

# CMA 3000

## SPECIFICATIONS

### V-series Interface Measurement Option



#### The easy way to test V-series interfaces

When equipped with the V-series interface measurement option, the portable, easy-to-use and compact CMA 3000 offers test and measurement of V-series data transmission lines, in addition to the full-featured 2 Mbps transmission testing provided by the basic instrument. Additional CMA 3000 options enable you to test Ethernet connections and SDH lines.

In order to test the data interfaces on a transmission line you may set up the CMA 3000 as a DTE. You may also configure the CMA 3000 as a DCE to test the terminal equipment. The dual-receive setting for the V-series data interfaces allows you to monitor the control circuits on the line. This makes CMA 3000 the ideal solution for both in-service and out-of-service transmission measurements.

For fast troubleshooting, CMA 3000 displays alarms, transmission-link and control line status on LED indicators. Detailed analysis and graphical presentations are shown on the instrument's large color display.

#### Speeds troubleshooting

To accelerate troubleshooting the Line Status LEDs on the CMA 3000 present the current status in relation to alarms and errors. A trap facility saves information on historical alarms and errors, allowing you to detect random errors and operate unattended.

Key Features	Key Applications
<ul style="list-style-type: none"> <li>• Data interface testing: <ul style="list-style-type: none"> <li>○ RS-232C/V.24</li> <li>○ X.21/V.11</li> <li>○ V.35</li> <li>○ RS-449/V.36</li> <li>○ RS-530</li> </ul> </li> <li>• Full-featured 2 Mbps transmission test set</li> <li>• Drop-and-insert testing</li> <li>• Propagation-time measurements</li> <li>• Simultaneous monitoring of both directions of a line</li> </ul>	<ul style="list-style-type: none"> <li>• Installation testing</li> <li>• Rapid in-service diagnostics and troubleshooting</li> <li>• Transmission line performance analysis</li> <li>• Mux/demux testing</li> <li>• Drop-and-insert to other equipment for further analysis</li> </ul>

### Comprehensive out-of-service testing

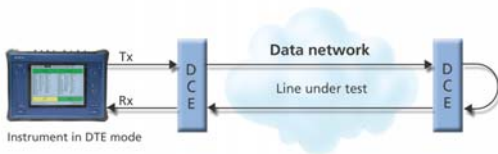


Figure 1 Transmission line testing.



Figure 2 Data terminal testing.

CMA 3000 supports basic BER testing for installation, commissioning and stability tests. The performance of the system under test is evaluated on the basis of BER measurements, with a loop-back at the far end of the tested line. A wide range of test patterns is available for the BER test. The graphical histogram presentation provides an overview of a long measurement and makes it easy to identify error periods.

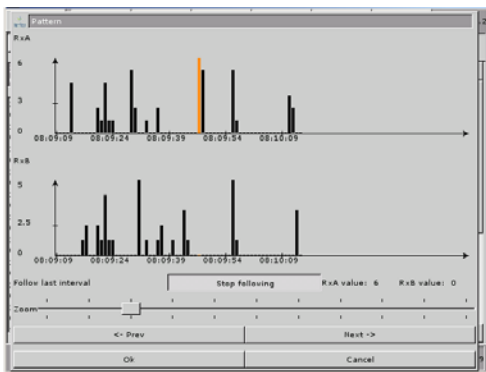


Figure 3 Graphical histogram presentation of pattern bit errors.

### Propagation time

Propagation time can be measured when the CMA 3000 transmits a PRBS and the pattern is looped back to the instrument. This enables you to verify that delays introduced by multiplexers, demultiplexers and transmission lines are below specified limits.

### Mux/demux testing

You can use the CMA 3000 for comprehensive testing of multiplexers and demultiplexers that insert and extract data lines to and from 2 Mbps systems.

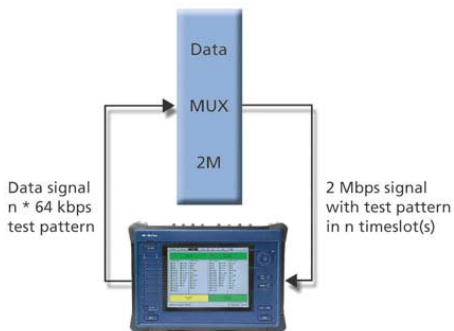


Figure 4 Mux testing using the CMA 3000.

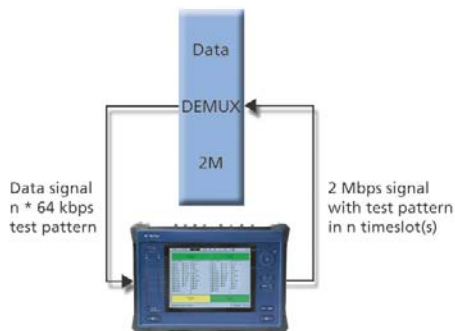


Figure 5 Demux testing with the CMA 3000.

BER testing is used for evaluating the performance of the network element under test with the CMA 3000 connected to both the data line and the 2 Mbps side of the network element.

### Control circuit monitoring and analysis

For analysis of handshake problems, CMA 3000 can monitor the control circuits on a line.

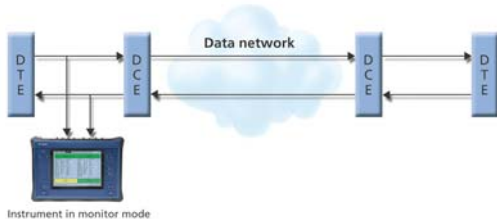


Figure 6 In-service monitoring with the CMA 3000.

The Control Circuit Status LEDs present the current status of the most important control circuits. Current status of all relevant control circuits is visualized on the color display.

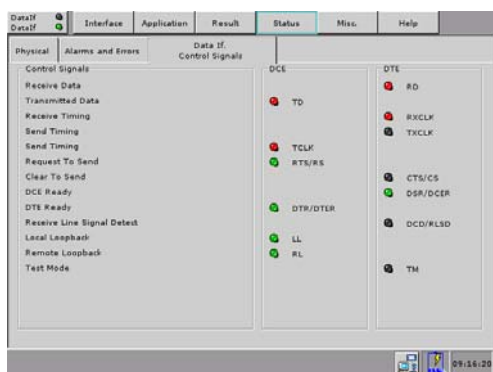


Figure 7 Detailed information on control circuits is visualized on the display.

For detailed timing analysis, you can log changes in the control circuit states on the line. This allows easy examination of timing relations. When the instrument is in DTE or DCE mode you can define the state of the control circuits output from the instrument.

### Drop-and-insert testing

For testing with external equipment, the CMA 3000 field tester can drop and insert signals between its 2 Mbps interfaces and a selected data interface.

Two modes are available:

- A normal drop-and-insert mode for testing applications
- A dual-drop mode for monitoring applications

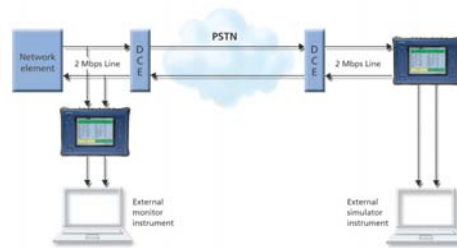


Figure 8 Drop-and-insert testing using the CMA 3000.

## Specifications

Below are specifications for a basic CMA 3000 with the V-series interface measurement option. For further information on the basic functionality please consult the CMA 3000 basic instrument specifications sheet.

Data interfaces	
<b>Supported interfaces</b>	RS-232C/V.24 async, RS-232C/V.24 sync., X.21/V.11, V.35, RS-449/V.36, RS-530
<b>Modes of operation</b>	DTE, DCE, Monitor, All Tx (for dual-drop from 2 Mbps)
<b>Data rates for BER tests</b>	<ul style="list-style-type: none"> <li>• 50, 75, 100, 110, 150, 200, 256, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 33600, 38400, 57600, 115200 bps</li> <li>• 4928 (77*64) kbps and 4992 (78*64) kbps</li> <li>• m*8000 bps (m=1, 2, 4 or 8)</li> <li>• n*56000 bps, n*64000 bps (n=1 to 32)</li> <li>• q*1024 kbps (q=1 to 10)</li> <li>• Freely programmable bit rate: <ul style="list-style-type: none"> <li>○ X.21/V.11, V.35, RS-449/V.36, RS-530: From 50 bps to 10240000 bps in 1 bps steps</li> <li>○ RS-232C/V.24 async.: From 50 bps to 128000 bps in 1 bps steps</li> <li>○ RS-232C/V.24 sync.: From 50 bps to 64000 bps in 1 bps steps</li> </ul> </li> </ul> <p>Drop and Insert to/from the 2 Mbps interfaces is not supported with freely programmable bit rates, even if the bit rate match the relevant value. Drop and Insert must use predefined bit rate settings.</p> <ul style="list-style-type: none"> <li>• BER test in DTE mode (with incoming clock): any rate up to 10 Mbps</li> <li>• RS-232C/V.24 async., max. data rate: 128000 bps</li> <li>• RS-232C/V.24 sync., max. data rate: 64 kbps</li> </ul>
<b>Drop-and-insert</b>	<p>Modes:</p> <ul style="list-style-type: none"> <li>• Drop and insert between a 2 Mbps receiver/transmitter and a data interface selected by the user</li> <li>• Dual-drop from the two 2 Mbps receivers to a data interface selected by the user. The instrument will operate all circuits as outputs in this mode</li> </ul> <p>Number of traffic channels:</p> <ul style="list-style-type: none"> <li>• n*64 kbps time slots</li> <li>• 8 or 16 kbps sub-channel of a selected time slot</li> </ul>

G.703 interfaces	
<b>Supported interfaces</b>	Co-directional in accordance with ITU-T rec. G703 §.1.2.1
<b>Modes of operation</b>	Tx/Rx, Dual Rx, Tx only, Rx only
<b>Data rates for BER tests</b>	n*64000 bps (n=1 to 8)

Results	
<b>Status</b>	Current information on: <ul style="list-style-type: none"> <li>Alarms (no signal/no clock) and pattern bit errors on the monitored line</li> <li>Clock rate and deviation</li> </ul>
<b>Statistics</b>	User-defined resolution: <ul style="list-style-type: none"> <li>1, 2, 5, 10, 15, 30s, 1, 5, 15, 30 min, 1, 2, 4, 6, 12 hours</li> </ul> Information logged: <ul style="list-style-type: none"> <li>Alarms (no signal/no clock)</li> <li>Pattern bit-error count/ratio and G.821 or M.2100 parameters (ES, SES, UAT, EFS, AT % or count)</li> <li>Pattern slip</li> </ul>
<b>Event log</b>	Events logged with 1 msec resolution time stamps (planned): <ul style="list-style-type: none"> <li>Detected alarms and pattern bit errors</li> <li>Changes in Control Circuit states</li> </ul> Filters enable/disable the logging of individual events Control Circuit state changes are shown as text in a table or graphically

Test patterns	
<b>Patterns supported for BERT in DCE or DTE mode</b>	Patterns generated and detected: <ul style="list-style-type: none"> <li>PRBS 6</li> <li>PRBS 7 (ITU-T V.29)</li> <li>PRBS 9 (ITU-T O.153/ V.57)</li> <li>PRBS 11 (ITU-T O.152 or ITU-T O.153/V.57)</li> <li>PRBS 12</li> <li>PRBS 15 (ITU-T O.151 and ANSI T1.403)</li> <li>PRBS 20 (ITU-T O.153/V.57)</li> <li>PRBS 23 (ITU-T O.151 and ANSI T1.403)</li> <li>QRSS 11 – as PRBS 11, but max. 7 consecutive zeros (ITU-T O.152)</li> <li>QRSS 20 – as PRBS 20, but max. 14 consecutive zeros (ITU-T O.151 and ANSI T1.403)</li> <li>All 0s, All 1s</li> <li>Alternating (1:1), (1:3), (1:7), (3:1), (7:1), (3:24)</li> <li>Quick brown fox (ITU-T O.151 and ANSI T1.403)</li> <li>User-defined up to 16 bits. Length in steps of 1 bit</li> <li>User-defined up to 2048 bits. Length in steps of 8 bits</li> <li>All patterns, except "All 0", "All 1" and "Fox", can be inverted</li> </ul>
<b>Error insertion</b>	Insertion of pattern errors and slip in generated signal <ul style="list-style-type: none"> <li>Manual burst</li> <li>Burst length: 1-255 consecutive errors</li> <li>Continuous: burst length * 10-2, 10-3, 10-4, 10-5, 10-6 ,10-7</li> <li>Provoking of G.821 events (ES, SES)</li> <li>Slip insertion: manual</li> </ul>

Miscellaneous	
<b>Optional accessories for the data interface option</b>	<ul style="list-style-type: none"> <li>Converter cables ("Y" cables) for the data interface option. Individual cables are available for each of the supported interfaces. The cables support DTE and DCE emulation for the interface</li> <li>V.35 converter cable for DTE emulation</li> <li>Connector box for data interface option. The connector box supports DTE and DCE emulation for all the supported interfaces</li> </ul>

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