MICROPROSS
Test and personalisation tools for smartcard, RFID and NFC industry.

Microprosss
33 rue Gantois
59000 LILLE - FRANCE
Tel: +33 (0)3 20 74 66 30
Fax: +33 (0)3 20 74 66 35
smartcards@microprosss.com
WWW.MICROPROSS.COM

MP300 TC3

A high-end contact smartcard tester, optimised for NFC enabled SIM chips

- **Supports the ISO/IEC 7816, USB 2.0, USB-IC, SWP/S-HDLC/HCI protocols**
- **Spies the dialogue happening between itself and the device under test**
- **Numerous physical measurement features**
- **Able to include perturbations inside the dialogue**

OVERVIEW :

This tester will typically be used in the following contexts :

Debug of a smartcard operating system
Quality inspection tasks
Compliance checking of a smartcard with defined standards
Electrical qualification of a smartcard or a micro-module

The main features of the MP300 TC3 are :

Emulation of a contact smartcard reader, or a CLF
Compatible with smarcards, micro-modules, M2M components
Support of the ISO/IEC 7816-3 and -4, USB 2.0 and –IC, SWP/S-HDLC/HCI protocols and various types of memory chips
Completely supports the ETSI TS 102 613 and TS 102 622 specifications
Open for implementation of custom protocols
Endless possibilities of protocolary customisation
Possibility to adjust all electrical parameters
Spy of ISO/IEC 7816-3 and –4, USB and SWP interfaces, with comprehensive protocol analysis
Advanced physical measurement characteristics (open/short, consumption, leakage current, drivability, ...)
Accurate timing measurement features
Hardware sequencer, for a perfect test scenario repetition and advanced protocol testing
Open platform : integrate the MP300 TC3 inside your own test platform
Supplied with the MPManager software suite, enabling the complete control of the tester without any programming knownedge
Integrated in numerous third parties test suites, including test cases for ISO/IEC 7816-3, Visa Level 1, EMVCo Level 1, ETSI TS 102 613 and TS 102 622 compliance checking

SPECIFICATIONS :

Supported protocols

ISO/IEC 7816-3

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Hardware acceleration	Transmission and reception of characters managed by the MicroSmart technology
USB 2.0	
Available speeds	Low speed, full speed
Classes	ISO/IEC 7816-12, mass storage, custom protocols
USB-IC	
SWP (ETSI TS 102 613 and TS 102 622)	
SWP transmission	Assisted by hardware
LLC layers support	ACT, CLT and S-HDLC realised by firmware
Evolutivity	This tester can be upgraded to support future evolutions of the standard
Synchronous chips (memory chips)	
Avalaible librairies	T2G Eurochip SLE 4442 SLE 4407 AT24CXX
Hardware acceleration	Available
Raw mode	
Gives the possibility to exchange frames without any protocolary encapsulation	
Out of standards chip support	
Benefit from Microprosss\' experience in smart card programming	
T=0 and T=1 protocols	100% implemented, managed by firmware
Custom protocols development	Available

Programmable parameters

Physical parameters	
Voltages	
Vcc	0V to 10V
Vol	0V to 5V Each contact can be adjusted independently
Voh	1V to 7V Each contact can be adjusted independently
Vil	0.2V to 5V
Vih	1V to 6.8V
Frequency	
ISO 7816 clock frequency	10kHz to 20MHz
ISO 7816 clocy duty cycle	30% to 70%
Rise and fall times	
Vcc	From 20ns to 1.8V/ms
C2, C3, C4, C6, C7, C8	From 10ns to 5µs (500µs on C2) Each contact can be adjusted independently
Pin states	
All pins are independent fom each other, and can be separately managed	
ISO 7816 communication parameters	
ETU width	From 1 to 4096 clock cycles (bit sampling adjustable)
BGT, initial ETU width	Adjustable in clock cycles
BWT, CWT, EGT, RGT, WWT	Adjustable in ETUs
Clock stop at high or low state	Adjustable
Clock stop tG and tH timings	Adjustable in clock cycles

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Parity control	Can be forced to 0,1, odd, even
Input parity error checking	Can be disabled
Pull-up resistor	5kΩ or 20kΩ by fixed pull-up resistor Any value between 1kΩ and 100kΩ can be emulated
SWP communication parameters	
Baudrate	Adjustable from 49kbps to 1.9Mbps
SWP duty cycle (definition of SWP S1 high and low states duration)	Adjustable from 0% to 50%
SWP S2 detection threshold	Adjustable from 1nA to 1.1mA
Activation time, P2, P3 timings	Adjustable
USB-IC parameters	
USB-IC specific attachment procedure	Managed by the tester
Voltage classes supported	1.8V and 3.0V

Spy feature

Accuracy	20ns
Signals displayed	Signals C1, C2, C3, C4, C6, C7, C8 SWP S1, SWP S2 Trigger in Trigger out
Protocols supported	ISO/IEC 7816-3, SWP, USB 2.0 (simultaneous spy possible without accuracy damage)
Type of events displayed	Logical state change Characters (ISO/IEC 7816, SWP, USB 2.0, USB-IC) Modification of baudrate Clock frequency detection Analog representation of the signals I/O direction

Available tests

Electrical tests	
Open/short test	
Available contacts	Contact C1, C2, C3, C4, C5, C6, C7, C8
Forced current	Adjustable between –500µA and 500µA
Leakage current measurement	
Available contacts	Contact C1, C2, C3, C4, C6, C7, C8
Measurement ranges	+/- 5mA + - 500µA
Voltage measurement	
Available contacts	Contacts C1, C2, C3, C4, C6, C7, C8
Range available	+/- 10V
Modes available	Dynamic mode : we give you an analog like vision of the voltage on the pin you chose from the moment you chose Static mode : we give you the instant voltage value Burst mode : 512000 voltage measurements are made with 40ns in between, on C1 and C6, to give an analog like display of the studied signal
Current measurement	
Available contacts	Contacts C1, C2, C3, C4, C6, C7, C8

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Ranges available	+/- 100mA +/- 25mA +/- 5mA +/- 500µA
Modes available	Dynamic mode : we give you an analog like vision of the current on the pin you chose from the moment you chose Static mode : we give you the instant current value on the selected contact Burst mode : 512000 current measurements are made with 40ns in between, on C1 and C6, to give an analog like display of the studied signal
Parametric tests	
Available contacts	Contacts C1, C2, C3, C4, C6, C7, C8
Modes available	Force a current, measure a voltage Force a voltage, measure a current
SWP specific measurement functions	
S2 signal characterisation	Measurement of minimum and maximum values of the current on the S2 signal during a given period
Logical tests	
Anti tearing test	
Simulate the chip\'s immunity against tearing from the reader	
Timing measurement	
Measure the chip\'s response to a command	
Concurrent I/O testing	
Simultaneous sending of characters in ISO/IEC 7816 and SWP, with a user defined time offset (can be 0 ns)	
Personalisation assisted by hardware	
Do not lose a microsecond while sending data to the chip thanks to the hardware assisted data sending mechanism	
SWP framing tests	
Possibility to send frames at a bit per bit level, enabling the sending of data without bit stuffing, or with CRC errors.	

Sequencer tests

Generation of glitches on Vcc, C3, C6
Modification at a user defined moment of the state of a pin
Sending out of standard frames/provoking collisions
Creation of custom activation/deactivation sequences
Generation of parity errors on transmission, simulation of parity errors on reception
Management of triggers
Sudden modification of an electronic parameter
Definition of the time between two commands

Triggers

The MP300 TC3 offers 5 triggers, to synchronise or to be synchronised by external laboratory devices (oscilloscopes,...)

Physical information

Weight (Unitary rack package)	1.98kg
Dimensions	Width : 150mm Height : 78mm Depth : 270mm

Communication parameters

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USB 2.0
TCP/IP 10/100 Mbps
RS 232

Software development

Remote development (the code is executed from the PC)	
Elements available	MPSDK .NET library available on demand Communication Dll supplied
Supported programming languages	: C, C++, VB, Java, .NET Any language that supports Dll
Embedded development (the code is executed directly by the MP300)	
Recommended cross compiler	Windriver compiler (prefered version : 4.4b)

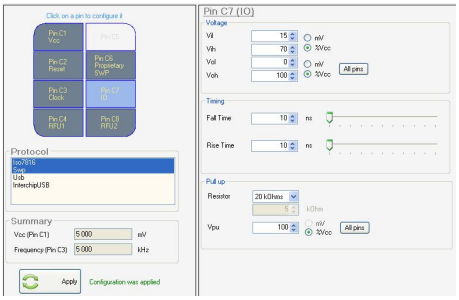
User interface

MPManager

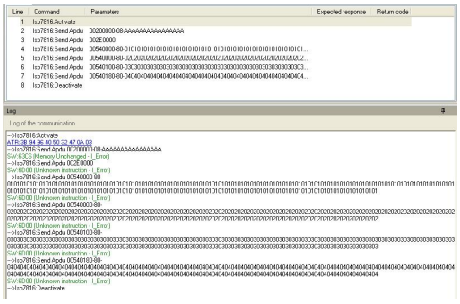
SOFTWARES :

The MP300 TC3 is supplied with the MPManager software, whose aim is to open all of the tester\'s functionalities, accessible just with mouse clicks.

First, the MPManager software will make it possible for you to define all electrical settings, including applied voltages, the clock frequency, the rise and fall time of all signals.



This user interface will allow you to edit your test scripts, starting from the library of commands available. They cover a full range of functionalities, such as sending APDU commands, or launching electrical measurement.



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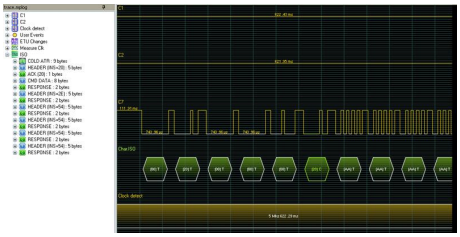
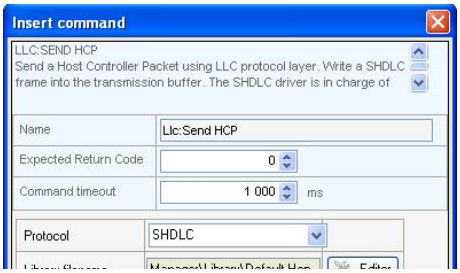
MPManager also allows you to visualise all exchanges that happened between the MP300 TC3 and the smartcard. Data is displayed both as a tree, where a deep analysis is supplied, and as a chronogram, which gives the possibility to measure all kind of timings (response times, activation time, ...)

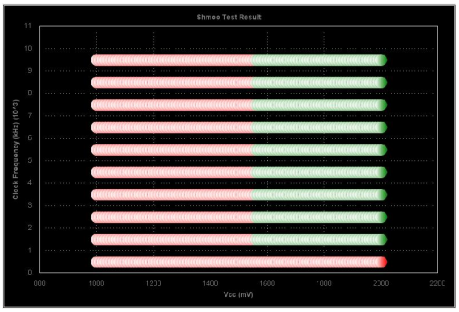


Many possibilities are offered to edit HCI commands, and send them to the smartcard



This user interface gives also access to all electrical measurements of the smartcard. For example, the shmoo plot window will make it possible for you to study the influence of the combination of several electrical or protocolary parameters on the execution of a given script.

This user interface also allows to launch dynamic measurement. This feature allows you to have a clear vision of the current or the voltage on a given contact, as time goes by.



ACCESSORIES :

Microprross supplies a complete range of accessories for the MP300 TC3, that include :

a SIM to ISO converter
an external smartcard reader (ideal companion to perform testing in temperature controlled environments)
probes to enable spying sessions between a smartcard and an external reader
a probe for oscilloscope connection

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We also supply packages to extend the warranty of the tester. Please ask us for the maintenance contracts available.