

MP300 SC1 + MP300 TCL2

Spy complex transactions, mixing contact and contactless technologies using the combination of MP300 SC1 + MP300 TCL2

- ◆ Simple synchronisation link
- ◆ Contact and contactless exchanges displayed on the same time base
- ◆ Convenient data display thanks to the MPManager software suite
- ◆ Possibility to do parametric tests on both contact and contactless interfaces of the NFC component



OVERVIEW :

The main features of the combination MP300 SC1 + MP300 TCL2 are :

- Spy of ISO/IEC 7816-3, SWP, ISO/IEC 14443, FeliCa, ISO/IEC 15693 exchanges on one single session
- Convenient display of the captured data using the MPManager software
- The NFC transaction is initiated by the MP300 TCL2
- Simple to setup
- Possibility to measure translation time of a contactless frame into SWP by a NFC component
- All features of both MP300 testers remain available
- Enables to capture a complete NFC transaction
- Also compatible with dual interface smartcards

The combination of MP300 SC1 + MP300 TCL2 will typically be used in the following contexts :

- Characterisation of a NFC host component
- Debug of a CLF (contactless front end)
- Analysis of a combi card

SPECIFICATIONS :

MP300 TCL2 : Supported protocols

| ISO/IEC 18092 (NFC-IP1, NFC-IP2) and NFC Forum | |
|--|--|
| Communication modes supported | Passive initiator Passive target (optionnal) Active initiator Active target |
| ISO/IEC 14443-3 (proximity cards) | |
| Type A | Supported |
| Type B | Supported |

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|--|---|
| Anticollision | Managed by firmware |
| T=CL protocol | Managed by firmware |
| Supported baudrates | 106, 212, 424, 828 kbps Asymmetrical baudrates supported |
| B\ (Innovatron) | |
| Supported | |
| ISO/IEC 15693 (vicinity cards) | |
| Coding type | Manchester |
| Encoding modes | 1 out of 4 1 out of 256 |
| ISO 18000-3 Mode 1 | |
| Supported | |
| Mifare TM | |
| Types supported | Classic Light Ultra Light Ultra Light C Many more |
| Encryption | Assisted by hardware |
| FeliCa TM | |
| Available baudrates | 212 and 424 kbps |
| Encryption | Available through an external device |
| Raw mode | |
| Gives the possibility to exchange frames without any protocolary encapsulation | |
| Out of standard chips | |
| Benefit from Micropross\experience in smartcard programming | |

MP300 TCL2 : Programmable parameters

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| Physical parameters (contactless interface) | |
| 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 (contact interface) | |
| 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 |

MP300 TCL2 : Spy feature

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| Resolution | 20ns |
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| Events displayed | Field detection External field detection (for active mode) Carrier and subcarrier detection Type A sequences Phase changes Bytes Frames User events Trigger in Trigger out I/O direction Baudrate changes (asymmetrical baudrates are supported) |
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MP300 TCL2 : Available tests

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| Electrical measurement | |
| Resonance frequency measurement (loaded and unloaded modes) | |
| Range | 11 to 24 MHz |
| Q factor measurement | |
| Chip impedance | |
| Frequency at which the measurement is done | 13.56MHz |
| Magnetic field measurement | |
| Logical testing | |
| 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 | |

MP300 TCL2 : Triggers

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| The MP300 TCL2 offers many triggers, to synchronise or to be synchronised by external laboratory devices (oscilloscopes,...) |
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MP300 SC1 : Supported protocols

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| Protocol analysis mode | |
| ISO/IEC 7816-3 | |
| T=0 and T=1 protocols | 100% implemented |
| Block level spy | Available |
| SWP (ETSI TS 102 613 and TS 102 622) | |

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|---|--|
| Baudrate supported | From 49kbps to 1.9Mbps |
| Block level spy | Available |
| LLC level spy (S_HDLC, ACT, CLT) | Available |
| HCI | Available |
| Synchronous chips (memory chips) | |
| Implemented | |
| Example of supported chips | Eurochip T2G SLE 4442 SLE 4407 AT24CXX |
| USB 2.0 | |
| Supported speeds | Low speed, full speed |
| Smartcard emulation mode | |
| ISO/IEC 7816-3 | |
| T=0 and T=1 protocol | 100% implemented by firmware |
| Custom protocol emulation | Available |
| SWP (ETSI TS 102 613 and TS 102 622) | |
| Baudrate supported | From 49kbps to 1.9Mbps |
| Block level spy | Available |
| LLC level spy (S_HDLC, ACT, CLT) | Available |

MP300 SC1 : Programmable parameters

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|---|-----------------|
| Protocol analysis mode | |
| ISO/IEC 7816-3 | |
| I/O direction detection threshold | |
| SWP (ETSI TS 102 613 and TS 102 622) | |
| SWP S2 channel current threshold | |
| Smartcard emulation mode | |
| ISO/IEC 7816-3 | |
| Guard time | Defined in ETUs |
| Smartcard response time | Defined in ETUs |
| SWP (ETSI TS 102 613 and TS 102 622) | |
| Current values on SWP S2 signal (high and log stated) | From 1nA to 2mA |
| Smartcard response time | |

MP300 SC1 : Spy feature

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| 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) |

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| Type of events displayed | Logical state change Characters Modification of baudrate Clock frequency detection Analog representation of the signals I/O direction |
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MP300 SC1 : Available tests

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|---|----------------------------|
| Electrical measurement (available for all versions) | |
| Possibility to execute simultaneous voltage and current measurement to characterise both the terminal and the smartcard | |
| Number of samples | 512000 (unlimited for Vcc) |
| Contacts available | C1, C6, C7 |
| Perturbations (smartcard emulation mode) | |
| ISO/IEC 7816 | |
| Sending out of standard blocks (wrong CRC, wrong data length, ...) | |
| Sending characters with parity error | |
| Simulating reception of parity errors | |
| Modifying the guardtime on the fly | |
| SWP (ETSI TS 102 613 and TS 102 622) | |
| Sending out of standard blocks | |
| Removal of bit stuffing | |
| Card response time | |
| Master resume time measurement | |

MP300 SC1 : Triggers

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| The MP300 SC1 offers triggers, to synchronise or to be synchronised by external laboratory devices (oscilloscopes,...) |
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MP300 SC1 : Communication parameters

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| USB 2.0 |
| TCP/IP 10/100 Mbps |
| RS 232 |

MP300 SC1 : Software development

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| 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) |

MP300 SC1 : User Interface

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| MPManager |
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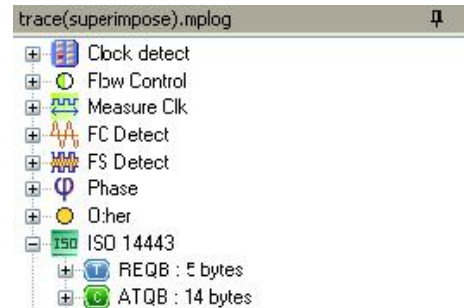
SOFTWARES :

The software that is used for the display of the trapped exchanges is MPManager.

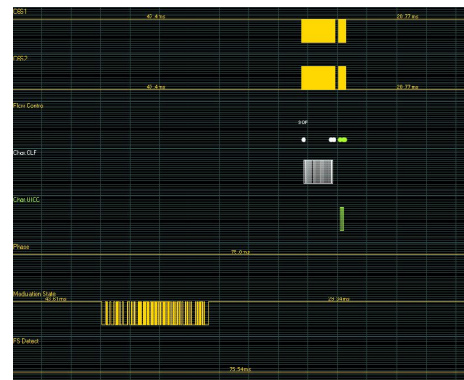
First, the user defines which commands will be sent by the MP300 TCL2 on the contactless interface of the device under test.

| Line | Command | Parameters |
|------|--------------------|---|
| 1 | Power On | |
| 2 | Remote command | CLT2110 |
| 3 | Select Card Type | Type B |
| 4 | Request | Slot number : 0 |
| 5 | Remote command | ATTR 1 9 1D1122334400000100 |
| 6 | Remote command | CLT2111 |
| 7 | Iso7816: Send Apdu | 00A40400-0E-325041532E5359532E4444463031-00 |
| 8 | Power Off | |

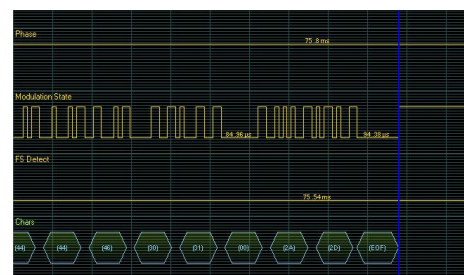
Once the spy session is over, the "Viewer" window of MPManager shows all signals that have been spied (contact and contactless exchanges)



The viewer window of MPManager also gives a graphical display of the trapped exchanges. For example on the following screenshot, we have a contactless command (starting a payment application). This command will be in fact executed by the U-SIM. The contactless frame thus needs to be translated into SWP



The time between the contact, and the SWP blocks, is the time it takes to the NFC component to do the translation job. By positioning two cursors, we will know how long it takes to the NFC component to perform this job.



Delta : 2 268 940 ns

MPManager gives us the time difference between both cursors

ACCESSORIES :

Micropross supplies a complete range of accessories for their laboratory tools, that include :

A SIM to ISO converter

Numerous shapes of probes, to use this tester with different types of contact smartcard readers and handsets

A probe for oscilloscope connection

Numerous sizes of antennas, to adapt to various form factors

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