

HOW TO USE A BWD 539 OSCILLOSCOPE

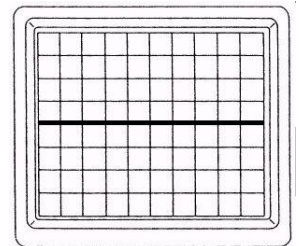
Note: The oscilloscope is also called a Cathode Ray Oscilloscope -CRO for short.

Initial Setup

Turn Power ON by turning the INTENSITY knob (1) fully clockwise, adjust the FOCUS knob (2) as necessary or leave in mid position. Check all Push buttons are OUT, all CAL knobs are turned to CAL and all ↔ & ↑ knobs (7,11,23) to mid-position.

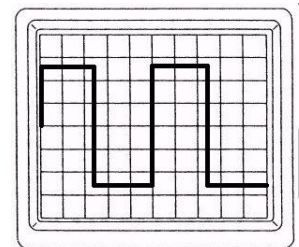
Displaying a straight line trace

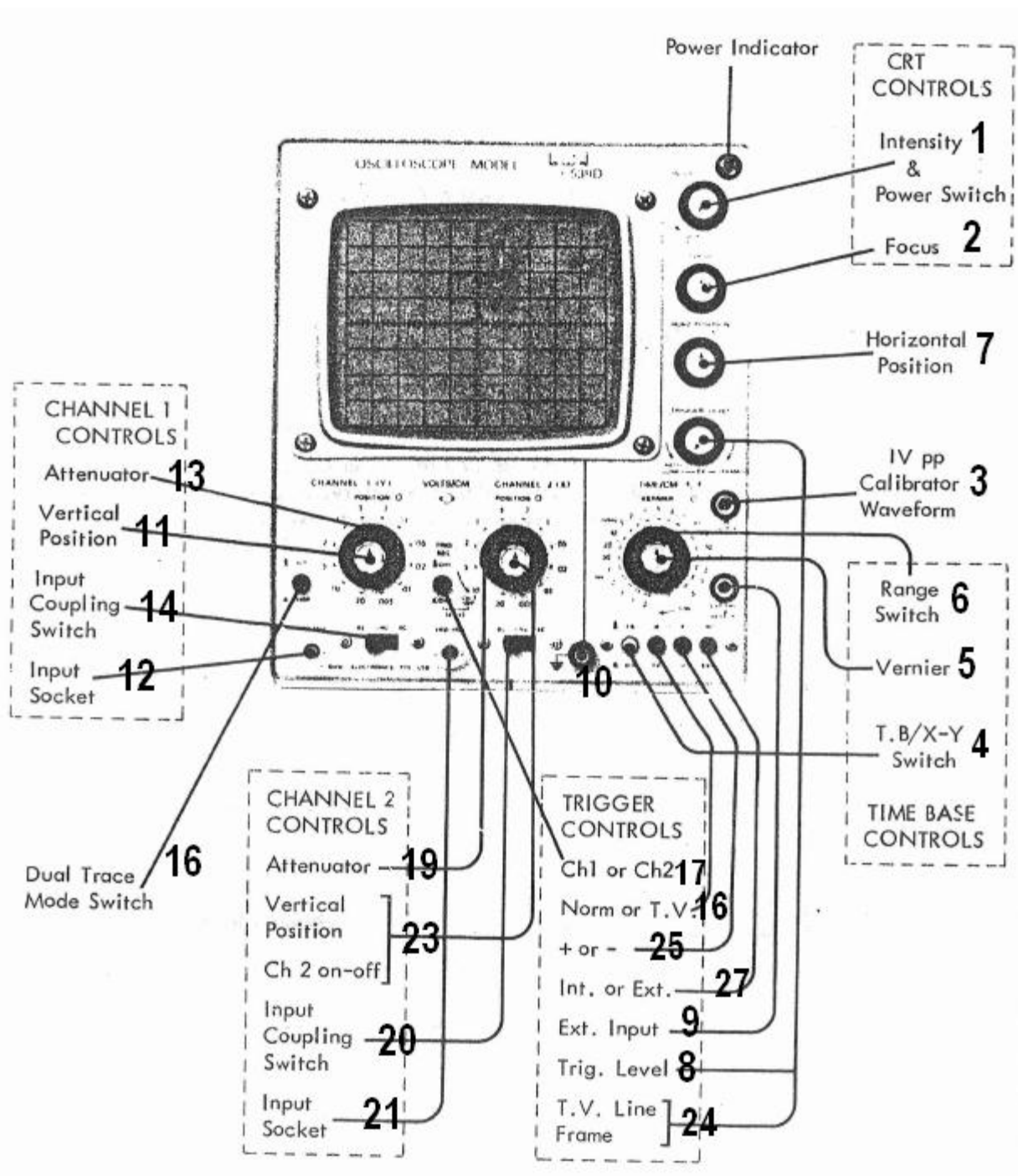
1. Select **GND** on the both the vertical input selectors (14 & 20). *This disconnects the inputs and feeds 0v to the vertical channels.*
2. Set both **VOLTS/DIV** knobs (13 & 19) to **2 V**.
3. Check that both the buttons (4 & 17) are OUT.
4. On the trigger controls section, turn the TRIG. **LEVEL** knob (8) fully anti-clockwise. (**AUTO**)
5. Check that all the buttons (4, 16, 25, & 27) below the **TIME/CM** range switch knob are OUT.
6. Set the **TIME/CM** (6) range switch KNOB TO **5mS**. *Ensure the 'VARIABLE' knob (5) is fully clockwise (CAL).*
7. Now adjust the Channel 1 **POSITION** knob (11) to obtain a horizontal trace in the middle of the screen.
8. Adjust the **INTENSITY** (1), **FOCUS** (2) and horizontal **POSITION** (7) knobs for a centered sharp trace.
9. A control is on the rear panel to alter the TRACE ROTATION for a truly horizontal trace.



Displaying the Calibration Square waveform

1. Plug a CRO probe into socket **CH1** and connect it to the **CAL** (3) terminal. If the probe has a **X10/X1** switch set it to **X1**.
2. Select **DC** on the both the vertical input selectors (14 & 20). *This connects the inputs to the vertical channels.*
3. Set both **VOLTS/DIV** knobs (13 & 19) to **2 V**.
4. Check that all the buttons (4, 16, 25 & 27) along the bottom of the front panel and button 17 are OUT.
5. On the trigger section, adjust the **LEVEL** (8) knob for a stable waveform.





Displaying the waveform from a signal generator

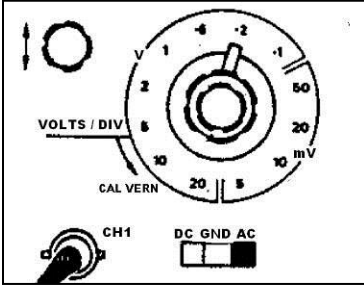
With the CRO probe plugged to socket **CH1** and connected to the generator output.

1. Adjust channel '1' **VOLTS/DIV** knob (13) for a large waveform height.
2. Adjust the **TIME/CM (6) range switch** knob for a few wave cycles across the screen.
3. If the waveform doesn't stabilize select **AUTO OFF** by turning the **LEVEL (8)** knob to adjust for a stable waveform.

IDENTIFYING & UNDERSTANDING THE CRO'S SECTIONS

(A general discussion)

Vertical Amplifier

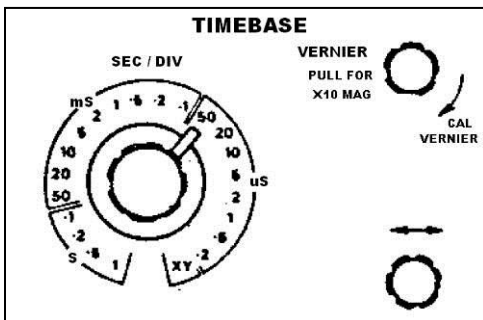


Most CROs have one or two vertical amplifier channels, often labeled 'CH1' & 'CH2' or 'A' and 'B'. These are the inputs for the vertical deflection of the sweep. Each has an input switch which can be set to 0v (GND), a DC position where the deflection is proportional to all input voltages and an AC position where the deflection is driven only by the Alternating Current (AC) part of the input voltage.

A position control used with the GND input switch setting for adjusting the vertical position desired to represent zero volts. Once achieved the horizontal line displayed can then be used for brightness and focus adjustments.

A Volts/Division rotary switch sets the number of volts required to deflect the sweep one division vertically. Generally a 'variable' control is provided must be turned to the 'CAL' position for the Volts/Div setting to be calibrated. This may not be fitted on simpler CROs.

Horizontal sweep

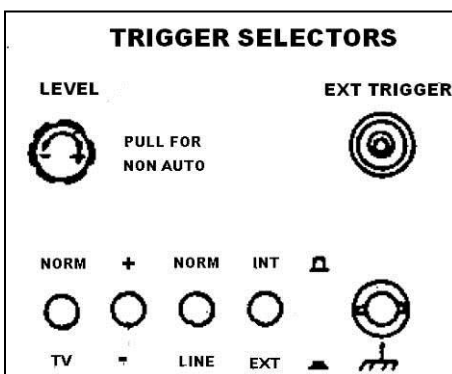


The Horizontal Sweep control sets the time the trace will take to sweep horizontally across the screen. The time of a sweep may be adjusted from several nanoseconds to several seconds. The value on the dial sets the time per division on the CRO screen, which typically has either 8 or 10 divisions across the graticule.

Often a multiplier switch, marked x5 or x10 is fitted which multiplies the sweep time.

A position control sets the start point of the horizontal sweep.

Trigger control



This section controls the triggering or commencement of the sweeping of the trace across the screen.

The CRO needs to know when to begin each sweep. This is done using the trigger settings. If the trigger is set to **AUTO** the trace will continuously sweep – this is useful for the first stages of getting a trace on the screen.

Usually, the signal itself is used to set the trigger the sweep. To do this, set the trigger to **INT** (internal); the **SLOPE** to **+** (positive);, and adjust the **TRIGGER LEVEL** for a stable waveform.

Setting the trigger to **LINE**, the CRO will be triggered by the 50-Hz oscillations of the mains voltage.

Oscilloscope probe

A CRO probe is used to connect the CRO to the signal source. It may have a X10 switch so it can be used to divide large signals by a factor of 10. The switch may also have a reference 'REF' position which connects the CRO input to 0v.

