

Spectro TP

The Validated Conformance Platform for Smart Card Testing



Spectro TP is COMPRION's flagship for the development of contact and contactless interfaces of smart cards and their chips. The calibrated hardware is based on high-performance processors that allow the execution of analog and digital tests in real time and offer unique advanced measuring options. The integrated digital storage oscilloscope is the ideal tool for analyzing the electrical signal. This GlobalPlatform-qualified test platform comes with a wide range of test benches for all card interfaces (SWP/HCI, ISO/IEC 7816, IC-USB, NFC).

For test requirements that go beyond the scenarios

covered by the supplied COMPRION test benches, Spectro TP comes with a Contact Card Testing API.

COMPRION's Connectivity Test Center is the user-friendly software that provides comprehensive access to all functionalities of Spectro TP. With the optionally available Interoperability Test Center and together with the Monitoring Probe, Spectro TP can be used as a spy tool that traces and analyzes the complete communication between smart card and terminal.

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Main Capabilities

- Digital and analog test and measurement abilities for
 - All UICC contacts (ISO 7816, SWP/HCI, IC-USB)
 - Contactless NFC communication
- Qualified by GlobalPlatform
- Unique advanced analog test capabilities
- Real-time test case execution
- Test cases available for 3GPP, 3GPP2, ETSI, and GlobalPlatform
- Setup of individual test scenarios (Contact Card Testing API)
- Calibrated hardware (recalibration on a regular basis offered)
- Integrated oscilloscope

Use Cases

- SWP/HCI conformance testing according to GlobalPlatform (qualified test tool)
- Chip development for smart cards
- Electrical chip qualification
- Smart card protocol implementation
- Extended protocol tests (real-time test execution)
- Quality assurance: detecting communication errors before product launch

Specification

FEATURES

ISO/IEC 7816 Interface Testing

- Terminal simulation according to ISO/IEC 7816
- Supported ISO/IEC 7816 protocols: T=0 and T=1
- Adjustable electrical, logical protocol and application parameters
- Simulation of VCC, RST, CLK, I/O signals
 - Voltage ranges: 0.5V–6,5 V, ± 20 mV and –0,5V–10 V (boost mode, VCC only), ± 40 mV
 - Signal rise/fall time:
VCC: 1 ns ... 16 ms
RST: 10 ns ... 16 ms
CLK: 4 ns ... 1 μ s
I/O: 10 ns ... 10 μ s
 - Frequency: 0.1 MHz–20 MHz
 - Duty-cycle: 10 %–90 % (depending on frequency)
 - I/O input capacity < 30 pF
- Measurement of electrical signals
 - Voltage at VCC: –2 V... +10 V, ± 30 mV
 - Voltage at RST, CLK, I/O: –2 V... +7 V, ± 25 mV
 - Current at VCC (4 measurement ranges), accuracy up to ± 5 μ A
 - Current at RST, CLK, I/O (Two measurement ranges each), accuracy up to ± 10 μ A
 - Frequency: 0.1 MHz–100 MHz
 - Duty-cycle: 0.1 % –99.9 % (depending on frequency)

SWP/HCI Interface Testing

- Terminal simulation according to
 - ETSI TS 102 613 (SWP)
 - ETSI TS 102 622 (HCI)
- Supported SWP/HCI modes: card emulation, card reader, connectivity
- S1/S2-signal at C6 contact:
 - Digital & electrical parameters adjustable
 - S1 voltage low and high level: –0.5 V ... 3.0 V, ± 10 mV
 - S1 rise/fall time: 10 ns ... 10 μ s
 - S2 trigger threshold value adjustable
- Measurement of electrical signals
 - S1 voltage: –2 V... +7 V, ± 25 mV
 - S1 rise/fall time: 1 ns ... 10 μ s
 - S2 current: –100 μ A... +1100 μ A, ± 5 μ A

NFC Testing

- Support of all NFC modes: card emulation, reader/writer, peer-to-peer
- Simulation of polling and listening mode for NFC-A, NFC-B, NFC-F
- Simulation of PICCs and PCDs as per ISO/IEC 14443, types A and B
- Support for higher bit rates (up to fc/16; 848kbit/s)
- Hardware supporting waiting time extension (WTX) request
- Configurable protocol/timing parameters
- Hardware supports RF analog testing

IC-USB Interface Testing

- Terminal simulation according to ETSI TS 102 600
- Supported IC-USB modes: ICCD, Ethernet Emulation Module, Mass Storage
- C4/C8 signal:
 - Digital parameters adjustable
 - Monitoring/measurement of digital states

Monitoring and Analysis

- Display and analysis of communication
 - During test case execution using Connectivity Test Center
 - Between cards and devices using Interoperability Test Center
 - On all layers (physical, protocol, transport, and application layer)
- Synchronization between layer views
- Various on-the-fly protocol checks
- Summary view: showing synchronized high-level information in one compact all-protocol master view

ISO/IEC 7816 Monitoring

- Provides a structured view of the terminal profile

SWP/HCI Monitoring

- Based on ETSI TS 102 613/ETSI TS 102 622
- Based on proprietary SWP standard Inside Contactless
- SHDCL
- Contactless tunneling (CLT)

IC-USB Monitoring

- Based on ETSI TS 102 600
- Monitoring of bytes/frames/bus-states

FEATURES (CON.)

Contactless Monitoring

- NFC Forum digital protocol and activity, LLCP
- NFC Forum application protocol: NDEF, RTD
- All NFC Forum tag types
 - Based on ISO/IEC 14443 (A/B)
 - Based on ISO/IEC 18092
 - Proprietary contactless protocols B', MIFARE, and FeliCa
- Decoding of carrier and subcarrier
- Timing measurements of frame delay/waiting time
- Monitoring of bit rates from 106 kbit/s up to 848 kbit/s

GENERAL FEATURES

- Supported smart card voltages: 1.2 V/1.8 V/3 V/5 V
- Microcontroller for execution of real-time test cases
- Contact Card Testing API: allowing customized simulation actions
- GlobalPlatform Translation

TEST SUITES

ISO/IEC 7816 Test Benches

(Electrical/Protocol/Application)

- Spectro TP 3GPP TS 31.122 UICC/USIM
- Spectro TP 3GPP 51.017 SIM
- Spectro TP 3GPP ISIM
- Spectro TP 3GPP2 CSIM
- Spectro TP 3GPP2 C.S0049-0 R-UIM

Global Platform Test Benches

- Spectro TP eUICC Compliance test bench

SWP/HCI Test Benches

- Spectro TP ETSI TS 102 694-2 SWP
- Spectro TP ETSI TS 102 695-2 HCI

JAVA API Test Benches

- Spectro TP ETSI TS 103 115 HCI API
- Spectro TP 3GPP TS 51.013 SIM Java AP
- Spectro TP 3GPP TS 31.213 USIM Java API
- Spectro TP ETSI TS 102 268 UICC Java API

Others

- Spectro TP Card Profile Test Bench

OPTIONS

Analog Scope

- Integrated digital storage oscilloscope
 - Contact-based operation: configurable sample rate of up to 100 M samples/s
 - Contactless operation mode: configurable sample rate of up to 4 fc
- Detailed timing and value measurements
- Analog voltage measurements on contacts VCC, RST, CLK, I/O, and SWP
- Analog current measurements on contacts VCC and SWP
- 2-stage cascading trigger definition
- Retriggerring: multiple recording of samples initiated by defined trigger condition
- Configurable sample rate: Resolution per sample up to 14 bit
- Record length
 - Contact-based operation mode: up to 256 G sample points
 - Contactless operation mode: up to 32 M sample points

Analog Scope Viewer

- Visualization of the analog signals (e. g. modulated carrier amplitude, envelope signal)
- Display of up to 8 digital channels in contactless and up to 16 digital/2 analog channels in contact-based operation mode
- Signal/frequency analysis
- Quick measurements
 - Modulation index
 - Waveform characteristics
 - Frequency spectrum
 - Fall/rise times
 - Peak-to-peak
 - Top/bottom
 - Duty cycles
 - Overshoot, undershoot
 - Low-level, mid-level, high-level
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OTA View

- Shows translated OTA traffic on all transport protocols (HTTP/CAT_TP/SMS-PP)

Universal Translator

- Supports GSM, W-CDMA, LTE, CDMA2000 (incl. SIM/SAT, USIM/USAT, CSIM/CCAT, and ISIM)

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DIMENSIONS

- W x D x H: 450 x 375 x 175 mm
- Weight: 14 kg

SCOPE OF DELIVERY

- Spectro TP
- Spectro TP Analog Probe
- Plug-in SIM adaptor (PISA)
- Keyboard/mouse, power cords (EU, US)
- Manuals



COMPRION GmbH
Lise-Meitner-Str. 3
33104 Paderborn
Germany

Phone: +49 5251 6859 0
E-mail: info@comprion.com
www.comprion.com

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