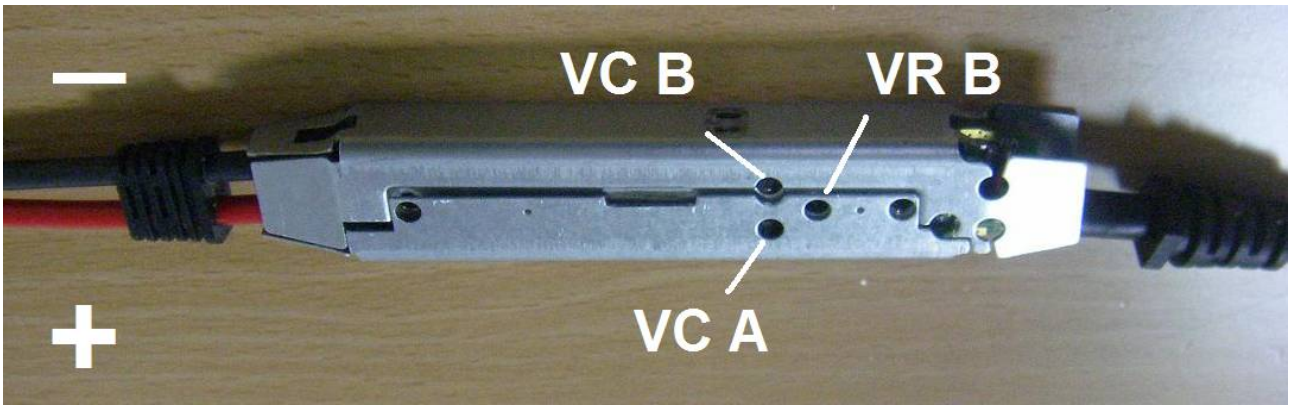
Bottom side

Fig. 2

B. Adjust input bias voltage
    B-1. Connect the probe as shown in Fig.3.
    B-2. The value of input bias voltage now is displayed on the digital multimeter.
    B-3. Adjust VRA to make the input bias voltage as small as possible.
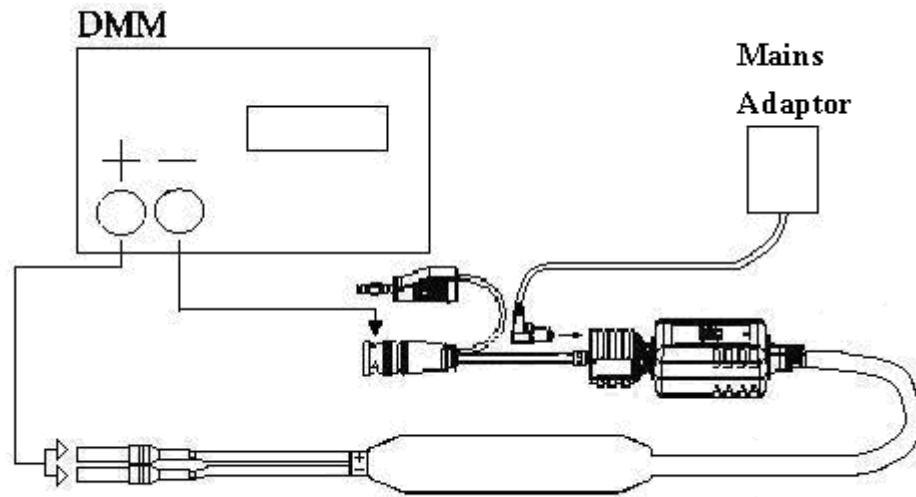   B-4. The criterion is -3 mV <= Vib <= +3 mV.

Fig. 3

C. Adjust output offset Voltage

    C-1.   Connect the probe as shown in Fig.4.

    C-2.   Adjust VRC for minimum output offset voltage.

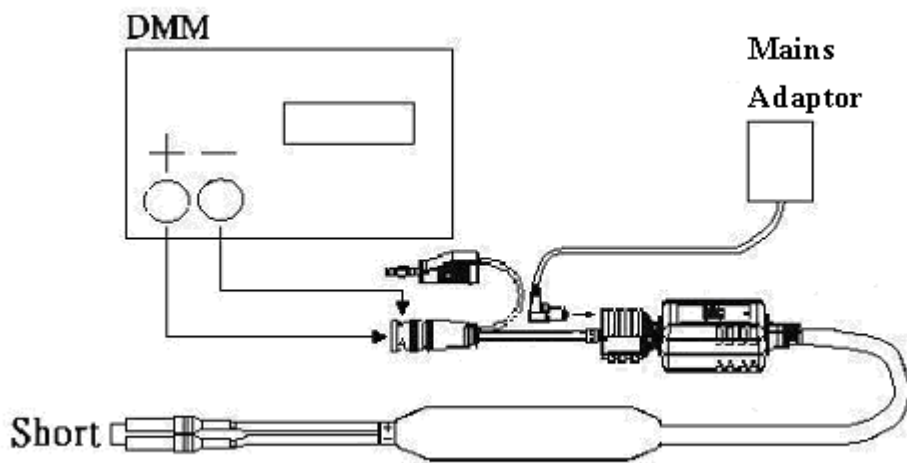   C-3.   The criterion is -1 mV <= Vout <= +1 mV.

Fig. 4

D. Adjust square-wave compensation for + input.

   D-1. Connect the probe as shown in Fig.5.

   D-2. Set the output of the function generator to 40 Vp-p, 1 kHz square-wave.

   D-3. Set the input impedance of the oscilloscope to 1 M ohm.

   D-4. Adjust VCA to make the front corner roll off or overshoot of the square-wave displayed on the oscilloscope less than 4 mV.
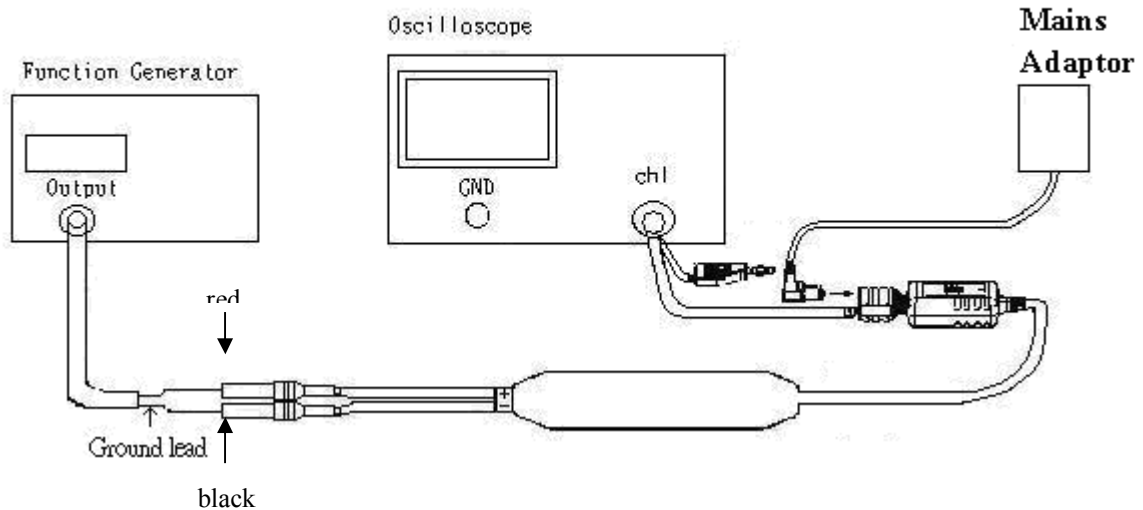

Fig. 5

E. Adjust square-wave compensation for - input.

   E-1. Connect the probe as shown in Fig.6.

   E-2. Set the output of the function generator to 40 Vp-p, 1 kHz square-wave.

   E-3. Set the input impedance of the oscilloscope to 1 M ohm.

   E-4. Adjust VCB to make the front corner roll off or overshoot of the square-wave displayed on the oscilloscope less than 4 mV.
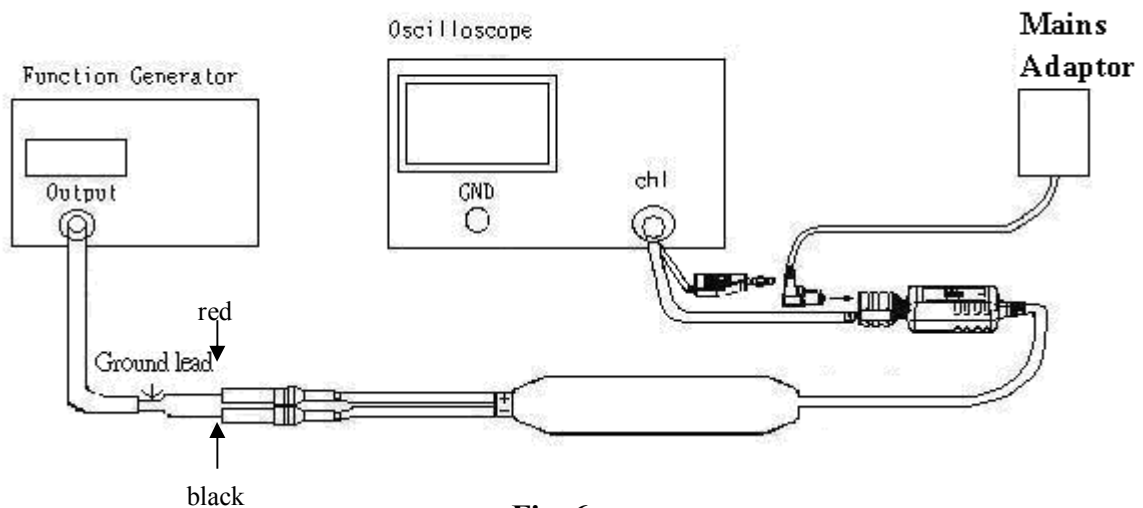

Fig. 6

F. Adjust CMRR at 60Hz
   F-1. Connect the probe as shown in Fig.7.
   F-2. Set the output of the function generator to 620 Vp-p 60 Hz sine-wave, and set the input impedance of the oscilloscope to 50ohm. (Add a feedthrough 50ohm terminator to the input, if the oscilloscope doesn't provide the 50 ohm input impedance.)
   F-3. Adjust VRB for minimum Vout displayed on the oscilloscope.
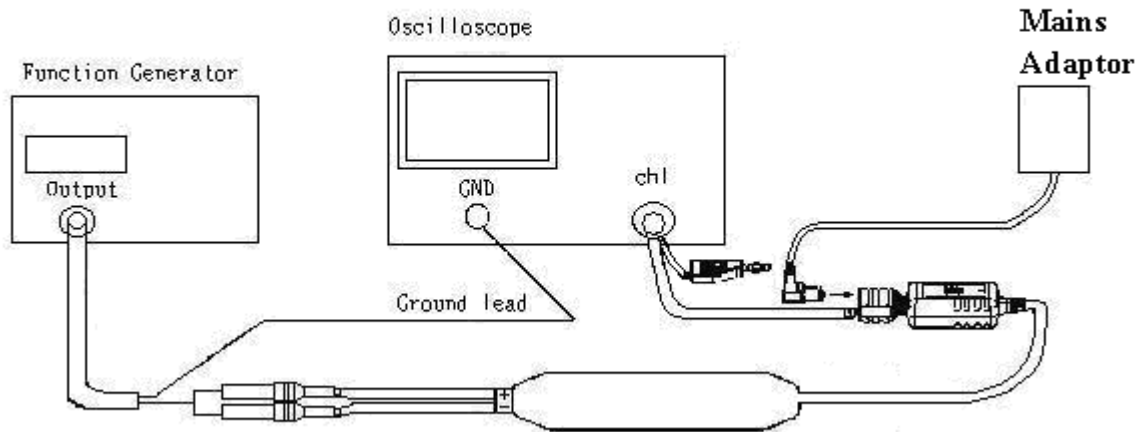   F-4. The criterion is Vout <= 0.6 mVp-p(after excluding noise).

Fig. 7

G. Adjust CMRR at 1MHz
   G-1. Connect the probe as shown in Fig.8.
   G-2. Set the output of the function generator to be 20 Vp-p, 1 MHz, sine-wave, and set the input impedance of the oscilloscope to be 50 ohm (Add a feedthrough 50ohm terminator to the input , if the oscilloscope doesn't provide the 50ohm input impedance.)
   G-3. Adjust VCB slightly for minimum Vout displayed on the oscilloscope.
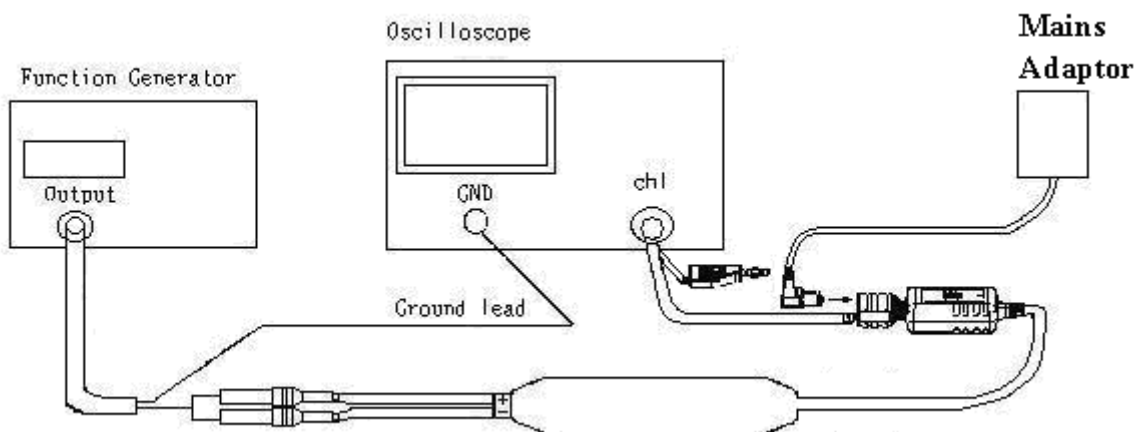   G-4. The criterion is Vout <= 1 Vp-p (after excluding noise).

Fig. 8