

# Spirent Automotive C1

## Portable Layer 2–7 System

The Spirent automotive C1 offers the power of Spirent’s award-winning Layer 2–7 router, switch, application and security test solutions in a portable form factor. With support for line-rate 10/100 BroadR-Reach® (100BASE-T1), 1000BASE-T1, 1 G and 10 G Ethernet test ports, the C1 offers the power of a professional test tool for deterministic testing of automotive Ethernet products and solutions. A complete Layer 2 to Layer 7 test tool is now available to replace open source utilities and ad-hoc testing methods. Test smarter by moving up to Spirent C1.

### Applications

The C1 is an ideal fit for Automotive OEMs, suppliers, component manufacturers and service providers performing:

- R&D testing involving technology feasibility studies and performance modeling
- Device and protocol functional testing
- Conformance and certification testing
- Device, sub-system, or services performance characterization and availability
- Security and vulnerability testing: Emulate attacks & malware, fuzzing

### Solution Overview

Test automotive InCar or Car2X devices and systems with a solution that reproduces a realistic and deterministic environment accelerating product development and improving quality. Spirent’s C1 minimizes your risk with its highly accurate emulated traffic and measurements so networks and individual network elements can be quickly validated.



The C1 lowers the barrier to entry and enables companies of all sizes to test smarter and optimize their test investment by leveraging the industry-leading test capabilities Spirent offers. The Spirent Automotive C1 supports the Spirent TestCenter™, CyberFlood™ and TTworkbench™ Software Test Suites. Whether you are an InCar network engineer, product researcher/developer, or systems engineer—Spirent will empower you to better manage your solutions and deliver on the promise of next-generation automotive services.

### Features & Benefits

- Native BroadR-Reach PHY eliminates latency measurement inaccuracies and provides true interoperability testing
- Transceiver based PHY options provide flexibility: 100BASE-T1, 1000BASE-T1, 10/100/1000BASE-TX and 10GBASE-T
- Hardware-based timestamp measurements for highly accurate latency measurements
- Wizard-driven RFC benchmark suites for push-button, repeatable tests
- Realistic stateful protocol emulation to exercise protocol state machines
- Small footprint appliance and quiet operation for benchtop or desktop operation

### Realism

- Realistic Layer 2–3 traffic to test Quality of Service (QoS) mechanisms
- Realistic Layer 4–7 user and endpoint emulation to test applications and application infrastructure - industry’s most comprehensive TSN standard and protocol emulation support
- Security and vulnerability testing: Emulate attacks & malware, fuzzing

### Productivity

- Intelligent Results™ allow users to quickly confirm positive results and identify problematic areas
- Real-time traffic and protocol controls enable the tester to validate and troubleshoot problems by altering the test configuration while the test is running
- Real-time results views allow the user to see how the network responds to changes in specific test conditions without having to stop the test and save the results
- Built-in wizards and automated test scenarios reduce test setup and execution times
- Easy NoCode™ Automation for novice programmers

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## Spirent Services

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements.

For more information, visit the Global Services website at [www.spirent.com](http://www.spirent.com) or contact your Spirent sales representative.

### Technical Specifications

#### Spirent C1 Appliance

<b>Chassis</b>	<ul style="list-style-type: none"><li>Four 10/100 BroadR-Reach ports or four 1000BASE-T ports</li><li>2U (3.5 inches) height x 13 inches wide x 10 inches deep</li><li>100-240 V AC input, 300 W max</li><li>Supports Spirent TestCenter and TTworkbench</li></ul>
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<b>Ports per chassis</b>	Four 10/100 BroadR-Reach or 1 GbE (native copper or SFP) or 10GbE (SFP*)
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<b>Interface media support (based on configuration)</b>	<ul style="list-style-type: none"><li><b>10/100 BroadR-Reach:</b> 2 x 2-wire DE9M connectors (2 ports per connector)</li><li>10/100/1000BASE-T (RJ-45), 10/100/1000BASE-T, 100BASE-T1, 1000BASE-T1 or Fiber (SFP)</li><li>10GBASE-T or Fiber (SFP+ Transceiver)</li></ul>
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<b>Traffic encapsulations</b>	<ul style="list-style-type: none"><li><b>Layer 2:</b> 802.3, Ethernet II, 802.1Q, 802.1ad, 802.1ah</li><li><b>Layer 3 and 4:</b> IPv4, IPv6, UDP, TCP</li><li>Custom PDU builder</li></ul>
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<b>Timing</b>	Internal Tx clock
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<b>User reservations</b>	Per port
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#### Layer 2/3 Generator and Analyzer

<b>Frame transmit modes</b>	<ul style="list-style-type: none"><li>Port based (rate per port)</li><li>Stream based (rate per stream)</li></ul>	<ul style="list-style-type: none"><li>Burst</li><li>Timed</li></ul>	<ul style="list-style-type: none"><li>Manual Rate Scheduling</li></ul>
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<b>Min/max frame size (w/CRC)</b>	60 to 10,240
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<b>Min/max Tx rates</b>	1 packet per 3.43 seconds to 101% of line rate
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<b>Real-time Tx stream adjustments</b>	Change rate and frame length settings without stopping the generator or analyzer for truly interactive, cause and effect analysis
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<b>Advance per-stream statistics available in real-time</b>	Over 35 measurements tracked in real-time for each received stream including: <ul style="list-style-type: none"><li>Real-time loss and advanced sequencing</li><li>Out of sequence</li><li><b>Latency:</b> Avg, min, max and short-term avg; first/last frame arrival timestamp</li><li><b>Latency modes:</b> LIFO (forwarding delay per RFC 4689), LIFO (store and forward devices per RFC 1242) and FIFO (bit forwarding devices per RFC 1242)</li><li><b>Data integrity:</b> IP checksum, TCP/UDP checksum, frame CRC, embedded CRC and PRBS bit errors</li></ul>
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<b>Packet capture</b>	<ul style="list-style-type: none"><li>4 MB (first 128 bytes of each frame via CPU RAM)</li><li>Stateful capture/replay for extended protocol support</li></ul>
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<b>Reporting</b>	<ul style="list-style-type: none"><li>Integrated test Results Reporter (TM)</li><li>Full raw test results in CSV and customizable report generation in PDF and HTML</li></ul>
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<b>Automotive C1 advanced software kit</b>	<ul style="list-style-type: none"><li>IGMPv1/v2/v3 and MLDv1/ v2 protocol emulation</li><li>IEEE 1588v2 protocol emulation</li><li>IEEE 802.1x protocol emulation</li><li>Spirent dynamic protocol generator</li><li>RFC 2544 network device benchmarking suite and wizard</li><li>RFC 2889 switching benchmarking suite and wizard</li><li>HTTP, SIP, and FTP emulation</li></ul>
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For more information, contact your Spirent sales representative.

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