

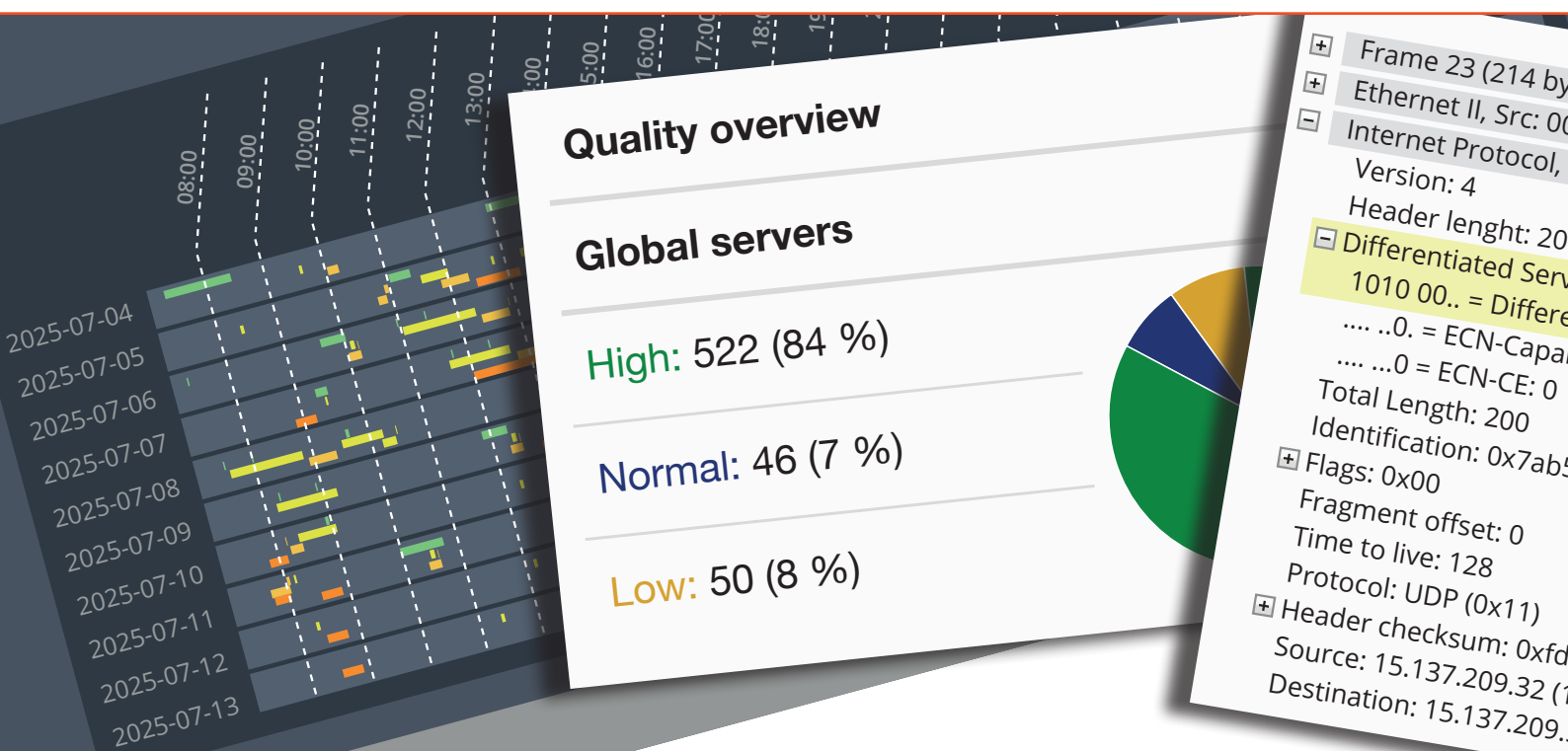


**Allegro Packets**  
Network Multimeter



Allegro Network Multimeter and NETCOR GeNiEnd2End

# A Powerful Toolset for Comprehensive Proactive Network Analysis



## Network troubleshooting on a new level

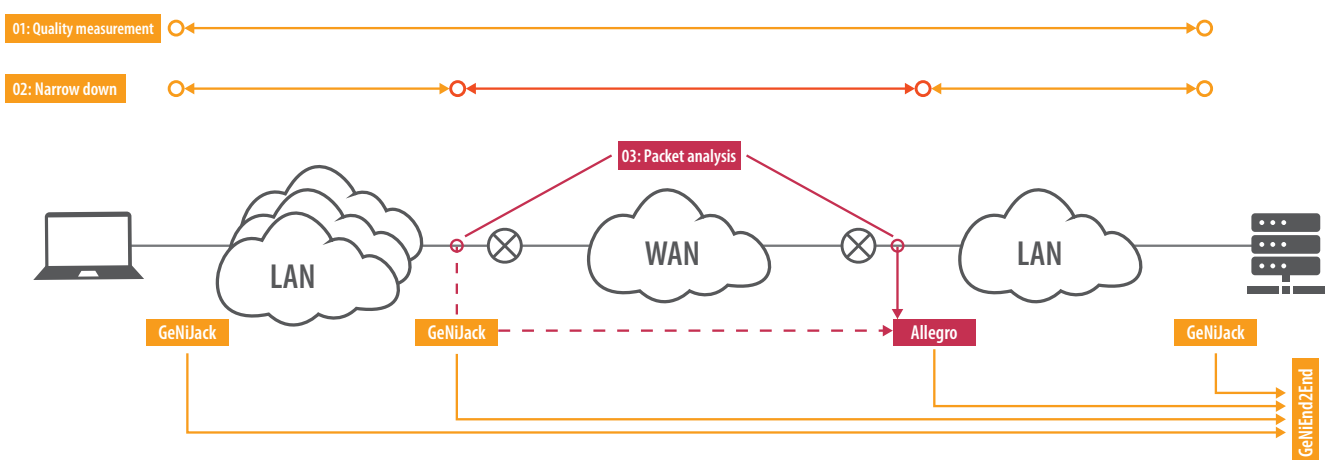
The combination of the passive network troubleshooting solution Allegro Network Multimeter with the active end-to-end monitoring solution NETCOR GeNiEnd2End creates an effective synergy between two powerful measurement tools. This combination enables comprehensive and efficient analysis of even the most complex network infrastructures. This allows network specialists not only to improve network performance but also to significantly enhance reliability.

GeNiEnd2End actively tests network performance by providing interval-based or ad-hoc Layer 4 quality measurements along the entire transmission path or specific sections. This facilitates the implementation of a structured troubleshooting process to quickly and systematically uncover performance bottlenecks through an efficient exclusion procedure.

In the field of passive recording and analysis, the Allegro Network Multimeter is the winner. The flexible recording modes in inline, SPAN and ERSPAN modes and interfaces from 1 to 400 Gbit/s offer a suitable option for every situation. Whether an incident is analyzed live or retrospectively, the outcome remains the same. The analysis always takes place in real time, which sets the solution apart from its competitors. The high-performance in-memory database minimizes waiting times when filtering metadata from Layer 2 to Layer 7 to the required level of detail. The intuitive and structured graphical web interface enables fine-grained log analysis. Even short-term load peaks, so-called microbursts, can be easily identified by the analyst. PCAP extraction from a packet ring buffer is also available to analyze the data retrospectively with tools such as Wireshark.

The combination of GeNiEnd2End and Allegro Network Multimeter provides a comprehensive solution for active and passive network monitoring: GeNiEnd2End identifies routes and time windows with impaired network performance. It also supports targeted placement of Allegro appliances, which can be used to perform detailed packet analysis if required.

A wide range of notification options in both solutions proactively alert those responsible in the event of predefined rule-based network events, before user support tickets are generated. In addition, automated actions can be triggered for certain events to support proactive network management.



At the beginning of the troubleshooting process, NETCOR GeNiEnd2End uses active measurements on layer 4 to objectively determine whether a bottleneck exists from an end-to-end perspective. If this is the case, the problem area can then be precisely identified by measuring sections. In the third step, a packet analysis is carried out in the problem area using the Allegro Network Multimeter. This significantly increases the level of detail of the measurement data.

Predefined analyses allow the causes of performance problems to be identified with little effort.

## Typical challenges in network troubleshooting

### Sporadic problems

Irregular network errors pose a real problem for network managers due to a lack of event data. This is because sporadic errors are inherently unpredictable, requiring consideration of multiple potential causes. These range from unexpected interactions between different network components and applications to intermittent faults and temporary bottlenecks.

### Numerous possible measurement points

In complex networks, measurements can be taken at many points. This results in a large amount of measurement data, complicates evaluation and takes a considerable amount of time. There is also a risk of misinterpretation if the most relevant data is not specifically taken into account. Careful selection and focus on essential measurement points are crucial for effective error analysis.

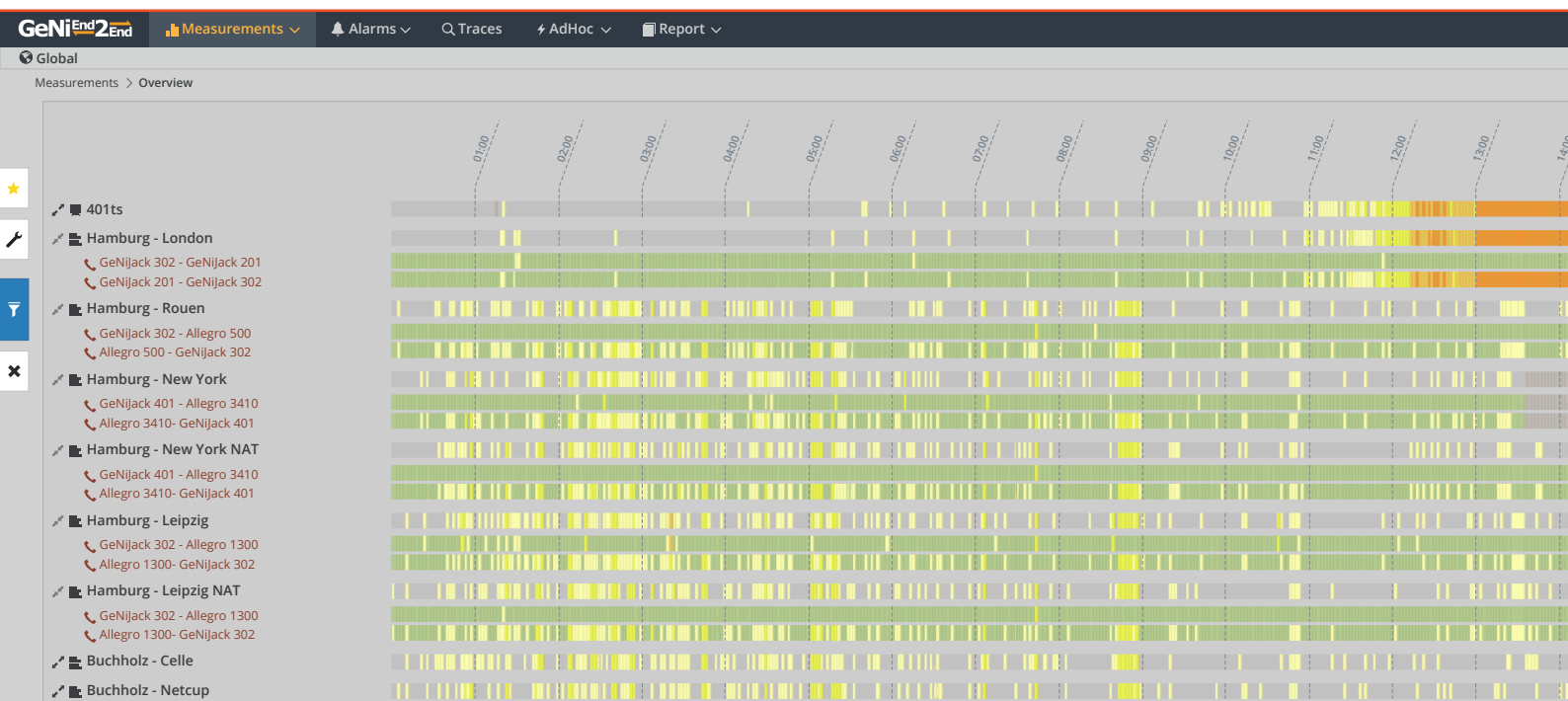
### Proactive error detection

Many analysis approaches are carried out reactively. Proactive error detection, which continuously monitors critical metrics, is essential for identifying and resolving issues before they affect network operation or users.

### Efficient error assignment

Identifying and isolating problems in complex and dynamic networks can be highly challenging. Therefore, it is crucial to quickly narrow down potential problem sources to specific areas rather than scanning the entire network indiscriminately.

NETCOR GeNiEnd2End measures the end-to-end performance of connections 24/7. The graphical user interface can be used to quickly pinpoint when and where defined threshold values have been undercut or exceeded. This initial and objective finding can be used to narrow down the problem, which can be the starting point for detailed analysis with the Allegro Network Multimeter.



## Network troubleshooting made simple

SNMP and API-based monitoring play a key role in comprehensive network oversight and long-term data collection of critical network metrics. These tools gather essential data on network availability and performance.

However, even if the tools based on these interfaces signal with a green light that everything is OK, the actual performance may be in the red zone. In such cases, the following approaches can provide valuable insights for effective troubleshooting:

### 1. Gain objective insights through end-to-end long-term measurements and 24/7 package recording

Active measurements at OSI Layer 4 between network handover points allow qualitative end-to-end metrics to be recorded independently of productive data traffic. This helps identify potential bottlenecks in the network. Passive packet captures at key points using the Allegro Network Multimeter enable live analysis in case of a bottleneck, as well as retrospective analysis in the case of temporary issues.

### 2. Pinpoint problem areas through partial route measurement

When network performance issues arise, partial route measurements help to accurately identify the affected segments. These measurements can be performed passively using the Allegro Network Multimeter or actively with NETCOR GeNiEnd2End.

### 3. Detailed analyses with data packets

Performance issues can often be traced back by analyzing data packets using predefined analysis templates. Metrics such as TCP-ACK handshake times and application response times can be identified and corrected quickly. This requires suitable analysis tools.

The Allegro Network Multimeter offers built-in protocol analyses based on metadata derived from packets, which it processes efficiently in the in-memory database.

A fact-driven exclusion method has proven to be particularly effective in network troubleshooting. It enables rapid identification of bottlenecks and facilitates the accurate correlation of user complaints with their underlying technical causes.

One of the most common misconceptions in performance analysis is summed up by the familiar phrase: "It's the network." To move beyond this assumption, clear, evidence-based insight into potential performance constraints is essential. Such clarity can be achieved by active end-to-end long-term measurements or passive traffic recording with subsequent protocol-level analysis. NETCOR GeNiEnd2End provides continuous active measurements, while the Allegro Network Multimeter offers passive monitoring at strategic points - such as WAN transition nodes between remote offices and central headquarters - allowing precise localization of latency or throughput degradation.

Sporadically occurring performance issues - whose root cause is often difficult to localize - are particularly challenging to troubleshoot. In such cases, GeNiEnd2End serves as a highly effective tool for initiating root cause analysis. It enables the early detection of network bottlenecks and provides precise visibility into when and where problems occur.

Once a performance anomaly is detected, the Allegro Network Multimeter can be used to capture the specific error pattern and analyze it in detail. The selection of the measurement point depends on the nature of the issue: at the endpoint, at the server, or across multiple points using a tiered measurement strategy.

Packet analysis with the Allegro Network Multimeter and an end-to-end measurement with NETCOR GeNiEnd2End complement each other perfectly - forming a powerful combination for effective troubleshooting and sustainable optimization of network performance.

## 24/7 end-to-end measurement to assess network performance

To identify bottlenecks and precisely pinpoint problematic areas in the network, a comprehensive long-term performance analysis is essential. Strategically placed measurement points at key network transfer locations play a critical role in this process. Both continuous passive recording and real-time analysis, as well as active end-to-end measurements, provide valuable insights into network performance. The Allegro Network Multimeter and NETCOR's GeNiJacks are highly effective tools for this purpose.

Two performance testing tools come pre-installed on the Allegro appliances and GeNiJacks: the Hawkeye/IxChariot Performance Endpoint from Keysight and the open-source tool iPerf3. Both can be seamlessly integrated into GeNiEnd2End and serve as active test endpoints for end-to-end measurements.

This combination enables comprehensive end-to-end measurement that covers key performance metrics such as packet loss, jitter, latency and throughput. The data obtained provides detailed insights into network performance from the end user's perspective, especially at remote locations.

Both the Allegro Network Multimeter and the GeNiJacks enable in-depth application and service analyses to ensure availability and performance. They include ready-to-use tests and analyses for SMB/CIFS, HTTP/s and RTP for VoIP quality metrics.

If required, the GeNiJacks can perform in-depth packet capture to generate PCAP files for further analysis. After using its built-in PCAP import function, the Allegro Network Multimeter can retrospectively analyze on the application and service level.

Type	Python		
Script	iperf3 TCP duplex (6.3.1)		
<b>Input-Variables</b>			
✓ iperf3-Server	<input type="radio"/>	your-server.your-domain.tld	?
✓ Port	<input checked="" type="radio"/>	5201	?
✓ Bitrate	<input type="radio"/>	1M	?
✓ Time	<input checked="" type="radio"/>	30	?
✓ Direction	<input checked="" type="radio"/>	duplex	?
✓ Interval	<input checked="" type="radio"/>	1	?
✓ Length	<input checked="" type="radio"/>		?
✓ ParallelStreams	<input type="radio"/>	4	?
✓ ReceiveSocketBufferSize	<input checked="" type="radio"/>		?
✓ CongestionAlgorithm	<input checked="" type="radio"/>		?
✓ MSS	<input checked="" type="radio"/>		?
✓ NoDelay	<input checked="" type="radio"/>	false	?
✓ TOS	<input checked="" type="radio"/>		?
✓ DSCP	<input checked="" type="radio"/>		?
✓ Omit	<input checked="" type="radio"/>	0	?
✓ Zerocopy	<input checked="" type="radio"/>	false	?
✓ Version4	<input checked="" type="radio"/>	false	?
✓ Version6	<input checked="" type="radio"/>	false	?
✓ Flowlabel	<input checked="" type="radio"/>		?

Using the GeNiEnd2End interface, iPerf tests can be created, configured and automatically executed on a cyclically scheduled basis. Every Allegro appliance and every GeNiJack can be used as a measuring point.

The results are displayed graphically by GeNiEnd2End.

## High-performance network analysis and packet capture

Allegro Packets offers scalable network monitoring solutions for bandwidths ranging from 1 Gbps to 400 Gbps. The Allegro Network Multimeter can also apply powerful and privacy-conscious filters, such as for specific phone numbers in VoIP recordings or packet lengths in header analysis. These filters help to reduce the volume of recorded data to a manageable level. Alerting functions - via e-mail, syslog, SNMP traps, or Kafka - can also proactively report threshold violations before there is a productive impact. Reporting functions also provide baselining, making it easier to detect deviations in case of performance issues.

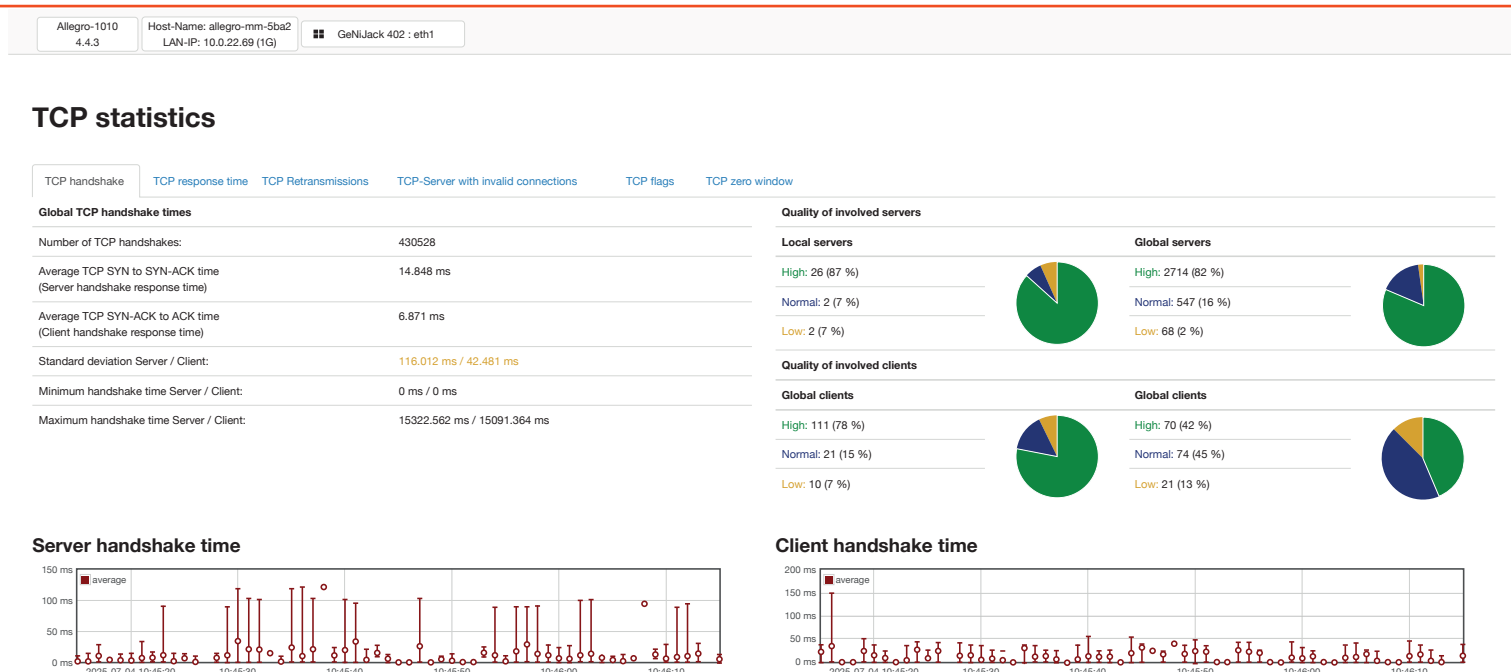
The Allegro Network Multimeter features advanced analysis capabilities for detailed examination of network traffic. These start at Layer 2 with MAC-based statistics and Spanning Tree Protocol analysis, continue through Layer 3 with IP statistics, and extend to Layer 4 with TCP flow graphs and handshake time evaluations. The Allegro Network Multimeter also displays important metrics on infrastructure services, such as DHCP and DNS response times. Analysis further extends to the application layer. For example, VoIP quality metrics - such as packet loss, jitter, and delay for RTP streams - are available to assess user experience. As more network traffic becomes encrypted in transit, the Allegro Network Multimeter offers valuable TLS-level insights. These include certificate details, supported cipher suites, and TLS handshake durations, making it easier to detect performance issues like server-side delays during TLS negotiation. In addition, SMB and HTTP statistics enable straightforward root cause analysis of commonly used protocols, even for users without extensive protocol expertise.

The seamless integration of Webshark and the export to Wireshark expands the range of analysis options, enabling an even deeper and more comprehensive analysis.

A standout feature of the Allegro Network Multimeter is its ability to perform passive path monitoring. By placing one or two appliances at selected points within the network, it can observe the traffic exchanged between them. This method enables continuous measurement of key performance metrics such as packet loss, jitter, latency and throughput. As a result, network managers gain detailed insights into the performance of the network and can identify bottlenecks and issues quickly and reliably.

The GeNiJack hardware endpoints can also be used as a data source for flexible remote parcel recording. By configuring a PCAP stream via TCP or ERSPAN tunnels to the Allegro Network Multimeter, real-time performance analyses can be carried out on the Allegro appliance.

The Allegro Network Multimeter provides precisely the graphical analyses that Wireshark lacks. Numerous dashboards are available.



## Through combination: Effective network monitoring and optimization

The combination of Allegro Packets, GeNiEnd2End and Wireshark provides organizations with a powerful toolset to proactively monitor, troubleshoot and optimize their network environment. This integrated solution improves return on investment (ROI) by enabling efficient incident detection, time-saving diagnostics, precise log analysis and reduced operational costs. It is successfully used by companies from various industries and organizations worldwide.

### About Allegro Packets

Leipzig-based network analysis specialist Allegro Packets offers innovative troubleshooting and analysis functions for network problems with the Allegro Network Multimeter. Thanks to their innovative features, the Allegro devices meet all the requirements of modern network infrastructures.

Customers include network managers from companies, data centers, IT service providers, system houses and ISPs. Support is available for them both in Leipzig and in the USA. The Allegro Network Multimeter is developed 100 percent in Leipzig. This guarantees customers short distances to support and rapid integration of new features.

<https://www.allegro-packets.com>



Allegro Network Multimeter 1010

### About NETCOR

NETCOR focuses on the determination and visualization of IT performance in its various forms. In Germany, NETCOR is one of the leading experts in this special field. The knowledge gained from numerous successful projects and services has been incorporated into the development of GeNiEnd2End and GeNiJacks for over 20 years.

Development and support are located in the south of Hamburg. NETCOR develops exclusively in Germany.

<https://www.geniend2end.com>



NETCOR GeNiJack 302