APOGEE LABS

AL6500
DATA LINK TEST INSTRUMENT

FEATURES

- Fully Portable
  - AC operation
  - Light Weight, Compact Size
- Touch Screen and Key Pad Front Panel GUI Display
- Four Expansion Slots
- Ethernet Interfacer Remote Control
- Full Suite of Test Data Patterns
  - PRN & PCM
  - 100 bps to 35 Mbps
- Wide Range of Measurements
- One-Way and Loop-Back Link Testing

OVERVIEW

The AL6500 Data Link Test Instrument (DLTI) continues the tradition of our previous Apogee Labs data link test equipment in providing exceptional flexibility, versatility and reliability. All features of our earlier Data Link Test Sets are continued in the AL6500 with the addition of one-way data link path delay measurement and inter-changeable signal and protocol interfaces. Data link path delay may be measured in a single direction or round-trip path using a GPS timing source input to the DLTI. In round trip mode only, using an injected error bit methodology, the path delay is measured without the need for an external timing source.

The AL6500 DLTI is used by communication and telemetry engineers to test data links and system components such as bit synchronizers, modems and digital multiplexers to determine data handling integrity. In addition to standard Pseudo Random Number (PRN) data patterns, the AL6500 provides the user with simulated Time Division Multiplexed (TDM) Pulse Code Modulation (PCM) data to test complete systems from a receiver output or data source to the digital processor in a ground station. Bit rates are generated up to 35 Mbps, with data patterns up to 8 Megabits in length and output serial data coded as NRZ, Bi-phase or RNRZ for testing most data links. The use of optional modules, which are installable in the field, permit mixing the test data stream with noise and other perturbations to emulate real-world data sources.

The data receiver in the AL6500 automatically synchronizes to the incoming PRN or TDM data stream. Detected errors are displayed coincident with other test parameters. The measurement display may be customized by the user simply by selecting the measurement parameter to be presented in any field.

The AL6500 front panel contains a touch-screen combined data entry and display device. A full function key-pad is also present for those who prefer this method of control. The Ethernet interface functions in 10/100 b-T mode and permits complete remote control, monitoring and access to all measurement results.

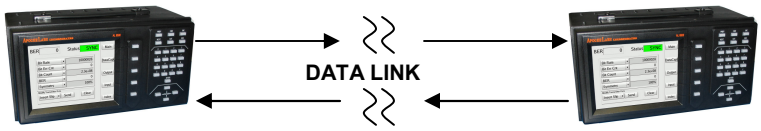

Figure 1: Full Duplex Data Link Measurements

Figure 3 Measure Round Trip Link Path Delay

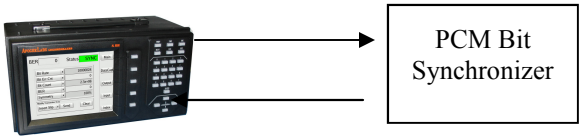

Figure 2 Measure Device Performance

SPECIFICATIONS

TRANSMITTER

Bit Rate:
100 bps to 35 Mbps
User Selectable Doppler Shift Rates
Selectable Outputs:
TTL—50/75 Ohm, BNC Connector
RS422—120 Ohm
Output Bit Codes:
NRZ-L/M/S; BiPhase-L/M/S;
RNRZ-L; Dm-M/S
PRN Patterns: Forward and Reverse:
2^7-1, 2^9-1, 2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, 2^{31}-1
TDM Format
4-32 Bit Frame Synchronization
Up To 4096 Words per Frame
8, 16, 32 Bits per Word
General and Unique Data
Programmable Word Patterns:
4-16 Bits per Word
Time Code Input
GPS/IRIG A, B, G for one-way Link
Delay Measurement
Error Injection:
One Error per Command
Constant Rate 10^{-2} to 10^{-6} Error Rates
Uniform or Random Distribution
Blanking:
10 to 4096 Bits Every 64 to 1024 Bits
Free Run or Synchronized to Frames
Force Output To All Zeros
Force 1 Transmitted Bit-Slip

RECEIVER

Clock (0°) and **Data:** Polarity Selectable
Bit Codes:
NRZ-L/M/S; BIP-L/M/S; RNRZ-L;
DM-M/S
Time Code Input:
GPS/IRIG A, B, G for one-way Link Delay
Measurement
Auto Synchronization: to PRN Data
Auto Alignment: of TDM Data
Test Modes:
Accumulate
Time Based Interval (1 Second to 500 Hrs.)
Bit Based Intervals (10^3 to 10^{12} Bits)
Measurements:
Received Bit Rate
Bit Count
Receiver Re-Syncs (Slips)
Bit Error Count
Ones In Error
Bit Error Rate
Bit Slip Probability
Symmetry
Frames In Error
Seconds In Test
Seconds In Error
Link Path Delay
Loop-Back Bidirectional
One Way—Uses Synchronized Timing

REMOTE CONTROL:
Ethernet 10/100b-T

MECHANICAL:
6.9"H X 12.3" W X 7.5" D; approx. 7 lbs.

POWER:
Supply Voltage 100 to 240 Vac 47-63Hz

ENVIRONMENT:
Operating temperature: 0 °C to +40 °C
Relative Humidity: 0 to 95%, non-condensing