



Amitec Transmission Line Lab TLA30

Amitec Model TLA30 Transmission Line Lab has been designed to help educators visualize standing waves on a CRO and work on real transmission lines unlike most of the transmission line trainers currently available for educational purposes which use artificially simulated line modules with lumped parameters. An exhaustive manual has been provided with the system, which provides detailed experimental procedure of the system.

Amitec TLA30 Features:

- * To study standing waves and observe maxima and minima of a transmission line on a CRO.
- * Uses actual coaxial lines rather than simulated ones.
- * Appreciate significance of impedance matching.
- * Measures VSWR, reflection coefficient, characteristic impedance, velocity of propagation, dielectric constant and signal attenuation in TDR.
- * Study Time Domain Reflectometry.
- * Study location and nature of discontinuities, Open/short, mismatched terminations, etc.
- * Offers a complete view of the transmission line in analog and digital domains, which is essential for complete understanding of transmission line
- * 10MHz to 500MHz measurement range
- * Waveform and modulation independent
- * Inbuilt frequency counter
- * Wide input range -70dBm to +20 dBm
- * Tracking signal source for network analysis
- * User selected variable transmitter & receiver frequencies to cover wide frequency range.
- * PLL stabilized antenna transmitter and receiver operating in the frequency range of 5-2000 MHz with 50 KHz step size.

Amitec TLA30 Technical Specifications:

A. Frequency Domain Analyzer

Frequency range	: 30-300 MHz typical LCD Display.
Level	: 100mV p-p
Attenuator 50 Ohms	: 0.5, 1, 2, 4, 8, 15 dB
Output Impedance	: 50 Ohms
Scope out	: X-Y output to scope

B. Resistive Impedance Analyzer

Characteristic Imp.	: upto 900 ohms
Display	: LCD

C. Time Domain Reflectometer

PRR Short range	: 10MHz typical
Pulse width	: <10ns typical
PRR Long range	: 100KHz typical
Amplitude	: 1V nominal
Output Impedance	: 50 Ohms

D. Scalar Network Analyser

Frequency	: 10 MHz – 500 MHz
Center frequency	: 4 digit LED display
Accuracy	: ±0.1%
Resolution	: 100KHz
Sensitivity	: -70dBm
Attenuator	: 40 & 20dB External
Input Impedance	: 50 Ohms (BNC)
Horizontal scan	: upto 50MHz/div continuous
Center freq.	: Variable control
CRO Output	: Linear X out (BNC)
	: Log Y out (BNC)
Tracking signal	: -5dBm Typical
Impedance	: 50 Ohms
Attenuator	: 40 & 20dB External
Power Supply	: 220V ± 10%, 50Hz AC
Accessories	: Mains Lead, BNC-BNC

E-Manual: Installation DVD for ease of Learning

Specifications are subject to upgrade due to constant innovation in technology. Accessories shown are not part of standard equipment.

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Amitec TLA30 Technical Specifications:

PLL Synthesized Digital RF Source

Frequency range	: 5-2000 MHz PLL synthesized in 3 ranges
Step size	: 0.05, 0.1, 0.25, 0.5, 1 & 10 MHz
Accuracy	: 0.01%
Display	: 16X2 Backlit LCD
Controls	: Menu, Enter, Escape, Up & Down buttons.
Memory	: 1000 individual frequencies can be stored/recalled
Modulation FM	: Internal 1KHz/ External Micro phone
RF Level	: 110 dBuV typical
Attenuator	: 40dB (external)
Output Z	: 50 ohms
Auto mode	: Tracking operation with receiver
Power Supply	: 220V AC \pm 10%

PLL Synthesized Digital RF Receiver

Frequency range	: 5-2000 MHz PLL synthesized in 3 ranges
Step size	: 0.05, 0.1, 0.25, 0.5, 1 & 10 MHz
Accuracy	: 0.01%
Display	: 16X2 Backlit LCD
Controls	: Menu, Enter, Escape, Up & Down buttons.
Memory	: 1000 individual frequencies & levels can be stored/recalled
Measurements	: RF power level measurement in dBuV with 0.1dB resolution
Dynamic range	: 110 dB (70dB logarithmic + 40dB attenuator)
Input Z	: 50 ohm
Speaker	: Inbuilt for Audio output
Rs232 interface	: Easy connectivity to PC for polar plotting using supplied software
Auto mode	: Data logging for antenna bandwidth & polar plots for interfacing with transmitter & stepper.
Power Supply	: 220V AC \pm 10%

Software: Rs232 interface with polar plotting with log, linear cartesian and polar plots, Vi, Vr & Return loss plots, Multiple pattern overlay, Double cursor, Zoom, Colour editing, 1000 location editor, Absolute/Relative, 3dB/10dB beam-width, Gain, Front to back, Side lobe level and position, Plot rotate, File- edit, save, get.

Directional Coupler: Directional Coupler is provided with 2 GHz frequency response and high directivity for antenna forward & reverse power & VSWR measurements.

Slotted Line:

Impedance	: 50 ohms
Probe Depth	: Preadjusted
Connector	: N
Frequency	: upto 2 Ghz

ACCESSORIES

Lengths of 50 ohms and 75 ohms coaxial cable 300ohms parallel line with balun, lossy line, Tee connectors, Standard load of 50 and 75 ohms, Various capacitive and inductive loads, shorts, Operating manual, Antennas Mains cord

List of Experiments TDR

1. Introduction
2. To observe the open / short & terminated line.
3. To measure the characteristic impedance of a line.
4. To measure the velocity and dielectric constant
5. To measure the attenuation constant
6. To measure the VSWR, return loss
7. To observe the two sections joined with a connector
8. To observe the inductive coil Termination
9. To observe the t-line with a capacitor termination
10. To observe the t-line with a varying pulse width
11. To observe line with partial open and partial short
12. To observe the lossy transmission line

List of Experiments FDR

1. To setup the standing waves and observe the maxima and minima on a CRO in real time.
2. To measure characteristic imped. & differentiate between the matched and unmatched lines.
3. To study the attenuation characteristic of signal along a transmission line and observe its variation with frequency
4. To study the effect of reactive loads
5. To study the difference between lossy and loss less
6. To study the physical dimensions & estimate its Zo
7. To study behavior of infinite and short lines.
8. To study the operation of balun transformer on 300 ohms parallel line.
9. To study dielectric constant of insulator.
10. To study velocity of propagation & wavelength.

