



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**  
**COMMUNICATION LAB**  
**STANDARD OPERATING PROCEDURE**

Name of the Lab./facility	Communication Lab
Purpose	To educate the students in using the different devices used in the Digital Communication & Communication Engineering Lab by way of doing the experiments and instill in them the common procedures to be followed in conducting the experiments
Scope	Procedure for usage of CRO while conducting experiments in the Digital Communication & Communication Engineering Lab
Responsibility	Faculty In Charge of the Lab – Monitoring if the students are following the SOP & recommending revisions wherever needed

**STANDARD OPERATING PROCEDURE FOR CRO**

- ✓ **Switch on** the oscilloscope to warm up (it takes a minute or two).
- ✓ Do **not** connect the input lead at this stage.
- ✓ Set the **AC/GND/DC** switch (by the Y INPUT) to **DC**.
- ✓ Set the **SWP/X-Y** switch to **SWP** (sweep).
- ✓ Set **Trigger Level** to **AUTO**.
- ✓ Set **Trigger Source** to **INT** (internal, the y input).
- ✓ Set the **Y AMPLIFIER** to **5V/cm** (a moderate value).
- ✓ Set the **TIMEBASE** to **10ms/cm** (a moderate speed).
- ✓ Turn the time base **VARIABLE** control to **1** or **CAL**.
- ✓ Adjust **Y SHIFT** (up/down) and **X SHIFT** (left/right) to give a **trace across the middle of the screen**, like the picture.
- ✓ Adjust **INTENSITY** (brightness) and **FOCUS** to give a bright, sharp trace.
- ✓ The oscilloscope is now ready to use.
- ✓ Experimental procedure to be followed as given in the manual.
- ✓ Upon completion of experiment the CRO shall be turned off first, followed by turning off of the mains power supply.

**PRECAUTIONS TO BE FOLLOWED**

- ✓ Short circuit of the battery terminals or any source terminals has to be avoided.
- ✓ Make all measurements in the centre area of the screen; even if the CRT is flat, there is a chance of reading errors caused by distortion.
- ✓ Use only shielded probes. Never allow your fingers to slip down to the metal probe tip when the probe is in contact with a hot circuit.
- ✓ Avoid operating an oscilloscope in a strong magnetic field. Such fields can causes distortion of the display. Most quality oscilloscopes are well shielded against magnetic interference. However, the face of the CRT is exposed and is subjected to magnetic interference.
- ✓ Most oscilloscopes and their probes have some maximum input voltage specified in the instruction manual. Do not exceed this maximum value. Also, do not exceed the maximum line voltage or use a different power.

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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### COMMUNICATION LAB

### STANDARD OPERATING PROCEDURE

Name of the Lab./facility	Communication Lab
Purpose	To educate the students in using the different devices used in the Digital Communication & Communication Engineering Lab by way of doing the experiments and instill in them the common procedures to be followed in conducting the experiments
Scope	Procedure for usage of Function Generator while conducting experiments in the Digital Communication & Communication Engineering Lab
Responsibility	Faculty In Charge of the Lab – Monitoring if the students are following the SOP & recommending revisions wherever needed

#### STANDARD OPERATING PROCEDURE FOR FUNCTION GENERATOR

- ✓ **Switch on** the Function Generator to warm up (it takes a minute or two).
- ✓ Do **not** connect the input lead at this stage.
- ✓ After Power on the generator and select the desired output signal: square wave, sine wave or triangle wave.
- ✓ Connect the output leads to an oscilloscope to visualize the output signal and set its parameters using the amplitude and frequency controls.
- ✓ Attach the output leads of the function generator to the input of the circuit you wish to test.
- ✓ Attach the output of your circuit to a meter or oscilloscope to visualize the resulting change in signal.
- ✓ The Function Generator is now ready to use. Experimental procedure to be followed as given in the manual.
- ✓ Upon completion of experiment the FG shall be turned off first, followed by turning off of mains power supply.

#### PRECAUTIONS TO BE FOLLOWED

- ✓ Short circuit of the battery terminals or any source terminals has to be avoided.
- ✓ Do not use in high temperature and high pressure, humidity, strong vibration and strong magnetic fields and storage.
- ✓ Use in relatively stable environment, and provide good ventilation and cooling conditions.
- ✓ Use only shielded probes. Never allow your fingers to slip down to the metal probe tip when the probe is in contact with a hot circuit.
- ✓ Adjust the function generator output until the desired amplitude and frequency are achieved.
- ✓ Turn off the function generator and disconnect the scope probe.

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Purpose	To educate the students in using the different devices used in the Digital Communication & Communication Engineering Lab by way of doing the experiments and instill in them the common procedures to be followed in conducting the experiments
Scope	Procedure for usage of Power Supply while conducting experiments in the Digital Communication & Communication Engineering Lab
Responsibility	Faculty In Charge of the Lab – Monitoring if the students are following the SOP & recommending revisions wherever needed

**STANDARD OPERATING PROCEDURE FOR POWER SUPPLY**

- ✓ Turn on the DC power supply. Low-power DC supplies operate in two main modes - either voltage sources or current sources.
- ✓ Observe the voltage and current readings.
- ✓ Set the DC power supply output voltage to 10 V by adjusting the output voltage knob. Operating as a voltage source is the most common, where the supply provides low voltage DC; typically ranging between 0 and 36 V. In a current source operation, these supplies are "current limited" where their maximum current is set to the desired value, and their voltage is automatically adjusted to provide the desired maximum current. Current and voltage limits thus provide operational flexibility as well as safety margins when operating a DC power supply.
- ✓ Press the "Current" button to display the current limit and adjust the current knob to adjust the maximum current limit. Set the current limit of the supply.
- ✓ Note that most single-output DC power supplies have three terminals labeled as "+," "-", and ground. In many applications, "-" and ground are tied to provide a more stable and reduced noise environment when providing an external circuit with power. However, certain cases require that "-" is floating from ground to isolate the electrical circuit or apparatus under test from the supply ground.
- ✓ Upon completion of experiment the DC Power Supplies shall be turned off first, followed by turning off of mains power supply.

**PRECAUTIONS TO BE FOLLOWED**

- ✓ Short circuit of the battery terminals or any source terminals has to be avoided.
- ✓ Avoid shorting circuit the output of DC power supply.
- ✓ Set the voltage and current adjustment knobs as you desire. The unit should be stored in a dry and well ventilated place and the power cord removed if storing for long periods.
- ✓ Turn off the DC Power supply and disconnect the connection.

*[Handwritten Signature]*

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Scope	Procedure for usage of DSO while conducting experiments in the Digital Communication & Communication Engineering Lab
Responsibility	Faculty In Charge of the Lab – Monitoring if the students are following the SOP & recommending revisions wherever needed

**STANDARD OPERATING PROCEDURE FOR DSO**

- ✓ **Switch on** the oscilloscope to warm up (it takes a minute or two).
- ✓ Do **not** connect the input lead at this stage.
- ✓ Trig volt level at limit : When turning the trigger knob, Alerts the user that the trigger level reached its limit.
- ✓ Horizon position at limit When turning the horizontal position knob , alerts user that the horizontal position reached its limit
- ✓ Volts/Div at limit Alerts the user that the vertical volt/Div knob was adjusted to the min (2mV/div) or maximum ( 5V/div ) value
- ✓ Volts position at limit When turning the vertical position knob , alerts user that the vertical knob reached its limit.
- ✓ Sec/Div at limit : prompts the user that the Volts/Div is at full range while turning the vertical scale knob.
- ✓ A function isn't useable : Function not supported in this mode. (Example: Reference mode is not available in YX format)
- ✓ No signal! : The system could not detect a suitable signal ( used in the auto set )
- ✓ Adjust at limit: You could adjust the pulse width with the ADJUST knob until the pulse width has reached the min of 20.0ns or max 10.0s limit.
- ✓ Adjust **INTENSITY** (brightness) and **FOCUS** to give a bright, sharp trace.
- ✓ The DSO is now ready to use. Experimental procedure to be followed as given in the manual.
- ✓ Upon completion of experiment the DSO shall be turned off first, followed by turning off of mains power supply.

**PRECAUTIONS TO BE FOLLOWED**

- ✓ Short circuit of the battery terminals or any source terminals has to be avoided.
  - ✓ DO not store or leave the instrument where the LCD display will be exposed to direct sunlight for long periods of time.
  - ✓ To avoid damage to the instrument or probes, do not expose them to sprays, liquids, or solvents.
  - ✓ Use only shielded probes. Never allow your fingers to slip down to the metal probe tip when the probe is in contact with a hot circuit.
  - ✓ DO not store or leave the instrument where the LCD display will be exposed to direct sunlight for long periods of time.
- CAUTION: To avoid damage to the instrument or probes, do not expose them to sprays, liquids, or solvents.

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Name of the Lab./facility	Communication Lab
Purpose	To provide training to the students to practice the basic theories of analog and digital communication systems with the hands on experience using the trainer kits
Scope	This course provides the foundation education in communication engineering and the experiments in this laboratory enable the students to gather basic knowledge on the various types of communication systems. These systems form the fundamental blocks of any communication system used nowadays
Responsibility	Faculty In Charge of the Lab – Monitoring if the students are following the SOP & recommending revisions wherever needed

**STANDARD OPERATING PROCEDURE FOR ANALOG COMMUNICATION SYSTEMS ( AM, FM )**

- ✓ The connections should be given in the trainer kit as per the experiment.
- ✓ The connections are to be verified by the instructor before switching on the trainer kit.
- ✓ The input signal and the carrier signal are given and the modulated output is observed.
- ✓ After completing the experiment, the trainer kit is switched off and the connections are removed.

**PRECAUTIONS TO BE FOLLOWED**

- ✓ The trainer kit is switched on only after checking the connections.
- ✓ After completing the experiment, the trainer kit is switched off and the connections are disconnected.

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Responsibility	Faculty In Charge of the Lab – Monitoring if the students are following the SOP & recommending revisions wherever needed

**STANDARD OPERATING PROCEDURE FOR DIGITAL COMMUNICATION SYSTEMS (ASK, FSK, PSK, PCM )**

- ✓ The connections should be given in the trainer kit as per the experiment.
- ✓ The connections are to be verified by the instructor before switching on the trainer kit.
- ✓ The input signal and the carrier signal are given and the modulated output is observed.
- ✓ After completing the experiment, the trainer kit is switched off and the connections are removed.

**PRECAUTIONS TO BE FOLLOWED**

- ✓ The trainer kit is switched on only after checking the connections.
- ✓ After completing the experiment, the trainer kit is switched off and the connections are disconnected.

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