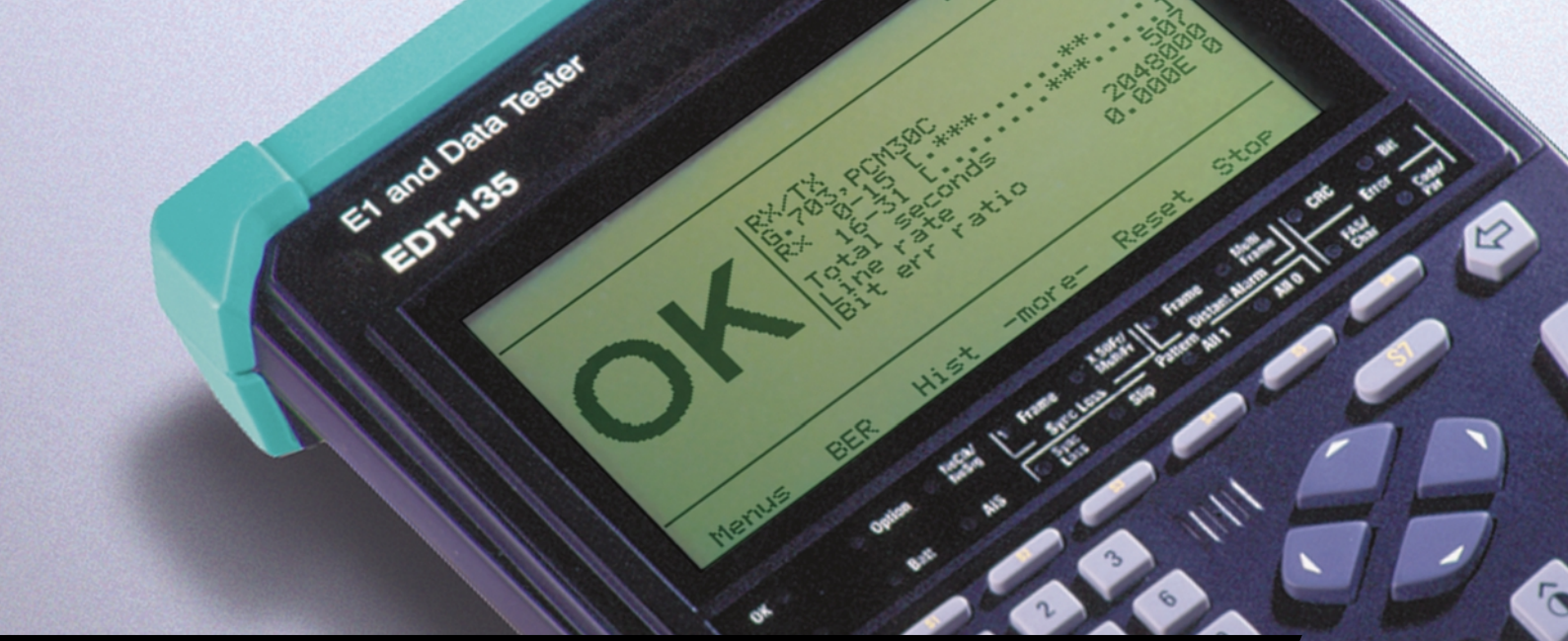

Acterna E1 and Data Testers

(EST-120, EST-125, EDT-130, EDT-135)

Scalable testing for digital networks

The range of E1 and Data Testers provide a scalable, future-proof solution for the testing needs of engineers involved in the installation, commissioning and maintenance of digital networks. These instruments can carry out both framed and unframed tests on a wide variety of equipment, ensuring that technicians can perform their jobs quickly and efficiently. The E1 and Data testers come in compact, robust, handheld packages that make them ideal for field use.

This low cost, time saving, multiple language solution for E1 and Data testing supports a wide range of software options including Pulse Shape Analysis, Jitter, and Frame Relay all implemented on the same straightforward user interface. The generic hardware platform can be configured and optioned to meet the needs of various engineering groups or activities. It can also be reconfigured or upgraded as required.

Highlights

- **Provides a scalable test solution for E1 and Data testing applications, supported by a large range of software options for E1 services (Frame Relay, GSM) and subrate multiplexing system (X.50, HCM, V.110) testing**
- **Allows for rapid evaluation of circuits through an intuitive user interface with an autoconfigure feature and large, clear results screens**
- **Employs a full set of physical layer tests for E1 balanced and unbalanced circuits including BERT, VF, Round Trip Delay, Signal Level, Pulse Shape and Jitter**
- **Provides standard options for Quality of Service (QoS) measurements to ITU-T G.821, G.826, and M.2100 recommendations**
- **Makes clear distinctions between bit errors and bit slips in QoS testing through the patented Gelbricht synchronization method**

ACTERNA™
Communications Test and Management Solutions

The range of products comprizes EST-120, EST-125, EDT-130, and EDT-135. The EST-120 and EST-125 are multipurpose field service testers designed for commissioning, maintenance, and troubleshooting on E1 PCM circuits. They can perform a wide variety of tests, including: framed and unframed monitoring, framed and unframed end-to-end testing, drop and insert, channel associated signaling monitoring, Round Trip Delay measurement and repeated BERT.

The EDT-130 and EDT-135 have a similar range of features for E1 circuit testing, plus an extended range of interfaces for data circuit and primary multiplexer testing.

Some of the key functions and benefits of the E1 and Data testers include:

Ease of use

The EST/EDT range has been designed with the technician in mind. The instruments are lightweight, easy to hold and carry, and feature a large LCD screen with integral backlight for the most demanding testing environments.

Rapid fault identification

Test results are displayed in a concise, graphical format with our recognized big “OK” when no errors or alarms are present (figure 1). The testers also support multiple languages. With comprehensive alarm and errors status LEDs, technicians are given a clear indication of problems even at a distance. All results and data can be stored for later analysis and printed to an external printer or computer with a single key press.

Autoconfigure

The autoconfigure feature greatly simplifies instrument setup. A test can be started on framed or unframed traffic using just two key presses. For a framed signal the instrument can determine the framing type, timeslot allocation and test pattern type.

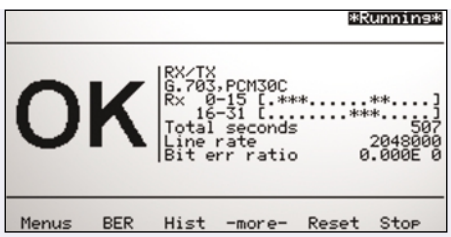

figure 1

Gelbrich synchronization

The patented Gelbrich synchronization method enables test pattern synchronization and accurate BERT measurement even in the presence of rapid bursts of errors. It also differentiates between bit slips and bit errors, important in QoS testing.

Results storage and printing

The EST/EDT range of instruments has eight configuration and test memories that store test configurations and results, allowing them to be viewed or printed at a later time. Results are printed through the serial port and a setup screen enables the instrument to be set for a range of serial printers. Parallel printers are supported with the use of a serial to parallel converter cable. Alternatively, printing to a PC can be achieved using a software program such as WG Print Capture.

Programmable timers

The instrument can be programmed to start a delayed test at a specific date and time for a selectable duration.

Battery/mains operation

For field use, the instrument has an 8-10 hour battery life using rechargeable and exchangeable batteries. Long duration testing can be achieved using the combined AC mains power supply and charger.

Software options

A key feature of the EST-125 and EDT-135 instruments is the ability to load software options to extend testing functionality.

Application orientated packages

A range of application orientated packages is available that combines the instruments with a carefully selected collection of software options and accessories. Should requirements change, a range of packages is available for upgrading EST/EDT instruments to EDT-135.

Accessories

The ELM-2 accessory allows the instrument to be connected to 2 Mbps lines carrying hazardous voltages and √f distortion. It removes the DC voltage, equalizes the voltage signal and also measures and displays the signal level.

The V.11 cable test adapter is used to detect a number of common faults on V.11 cables that might otherwise go unnoticed due to the nature of balanced line interfaces.

Feature summary

	E1 Testers		*E1 and Datacom Testers*	
	EST-120	*EST-125*	*EDT-130*	*EDT-135*
General features				
Remote operation and control	•	•	•	•
Autoconfigure	•	•	•	•
Test patterns, fixed, programmable and ITU-T	•	•	•	•
Local language support	•	•	•	•
Downloadable software options	•	•	•	•
Test configuration and results memories	•	•	•	•
Printer interface	•	•	•	•
Programmable timer	•	•	•	•
Backlight	•	•	•	•
LEDs	•	•	•	•
Large display	•	•	•	•
E1 circuit testing				
Balanced and unbalanced G.703 Tx and Rx	•	•	•	•
Terminated and high impedance termination modes	•	•	•	•
Framed and unframed test signal generation	•	•	•	•
n and m x 64 kbps time slot monitoring	•	•	•	•
Pattern generation into n and m x 64 kbps timeslots	•	•	•	•
G.821, G.826, M.2100 analysis (both IS and OOS)	•	•	•	•
Error and alarm, generation and analysis	•	•	•	•
PCM tone generation with variable level and frequency	•	•	•	•
PCM decoding and audio output	•	•	•	•
CAS monitoring of all 30 channels	•	•	•	•
CAS history for a single channel	•	•	•	•
E1 signal Through mode	•	•	•	•
n x 64 kbps drop or n x 64 kbps insert	•	•	•	•
m x 64 kbps drop and insert		•		•
Si, Sa, A and E monitoring and generation		•		•
NFAS and NMFAS monitoring and generation		•		•
Tx frequency offset		•		•
Round trip delay, framed and unframed		•		•
Primary multiplexer testing				
Pattern into MUX channel and monitoring on E1 signal			•	•
Pattern into E1 signal and monitoring on MUX channel			•	•
X.50 multiplexer testing				•
Datacom circuit testing				
X.21 V.11/RS422 interface			•	•
V.24/RS232 interface (sync and async)			•	•
V.35 interface via adapter			•	•
V.36/RS449 interface via adapter			•	•
EIA530 interface via adapter			•	•

Accessories

Unbalanced 75 Ω BNC 2m (x4)	K169
Type 43 stub adapter cable (for above)	K1549
Balanced 120 Ω CF to 3 x Banana 2m (x4)	K71
Balanced 120 Ω CF to RJ45	K1597
BNC to Siemens 1.6/5.6	K1616
External clock adapter	K1513
V.24 download cable	K1515
Serial printer cable (25 way)	K1500
Serial to parallel printer cable	K1589
V.11 DCE adapter cable	K1505
V.24 DCE adapter cable	K1512
V.35 DTE (AMP 1.6 mm) adapter cable	K1508
V.35 DCE (AMP 1.6 mm) adapter cable	K1509
V.35 DTE (Positronic 1.6 mm) adapter cable	K1525
V.35 DCE (Positronic 1.6 mm) adapter cable	K1526
V.35 DTE (Positronic 1.0 mm) adapter cable	K1510
V.35 DCE (Positronic 1.0 mm) adapter cable	K1511
V.36/RS449 DTE adapter cable	K1506
V.36/RS449 DCE adapter cable	K1507
EIA-530 DCE adapter cable	K1629
EIA-530 DTE adapter cable	K1630
ELM-2 Equalizer Level Meter	BN 4546/01
V.11 cable test adapter	BN 4534/00.37
Equipment case (small)	BN 4562/00.50
Equipment case (large)	BN 4562/00.51
Soft carrying case	BN 4518/00.08
Soft shoulder bag	BN 4562/00.01
Neck strap	BN 4562/00.53

Software options (available at extra cost)

French S/C bits	BN 4562/00.11
X.50	BN 4562/00.14
GSM	BN 4562/00.15
Large Frequency Offset	BN 4562/00.19
All 1's/All 0's histogram	BN 4562/00.20
Noise Measurement	BN 4562/00.23
V Interface Status Monitor	BN 4562/00.28
V.110	BN 4562/00.32
HCM	BN 4562/00.38
Frame Relay	BN 4562/00.41
Jitter	BN 4562/00.42
Datacom	BN 4562/00.44
V delay	BN 4562/00.48
E1 Level Measurement	BN 4562/00.52
E1 Pulse Shape Analysis	BN 4562/00.56

Technical specification

Generator/Receiver

Interfaces

G.703
X.21/V.11
V.24 (RS232)
V.35 via adapter
V.36 (RS449) via adapter
EIA530 via adapter

Physical Connections

3 pin CF connectors (120 Ω balanced)
BNC connectors (75 Ω unbalanced)
15 way D type (100 Ω balanced)
25 way D type

G.703 Test Modes

RX mode

Framing	PCM30, PCM30CRC, PCM31, PCM31CRC or unframed
G.703 line code	HBD3, AMI, codirectional
V.11 Drop	n x 64 kbps, m x 64 kbps

RX/TX

As RX plus:	BER test pattern generation n x 64 kbps, m x 64 kbps
V.11 Drop/Insert	Drop or insert n and m x 64 kbps Drop and insert n x 64 kbps

2 Mbps internal clock offset up to ±150ppm
Programmable Si, Sa, A and E bits and NMFAS

Through mode

As RX/TX mode plus:
Drop and insert n and m x 64 kbps

Round Trip Delay mode

Framed and unframed 2 Mbps:

Range	0-10s
Resolution	1μs

MUX/DEMUX mode

G.703 interface as RX/TX mode
Unframed DTE emulation on V.11, V.24, V35, V.36

Monitor mode

Simultaneous monitoring and display of any time slot in both frame and multiframe.
Simultaneous monitoring and generation of the Si, Sa, A and E bits of the NFAS.
Simultaneous monitoring and generation of the NMFAS.

Level and Frequency mode

PCM generation and measurement of sinusoidal signals in a time slot. (A-law coding to ITU-T Rec. G.711)

Tx frequency range	5 Hz to 3998 Hz
Tx level range	–55 dBm0 to +3 dBm0
Rx level measurements	–80 dBm0 to +5 dBm0

X.50 Test modes

RX/TX, through, D&I and MUX/DEMUX
Division 2 and 3 framing
Test pattern insertion/evaluation in n x 600, 19.2, 48 kbps
X.50 frame analysis
Programmable A-H bits

Test patterns

$2E^{6}$–1, $2E^{9}$–1, $2E^{11}$–1, $2E^{15}$–1, $2E^{20}$–1, $2E^{23}$–1
Alternating 1s and 0s, All 1s, All 0s
8 and 16 bit programmable words

Error injection

Bit, code, FAS,
CRC errors: Single, ratio or frequency

Clocking

G.703 transmit clock source 2048 kbps and co-dir.: Internal, external, from RX

Printer and remote operation

Interface	V.24, DTE, Async
Baud rates	300, 600, 1200, 2400, 9600, 19200, 38400

Front panel

Display	42 character x 16 line LCD with backlight
LEDs	2 summary, 14 alarm/error, option and low battery
Keyboard	Numeric keypad, 4 cursor, 2 contrast, main menu, 6 soft keys, alt, on and off

Stores/Memory

8 test configuration stores and 8 test results memories

Self check

Comprehensive self check at power on

Languages

English, German, French, Spanish, Italian, Turkish and Portuguese

Power Supply

Internal supply	Rechargeable NiCd batteries (8 to 10 hours operating time)
External supply	External mains adapter/charger

Low battery warning LED before auto switch off

Weight/Dimensions

Weight	1.55 kg approximately
Dimensions (w x h x d)	270 x 199 x 56 mm

Ordering information

– EST Silver Package (Includes EST-120 with M.2100, G.826, extended PRBS and Level Measurement options)	BN4562/21
– EST Gold Package (Includes EST-125 with M.2100, G.826, extended PRBS, Pulse Shape Analysis with Level Measurement and Jitter options)	BN4562/26
– EDT Platinum Package (Includes EDT-135 with M.2100, G.826, extended PRBS and Level Measurement options)	BN4562/31
– EDT Diamond Package (Includes EDT-135 with M.2100, G.826, extended PRBS, Pulse Shape Analysis with Level Measurement and Jitter options)	BN4562/33
– EDT X.50 Sub-Rate Package (Includes EDT-135 with M.2100, G.826, X.50, HCM and V.110 options)	BN4562/32
– EDT Frame Relay Package (Includes EDT-135 with M.2100, G.826, extended PRBS Frame Relay and All 1s and All 0s options)	BN4562/36
– EDT-130 (Includes EDT-130 with M.2100, G.826, and extended PRBS options)	BN4562/30
– EDT Datacom Package (EDT-135 with all software options to comprehensively address datacom testing)	BN4562/37
– EDT Complete Package (Includes all software options)	BN4562/38
All complete with Plug for US, Euro, UK or Australian voltage User manual	AC adapter/charger

Packages include:
Soft case or small equipment case
K1515 download cable, plus a choice of three other cables from the cable list

Acterna is the world's largest provider of test and management solutions for optical transport, access and cable networks, and the second largest communications test company overall. Focused entirely on providing equipment, software, systems and services, Acterna helps customers develop, install, manufacture and maintain optical transport, access, cable, data/IP and wireless networks.

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