

Advanced Network Testing

**The magazine for
ANT-20 users –
The standard test
platform for PDH,
SDH, SONET
and ATM PVC/SVC
networks**

Dear Reader:

Here it is, the first issue of our new newsletter. It is intended to provide information about upgrades and new releases directly to users of the ANT-20 Advanced Network Tester (a rapidly growing circle!). Insider tips and suggestions on configurations and instrument usage are included as well. Background info is here too, but brevity is our motto. If you'd like to be on our mailing list, let us know via e-mail (ant.news@wago.de) or with the enclosed fax form.

Please give us an idea of what you hope to see in future issues. We intend to make Advanced Network Testing your newsletter!

**Jochen Hirschinger
Wandel & Goltermann
Marketing, Division 1**

Available in 2nd Quarter of 1998:

“Block and Replace”, upgrade
“Tandem Connection Monitoring”,
upgrade “OC-12c/STM-4c”,
new options

Settings and Results:

With Save, Export & Print, You've
Got Every Storage Capability
Imaginable

Fast Overview:

With Auto-Configuration, Scan,
Trouble Scan and Search, You Can
Come to Terms with a Complex
System Fast!

Alarm Sensors:

ANT-20 Uses Dynamic Alarms
To Test Actual Threshold Values

Signal Running Late?

ANT-20 Measures Delay

Performance Monitoring:

CATS Test Sequences Automatically
Check System G.821/G.826 Sensors

Available in 2nd Quarter of 1998:

“Block and replace”, update

This is an extension of the ANT-20's Drop & Insert Option. It makes it possible to replace a synchronous tributary in a synchronous signal. The received tributary is analyzed (“block”). The SOH, POH and high-order payload of the synchronous tributary (AU-3 or AU-4) are what is replaced (“replace”). As the payload, 140 Mbit/s, 34 Mbit/s, 45 Mbit/s, BULK signals or ATM cells can be chosen, depending on the

options. Errors and alarms can also be inserted into the SOH, POH and payload.

“Tandem Connection Monitoring”, update

This is an extension of the ANT-20's Extended Overhead Analysis Option. This function enables recording of the N1/N2 bytes with the Capture Function; the bytes can then be evaluated.



The data stream can be checked for errors and alarms and an error source isolated in this manner.

“Tandem Connection Monitoring” is available for all of the mappings built into the ANT-20. The ANT-20 allows access to SDH and SONET systems up to 2.5 Gbit/s.

“OC-12c/STM-4c”, new options

Today’s broadband driving forces (such as the Internet) are leading to construction of networks offering transmission capacities of 600 Mbit/s. With the OC-12c/STM-4c options, we

are expanding the main applications and functions of the ANT-20 for new signal structures. Three options are available as of May '98:

- OC-12c/STM-4c BERT (contiguous concatenation)
- OC-12c/STM-4c ATM testing
- OC-12c/STM-4c virtual concatenation



ANT-20E used as ATM tester at German network provider “tesion”. More about broadband applications in our next issue of Advanced Network Testing.

Settings and Results: With Save, Export & Print, You’ve Got Every Storage Capability Imaginable

The ANT-20 has sophisticated storage and printing facilities, making it easy to create test documents.

Applications

“save as” saves the current application including instrument setup and Virtual Instruments (VIs) but without test results to c:\ (application library on internal hard disk) or a:\ (floppy disk). An internal data format is used (.apl).

“open” loads the instrument setup from c:\(application library) or a:\ and sets the ANT-20.

“export” exports one or more saved applications (instrument setup & VIs without test results) to a:\. Internal format (.apl).

“import” imports one or more applications from a:\ to c:\ (application library).

Test results

“save results as” saves the test results on c:\ or a:\ with associated instrument setup and loaded VIs. Internal format (.ara).

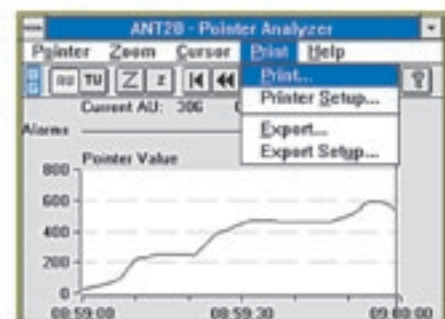
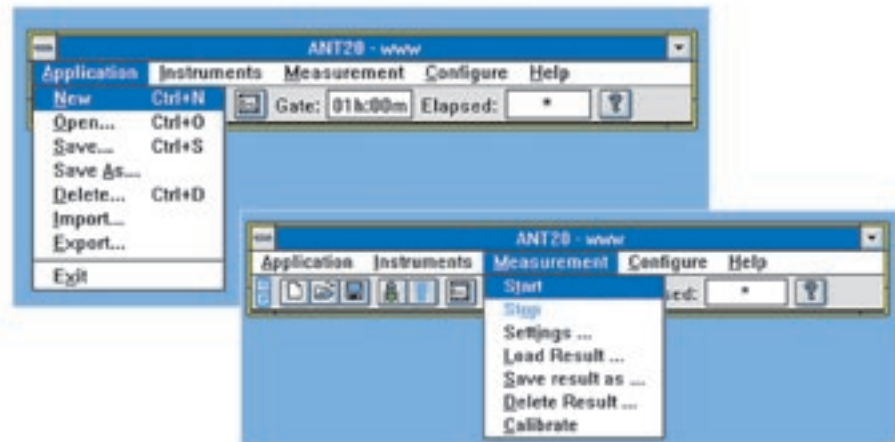
“load results” loads saved test results from c:\ or a:\ with associated instrument setup and VIs. Internal format (.ara).

You can activate Export and Print functions in the following test VIs: Anomaly/Defect Analyzer, ATM Traffic Analyzer, Jitter Analyzer, Pointer

Analyzer, Performance Analysis. You will find them under the “Print” button. “export” exports test results to c:\ or a:\ without associated instrument setup.

The format is .csv (comma separated values). This ASCII-compatible format is easy to import into Excel or WinWord, making it a snap to create test documents. In addition, .csv wander data (TIE) from the Jitter Generator/Analyzer VI can be imported into the MTIE/TDEV Offline Software.

“print” outputs test results directly to the external printer. Use the printer menu to modify parameters.



Fast Overview: With Auto-Configuration, Scan, Trouble Scan and Search, You Can Come to Terms with a Complex System Fast!

With its automated measurement facilities, the ANT-20 can be used to gain a rapid overview of complex systems. Examples:

Unknown signal structure?

Auto-Configuration recognizes standard PDH and SDH signals and the payload content on balanced/coaxial electrical and optical interfaces. Once detected, a keypress automatically sets the receiver to the structure.

Faulty cross-connection?

Scan automatically verifies error-free cross-connection of channels in synchronous network elements. The ANT-20 checks one channel after another for proper connection (out-of-service). At the same time, the instrument checks for alarms and

pattern synchronization and marks faulty channels in a matrix.

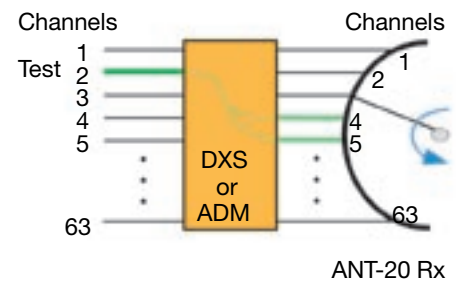
Where is the alarm?

Trouble Scan checks one channel after another in synchronous networks for alarms (in-service). The ANT-20 displays detected errors in a table for each errored channel.

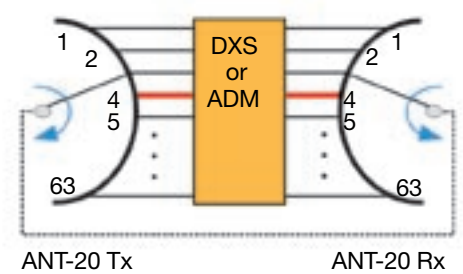
Where's the channel?

Search locates displaced channels in synchronous DXCs and ADMs. The ANT-20 receiver searches all of the channels in an STM-1 signal for the transmitted test signal. The result is displayed in a matrix. The ANT-20 TX channels are not thru-connected.

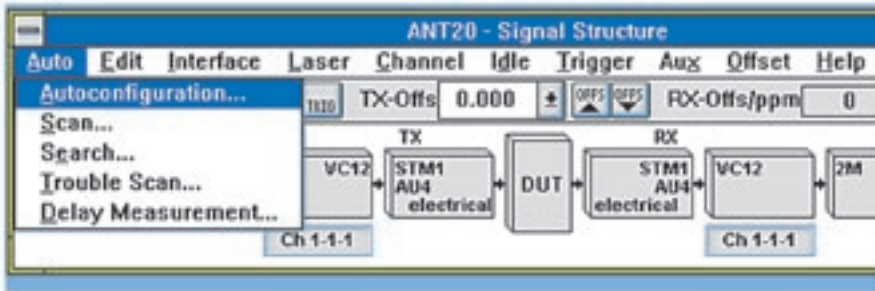
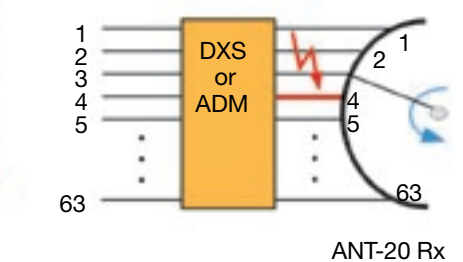
Search mode



Scan mode



Trouble Scan mode



Alarm Sensors: ANT-20 Uses Dynamic Alarms To Test Actual Threshold Values

In plesiochronous and synchronous networks, errors and decreasing performance are indicated using various alarms, generated by built-in sensors. The alarm messages are transmitted in the overhead bytes. But what happens if bit errors occur in the overhead itself? To prevent sporadic errors from falsifying alarms, the message is recognized only if it is received several times in succession. Example:

MS-AIS is active, if 3 successive frames of the K2 byte are "1".

MS-AIS is passive, if 3 successive frames of the K2 byte are "0".

To test this complex alarm structure, the ANT-20 provides "dynamic alarms". This means that the alarm is set for a precise number of frames or a precise time – and then removed. This is a way to precisely test sensor thresholds.

Parameters:

Frames:

M (active frames) 1 to N-1,

N (all frames) 1 to 8001.

Time:

t1 (active time) 0.1 to 60 s,

t2 (passive time) 0.2 to 600 s.

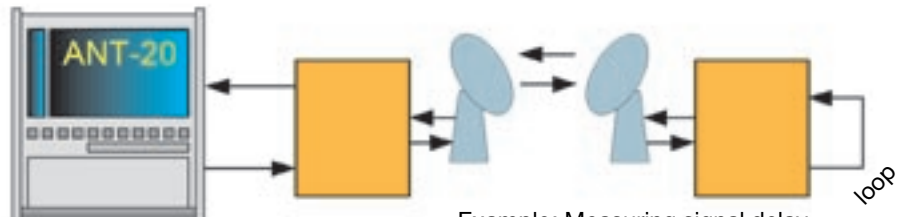
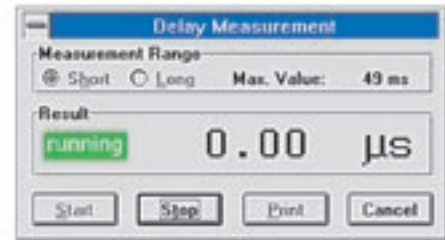
Signal Running Late? ANT-20 Measures Delay

Delay measurements are used to line up satellite links, test the maximum allowable delay in buffered cross-connect systems and check loop circuits in regenerators.

As part of such measurements, the transmission circuit is looped back at the far end. The ANT-20 transmits a test pattern and measures how long it takes to make its way back to its receiver. In this measurement, test patterns are inserted into the selected channel, into the container of the SDH signal or into the selected channel of the lowest level system for PDH signals.

To avoid ambiguities, two test durations can be set, depending on the expected delay.

The delay measurement function is available in the ANT-20 starting with version 5.0. The measurement can be activated in the "Signal Structure Editor" window under "Auto" / "Delay measurement".



Time measurement

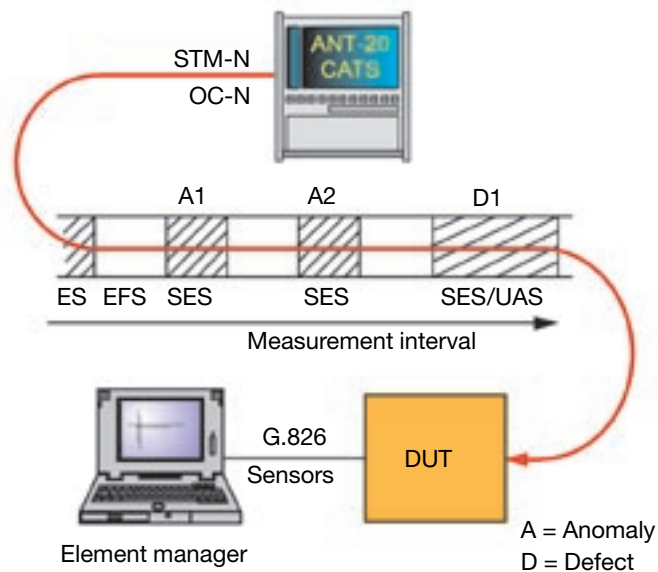
Example: Measuring signal delay caused by long transmission links

Performance Monitoring: CATS Test Sequences Automatically Check System G.821/G.826 Sensors

In order to test Performance Monitoring (PM) sensors, it is necessary to generate a precisely defined scenario of signal degradations and defects and then compare the reaction of the device under test with the reaction specified in the recommendation – a job that the CATS Test Sequencer simplifies considerably. The picture below shows a typical test sequence as can be generated on the ANT-20 with the CATS Test Sequencer.

The method for generating customer-specific G.826 stimulus sequences is very simple: After setting the desired signal structure (e.g. STM-1 C4), a scenario with any desired degree of complexity can be created based on periods with fixed error rates, alarms, defects and corresponding periods with a "good" signal. All aspects of the PM sensors can be tested in this manner, using just a single, predefined test sequence.

Examples of such tests include proper detection of the ES/SES thresholds, proper detection of the unavailable time, proper switch-over to the available state, detection of all defects/anomalies defined in the recommendation, and so on.



Besides the pure stimulus test cases used here, the ANT-20 CATS Test Sequencer also offers the capability of performing complete stimulus/response tests. A specific alarm stimulus (LOS, LOF, excessive B1/2/3 error rate, etc.) is inserted, and the ANT-20 verifies on its RX end whether the expected alarms are received (MS-RDI, AU-AIS, RDI, etc.).

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What topics would you like to see more of in "Advanced Network Testing"? _____

Other comments: _____
