MICROWAVE MEASUREMENTS

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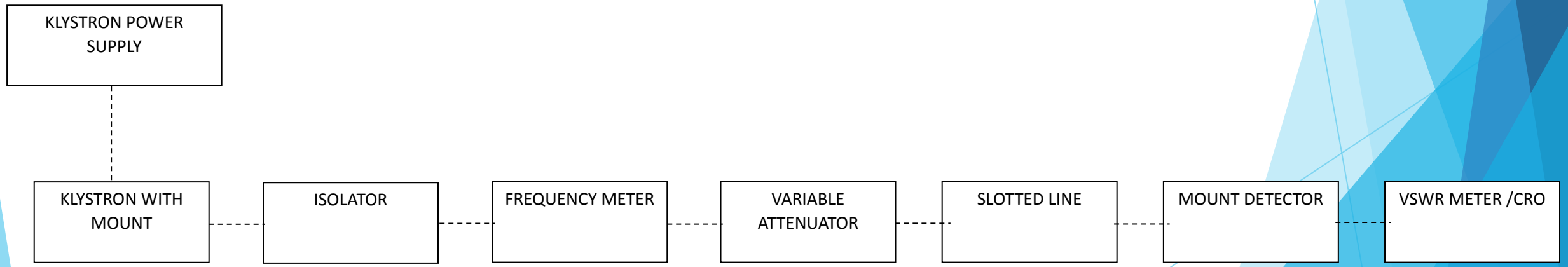
Need of Microwave Measurements

Frequency Measurement

EXPERIMENTAL SETUP FOR MICROWAVE FREQUENCY MESUREMENT



KLYSTRON POWER SUPPLY:

It provides various power supply voltages to anode, cathode, gun and repeller.

KLYSTRON WITH MOUNT:

Reflect klystron is used as microwave source i.e., oscillator around 9 to 10GHz. Klystron mount is used to hold klystron tube.

ISOLATOR:

Isolator is a unidirectional device which allows the microwave transmission in one direction and does not allow the transmission in other direction. It absorbs the reflections from other end. Hence standing waves can be avoided.

FREQUENCY METER:

It is used to measure the microwave frequency generated by the microwave klystron.

There are two types:

1. Cavity wave meter type which is indirect one.
2. Direct reading frequency meter.

VARIABLE ATTENUATOR:

It is used in microwave test bench. It is always kept at minimum position of attenuation i.e., zero attenuation. It can be used to find out attenuation of unknown wave guide.

SLOTTED LINE:

It is used to find minima and maxima of microwave signal from which we can calculate wavelength and frequency also.

MOUNT DETECTOR:

It demodulates the signal. It converts electromagnetic waves into electrical signal.

VSWR METER/CRO:

Voltage standing wave ratio i.e., VSWR can directly measure on VSWR meter. A square wave is observed or display on CRO.

POWER METER:

It is used to measure microwave power directly.

- Set up the components and equipments as shown in fig.
- Set up the variable attenuator at minimum attenuation position.
- Keep the control knobs of VSWR meter as below:
  - Range - 50 db
  - Input switch - crystal low impedance
  - Meter switch - Normal position
  - Gain (coarse and fine) - Mid position
- 4. Keep the control knobs of KLYSTRON POWER SUPPLY as below:
  - Beam voltage - Off initially
  - Mod-switch - AM
  - Beam voltage knob - Fully anticlockwise
  - Reflector voltage - Fully clockwise
  - AM- Amplitude knob - Around fully clockwise
  - AM- Frequency knob - Around mid position

- Switch ‘ON’ the klystron power supply, VSWR meter and cooling fan switch
- Switch ‘ON’ the beam voltage switch and set beam voltage at 300 volts with helps of beam voltage knob
- Adjust the reflector voltage to get some deflection in VSWR meter
- Maximize the deflection with AM amplitude and frequency control knob of power supply
- Tune the plunger of klystron mount for maximum deflection
- Tune the reflector voltage knob for maximum deflection
- Tune the probe for maximum deflection in VSWR meter
- Tune the frequency meter knob to get a ‘dip’ on the VSWR scale (OR on CRO)and note down the frequency directly from frequency meter

Thanks…