SECTION 4

MAINTENANCE AND RE-CALIBRATION

Care must be taken not to touch high voltage tags. The instrument must be disconnected from the mains supply before removing the case, and whenever possible during servicing. In addition, the battery connector should be disconnected.

4.1 INTRODUCTION

4.1.1 The solid state design of the instrument makes frequent adjustment of the internal preset components unnecessary. The appropriate part of the Calibration Procedure should be performed whenever the instrument fails to meet its specification, or whenever a defective component is replaced. The Circuit Description, Section 3, will assist in deciding which part of the circuit requires adjustment.

4.1.2 The internal 500 mV calibrator allows the accuracy of the vertical amplifiers to be checked. Timing accuracy should be checked against an external sinewave or marker pulse source.

4.1.3 To carry out the whole calibration procedure, the following tools and equipment are required:—

Standard servicing tool kit.
Trimming tool, low capacitance (for preset capacitors and potentiometers).
Amplitude calibrator, approximately 1 kHz squarewave providing outputs of 50 mV to 50 V. To an accuracy of ±0.25%.
Time calibrator, providing markers of amplitude between 50 mV and 10 V, 1 μsec. to 1 msec., timing accuracy ±0.1%.
Squarewave generator, providing a terminated 1 MHz signal, of approximately 500 mV, rise time less than 10 ns.
Sinewave generator, providing 50 kHz, to 10 MHz signal of amplitude up to 25 volts.
Monitor oscilloscope with X 10 passive probe.
Digital voltmeter DC. with input impedance of not less than 1 megohm, or greater.
Composite TV video signal source.
Meter for voltage measurement with resistance of not less than 20 kΩ per volt.
Ammeter 0-500 mA DC accuracy ± 3%.
Co-axial connecting leads and terminating load suitable for matching to co-ax impedance.
X10 probe, available as equipment accessory.

4.2 MECHANICAL

4.2.1 ACCESS TO INTERIOR

a) Switch off LINE and instrument and remove all external leads and cables.
b) Follow the advice given in the Danger Warning.
c) Remove six screws securing rear cover.
d) Remove rear cover.
e) Hold case firmly, and push on rear chassis to withdraw the instrument through front of case.

4.2.2 OPENING OUT SIDE AND LOWER PANELS

(See exploded view)

a) Remove case as in 4.2.1 above.
b) To open the right hand panel loosen the screws at the top and bottom of the instrument just behind the Time/Div switch.
c) To open the left hand panel loosen the screws at the top and bottom of the instrument just behind the attenuators.
d) To open the bottom flap loosen the screw under the attenuator and the screw under the level potentiometer.

4.2.3 CRT REMOVAL

a) Remove instrument from case as in 4.2.1.
b) Through elongated hole in top rear chassis, slide back shield extension and carefully prise off tube base.
c) Stand instrument on rear chassis and open out side and bottom assemblies as 4.2.2.
d) Break P.D.A. connector and earth each termination through 2MΩ resistor.
e) Unsolder trace rotate leads from eyelet numbers 6 & 7 on PC221.
f) Remove CRT shield securing screws located forward of battery packs.
g) Push CRT back to clear foam strips, and to unhook shield at top.
h) Lower face end of CRT and shield; withdraw both through lower opening.
j) Carefully separate the CRT and its shield.

4.2.4 CRT REFITTING

a) Follow the procedure 4.2.3 in reverse order, and make sure that CRT is pressed into the shield to locate against bezel rear before securing shield with its screws.
If trace rotation is in the opposite sense, reverse wires to eyelets 6 & 7, on PC221.

4.3. CALIBRATION PROCEDURE

4.3.1 BATTERY CHARGE RATE AND INITIAL SETTING

a) Check the a.c. supply voltage available, and set the AC line switch S402, and range switch S403 (both located at rear of instrument) as follows:-

AC LINE VOLTS	LINE SWITCH SETTING	RANGE SWITCH SETTING
100-112	112	LO
113-125	112	HI
200-225	225	LO
226-250	225	HI

b) 1. Remove instrument chassis from case as in 4.2.
2. Disconnect battery connector on r/h set of batteries.
3. Connect a DC ammeter (0 - 1A range) across the connector contacts.
4. Set instrument on/off switch to OFF.
5. Connect instrument to AC supply and set LINE switch to ON.
6. Adjust R408 on PC222 for a charge current of 380 mA.
7. Allow 5 minutes to warm up, then adjust R408, if necessary, for 400 mA current.
8. Set AC line switch to OFF, remove ammeter, and couple up connector.

c) With the exception of R408, set all preset trimmer resistors and capacitors on all boards to mid-range.
d) Set front panel controls as follows:—
1. DC/AC switches (CH1 & 2) to AC.
2. VOLTS/DIV switches (CH1 & 2) to 5 V.
3. CH1 Y POSITION to mid-range.
4. CH2 Y POSITION to OFF.
5. TRIG to CH1.
6. Instrument switch to IN.
7. INTENSITY to mid-range.
8. LINE switch to OFF.
9. FOCUS to mid-range.
10. TIME/DIV to 1 ms.
11. HORIZONTAL POSITION to mid-range, and X1 (IN).
12. AUTO (IN) and LEVEL to mid-range.
13. Mode to AC, Source to INT and Slope to +.