नाम			
Name :	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _		
अनुक्रमांक		प्राप्त अंक	
Roll No :	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	Marks Awarded	:
पाठ्यक्रम			
Course :	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _		
दिनांक		अनुदेशक का अधाक्षर	
Date :	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	Instructor's Initial	:

OBJECTIVE: At the end of the Lab session you will learn about the procedure of testing the characteristics of copper cables.

Following Tests are to be carried out to measure the characteristics of Transmission lines.

1. **CROSS-TALK TEST (NEXT & FEXT)**
2. **PSOPHMETRIC NOISE LEVEL TEST**

1) CROSS TALK TEST:

Objective: To measure the **Cross talk** induced into one circuit by another adjacent circuit. The instrument used is of Anu Vidyut, Model no: 378-A, cross talk measurement set.

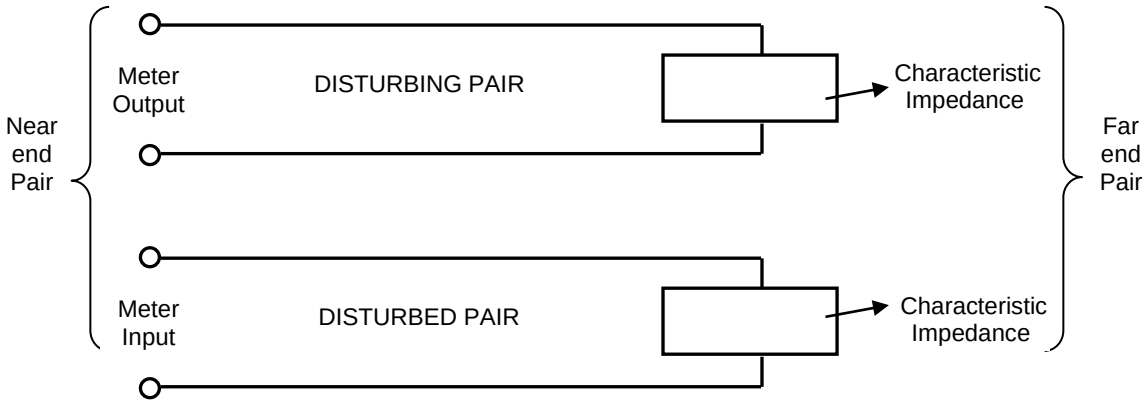
CROSS TALK: The signal of one pair of the cable induces unwanted signals in adjacent pairs due to electrostatic and electromagnetic induction effects. These unwanted signals are called as 'Cross Talk'. The first pair is called the **DISTURBING PAIR** and the other pair is called the **DISTURBED PAIR**

The cross talk is of two types: 1. Near end cross talk (**NEXT**)
2. Far end cross talk (**FEXT**)

Q1.Draw the front panel diagram of Cross Talk Measuring Set available in the lab?

1. Measurement of Near End Cross Talk (NEXT): The cross talk which is measured at the end from where the signal is fed is called the **N**ear **E**nd **C**ross **T**alk. One Cross Talk measuring Set is required to carry out the test as per the steps given below.

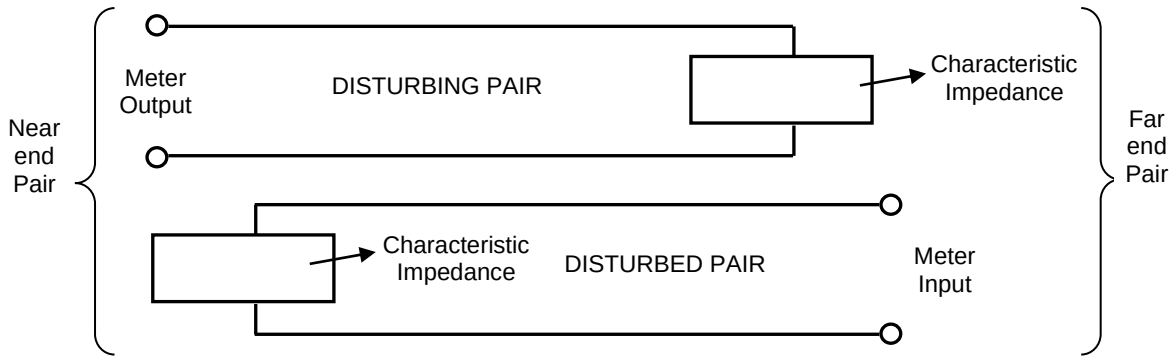
a. Set the impedance switches corresponding to the cable under test.
b. Link the Output of AF generator to the input of the level meter with patch cord for calibration.
c. Select the test frequency to 1000 Hz by pressing the test frequency push button.
d. Select the measuring range to 0 to – 40 dBm.
e. Turn 'ON' the instrument and give 5 minutes warm up time to have better results.
f. Adjust the level to 0 dBm with set level pot.
g. Check 0 dBm, if required re-adjust the set level pot.
h. Now the instrument is ready to measure cross talk.
i. Connect the instrument to the Tx line as per the connection diagram given below and record the readings.



Measured value of **Near End Cross Talk: ---------- dBm.**

2. Measurement of Far End Cross Talk (FEXT): The cross talk that is measured at **other end** of the line from where the signal is fed is called as "Far end cross talk". Two Cross TALK Measuring Sets are required to carry out this test. One meter at the near end and another at the Far end. The first instrument is connected to the disturbing pair at the near end to transmit the test signal and the other end of the pair is terminated by its characteristic impedance. The second meter is connected to the disturbed pair at the far end and the near end is terminated with characteristic impedance as shown in the below diagram.

a. The setting procedure of the instruments is as same as that of near end cross talk (from 'a' to 'g' steps) as mentioned above.
b. The cross talk is shown in the second meter at the Far End



Measured **far end cross talk value: ------ dBm.**

2) PSOPHOMETRIC NOISE LEVEL TEST:

Objective: To measure the **PSOPHOMETRIC NOISE LEVEL** induced in a circuit The instrument used is Digital Psophometer APLAB Model 1072.

INTRODUCTION: In all transmission systems the signal-to-noise ratio should be as high as possible. Psophometer is basically used to measure the interfering effect of noise in telephone equipment caused by amplifier noise, fundamental and harmonic frequencies of AC line supply as well as cross-talk from neighboring lines.

The APLAB Digital Psophometer has a built-in “hum” measurement facility which helps in measuring Psophometeric ripple on DC power supply and DC to DC converter.

The unit operates either on mains or with internal rechargeable battery and also on external 6V DC source.

CALIBRATION: The instrument should be properly calibrated before connecting the set for measurement. Set the front panel controls as follows.

I. The function switch to be set on 600 Ω positions.
II. Set the FILTER switch on CAL position.
III. Set the RANGE switch to 0 dBm position or Voltage range can be calibrated by setting cal. pot to 0.775V.

Q.2 Draw the front panel of the meter and indicate the parts?

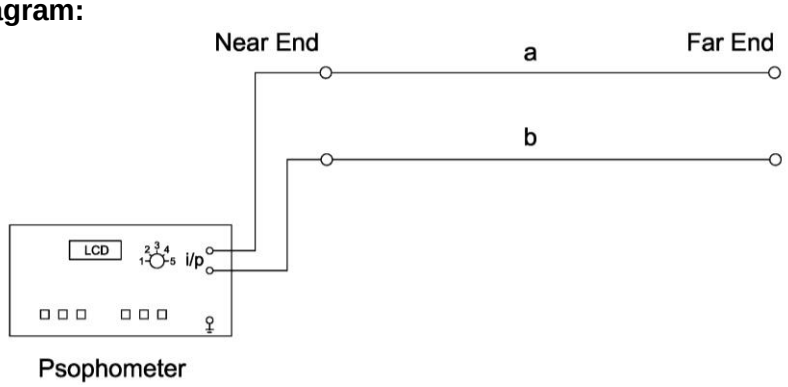
MEASURMENT PROCEDURE:

1) Measurement of Weighted NOISE:

i) Connect the telephone circuit under test to INPUT terminals of the meter.
ii) Set FUNCTION switch to 600Ω impedance.
iii) Set filter switch to WGT’D(weighed).
iv) Operate the RANGE switch from 0 dBm level to downwards till meter indication is observed.
v) Record the metallic noise indicated on meter.

Therefore: **Weighed Metallic noise level = ---------- dBm.**

Connecting diagram:



2) Measurement of Unweighted Metallic noise: Follow the all the steps as given in '1'. In step iii, select the filter as Unweighted (UNWGT'D).

Record the metallic noise indicated on meter.

Therefore: **Unweighed Metallic noise level = ---------- dBm.**

- **Mandatory Check & Tests before commissioning of Quad /PIJF cable for BPAC/ SSDAC / MSDAC applications**

As per RDSO letter No. STS/E/SSDAC/ SPN/177 dt. 28/30-08-2006)

1. Check for the cable parameters as below:			
a)	Insulation	-	shall be greater than 10 M Ω/Km
b)	Loop resistance	-	shall be 56 Ω./ km (Loop)
c)	Attenuation Losses	-	at 2 KHz/ 600 Ω impedance shall not be more than 30 dB for full length of Quad cable
d)	Near end crosstalk	-	shall be better than - 55 dB at 155 KHz
e)	Far end crosstalk	-	shall be better than - 55 dB at 155 KHz
f)	Continuity of Armour	-	shall be ensured
g)	Earth resistance at Armour	-	shall be less than 1 Ω.

- **Schedule of Testing & Measurements**

1	Checking Attenuation	Monthly
2	Loop Resistance Test	Monthly
3	Checking Cross Talk Level	Quarterly
4	Checking Noise Level	Quarterly
5	Insulation Resistance Test	Yearly

- **Precautions to be taken for using QUAD Cable**

c)
i) Designated pair of wire of the same Quad (mentioned in the above colour scheme) should be used.
ii) Do not use one wire from one Quad and another wire from some other Quad.
iii) If any wire of a pair of the Quad is broken/Non functional, then use fresh pair of wire.
iv) No wire should be paralleled for reducing the conductor resistance.

Date: **Signature of Trainee**