

## MP300 TCL2

The most complete tester for NFC device and tags characterisation.

- ◆ Supports ISO/IEC 14443 A/B, Mifare™, FeliCa™, ISO/IEC 15693, ISO/IEC 18092 (NFC-IP1 and NFC-IP2) protocols
- ◆ Numerous physical and protocolary adjustable parameters
- ◆ Gives the possibility to spy the exchange with the device under test
- ◆ Features chip impedance measurement, smartcard resonance frequency measurement and many other physical measurements



## OVERVIEW :

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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 TCL2 are :

- Compatibility with smartcards, RFID tags, inlays, e-Passports, micro-modules, and NFC objects
- Support of the ISO/IEC 14443, ISO/IEC 15693, ISO/IEC 18092, Mifare™, FeliCa™ protocols
- Supports NFC-IP1, NFC-IP2 specifications, in all modes (active, passive mode, in active and target variantes)
- Fully implements NFC peer to peer protocol
- Open for implementation of custom protocols
- Endless possibilities of protocolary customisation
- All physical parameters can be adjusted (field strength, carrier frequency, modulation index, ...)
- Spy of the exchanges happening between the tester and the tested object
- Accurate timing measurement features
- Sequencer, for a perfect test scenario repetition and advanced protocol testing
- Advanced physical measurement functionalities (chip impedance, resonance frequency measurement, field measurement)
- Compatible with Micropross\Universal Contactless Bench and ISO 18047 Test Bench
- Can be synchronised with a MP300 TC3 or SC1, for analysis of dual interface smartcards, or NFC objects
- Open platform : integrate the MP300 TCL2 inside your own test platform
- Supplied with the MPManager software suite, enabling the complete control of the tester without any programming knowledge

## SPECIFICATIONS :

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## Supported protocols

<b>ISO/IEC 18092 (NFC-IP1, NFC-IP2)</b>	
Supported communication modes	Passive initiator Passive target (optionnal) Active initiator Active target
<b>ISO/IEC 14443 (proximity cards)</b>	
Type A	Supported
Type B	Supported
Anticollision	Supported
T=CL protocol	Supported
Supported data rates	106, 212, 424, 828 kbps Asymmetrical data rates supported
<b>B\ (Innovatron)</b>	
Supported	
<b>ISO/IEC 15693 (vicinity cards)</b>	
Tag coding method	One sub-carrier Two sub-carriers
Encoding modes	1 out of 4 1 out of 256
<b>ISO 18000-3 Mode 1</b>	
Supported	
<b>Mifare TM</b>	
Types supported	Classic Light Ultra Light Ultra Light C Many more
Encryption	Assisted by hardware
<b>FeliCa TM</b>	
Available data rates	212 and 424 kbps
Encryption	Available through an external device
<b>Raw mode</b>	
Gives the possibility to exchange frames without any protocolary encapsulation	
<b>Out of standard chips</b>	
Benefit from Micropross\ experience in smartcard programming	
<b>NFC</b>	
<b>NFC Forum</b>	
Supported communication modes	Tag mode (type 1 to 4) Reader/writer mode Peer to peer mode (active and passive modes)
Supported data rates	106, 212 and 424 kbps
<b>Contactless terminal emulation (smartcard testing)</b>	
Supported data rates	Low data rate High data rate
Supported data rates	106, 212 and 424 kbps
<b>Optionnal smartcard emulation (reader/writer testing)</b>	
<b>ISO/IEC 14443 (proximity cards)</b>	

ISO/IEC 15693 (vicinity cards)	
FeliCa TM	
Type A	Supported
Type B	Supported
Supported datarates	106, 212, 424, 848 kbps Asymmetrical datarates supported
Supported datarates	212 and 424 kbps
Emulated types of tags	One sub-carrier Two sub-carriers

## Programmable parameters

Physical parameters	
Field strength	Adjustable
Modulation index	From 0% to 100%
Field rise time	0ms to 5ms
Carrier frequency	12.56MHz to 14.56MHz
Modulation rise and fall times	0µs to 10µs
Logical parameters	
Type A pause width	0 to 4.4µs
Frame waiting time	Adjustable in ETU
Type B framing (SOF, EGT, EOF, bit duration)	Adjustable in clock cycles
TR2 timing	Adjustable with the sequencer
Communication speed	106, 212, 424, 848 kbps

## Spy feature

Resolution	20ns
Events displayed	Field detection External field detection Carrier and subcarrier detection Type A sequences Phase changes Bytes Frames User events Trigger in Trigger out I/O direction Baudrate changes (asymmetrical data rates are supported)

## Available tests

Electrical testing	
Resonance frequency measurement	
Range	11 to 24 MHz
Q factor measurement	
Chip impedance	
Measurement done at 13.56 MHz	
Magnetic field measurement	

<b>Logical testing</b>	
Automatic testing	
Send type A command, wait, send type B command and receive answer (for type B cards)	
Send type B command, wait, sent type A command and receive answer (for type A cards)	
Switch on field, wait, send request command (A or B), receive answer	
Send request, wait, send request, receive the answer	
Antitearing	
PICC reset characterization	
Check minimum FDT (frame delay time)	
Testing through API manipulation	
Response time measurement (FDT, TR0, TR1)	
Sending of out of standard frames	
Sending misformed blocks (wrong number of bits)	
Retro modulation ratio measurement	
Distance simulation checking	
Separated RX channel allowing communication using a RF amplifier	
Measurement range	0 to 8 A/m
Generation of EMD (Electro Magnetic Disturbance)	

## Triggers

The MP300 TCL2 offers many triggers, to synchronise or to be synchronised by external laboratory devices (oscilloscopes,...)
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## Physical information

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

## Communication parameters

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 (preferred version : 4.4b)

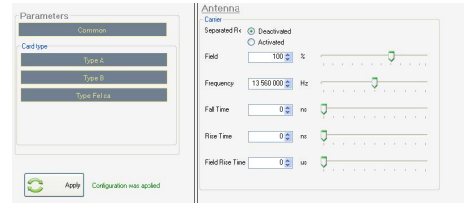
## User Interface

MPManager
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## SOFTWARES :

The MP300 TCL2 is supplied with the MPManager software. The aim of this software, is to allow the user to access the power of the tester without any programming knowledge.

First, the MPManager software allows you to define the physical conditions that will be used for the communication session with the smartcard.



Then, MPManager allows you to define the exchanges that will happen. A multitude of commands are available, which have been thought to cover all of the customer needs.



Using those commands, the user can build his own test script.

Line	Command	Parameters	Expected response
1	Select Card Type	Type A	
2	Power On		
3	Request	Request Type A	
4	Anticollision		
5	Send RATS	Nb bytes : 2 - Command : E001	
6	Send PPS	CID : 1 - DRI : 848 - DSI : 848	
7	Iso14443 Select Data Rate	PCD->PICC : 848, PICC->PCD : 848	
8	Iso7816:Send Adu	A0CADF20-00	
9	Iso7816:Send Adu	800E009E-01-55	
10	Iso7816:Send Adu	8008009E-01-55	
11	Power Off		

Once this script is built, it is possible to run it step by step, in continuous mode, or even specify how many times it is needed to run it.

```

-->Select Card Type Type A
-->Power On
-->Request Request Type A
<-- ATQA: 0008
-->Anticollision
<-- UID: 3029C6D1
<-- SAK: 20
-->Send RATS Nb bytes : 2 - Command :
E001
<-- ATS:
0F303304000000040000000400000000

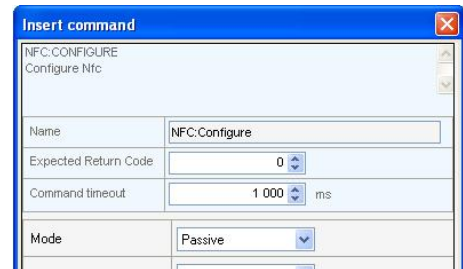
```

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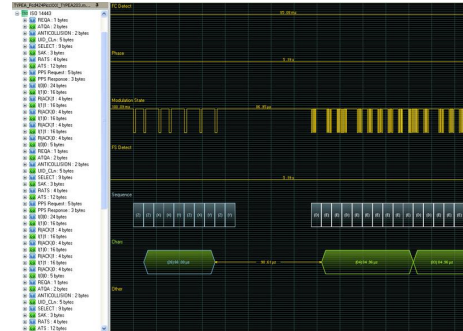
-->Send PPS CID : 1 - DRI : 848 - DSI :
848
-->Iso14443:Select Data Rate PCD->PICC
: 848, PICC->PCD : 848
-->Iso7816:Send Adu A0CADF20-00
<--9F-6A-05-47-44-00-B3-00-9F-6B-08-04-
21-07-28-00-30-31-37-9F-6C-08-03-00-39-
5F-00-00-08-54-9F-6D-02-00-00-9F-6E-03-
00-08-00-9F-6F-07-00-F8-01-25-00-F8-01
SW:9000 (Status Ok)
-->Iso7816:Send Adu 800E009E-01-55
SW:9000 (Status Ok)
-->Iso7816:Send Adu 8008009E-01-55
SW:9000 (Status Ok)
-->Power Off

```

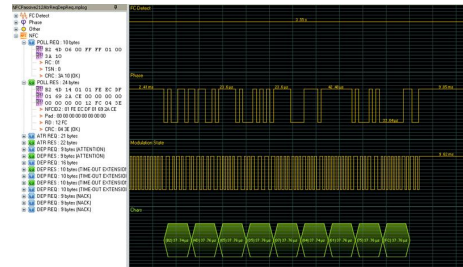
For NFC objects testing, MPManager opens you all possibilities that are defined by the NFC-IP1 and &ndash;IP2 specifications ;



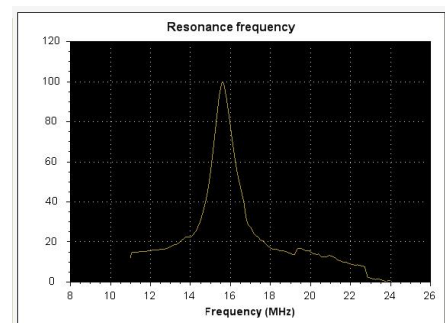
Just by clicking a button, it is possible to launch the spy of the exchanges between the MP300 TCL2 and the smartcard. This will give an exact display of the frames that have been exchanged, as well as protocol analysis. A tree and a graphical representation of the data is available. Among the graphical representation are the characters, sequences, modulations, presence of the field, phase changes...



For NFC compliant exchanges, the interpretation of the exchanges can be done according to the NFC specifications.



MPManager can also perform with the MP300 TCL2 some physical measurement. To qualify the assembly micromodule + antenna inside the smartcard, the resonance frequency + Q factor measurement is very handy.



## ACCESSORIES :

Micropross supplies a complete range of accessories for the MP300 TCL2, that include :

- Different sizes of antennas
- Different sizes of cables
- Test benches, to perform RF testing
- The software key to unlock the NFC passive target emulation and smartcard simulation modes

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