SmartClass™ E1/Datacom

Service Installation and Maintenance Tester

Key Features

- Performs E1/Datacom 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 and Datacom 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

- Supports G.703 Codirectional, Contradirectional, and Centralized interface testing

The JDSU SmartClass E1/Datacom is a handheld field tester for the installation and commissioning of E1 and Datacom service that offers multiple test modes for E1 and Datacom signal analysis. An economical and easy-to-use point solution, the SmartClass E1/Datacom 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.

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)
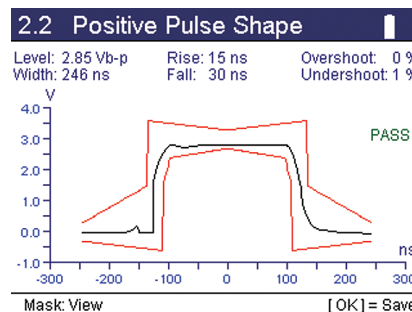- MFC-R2 (optional)

Datacom

- Offers DTE emulate, DCE emulate, and monitor mode
- Interfaces with X.21, V.24 (RS232), V.35, V.36 (RS449), and EIA530
- Provides round-trip delay
- Frame Relay (optional)
- Conducts G.703 Codirectional, Contradirectional, and Centralized interface testing

Others

- Provides VT-100 terminal emulation (optional)
- Offers remote control (optional)

Pulse shape for extra E1 testing capability

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	

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
Range of Rx jitter amplitude (UIpp)	10UI
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 points	20 Hz, 120 Hz, 1000 Hz, 2400 Hz, 6 kHz,
	18 kHz, 30 kHz, 60 kHz, 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 points	20 Hz, 2400 Hz, 18 KHz, 60 kHz, 100 kHz
Range of Tx jitter amplitude (UIpp)	0.1 to 1.5UI
Results format	Table

Specifications

Jitter Transfer Measurement

Rx accuracy	0.05UI or 3%, whichever is greater
Rx resolution	1/128UI
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 points	20 Hz, 2400 Hz, 18 kHz, 60 kHz, 100 kHz
Results format	Table and graphical
Intrinsic jitter of instrument	<0.07UI
Results approximate to	ITU-T G.823 and 0.171

MFC-R2 (optional)

Test Modes	Monitor, Simulate (Call in or out)
Country selection	ITU-T, Brazil, Mexico, India, China, Philippines, or User Defined

Datacom Circuit Testing

Interfaces

X.21, V.24 (RS232), V.35, V.36 (RS449), and EIA530
via adapter cable

G.703 Codirectional, Contradirectional, and Centralized
Interface testing via adapter cable

Data Rates (Emulate and Monitor)

X.21	Sync 50 bps to 10 Mbps
V.24 (RS232)	Async 50 bps to 128 kbps
V.24 (RS232)	Sync 50 bps to 128 kbps
V.35	Sync 50 bps to 2048 kbps
V.36 (RS449)	Sync 50 bps to 10 Mbps
EIA-530	Sync 50 bps to 10 Mbps

BERT Patterns

All Ones, All Zeros,
1:1, 1:3 (1 in 4), 1:4 (1 in 5), 1:7 (1 in 8), 3:1, 7:1,
63 (2^{6-1}), 511 (2^{9-1}), 2047 (2^{11-1}), 2047R, 2047R INV, 2^{15-1}
(ANSI, ITU), 2^{20-1} (ANSI, ITU), 2^{23-1} (ANSI, ITU), QRSS, QBF, Delay
User Bit Pattern (3 to 32 bits)
User Byte Pattern (1 to 64 bytes)

Transmit Clock Sources

Internal ±3 ppm, 1 ppm per year aging
Interface

Signaling Lead Control

Emulate DTE
RTS, DTR, LL, RL
Emulate DCE
CTS, DSR, DCD, TMA
Monitor

Self Loop

Internal
External Cable Test

Result Categories

Summary, Clock, BERT, Data, Control Signal, G.821, Time

Frame Relay (optional)

Interface	Datacom
Test Mode	Terminate and Monitor (UNI-U, UNI-N, NNI)
	ANSI T1.617 Annex D, ITU-T Q.933 Annex A, LMI Rev 1, None
DLCI	0 – 1023
Link Trace	Simple, Verbose, Text, Hex, Text, and Hex
Long Frame	5 – 9999

Load Test

Test of CIR (load)	Off, Fixed, Burst, Ping
CIR Fixed Rate	1 – 10,000 kb/s
Frame Lengths	5 – 9999
Payload	Sequence, User 1, User 2, Sequence + User
Control Bits	FECN, BECN, DE, C/R
Burst Settings	Tx time, Idle time

Ping

Settings	Source IP Address, Destination IP Address, Inverse ARP, Ping Length
Encapsulation	NLPID, Ethertype

Result Categories

Frame Relay (DLCI, Link, Ping, LMI, DLCI List, Trace)
and Datacom

Other Software Options

VT-100 (optional)

This option enables the instrument to emulate a VT-100
terminal and to connect to network device via instrument
9-pin RS232 interface.

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

Link Management	Auto-Detect (default setting),

Ordering Information

Order Number	Description
CSC-E1DC-P1	SmartClass E1 Datacom Package (No software options included)
CSC-E1DC-P2	SmartClass E1 Datacom Pulse Shape and Frame Relay Package (Pulse Shape and Frame Relay software option included)
CSC-E1DC-P3	SmartClass E1 Datacom Premium Package (Pulse Shape, MFC-R2, Frame Relay, and VT-100 software option included)
CSC-E1DC-P4	SmartClass E1 Datacom Pulse Shape and Jitter Package (Pulse Shape and Jitter software option included)
CSC-E1DC-P5	SmartClass E1 Datacom Complete Package (Pulse Shape, Jitter, MFC-R2, Frame Relay, and VT-100 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-SIG	MFC-R2
CSC-E1-FR	Frame Relay
CSC-E1-VT100	VT-100
CSC-E1-RC	Remote Control

Optional Accessories

E1 Cables

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

Datacom Cables

CB-44391	X.21 10M DTE/DCE Emulate (Support up to 10 Mb/s)
CB-44346	X.21 Monitor
CB-44385	V.24 DTE/DCE Emulate
CB-44348	V.24 Monitor
CB-44389	V.35 DTE/DCE Emulate
CB-44341	V.35 Monitor
CB-44388	V.36 DTE/DCE Emulate
CB-44347	V.36 Monitor
CB-21118474	68-pin MDR to Bananas
CB-21128081	68-pin MDR to DB15 (CB-2118474 and CB-21128081 for G.703 Codirectional, Contradirectional, and Centralized interface testing)

Test & Measurement Regional Sales