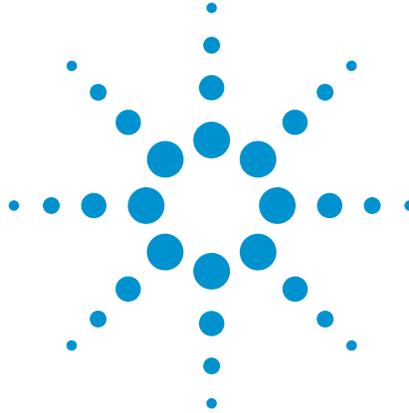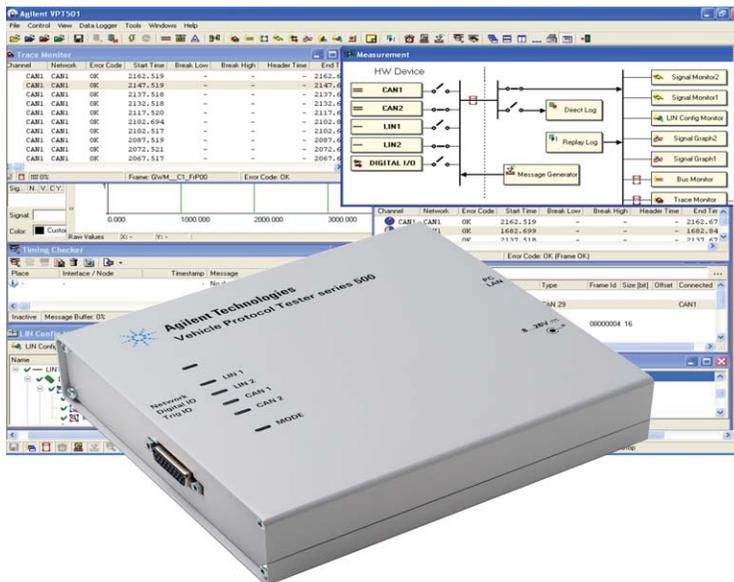# Agilent J8120A VPT501 Vehicle Protocol Tester Series 500
Complete Test in a Single Tool

Data Sheet

Validation of network communication –
robustness guaranteed

Agilent Technologies

Overview

The Vehicle Protocol Tester Series 500 addresses the needs of today's advancing automotive challenges brought about by the growth of distributed electrical communication systems. The Vehicle Protocol Tester uses innovative methods to isolate all complexities of network related errors within distributed systems to enable communication robustness and deliver a higher degree of system quality.

VPT501

The VPT501 from the Agilent Vehicle Protocol Tester Series 500, formerly sold by Mentor Graphics as the Volcano Tellus, is the next generation of vehicle communication test tools, redefining the test and validation of networked systems. With a highly versatile hardware interface combined with unique and powerful software features, the VPT501 creates a testing environment loaded with functionality needed for validating networked system behavior. Especially useful for identifying network communication failure points associated with complex gateway timing analysis, digital to protocol and protocol to digital signal measurements, and also verification of node level communication requirements. The VPT501 provides a complete and comprehensive solution that will prove invaluable to those with networked system test and validation needs.

Hardware

VPT501 hardware was developed on the concept of a single test product does it all by providing flexibility of interfaces for connections to Controller Area Networks (2x), Local Interconnect Networks (2x), Digital I/O (8x), hardware triggering, and standalone data logging capabilities. All network interfaces include software enabled transceivers and termination resistors for making the appropriate physical layer connections to any test environment without customization of cables.

The VPT501 is controlled from the host PC via LAN to ensure maximum flexibility and enable remote usage.

Tool configuration

The VPT501 is configured through Measurement Configuration Database Files (.mcf) which contain detailed system information that enables simple configuration of the tool, codeless network emulation, automatic network communication testing, and many additional database driven analysis and emulation capabilities. Measurement configuration files can be directly created from the MENTOR Volcano Network Architect tool, through the import of CAN Database Files (.dbc) and LIN Descriptor Files (.ldf).

Network Timing Checker

The Network Timing Checker feature utilizes network timing definitions from the Measurement Configuration Database Files to enable automatic identification of network timing problems without the need to write code. The Timing Checker works completely in a codeless environment.

Timing parameters can be specified through database import, manual entry, or can be acquired through a recorder mode where timing tolerances are taken from a reference node or system. Once enabled, the Network Timing Checker will in real time automatically identify all timing variances which are not in accordance with the specified tolerances.

The Timing Checker enables validation through identification of complex network timing issues related to gateway nodes, individual nodes and networks, resulting in higher quality assurance through communication robustness.

When data from the MENTOR Volcano Network Architect is available, the Volcano Aware functionality of the VPT501 simplifies the analysis process further. Since all communication data regarding gateway delays, publisher latency, subscriber latency, frame periods, and worst case latency is available; the Volcano Aware uses this information to validate the operation of the entire networking system. All timing parameters are monitored and verified with exact indications as to which problems exist associated with the corresponding Electronic Control Unit(s). This feature can be utilized for non-Volcano conforming nodes as well when the user specifies the timing data for those parameters which are to be verified.

Signal Chain Analyzer

The Signal Chain Analyzer combines digital and networked signals to provide a solution for measuring those timing parameters existing within chains of events. There is no need to write code to make the signal chain analyzer work.

The Signal Chain Analyzer is uniquely effective at identifying complex sequential signal chain timing issues often associated with gateway and node response timing, as well as system data with synchronized timing requirements (Figure 1).

The Signal Chain Analyzer of the VPT501 allows you to automatically verify properties such as:

- Publishing node timing

- Subscribing node timing

- Gateway throughput timing

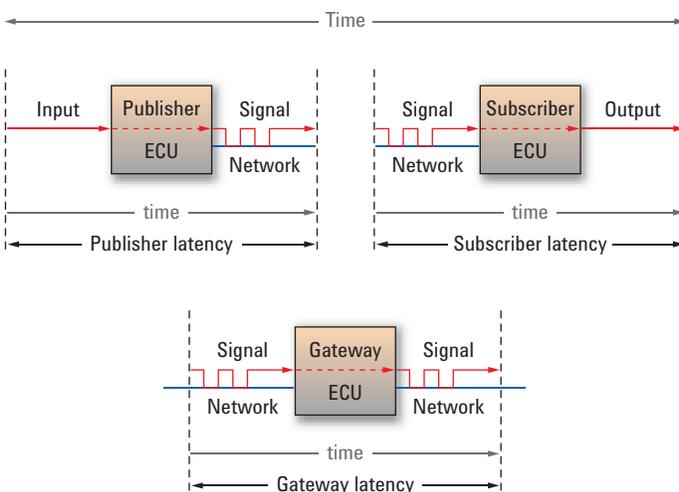- Functional timing

- Synchronized event timing

- Lost data

Standalone data logger

The VPT501 hardware unit is equipped with an internal 2 GB memory card enabling it as a standalone data logger. The VPT501 is packed into a mountable box that is ruggedized for direct usage in a car or outside environment. The integrated memory is capable of storing all communication data simultaneously for all active network channels (2 CAN, 2 LIN) operating at 100% bus utilization for several hours. Configurable hardware filters are provided to filter out unwanted data and significantly increase logging duration capabilities.

Bus emulation

The Measurement configuration file contains all the node specific information required (frames, signals, transmit intervals, etc.) for configuring the VPT501 for codeless bus emulation. Each network and node communication simulation is selectable for emulation with a single mouse click. In the graphical user interface clicking on a node symbol in the network description switches emulation on and off (Figure 2).

Advanced Control Interface

The Advanced Control Interface is C-based, event triggered programming environment included with VPT. This programmable environment extends the emulation and testing capabilities further to include customized user functionality, such as changing signal values or measuring network data based on events like message reception or changing of digital signal value.

CAN diagnostic tool

The CAN diagnostic tool enables diagnostic frame assembly and decoding according to ISO 15765-2 and ISO 14229.

With CAN diagnostic tool it is possible to assemble and run CAN diagnostic sequences with pre- or user-defined diagnostic requests.
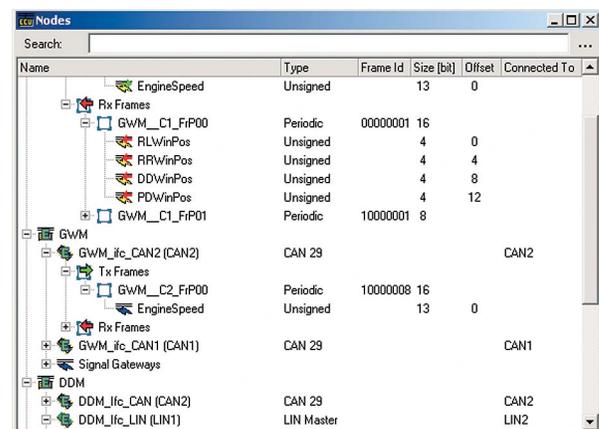

Figure 1.

Figure 2.

Key specification details

Features

Features	- Synchronized time-stamping with 1 µs resolution across all interfaces - Interfaces for 2 CAN, 2 LIN, 8 Digital I/O - All CAN transceivers (high-speed, fault-tolerant) are integrated - Supports direct import of CANdb, LDF, and MCF databases - Automatic identification and isolation of communication timing errors - Easily measure timings between inputs/outputs and correlated network data - Identify complex gateway signal and frame interactions - Perform data logging without being connected to a PC/Laptop - Quickly configure CAN diagnostic services according to ISO 15765-2 and 14229 - Programmable Advanced Control Interface for customized emulation and testing - Advanced configurable trigger out for controlling external devices - Trigger in provided for external device data logging control
Increased productivity	- Ensure communication robustness utilizing a single tool - Single product provides all interfaces required for connecting to all variants of CAN and LIN - Integrated standalone data logger provides testing environment flexibility - Reuse existing communication database definitions - Single click node and network emulation controls without programming - Automatic identification and isolation of communication timing errors - Measure signal chain timings without having to generate customized code - Quickly measure and perform timing analysis for complex gatewayed data - Ethernet connection allows test tool to be accessed remotely
Technical specifications	2 LIN interfaces, support version 1.x – 2.0 2 CAN interfaces, selectable high-speed, fault-tolerant, or single-wire CAN 1 µs time stamping resolution for all buses 8 configurable digital I/O channels 100 Mbps Ethernet link to PC - Standalone data logger capability - Low-power mode for long term analysis - Loss-less data acquisition and tracing - Trigger-out latency for the oscilloscope trigger: 40 µs after the end of the ID Byte - PC software: MS Windows[®] XP compatible, LAN access required to control the hardware

Key specification details

Environment

Temperature (AT-ETM757)	Operating: −30 °C to +65 °C Storage: −60 °C to +85 °C
Humidity (AT-ETM758)	Operating: 50% to 95% (40 °C) Storage: 90% (24 h) (65 °C)
Safety standards	• Installation category: IEC 61010-1:2001, EN 61010-1:2001, CSA 22.2 no. 61010.1: 2004, UL 61010: 2004 • Safety Class 2, Over voltage Category II, Pollution degree 2 • Environmental rating: general purpose product

General characteristics

Memory	2 GB
Display	5 LED display on the box for status information

Connectors	• External power connector (+8... 26 V DC transient voltage according to ISO7637-1-1990)
	• Ethernet connector
	• Vehicle interface connector (26 pin):
	    ▪ Vbat power supply (+8... 26 V DC transient voltage according to ISO7637-1-1990)
	    ▪ Typical power consumption of the VPT501: 5 W without digital I/O
	    ▪ Typical power consumption in low power mode: 0.5 W
	    ▪ Maximum Voltage Dip without reset: 1 ms
	    ▪ 8 digital I/O, DC voltage −3 V... +35 V
	    ▪ 2x GND
	    ▪ CAN (DC voltage −27... +35 V, transient voltage according to ISO7637-3-1995)
	        • CAN0 High (I/O)
	        • CAN1 High (I/O)
	        • CAN0 Low (I/O)
	        • CAN1 Low (I/O)
	    ▪ LIN (DC voltage −18 V... +35 V, transient voltage −150... +100 V (coupled through 1nF capacitor))
	        • LIN0 (I/O)
	        • LIN1 (I/O)
	    ▪ TRIGOUTn – trigger output (out) – open collector
	    ▪ TRIGINn – trigger input (input) – threshold 2.5 V (DC voltage −0.3 V... +35 V)

Related literature

Publication title	Publication type	Publication number
Agilent J8115A LIN Tester	Data Sheet	5989-6817EN

Product Web site

For the most up-to-date and complete application and product information, please visit our product Web site at: **www.agilent.com/find/automotive-network**

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LXI

www.lxistandard.org
LXI is the LAN-based successor to GPIB, providing faster, more efficient connectivity. Agilent is a founding member of the LXI consortium.

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