Applications

• Installing, commissioning and maintaining E1 circuits and multiplexers
• Commissioning and maintaining datacom and V.24 modem circuits
• Commissioning Frame Relay services
• Installing and maintaining GSM circuits

This powerful tester includes a full set of measurements to install, commission and troubleshoot E1 and data circuits, along with the services that run over them.

Installation tests require basic out-of-service Bit Error Rate (BER) testing to assess cabling integrity.

Full commissioning requires extended BER testing to international standards, as well as stress testing and complete assessment of link performance with respect to error and alarm reporting.

For successful maintenance, rapid identification of the current line status is critical to the speedy resolution of problems.

Specific services (such as Frame Relay and GSM) have their own testing requirements, and require a tailored solution to ensure satisfactory operation.

Functions

• E1 and n x 64k BERT with Autoconfigure and G.821, G.826 and M.2100 testing
• Clear OK/Status Page
• Multi-interface capability: V.24/RS232, V.11/X.24, V.35, V.36/RS449, G.703 (2048/704kbit/s), G.703 co-directional
• Frame Relay commissioning tools, turn-up, PING and Fox
• Multiplexer tests include MUX/DEMUX and A-D/D-A measurements
• Special sub-rates (HCM, X.50, V.110)

Features such as Autoconfigure and the 'Big OK' result screen make it easy to use with a minimum of training.

Quality of Service can be measured with G.821, G.826 or M.2100. E1 signal quality measurements include jitter, level and pulse shape. Datacom interface control signals can be monitored and set.

V.24 modem tests include dial-up, auto-answer, distortion measurement and BER. Other important features include round trip delay measurements on E1 and datacom circuits and E1 drop and insert.

Comprehensive service testing is possible using dedicated options.
Easy to Use
The EDT-135 has been designed with the user in mind. As well as being lightweight and comfortable to hold and carry, all testers feature large LCD screens with integral backlight for the most demanding testing environments. If you wish to self-support the tester, the integral two-position backstand/carry handle can easily be folded out, and can also be configured to suspend the instrument for hands-free viewing.

Test results are displayed in a concise, graphical format with our recognised ‘Big OK’ when no errors are present. Multiple language support is standard and comprehensive alarm and error status LEDs give clear indication of problems, even from a distance. And, as you’d expect, all results data can be stored for later analysis or printed to an external printer with a single keypress.

Autoconfigure
The Autoconfigure feature greatly simplifies instrument set-up. A test can be started on framed or unframed traffic using just 2 key-presses. For a framed signal, the instrument can determine the framing type, timeslot allocation and test pattern type.

Gelbrich Synchronization
The patented Gelbrich Synchronization method enables synchronization on a test pattern to be maintained and accurate BER measurement to be made even in the presence of rapid bursts of errors. It also enables differentiation to be made between bit slips and bit errors.

Result Storage and Printing
The EDT-135 has 8 test memories for the storage of text and histogram results, for viewing or printing at a later time. Printing of results is supported through the serial port. A set-up screen enables the instrument to be set up for a range of printers.

Programmable Timers
The instrument can be programmed to start a test at a specified date and time for a selectable duration.

Remote Operation
The instrument is compatible with the DTM-32 remote operation solution.

Battery/Mains Operation
8-10 hour battery life using rechargeable and exchangeable batteries. Long duration testing can be achieved with a.c. mains power.

Software Option Download
The testing capability of the EDT-135 can be greatly extended by downloading a range of software options. Applicable options include Signal Level Measurement, Pulse Shape Analysis, Jitter, Large Frequency Offset of Transmit Clock, Frame Relay, HCM, GSM, Enhanced Datacom Tests and Voice Channel Noise Measurement.

Instrument Applications
E1 Service Turn-up
Availability and performance of an E1 link can be established using either an intrusive or a non-intrusive test. The EDT-135 can be connected via 75Ω/120Ω connectors using Hi-Z termination or at a protected monitor point. A typical simple E1 test will take no longer than 30 seconds, the OK screen quickly indicates when an E1 service is present and error-free. G.826/M.2100 test sequences can then be run, and the results displayed, stored and printed.

n x 64kbit/s Timeslot Analysis
64kbit/s timeslots are grouped within the E1 frame to give end-customers intermediate data speeds such as 128 or 256kbit/s. The EDT-135 can perform BER analysis on bundles of n x 64kbit/s slots, and drop and insert n x 64 kbit/s to an external protocol analyser via V.11.
**G.826 and M.2100 Analysis**

G.826 is the ITU-T recommendation for error performance of international digital paths at or above the Primary Rate. The complementary M.21xx series permits rigorous testing of PDH links but in shorter time periods. Both methods are included as standard software modules in the EDT-135 tester. The following screens illustrate the summary results from G.826 and M.2100 tests.

**Results Monitor**

A graphical display of past and present alarm occurrences and error ratios for both near and far directions at the same time.

**Histograms**

A set of histogram screens may be displayed, based on the recorded history of alarms, errors and G.826/M.2100 events. There are histograms for each valid alarm, error and G.826/M.2100 result type (up to 12) at each resolution (days, hours, minutes and seconds).

**E1 Service Troubleshooting**

An extended bit error test will determine whether a periodic fault is causing problems. Electrical equipment such as air-conditioning may cause problems at regular times in the day. Error histograms make it possible to identify external events which can be isolated as causes of the problem.
If high jitter levels are isolated to the outputs of particular network elements, these elements can be taken out of service and further tested by injecting jitter at a known level and testing the jitter on the output (jitter transfer).

Jitter testing, Level Measurement and Pulse Shape Analysis options can be ordered for the EDT-135.

Primary Multiplexer Testing
The 2Mbit/s Framed capability of the EDT-135, and its wide range of interfaces enable in-service and out-of-service testing of a multiplexer to be carried out using a single instrument. Testing is possible in the mux and demux directions. For example, testing of the customer-network (mux) direction is performed by transmitting a test pattern into the multiplexer customer-side at n x 64kbit/s via V.24, V.11, V.35, V.36, RS449 or G.703 co-directional. The 2Mbit/s frame generated by the multiplexer is then monitored and the BER of the pattern in the appropriate timeslot(s) is evaluated.

Service Turn-up

HCM* Testing (HCM Option)
High Capacity Multiplexing (HCM) is a Newbridge proprietary rate-adaption and sub-rate multiplexing scheme that provides a bandwidth granularity of 800bit/s throughout a network. HCM multiplexes multiple V.24 lines into a single G.703 timeslot with very good bandwidth efficiency. The HCM option for the EDT-135 enables users to verify correct configuration, the ability of the link to maintain synchronisation to communicate data without errors.

Various errors can be injected to simulate problems and test the network response. These include bit errors, HCM FAS and Signalling FAS errors, and HCM Frame and Signalling AIS errors.

*HCM is proprietary to Newbridge networks corporation. Used with permission.

Frame Relay Testing (Frame Relay Option)
Loaded into the EDT-135, the Frame Relay option provides three test modes suitable for installation and maintenance of Frame Relay services:

- Frame Relay service Turn-Up for verification of user-to-network connectivity and configuration
- 'Fox' test for stress testing and Committed Information Rate confirmation
- TCP/IP PING Request Testing, providing additional tests to verify the connectivity of far-end terminals.
Accessories

**V.11 Cable Test Adapter**

This accessory detects a number of common faults on V.11 cables, which due to the nature of balanced line interfaces would otherwise go unnoticed.

**ELM-2 Equalizer and Level Meter**

The ELM-2 accessory allows the instrument to be connected to 2Mbit/s lines carrying hazardous voltages and \( \sqrt{\text{f}} \) distortion. It removes the DC voltage, equalizes the signal and also measures and displays the signal level.

**PenBERT 2Mbit/s Monitor**

The PenBERT PCM monitor can be used with the EDT-135 to perform simple end-to-end tests on a 2Mbit/s line. Errors and alarms are indicated by LEDs.

**V Interface Troubleshooting (V Status Option)**

The V Status option shows the status of input and output circuits when testing V.24, V.35 and V.11 interfaces. It also offers ON/OFF softkey control for a selection of the output circuits.

**Equipment Cases**

A range of equipment cases and shoulder-bags is available to allow convenient transport and storage of the EDT-135 and accessories.

**DTM-32 Features**

The DTM-32 product offers Remote Operation using an on-screen faceplate, via an easy to use Windows™ interface.

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**Weight/Dimensions**

**Weight:**
1.55kg approx

**Dimensions (in mm):**

- Width: 199 mm
- Height: 270 mm
- Depth: 56 mm
Technical Specifications

Generator/ Receiver
Interfaces:
  - G.703

Outputs:
  - Balanced 3 pin CF connector
  - Unbalanced BNC connector

G.703 Test Modes:
RX
Framing:
  - PCM30, PCM30CRC, PCM31, PCM31CRC, or Unframed

G.703 line code:
  - HDB3, AMI, co-directional

V.11 drop:
  - 1 x 64kbit/s, n x 64kbit/s

RX/TX
As RX plus:
Ber Test pattern generation:
  - Single timeslot
  - n x 64kbit/s timeslots

V.11 Drop/Insert:
  - Drop and/or Insert n x 64kbit/s timeslots
  - Drop and Insert 1 timeslot

Programmable Si, Sa, A and E bits and NMFAS

Through Mode
As RX/TX plus Drop and/or Insert via V.11

Round Trip Delay
Framed and Unframed 2Mbit/s

MUX and DEMUX Testing
Receiver and transmitter as for RX/TX mode.Unframed TX and RX on V interfaces or G.703 co-directional

Framed Monitor
Monitor and display of:
  - FAS, NEAS, MFAS, NMFAS, and CRC MFAS words 8-bit digital code word in any selected timeslot, CAS status of all 30 channels with idle/busy indication

Level and Frequency
Digital generation/measurement of sinusoidal signals in a timeslot. (A-law coding to ITU-T Rec. G.711)

X.50 Test Modes
Interfaces:
  - V.11, V.35, V.36, RS449 and G.703 co-directional

Test Patterns
PRBS:
  - 2^n-1, 2^n-1, 2^n-1, 2^n-1,
  - Alternating 1 and 0s, All 1s, All 0s,
  - 8 and 16 bit programmable word

Error Injection
Bit, Code, FAS, CRC errors:
  - Single, ratio or frequency

Clocking
G.703 transmit clock source
  - 2048kbit/s and co-dir:
    - Internal, External, From RX

Error and Alarm Indication
LEDs:
  - 2 summary, 14 alarm/error, option, low battery

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, LED back-light

Keyboard:
  - Numerical keypad, 4 Cursor,
    - 2 Contrast, Main Menu, 6 Softkeys,
    - Alt, On and Off

Stores/Memory
8 test result memories and 8 configuration stores

Self Check
Comprehensive self check at power on

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

Power Supply
External supply:
  - External mains charger
Rechargeable batteries:
  - 8 to 10 hours operating time
Battery low:
  - Warning before auto switch off

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Ordering Information

EDT Platinum             BN 4562/31
(M.2100, G.826, Extended PRBS,
Level Measurement Options)
EDT X.50 Sub-Rate         BN 4562/32
(M.2100, G.826, Extended PRBS, X.50,
HCM, V.110 Options)
EDT Diamond              BN 4562/33
(M.2100, G.826, Extended PRBS, Pulse Shape,
Level Measurement, Jitter Options)
EDT Frame Relay          BN 4562/36
(M.2100, G.826, Extended PRBS,
Frame Relay, All 1s All 0s Options)
EDT Datacom              BN 4562/37
(Includes all software options to
comprehensively address datacomms testing)
EDT Complete             BN 4562/38
(Includes all software options)

Complete with :
a.c. adapter/charger. Select appropriate plug :
US, European, UK or Australian
Operating Manual
M.2100 Option           BN 4562/00.13
G.826 Option            BN 4562/00.34
Extended PRBS Option    BN 4562/00.36

Accessories (available at extra cost):
External clock adapter   K 1513
V.24 Download cable      K 1515
Printer cable 25 way (M/F) K 1500
V.11 DCE adapter cable   K 150
V.36/RS449 DTE adapter cable K 1506
V.36/RS449 DCE adapter cable K 1507
V.24/RS232 DCE adapter cable K 1512

V.35 adapter cables (jackscrew fixing)
V.35 DTE (AMP) 1.6 mm dia. pin male  K 1508
V.35 DCE (AMP) 1.6 mm dia. pin female K 1509
V.35 DTE (Positronic) 1.6 mm dia. pin male K 1525
V.35 DCE (Positronic) 1.6 mm dia. pin female K 1526
V.35 adapter cables (clip fixing)
V.35 DTE (Positronic) 1.0 mm dia. pin male K 1510
V.35 DCE (Positronic) 1.0 mm dia. pin female K 1511

DTM-32 Remote Operation Software  DTM32
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
V.11 cable Test Adapter   BN 4534/00.37
ELM-2 Equalizer Level Meter  BN 4546/01
PenBERT 2Mbit/s Monitor   BN 4555/10
**Options (available at extra cost):**

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<thead>
<tr>
<th>Feature</th>
<th>Code</th>
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<tr>
<td>French S/C bits</td>
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<tr>
<td>GSM</td>
<td>BN 4562/00.15</td>
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<tr>
<td>Large Frequency Offset</td>
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<td>All Ones/All Zeros Histogram</td>
<td>BN 4562/00.20</td>
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<td>Noise Measurement</td>
<td>BN 4562/00.23</td>
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<td>V Interface Status Monitor</td>
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<td>V.110</td>
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<td>HCM</td>
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<td>Frame Relay (Enhanced)</td>
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<td>Pulse Shape Analysis</td>
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