ALBEDO AT.2048 is a rouged, extremly fast, and full-featured field tester designed in 2010 for E1 / Datacom mobile & fixed networks

Datasheet

ALBEDO AT-2048

1. ITU-T G.703 / E1 INTERFACE

1.1 Connectors

- Port A: Unbalanced (BNC) 75 Ω and balanced (RJ-45) 120 Ω (AT-2048 only).
- Port B: Balanced (RJ-45) 120 Ω (AT-2048 only).
- Port C: Unbalanced (BNC) 75 Ω and balanced (RJ-45) 120 Ω (Ether.Genius only).
- Analogue voice frequency audio port.

1.2 Line

- Connection modes: E1 monitor, E1 endpoint, E1 mux, E1 demux, E1 through, G.703 / E0 endpoint (AT-2048 only), analogue.
- Bidirectional testing (E1 monitor, E1 endpoint, E1 through) by simultaneous operation of Port A and Port B (AT-2048 only).
- Configurable input impedance: nominal line impedance, PMP 20 dB, PMP 25 dB, PMP 30 dB, high impedance (> 1000 Ω).
- Configurable output frequency offset within ±25,000 ppm around the nominal frequency.
- Line codes: HDB3, AMI.
- Input Level: From 0 dB to -45 dB.
- Pulse mask compliance: ITU-T G.703.
- Jitter compliance: ITU-T G.823.

1.3 Frame

- 2048 kb/s unframed, ITU-T G.704, ITU-T G.704 CRC, ITU-T G.704 CAS, ITU-T G.704 CRC + CAS.
- Generation of custom NFAS spare bits (ITU-T G.704 frame with CRC-4 multiframe).
- CAS A, B, C, D bit generation for each voice channel. Generation of CAS multiframe spare bits (ITU-T G.704 frame with CAS multiframe)

1.4 Test Patterns and Signals

- PRBS 9 (ITU-T O.150, O.153), PRBS 11 (ITU-T O.150, O.152, O.153), PRBS 15 (ITU-T O.150, O.151), PRBS 20 (ITU-T O.150, O.153), PRBS 23 (ITU-T O.150, O.151), PRBS 9 inverted, PRBS 11 inverted, PRBS 15 inverted, PRBS 20 inverted, PRBS 23 inverted, all 0, all 1.
- User configurable 32 bit word.
- Tone (from 10 Hz to 4000 Hz, from +6 dBm to -60 dBm).

- External signal: Analogue, 64 kb/s G.703 / E0 (AT-2048 only), data communications interface.

1.5 Analysis

- Analogue: Line attenuation (dB), frequency (Hz), frequency deviation (ppm), round trip delay (µs). Analogue results include pass / fail indications
- Defects: LOS, LOF, AIS, RAI, CRC-LOM, CAS-LOM, MAIS, MRAI, LSS, All 0, All 1.
- Anomalies: Code, FAS error, CRC error, REBE, MFAS error, TSE, Slip.
- Live and history LEDs for all Defects and Anomalies.
- ITU-T G.821 performance: ES, SES, UAS, DM. ITU-T G.821 results include pass / fail indications.
- ITU-T G.826 performance: ES, SES, UAS, BBE (near and far end statistics). ITU-T G.826 results include pass / fail indications.
- ITU-T M.2100 performance: ES, SES, UAS, BBE (near and far end statistics). ITU-T M.2100 results include pass / fail indications.
- ITU-T G.711 occupation map and time slot analysis: maximum code, minimum code, average code, time slot level and frequency
- CAS A, B, C, D bit analysis.
- Drop to external output: Analogue, 64 kb/s codirectional (Port A only), data communications interface.

1.6 Event Insertion

- Physical: AIS, LOS.
- Frame: FAS error, CRC error, MFAS error, REBE, LOF, MAIS, CAS-LOM, RAI, MRAI, CRC-LOM.
- Pattern: TSE, Slip, LSS, All 0, All 1.
- Insertion modes: Single (anomalies), rate (anomalies), continuous (defects), burst of M (defects), M out of N (defects).

1.7 Jitter and Wander Generation Function

- Modulation waveform: sinusoidal.
- Modulation frequency range: 1 µHz to 100 kHz.
- Modulation frequency resolution: 0.1 Hz (jitter), 1 µHz (wander).
- Modulation amplitude: 0 – 1000 Uipp. Maximum depends on modulation frequency.
- Modulation amplitude resolution: 1 mUIpp or $1/10^4$ configured value.

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- Modulation amplitude accuracy: better than O.172
- Smooth amplitude changes in jitter range (10 Hz – 100 kHz).
- Intrinsic jitter < 10 mUIpp.

1.8 Jitter Analysis Function
- Closed loop phase measurement method. Reference frequency not required.
- Modulation frequency range: 0.1 Hz to 100 kHz (locking time 10 s), 1 Hz to 100 kHz (locking time 1 s), 10 Hz to 100 kHz (locking time < 1 s).
- Modulation amplitude: 0 to 1000 UIpp (single range) (maximum amplitude depends on modulation frequency).
- Modulation amplitude resolution: 1 mUIpp.
- Measurement accuracy: better than ITU-T O.172.
- Jitter measurement results: peak to peak jitter, RMS jitter, maximum jitter (user reseteable), hits detection and count (user selectable threshold).
- Jitter measurement observation time: 1 s, 10 s, 60 s.
- Measurement selectable filters: LP (f < 100 kHz), LP+HP1 (20 Hz < f < 100 kHz), LP+HP2 (18 kHz < f < 100 kHz), LP+RMS (12 kHz < f < 100 kHz).

1.9 Wander Analysis Function
- Open loop measurement method. Reference frequency required.
- Modulation frequency range: 1 µHz to 10 Hz.
- Wander sampling frequency: 50 Hz.
- Modulation amplitude: 0 to ±2 s (single range).
- Modulation amplitude accuracy: 2 ns.
- Instantaneous: TIE, frequency offset, frequency drift.
- Statistics results: TIE, MTIE, TDEV.
- Statistics range: 10^2, 10^3, 10^4, 10^5, 10^6 s.
- Built in, real time statistics analysis.

1.10 Pulse Mask Analysis
- Operation modes: Eye diagram or continuous run.
- Measurement of pulse width, rise time, fall time, level, overshoot and undershoot (positive and negative pulses).
- Pass / fail indication for compliance with ITU-T G.703 E1 mask.

2. ITU-T G.703 / E0 INTERFACE
- The ITU-T G.703 / E0 interface is available only for the AT-2048

2.1 Connector
- Balanced (RJ-45) 120 Ω.
- Clock interface for ITU-T G.703 contradirectional and centralized interfaces is provided through external adapter.

2.2 Features
- Bit rate N x 64 kb/s (N from 1 to 4)
- Test pattern generation and analysis over co-directional interfaces
- Defect insertion and analysis: LOS, AIS, LSS, All 0, All 1.
- Anomaly insertion and analysis: TSE, Slip.

3. DATA COMMUNICATIONS

3.1 Connectors
- Smart Serial universal datacom connector for the DTE and DCE (all interfaces).

3.2 Interfaces
- V.24/V.28 asynchronous (RS-232) from 50 b/s to 128 kb/s.
- V.24/V.28 synchronous (RS-232) from 50 b/s to 128 kb/s.
- X.21/V.11 from 50 b/s to 2048 kb/s.
- V.35 from 50 b/s to 2048 kb/s.
- V.36 (RS-449) from 50 b/s to 2048 kb/s.
- EIA-530 from 50 b/s to 2048 kb/s.
- EIA-530A from 50 b/s to 2048 kb/s

3.3 Tests
- Operation: DTE emulation, DCE emulation and full duplex monitor.
- Test pattern generation and analysis over a datacom interfaces.
- Logic analyser capability.
- Defects: LOC, AIS, LSS, All 0, All 1.
- Anomalies: TSE, Slip.
- Analogue: Line attenuation (dB), frequency (Hz), frequency deviation (ppm).

4. FRAME RELAY MONITORING

4.1 Interfaces
- X.21/V.11 from 50 b/s to 2048 kb/s.
- V.35 from 50 b/s to 2048 kb/s.
- V.36 (RS-449) from 50 b/s to 2048 kb/s.
- EIA-530 / EIA-530A from 50 b/s to 2048 kb/s.

4.2 Settings
- DLCI.

4.3 Events
- Long frames, short frames.
- Alignment errors.
- FCS errors.
- Frame abort count.

4.4 Statistics
- Bandwidth statistics
- Maximum and minimum frame size.
- Frames with FECN, BECN and DE.
- Active DLCI list
- LMI frame count.

5. ANALOGUE TEST
- Tone Generation (from 10 Hz to 4000 Hz, from 0 dBm to -60 dBm).
- Level and frequency
- ITU-T G.711 analysis: maximum code, minimum code, average code.

6. SYNCHRONIZATION
- Internal clock reference.
- External reference clock: 2,048 kb/s (ITU-T G.703), 2,048 kHz.
- Configurable input gain: 0 dB, -20 dB.

7. GENERAL
- Operation time with batteries: 4.5 hours (AT-2048, minimum, one battery pack).
- IP remote control through attached Ethernet port.
- Configuration and report storage and export through attached USB port.
- TFT colour screen (480 x 272 pixels).
- Dimensions: 223 mm x 144 mm x 65 mm.
- Weight: 1.0 kg (with rubber boot, one battery pack).