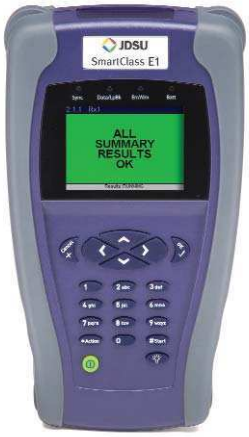
SmartClass™ E1

Service Installation and Maintenance Tester



Key Features

- **Performs E1 service installation and maintenance in easy-to-use, lightweight, and rugged form-factor**
- **Significantly reduces field technician training with Smart AutoConfiguration (AutoConfig) feature**
- **Works with PC software—download results for report preparation**
- **Provides additional E1 testing with available software options**
- **Includes Event Log and Histogram for troubleshooting**
- **Capable of bidirectional monitoring and troubleshooting via dual E1 ports**
- **Offers color graphical user interface (GUI) available in multiple languages**

Applications

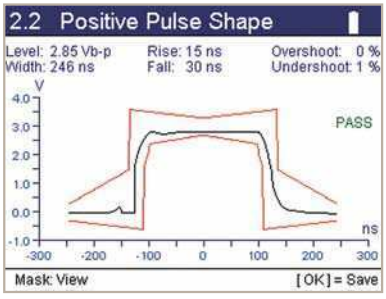
E1

- Provides terminate, monitor, bridge, and local loopback modes
- Provides G.703—2 Mb/s testing
- Conducts 2 M (Bulk), n x 64 kb/s BERT
- Measures performance G.821, G.826, and M.2100
- Provides audio monitor (VF drop)
- Provides transmit frequency offset
- Performs VF level and frequency measurements, VF tone insert
- Measures E1 signal level measurement
- Provides ABCD/Sa monitoring
- Provides round-trip delay
- Offers alarms (defects) and errors (anomalies) insertion
- Pulse shape (optional)
- Jitter (optional)

Others

- Offers remote control (optional)

The JDSU SmartClass E1 is a handheld field tester for the installation and commissioning of E1 service that offers multiple test modes for E1 signal analysis. An economical and easy-to-use point solution, the SmartClass E1 has a Smart AutoConfiguration (AutoConfig) feature and large, easy-to-read color display that make the lightweight, rugged, battery-operated tester ideal for both service provider and contractor field technicians. It also meets the needs of mobile operators in the construction of E1 backhaul infrastructure.



Pulse shape for extra E1 testing capability

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Specifications

E1 Circuit Testing

Interfaces

Dual RJ48 ports (port 1 Rx/Tx, port 2 Rx only)
120 balanced RJ48 (by default)
120 balanced CF, 75 unbalanced BNC (via adapter cable)

Line Code	AMI, HDB3
Tx Timing	Internal Recovered External (via adapter cable on Port 2)
Tx Frequency Offset	±100 ppm in 1 ppm intervals
Framing	Unframed, PCM31, PCM31C, PCM30, PCM30C
Test Mode	Terminate, monitor, bridge, local loopback 2M (Bulk), n x 64 kbps BERT

AutoConfig for framing and test pattern

LED Indicators	SYNC, ALARM, ERROR, DATA, LPBK, BATT

Performance Monitoring

G.821, G.826, and M.2100
ABCD/Sa monitoring
Round-trip delay

Test Patterns

All ones, All zeros
1:1, 1:3 (1 in 4), 1:4 (1 in 5), 1:7 (1 in 8),
63 (2^{6-1}), 511 (2^{9-1}), 2047 (2^{11-1}), ITU INV2^{15-1}, ITU2^{15-1}, ITU INV2^{20-1}, ITU2^{20-1}, ITU INV2^{23-1}, ITU2^{23-1}, QBF, QRSS, LIVE
User bit pattern (3 to 32 bits)
User byte pattern (1 to 64 bytes)

Key Results

Loss alarms, LOS seconds
Code error count, code error rate, timing slips, frame slips, LOF alarms, LOF seconds, AIS alarms, AIS seconds, RDI alarms RDI seconds, MF AIS alarms, MF AIS seconds, MF RDI alarms, MF RDI seconds
FAS bit error count, FAS bit error rate, FAS word error count, MFAS word error count, MFAS word error rate, CRC error Count, CRC error rate, CRC sync loss count
FAS sync loss count, MFAS sync loss count, remote end block error (E-Bit/REBE), NFAS word, MFAS word, NMFAS word Si bit, A bit, Sa-bit sequence (Sa4–Sa8)
TSE/bit error count, TSE/bit error rate, block error count pattern slips, pattern slip seconds
Pattern synchronization loss count, pattern synchronization loss seconds, round trip delay (µs), elapsed time, time, date/time-slot Rx byte, time-slot signaling data

Errors (Anomalies) Insert

2M code	Single
2M FAS	Single, 2, 3, 4
2M MFAS	Single, 2
2M CRC	Single
BERT pattern slip	Single
E-Bit/REBE	Single, Continuous
Bit (TSE)	Single-rate 1e-2, 1e-3, 1e-4, 1e-5, 1e-6, 1e-7, Multiple 1 to 50

Alarms (Defects) Insertion

LOS	Continuous
Loss of frame (LOF)	Continuous
AIS	
RDI/FAS Dist	
MF AIS	
MF RDI/MFAS dist	

VF Tests

VF level and frequency measurement

VF tone insert	404, 1004, 2713, 2804 Hz, –13.0, –3.0, 0.0, 3.0 dBm

VF drop to built-in speaker

Pulse Shape (optional)

Parameter Specification

Results	Pulse shape graph
G.703 mask	Pass/Fail
Pulse width resolution	2.75 ns
Rise time resolution	1 ns
Fall time resolution	1 ns
Undershoot resolution	1% of nominal level
Overshoot resolution	1% of nominal level
Signal level in [V] base-peak	

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Specifications

Jitter (optional)

Test Modes	Terminal, Monitor, Bridge
Jitter measurements available	Manual Jitter Measurement
	Maximum Tolerable Jitter Measurement (MTJ)
	Fast Maximum Tolerable Jitter Measurement (FMTJ)
	Jitter Transfer Measurement (JTF)

Manual Jitter Measurement

Rx accuracy	0.05UI or 3%, whichever is greater
Rx resolution	1/128UI
Rx frequency range	20 Hz to 100 kHz
Range of Rx jitter amplitude (UIpp)	16UI
Rx clock source	Recovered clock
Tx accuracy	0.03UI or 3%, whichever is greater
Tx resolution	1/64UI
Tx frequency range (nominal)	20 Hz to 100 kHz
Range of Tx jitter amplitude (UIpp)	0.1 to 10UI
Tx clock source	Internal clock

Maximum Tolerable Jitter Measurement

Tx accuracy	0.03UI or 3%, whichever is greater
Tx resolution	1/64UI
Tx frequency range (nominal)	20 Hz to 100 kHz
Range of Tx jitter amplitude (UIpp)	0.1 to 10UI
Results format	Table and graphical

Fast Maximum Tolerable Jitter Measurement

Tx accuracy	0.03UI or 3%, whichever is greater
Tx resolution	1/64UI
Tx frequency range (nominal)	20 Hz to 100 kHz
Range of Tx jitter amplitude (UIpp)	0.1 to 10UI
Results format	Table

Jitter Transfer Measurement

Rx accuracy	0.05UI or 3%, whichever is greater
Rx resolution	1/128UI
Rx frequency range	20 Hz to 100 kHz
Tx accuracy	0.03UI or 3%, whichever is greater
Tx resolution	1/64UI
Range of Tx jitter amplitude (UIpp)	0.1 to 5UI
Tx frequency range (nominal)	20 Hz to 100 kHz
Results format	Table and graphical
Intrinsic jitter of instrument	<0.07UI
Results approximate to	ITU-T G.823 and O.171

Other Software Options

Remote Control (optional)

Lets the user use command lines to control the tester via serial interface. Command guide is available with the option.

General Tester

Languages

English, French, German, Italian, Japanese, Korean, Portuguese, Russian, Simplified Chinese, and Spanish

Power

4 AA field-replaceable batteries (NiMH or Alkaline)

NiMH battery operating (at 25°C) under typical conditions provides up to 5 hours of continuous use for E1 application and 2 hours of continuous use for Datacom application

Supports sleep mode

AC line operation via external adapter

Charging time (at 25°C) under typical conditions for empty to full charge: with unit OFF up to 5 hours; with unit ON up to 7 hours

Permissible Ambient Temperature

Nominal range of use	0 to +50°C
Storage and transport	–10 to +60°C

Humidity

Operating humidity	10 to 90%

Physical

Size (H x W x D)	230 x 120 x 50 mm
Weight, including batteries	<1 kg (2 lb)
Display	320 x 240 color display

CE Marked

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Ordering Information

Order Number	Description
CSC-E1-P1	SmartClass E1 Package (No software options included)
CSC-E1-P2	SmartClass E1 Pulse Shape Package (Pulse Shape software option included)
CSC-E1-P3	SmartClass E1 Jitter Package (Jitter software option included)
CSC-E1-P4	SmartClass E1 Complete Package (Pulse Shape and Jitter software option included)

Accessories included with any package

- AC power adapter with plug kit (USA, UK, Australia, Europe)
- 4 x AA NiMH batteries
- CD-ROM (including PC utility, USB driver, and User Guide)
- 1 x RJ48-to-RJ48 cable
- 1 x USB cable
- Small carrying bag

Miscellaneous

CC-120101	Large Carrying Bag
AC-009801	Large Strand Hook
SCACARCHARGER	Car Adapter Charging Kit
ML-21107607	Printed User Manual SC E1 (English)
ML-21121114	Printed SC E1 Remote Control Reference Guide (English)

Software Options

CSC-E1-PS	Pulse Shape
CSC-E1-JIT	Jitter
CSC-E1-RC	Remote Control

Optional Accessories

E1 Cables

K1597	RJ48 to CF Y cable (120 Ω balanced)
CB-44995	RJ48 to Dual BNC cable (75 Ω unbalanced)
CB-0045402	2M External Clock Reference cable

Test & Measurement Regional Sales

NORTH AMERICA
TOLL FREE: 1 866 228 3762
FAX: +1 301 353 9216

LATIN AMERICA
TEL: +1 954 688 5660
FAX: +1 954 345 4668

ASIA PACIFIC
TEL: +852 2892 0990
FAX: +852 2892 0770

EMEA
TEL: +49 7121 86 2222
FAX: +49 7121 86 1222

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