

MP500 TCL3



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This tool must be used according to the user guide. Any operation related to maintenance, reparation or calibration must be carried out by qualified personnel. Consequently, in case of failure, contact MICROPROSS to find out about the procedure to follow.

FIRST STEPS	1
Introduction	1
Introduction note from Micropross	1
Instructional icons	2
Where to find the information you may need	3
Acronyms used	4
Unpacking	5
Package content	5
Incoming inspection	6
Operating conditions	6
Hardware installation	7
Starting your TCL3	7
TCL3 at a glance	8
Front panel	8
Back panel	8
Resonance Frequency measurement antenna connections	9
Communication antenna connections	10
Antenna tuning	11
VHBR antenna connections	12
External RX connection example: the ISO test bench	13
TECHNICAL CHARACTERISTICS	14
Physical characteristics	14
I/O	14
13.56 MHz signal generator	14
Measurements	15
MPMANAGER 3	18
MPManager in a few words	18
Installation	18
System requirement	18
Installation steps	18
Licensing System	22
Grabbing a license	22
Registering a license	22
Separated license server installation & activation	25
Remove a license from your PC or the license server	26
View available license tokens / Revoke tokens	29
How To update MP Manager	30
Detailed MPManager functionalities	31
Connection to a device	32
Firmware update	34
Embedded license management and update	35
Generate an embedded context file	35
Upload embedded licenses	36
Embedded applications	36
Script	38
Script commands	40

Configuration	44
<i>Antenna</i>	44
<i>Frequency</i>	44
<i>Modulation</i>	45
<i>Advanced</i>	45
Spy	47
Viewer	47
<i>Viewer</i>	49
<i>Detail Grid and Detail View</i>	51
Test	52
<i>Shmoo</i>	52
<i>Impedance measurement</i>	56
<i>Cable/Head compensation</i>	56
<i>Resonance Frequency measurement</i>	58
Menus	62
<i>File</i>	62
<i>Settings</i>	63
SUPPORT, MAINTENANCE & SAFETY	66
Hardware warranty.....	66
Micropross support	66
Maintenance agreement	66
Preventive Maintenance	66
Cable/Head compensation procedures	66
Cleaning and preventive maintenance.....	67
Safety Notes.....	68
SOFTWARE LICENSES	71

FIRST STEPS

INTRODUCTION

Introduction note from Micropross

Dear Customer,

Congratulations on your purchase of the Micropross MP500 TCL3 and welcome to its user's guide. You will find here complete reference on all the features included in this highly customizable multi-protocol tester used with MPManager 3 which presents all TCL3 functions in a graphical and user friendly environment. This guide will introduce you to:

- Create and save test projects,
- Edit and run script files,
- Configure and spy the communication between the TCL3 and a DUT,
- Visualize the log spy events,
- Execute parametric tests for smart card characterization.

Developers who wish to develop advanced tests in their own testing environment should refer to the Developer's guide that lists all the APIs provided with the MP500 TCL3.

Wishing you the best testing experience,

Micropross

Instructional icons



NOTE notes, usage tips, or additional information



REFER TO pages with related information; for example: p12 (represents “see page 12”)



WARNING statements identify conditions or practices that could result in damage to the equipment or other property.



DANGER statements identify conditions or practices that could result in personal damage

Where to find the information you may need

The following table describes where to get more service information.

To learn about	Do this
<i>Technical support</i>	Visit http://support.micropross.com for online Helpdesk support with our engineering team (English and French).
<i>Software updates</i>	Visit www.micropross.com/customer_area and use your personal access key to access to the download center
<i>Finding your MP500 TCL3 serial number</i>	The serial number can be found on the rear panel of the TCL3 (MP5.XX.XX.XX)
<i>Returning your device to Micropross</i>	Go to www.micropross.com/customer_area . Contact the Micropross support to get a RMA form and attach it to your shipment to : <i>Micropross, 11-21 Rue Hubble, Parc de la Haute Borne, 59650 Villeneuve d'Ascq, FRANCE</i>
<i>MP500 TCL3 API description and development guide</i>	Please refer to the MP500 TCL3 API Reference

Acronyms used

DUT:	Device Under Test (can be a card, a reader, or a NFC Device)
PCD:	Proximity Coupling Device (also named "Reader")
PICC:	Proximity Integrated Circuit Card
LDR:	Low Data Rate (106 kbps)
HDR:	High Data Rate (> 106 kbps)
VHBR:	Very High Baud Rate (> 848 kbps)
RF:	Resonance Frequency
Q:	Quality Factor

UNPACKING

Package content

MANDATORY CONTENT		
1	MP500 TCL3	
1	Calibration coil 1 antenna (907-2475)	
1	PICC and PCD simulation and active mode antenna (907-2489)	
1	SMB-SMB 50cm cable (907-9048)	
1	SMA-SMA 50cm cable (907-9327)	
2	SMA-SMB 50cm cable (907-9319)	
1	MP500 HDMI-Jack 2.5 ST cable (907-9466)	
1	HDMI 50cm cable (125-0162)	
1	BNC Adaptors and impedance calibration kit (907-9468 & 9079469)	
1	MP500 power supply unit (12V, 3.75A) with europe power plug (907-2107)	
1	USB cable	

- 1 Ethernet cable



- 1 MPManger 3 & associated user licenses (1 single license, 5 floating licenses)

- 1 Firmware ; software and samples for MP500TCL3

OPTIONAL MATERIAL

- 1 Card emulation software license (passive target) for TCL3

- 1 VHBR software license for TCL3 (software option)

- 1 VHBR communication antenna (907-2470)



- 1 Qi channel support for MP500 TCL3 (software option)

Incoming inspection

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the content of the shipment has been checked for completeness and the product has been checked mechanically and electrically.



To avoid hazardous electrical shock, do not turn on the product when there are signs of shipping damage to any portion of the outer enclosure.

Operating conditions

Determine an appropriate location for the product. You can operate the device in temperature ranging from +5°C to +40°C. Allow at least 15 cm of clearance on rear panel for proper cooling.



This is a class A apparatus. In a domestic environment, it can generate electromagnetic interference. In such a case, it may be necessary to take appropriate measures.

HARDWARE INSTALLATION

Starting your TCL3

Before connecting your TCL3 to external power supply, it is completely powered off:



When you connect the external power supply, the “power on” button starts blinking in red:



Press the “Power on” button to start the TCL3.

TCL3 at a glance

Front panel



- TX/RX - RF/Q: Used to connect a communication antenna or a calibration coil,
- ANALOG IN: Used as external RX connector,
- TRIG 1/2/3: Trigger out connectors,
- AUX 1/2/CPU: Used to connect accessories (antennas, HDMI-jack cable...).

Note:

- The TX/RX - RF/Q led will be switched on when a field is applied
The ANALOG IN led will be switched on when the device answer is expected on a separated Rx channel

Back panel



- 12V SUPPLY: Used to connect external power supply,
- ETHERNET: Used to connect the TCL3 to network using RJ45 cable,
- USB: Used to connect to your computer using USB link,
- TRIG4: Trigger in connector,
- SYNC IN/OUT: Used to synchronize several MP500 device,
- USB HOST 1/2: Used to connect an external USB device to the TCL3.

Resonance Frequency measurement antenna connections

The Calibration Coil 1 antenna (907-2475) is used to measure the resonance frequency of a device, for example using MPManager **Resonance frequency measurement** function.



As explained, this measurement must be realized only with provided cable and antenna. Two configurations shall be used:

Set-up



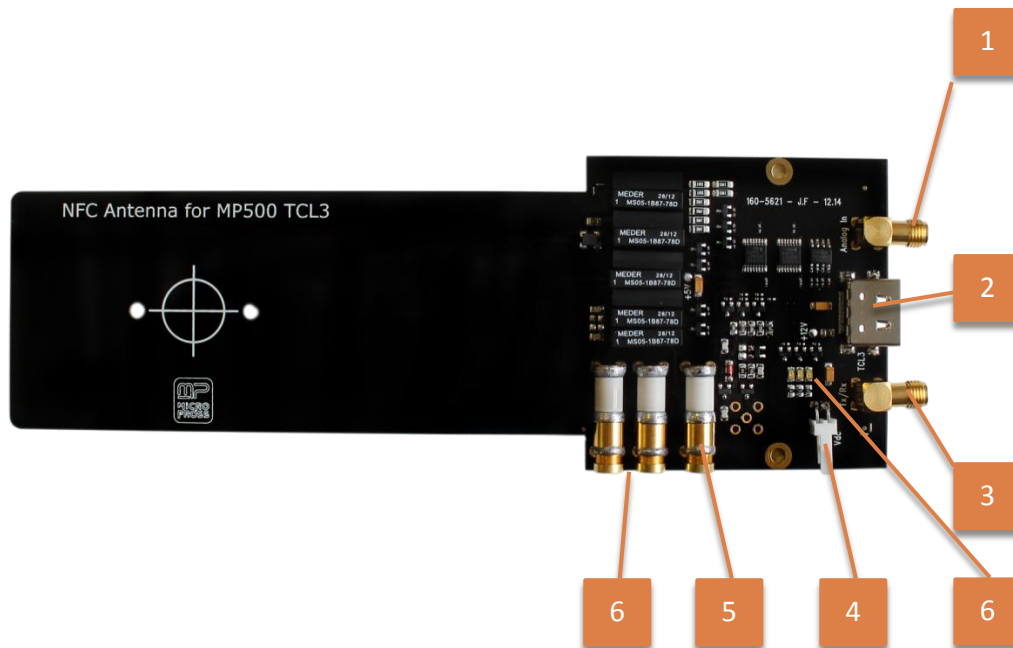
Measurement (use a 1cm spacer)



In both cases, the Calibration coil 1 antenna must be connected to "RF/Q" connector of the TCL3 using provided SMAM-SMBf cable.

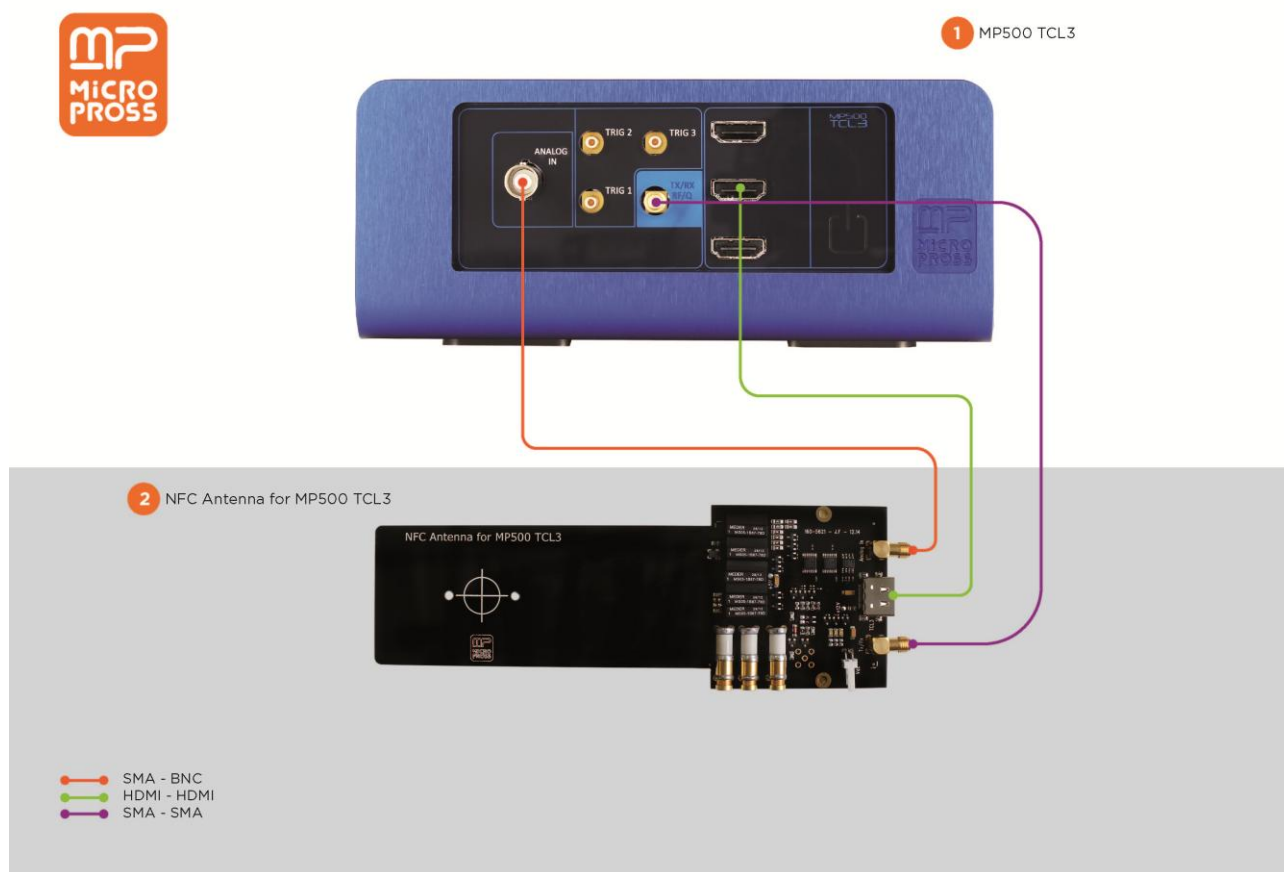
Communication antenna connections

The multi-function communication antenna (907-2489) is used to perform continuous and successive exchanges with a NFC device, using either MPManager **scripting** and **test** functions or a user program.



- 1: Analog In (pickup coil, card emulation)
- 2: Multi-purpose HDMI connector
- 3: Tx/Rx connector (Reader emulation)
- 4: Vdc connector (external Vov measurement)
- 5: Card emulation antenna tuning
- 6: Reader emulation antenna tuning
- 7: Leds indicator (Green: PCD mode enabled; Blue: PICC mode enabled)

Connect the communication antenna as follows:



Note: Connect the communication antenna before powering on the device

Antenna tuning

Adjust the (5) potentiometer with a ceramic screwdriver to adapt the car emulation antenna tuning. Default factory tuning is 16 MHz.

Adjust the (6) potentiometers with a ceramic screwdriver to adapt the reader emulation tuning. Default factory tuning is 13.56 MHz @ 50 Ω .

VHBR antenna connections

The VHBR antenna (907-2470) is used to perform exchanges with a card at Very High Baud Rate, for example using [script](#) or [shmoo](#) functions. Measure and adapt its impedance using [impedance measurement](#) function.



The VHBR antenna must be connected to the TCL3 "TX/RX" connector using a SMAm-SMAm cable. Please note that the card shall be positioned directly on the antenna without any spacer.



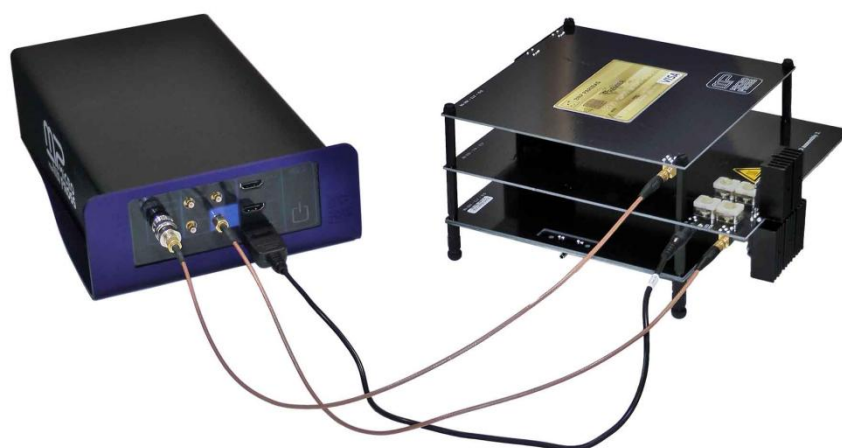
External RX connection example: the ISO test bench

As explained in the [Configuration > Antenna](#) part, the “Separated Rx” option must be activated when the user plan to use two different antennas: one to generate the field and send the signal to the card, and another one to pick the card’s answer.

This is the case when you use the ISO test bench (with or without amplifier) as it contains two antennas: a PCD antenna to generate the field and send TCL3 reader-signal to the card, and a “Sense coil” antenna to retrieve the PICC answer.

The connections are:

- SMAm-SMBf cable between TCL3 “TX/RX” connector and ISO test bench “PCD Antenna” connector,
- SMBf-BNCm cable between ISO test bench “Sense coil A” connector and TCL3 “Analog In” connector,
- HDMI – Jack cable between ISO test bench “PCD Antenna” and TCL3 “Aux CPU” connector (used to switch the PCD Antenna between LDR and HDR).



- Two adaptors are provided with the TCL3: BNCm-SMAf and BNCm-SMBm:



TECHNICAL CHARACTERISTICS

The accuracy is given at nominal test conditions, ambient temperature $23\text{ °C} \pm 3\text{ °C}$, in an open-air environment.



Warming up: at least 60 minutes before use for a correct accuracy. Micropross recommends **checking the calibration of your TCL3 device every year**, for normal use.

PHYSICAL CHARACTERISTICS

Height:	83 mm
Width:	185 mm
Length:	295 mm
Weight:	1.7 kg
Supply voltage:	12 V _{CC}
Supply current:	2 A
Consumption when idle:	< 100 mW
Operating environment:	5 °C to 40 °C
Storage temperature:	-10 °C to +50 °C

I/O

Ethernet:	RJ 45 10/100/1000 connector
USB Host:	2 USB Host connectors (proprietary implementation)
USB Slave:	2.0 USB slave compliant connector

13.56 MHZ SIGNAL GENERATOR

Parameter	Range	Resolution	Accuracy
Field strength	From 0 % to 200 % Voltage delivered at 100 % on a 50 Ω resistor: 9.5 V _{pp}	1 %	N/A
	From 0 ‰ to 2,000 ‰ Voltage delivered at 1,000 ‰ on a 50 Ω resistor: 9.5 V _{pp}	1 ‰	N/A
Field rise time	From 0 to 100 μs – starting with no field applied	10 μs	± 1 μs
	From 100 μs to 1 ms – starting with no field	100 μs	± 1 μs

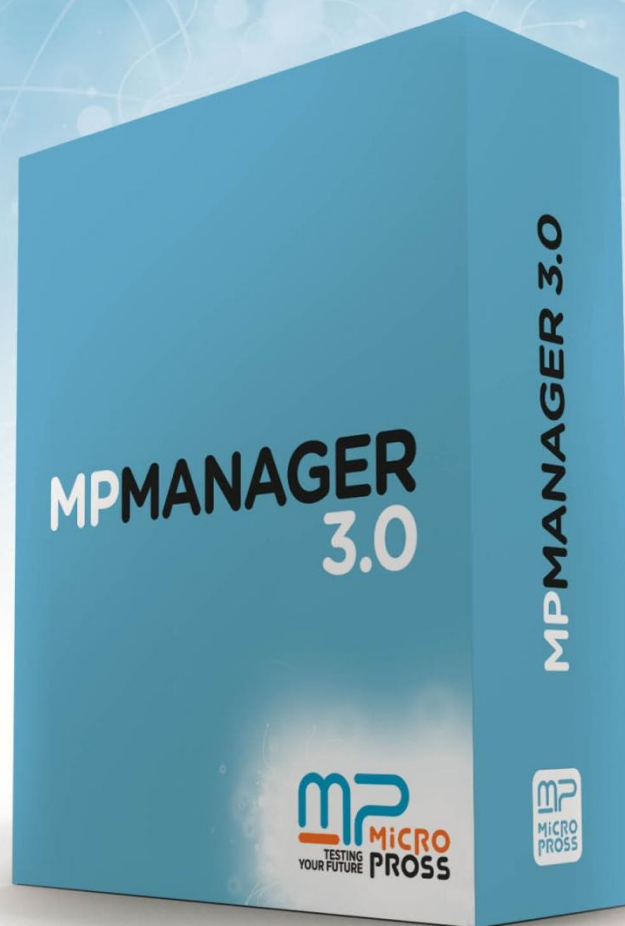
Parameter	Range	Resolution	Accuracy
	applied		
	From 1 ms to 5 ms – starting with no field applied	1 ms	$\pm 10 \mu\text{s}$
	From 0 to 5 ms – starting with field applied	1 ms	0 ms and 2.4 ms
Carrier frequency	12.56 MHz to 14.56 MHz (step 100 Hz)	2 Hz	$\pm 50 \text{ Hz}$
ASK modulation index	0 to 100 %	1 %	$\pm 1 \%$
	0 to 1,000 ‰	1 ‰	$\pm 1 \%$
Type A Pause Width	0 to 4.5 μs	$\frac{1}{f_c}$	$\pm \frac{1}{10f_c}$
Modulation Fall and Rise time	0 to 10 μs	$\frac{1}{f_c}$	$\pm \frac{1}{f_c}$
Bit Rate (PCD to PICC)	106, 212, 424, 848 kbit/s	N/A	$\pm 0.01 \%$
	1.696 Mbit/s, 3.39 Mbit/s, 6.78 Mbit/s (ASK VHBR)		
Programmable framing type B	SOF, EGT and EOF and each bit duration programmable in periods of the carrier	$\frac{1}{f_c}$	$\frac{1}{10f_c}$
RF Output impedance	50 Ω	N/A	$\pm 5 \%$
Separated RX input	Input impedance: 1 M Ω in parallel with 30 pF. Input max Voltage: 20 V _{pp}	N/A	$\pm 3 \%$
Event relative datation	From 0 to $+\infty$	10 ns	$\pm \frac{1}{f_c}$
Trigger OUT	TTL outputs	N/A	N/A
Spurious distortion in the vicinity of the carrier or its sidebands	< 60 dBc	N/A	N/A
Sum of all distortions	< -50 dB	N/A	N/A

MEASUREMENTS

Parameter	Range	Resolution	Accuracy
Data acquisition	Synchronized with all triggers with delay	14 bits	N/A
	Sample rate: 10 f_c , Duration: 1.9 ms		

Parameter	Range	Resolution	Accuracy
Impedance measurement	Capacitor value from 10 pF to 200 pF. Resistor value is given as informative value. Input max Voltage: 10 V _{pp}	0.1 pF	± 5 % ± 2 pF
Field measurement	From 500 mA/m to 8 A/m	10 mA/m	100 mA/m
Resonance Frequency measurement	Power level from -16 dBm to +10 dBm Resonance frequency from 11 MHz to 24 MHz	1 dBm 5 kHz, 10 kHz, 20 kHz or 50 kHz	± 0.5 dBm ± 1 %
Q Factor	From 4 to 100 with the following condition: $\frac{11 Q}{Q-1} < f_R < \frac{24 Q}{Q+1}$ where f_R is the resonance frequency in MHz	0.1	± 15 %
FDT_{PICC} measurement	Any duration	10 ns	$\pm \frac{2}{f_c}$
Event absolute datation	From 0 to +∞	10 ns	$\pm \frac{1}{f_c} \pm 2.5 ppm$
Event relative datation	From 0 to +∞	10 ns	$\pm \frac{1}{f_c}$

MPManager 3



MPMANAGER 3

MPMANAGER IN A FEW WORDS

MPManager is an optional part of the MP300TCL3 software package. It presents TCL3 functions in a graphical and user friendly environment to:

- Create and save test projects,
- Adjust all signal generation parameters, for both PICC and PCD emulation
- Start spy sessions
- Edit and run advanced script files,
- Execute parametric tests for smart card characterization.

INSTALLATION

System requirement

System part	Minimum	Recommended
MS Windows	Windows XP SP3	Windows 7 SP1
DirectX	10	11
CPU	Intel Core i3 or later	Intel Core i3 or later
RAM	2 GB	4GB
HDD	100 GB / 500 GB for analog test suite	100 GB / 500 GB for analog test suite
Screen	17" 1280x1024 display	19" 1600x900 display or superior

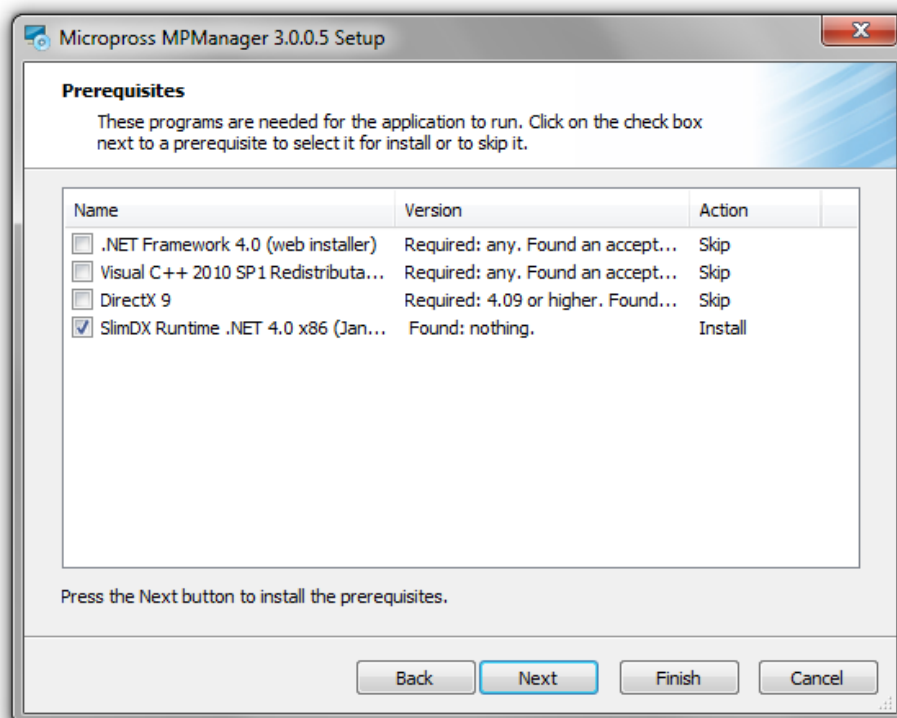
Installation steps

First of all ensure you are logged as an administrator, or at least that you are able to write on your hard drive (you can check it in the Windows Control Panel > User Accounts).

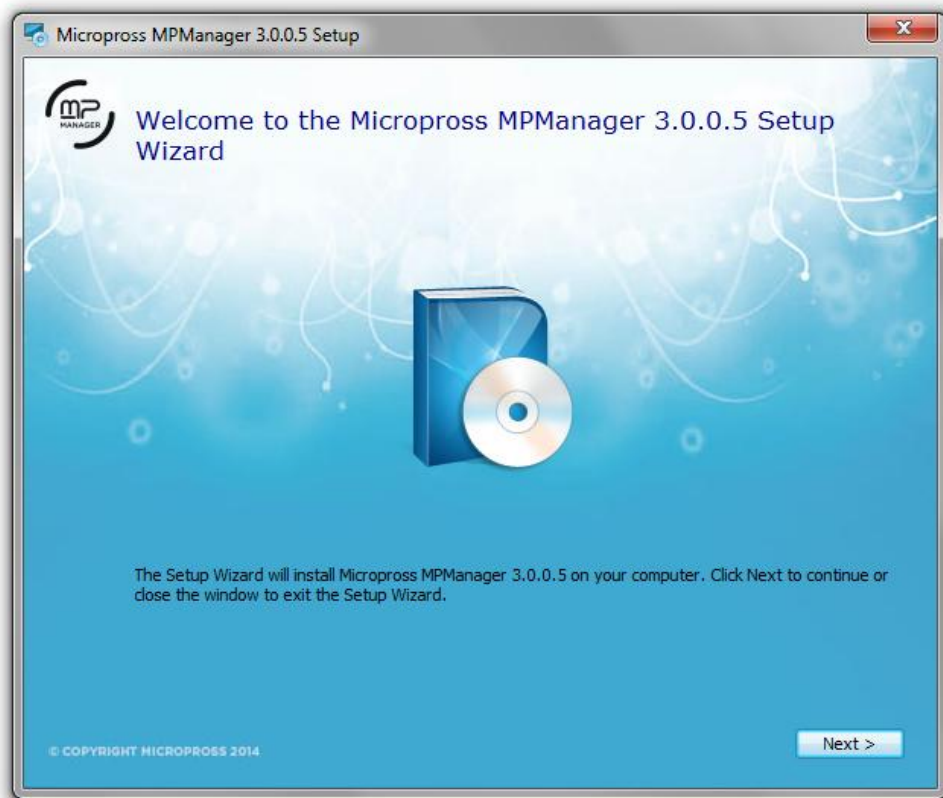
From the CD provided, run the installation program "MPManager 3.X.X.exe" located in the MP Manager directory, and follow the indications.



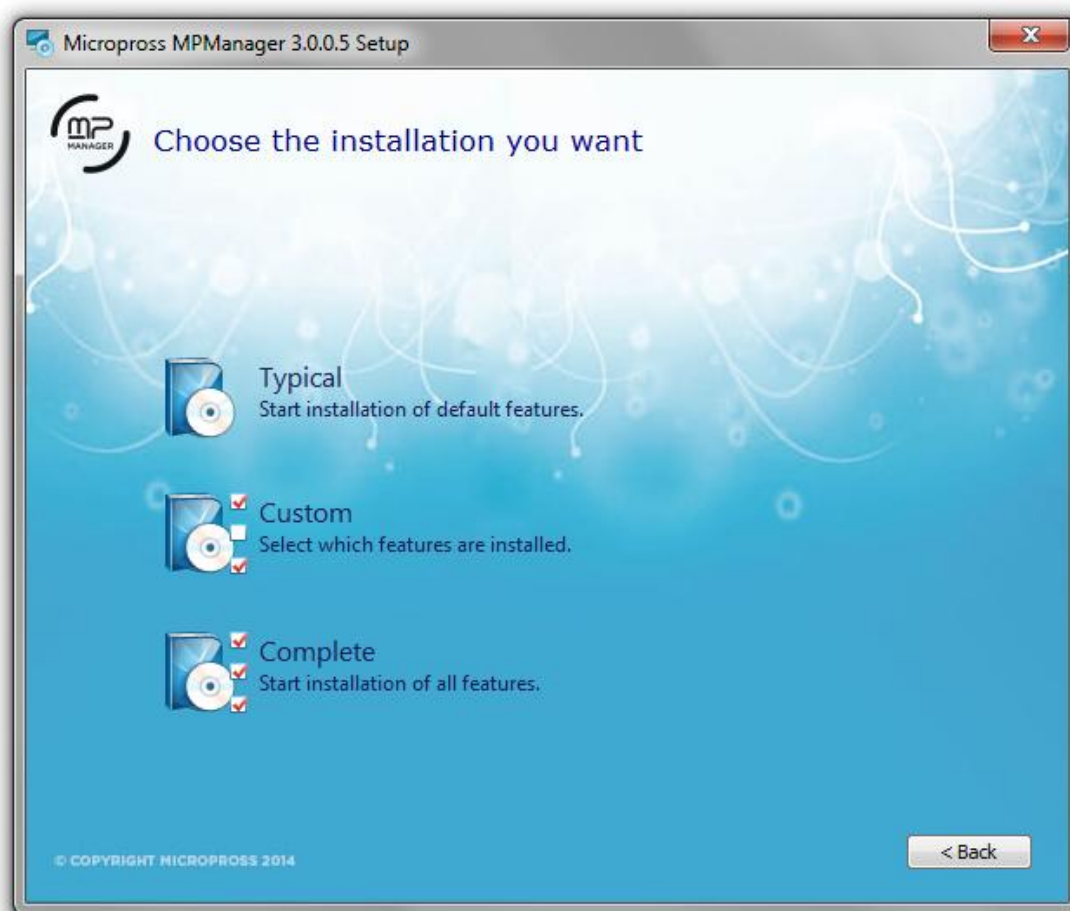
The Prerequisites installation will run if some of them are missing on your computer.



The setup will automatically determine which ones must be installed, so you just have to click on "Next" to proceed with the installation.



Then, MPManager Setup will start.



Three installation types are possible:

Typical installation: Install MPManager, the platform component and the USB Drivers Package without NI-Visa Runtime.

Custom installation: Install MPManager (the platform component and the USB Drivers Package are optional).

Complete installation: Install all components with NI-Visa driver.



NI-Visa Runtime is only required if you're planning to execute RF test suites with the following oscilloscopes:

- Lecroy
- Techtronix
- Agilent

Picotech oscilloscopes are natively supported by MP Manager.

LICENSING SYSTEM

MP Manager 3 comes with a dual model licensing system based on a license server. The user can either:

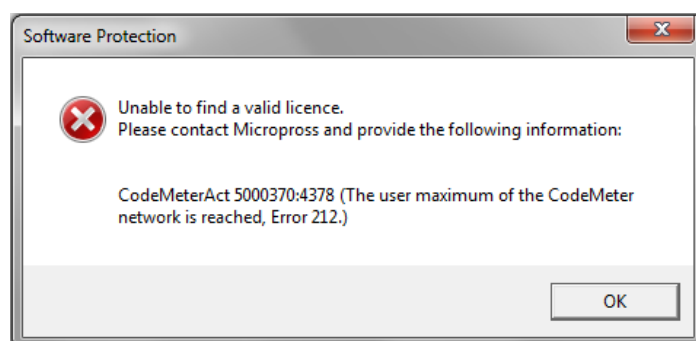
- Use a local license server, installed with MP Manager, for local use (1 token).
- Or/and use a network license server which comes with 5 tokens.

MP Manager requires 1 valid token to run.

The local license server installation is automatically performed during MP Manager's installation. The license server is also available as a separated package for network use (**recommended for lab environment where several instance of MP Manager are used concurrently**).

Grabbing a license

MP Manager will automatically try to obtain a token from a license server or a network license server. If no license is available, the following window appears and MP Manager will exit. You shall now register a license to access to its tokens.



No license found

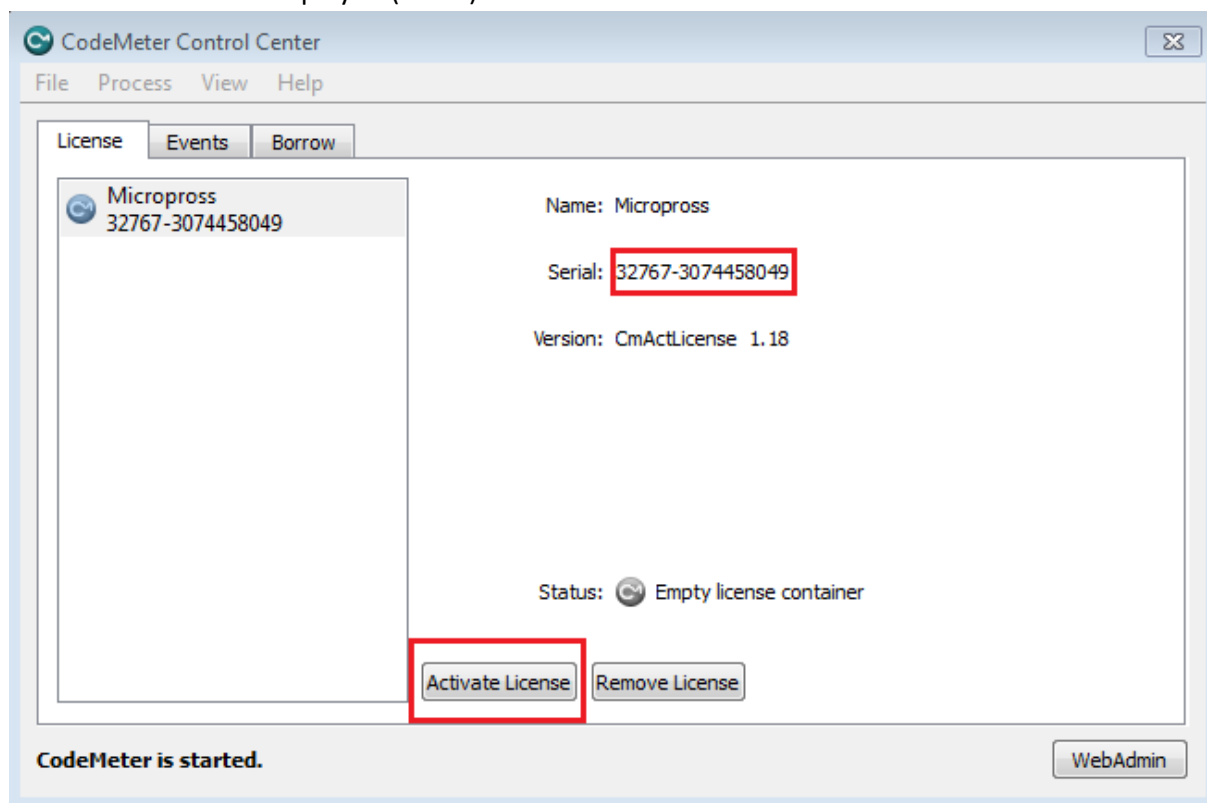
Registering a license

Each license is registered in a container. Both MP Manager and license server installation program will install an empty container for license registration.

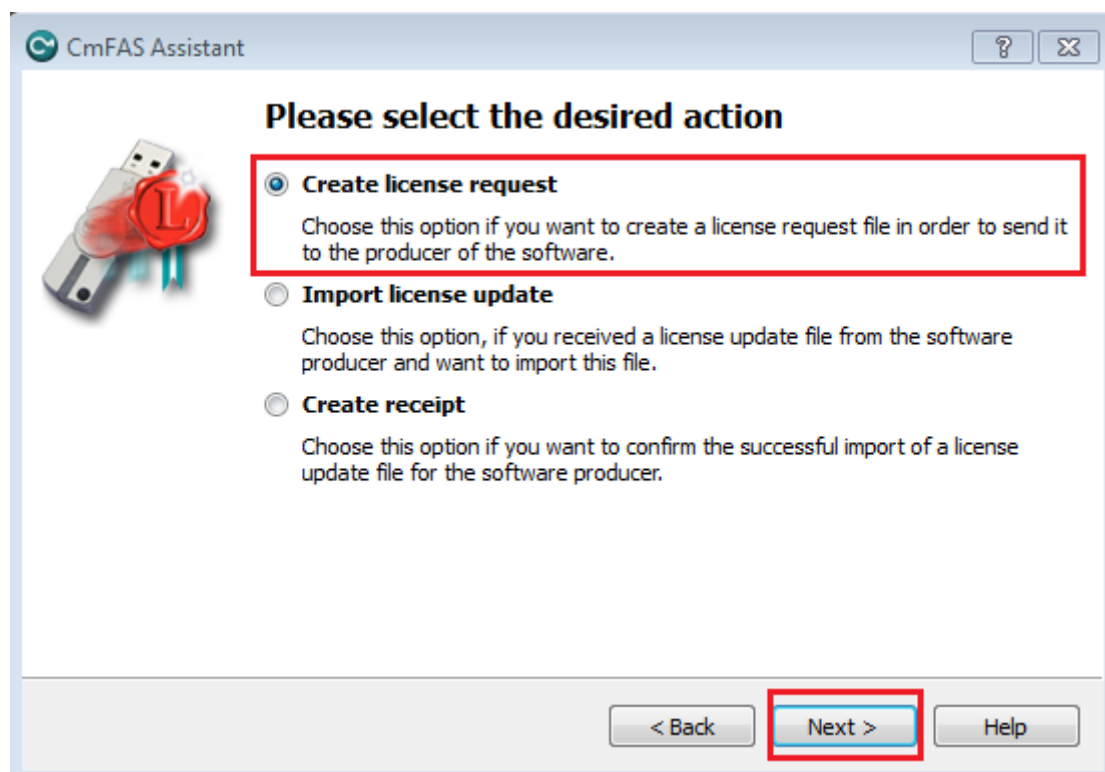
1 – Double click on the Code Meter icon available in the taskbar to launch the CodeMeter utility. No license is available yet (red icon).



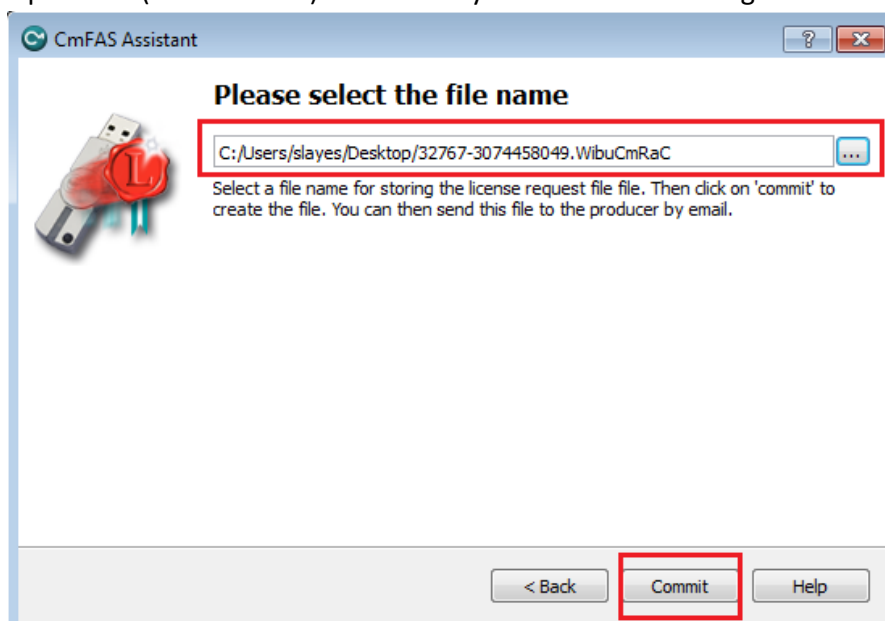
2 – Your **container** id is displayed (*Serial*). Click on the *Activate license* button.



3 – The CmFas assistant is launched. Click on the *Next* button, then pick “*Create license request*” and click on *Next*.



4 – A license request file (.WibuCmRaC) is created by the tool after clicking on the “Commit” Button.

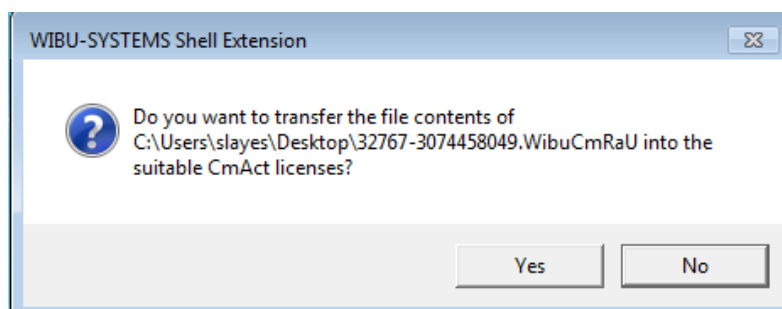
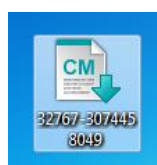


5 – Log in the Micropross support helpdesk and submit a MP Manager registration ticket at www.micropross.com/customer_area.

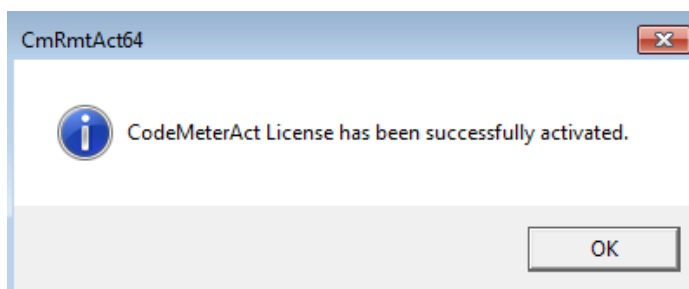


Don't forget to attach your license request file to the ticket.

6 – Copy the license update file (.WibuCmRaU) you received from Micropross to your computer and double click on it. Then, select “yes” to register the license into the container. This step can also be performed using the CmFas assistant of the CodeMeter utility and the “Import license update” option.



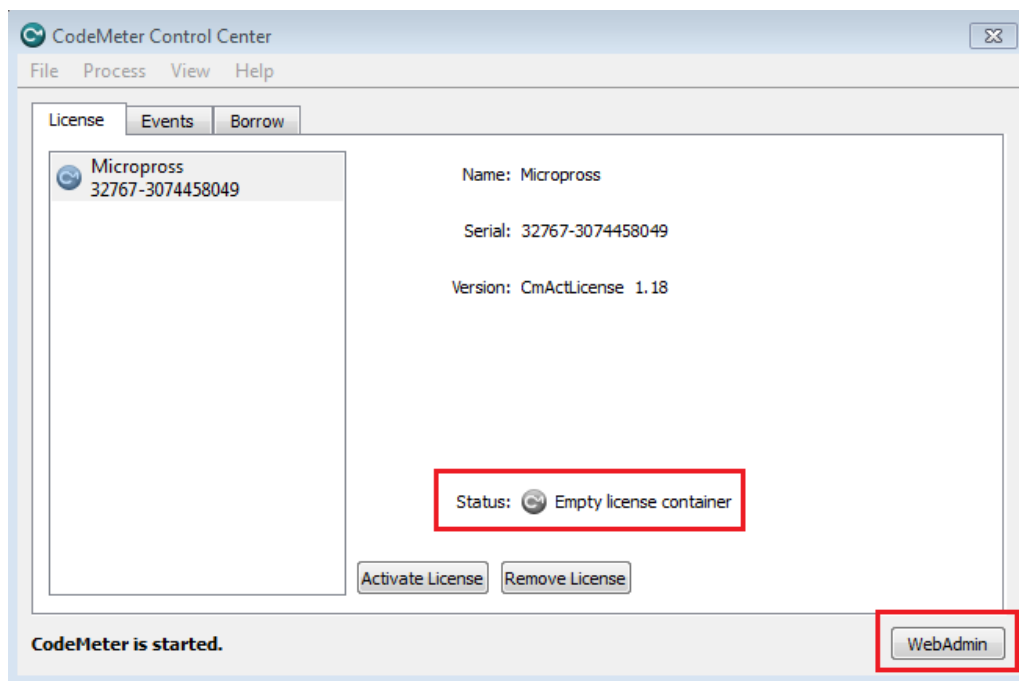
7 – Your license is now activated (the CodeMeter taskbar icon is now blue) and reachable by any MP Manager instance.



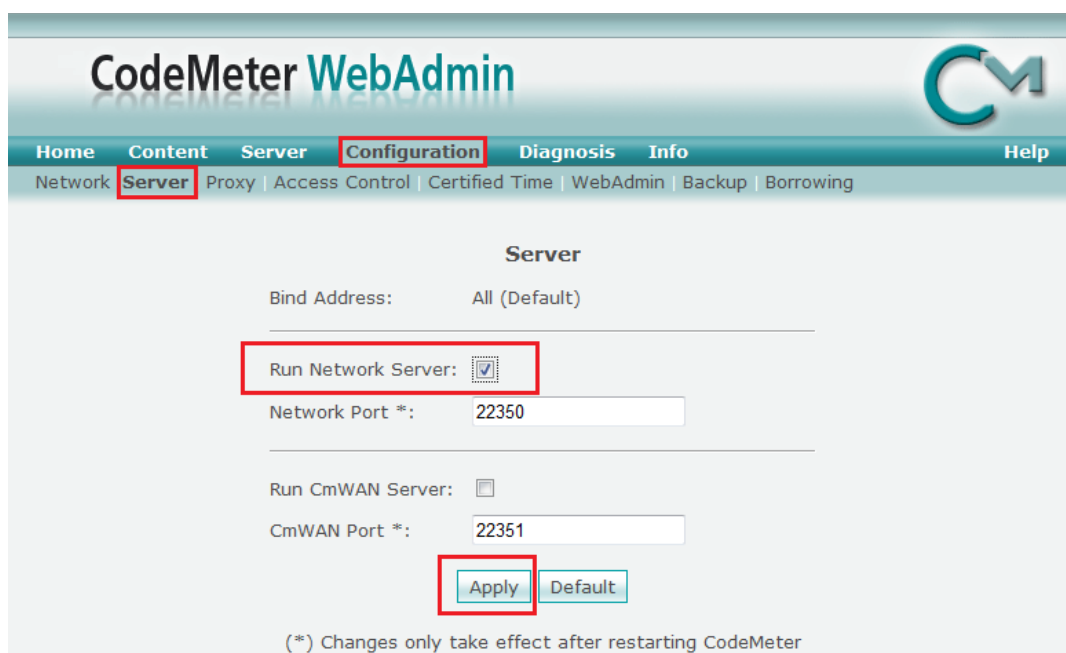
Separated license server installation & activation

- Execute the license server installation program on your server. Some prerequisites, like the .Net framework may be installed during the process.
- The CodeMeter Control Center service is launched and available in the taskbar
- Open the CodeMeter Control Center and enable the webserver as follows :

1 - No licenses are available in the container yet. Click on the WebAdmin button.



2 – In your web browser, go to **Configuration/Server**. Check the “Run Network Server” option, and then click on Apply.





Ensure that your license server is accessible through your network (your network administrator may need to open the TCP port specified in the *Network Port Option*)

3 – Register the license in the container (follow the [Registering a license](#) procedure)

4 – Run MP Manager. **The software will locate the license server on the network and grab a token automatically.**

Remove a license from your PC or the license server

Whenever necessary (Hardware change, PC formatting) a license can be unlinked and returned. This process will enable you to install the license server & MP Manager on another PC.

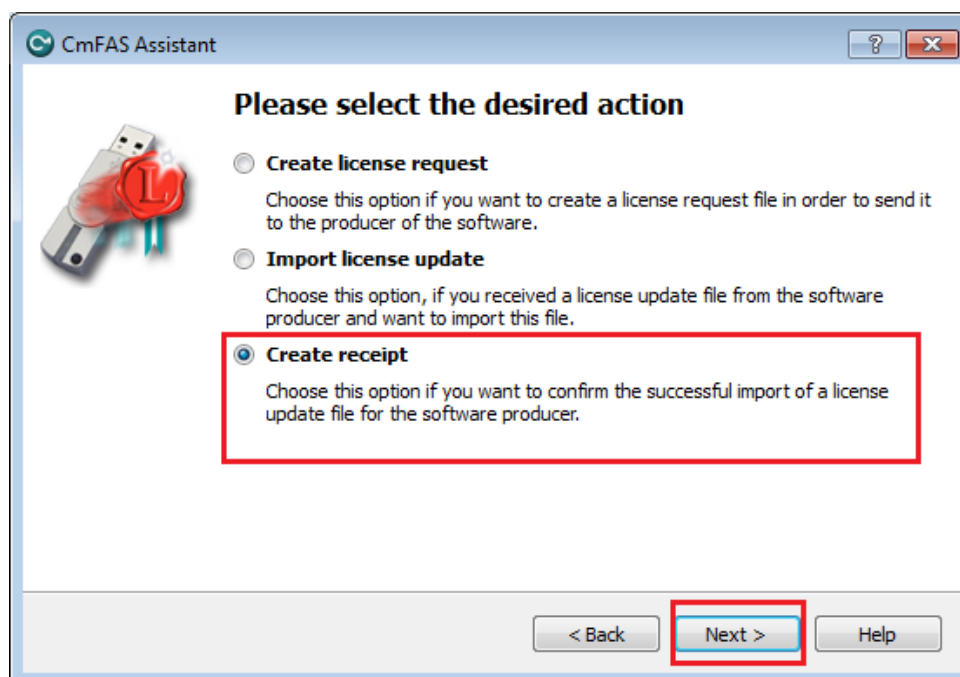
To return a license, please proceed as follows:

1 – **Generate a license request file with the CodeMeter utility** (see

[Registering a license](#))

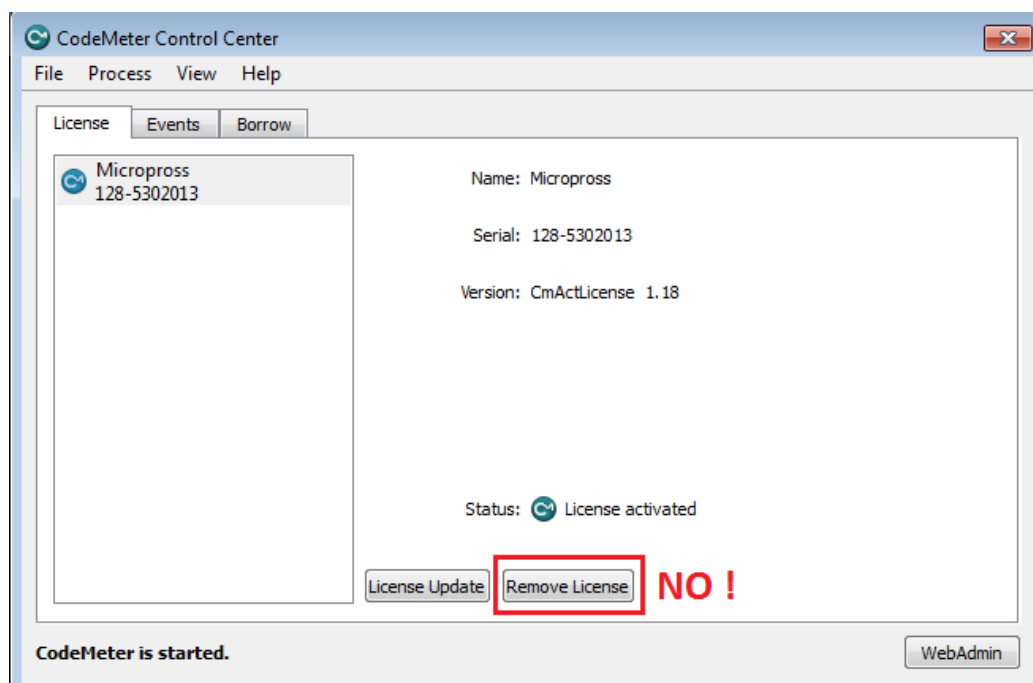
2 – **Send the license file to the Micropross support**, and apply the license update provided (license deactivation update). The deactivation will be effective within 5 minutes.

3 – **Generate a receipt with the CodeMeter Utility** and the CmFas assistant. Choose the create receipt option and send the .WibuCmRaC file to the Micropross support.



4 – Install MP Manager and/or the license server on another computer. **Proceed with the standard activation process.**

DO NOT USE THE REMOVE LICENSE FEATURE IN THE CODE METER UTILITY. THIS WILL REVOKE DEFINITELY YOUR LICENCE



View available license tokens / Revoke tokens

Available tokens from the license server are displayed in the CodeMeter WebAdmin (accessible through the webadmin button in the CodeMeter utility). **Browse to Server/Cluster to access to the available licenses details.**

The screenshot shows the CodeMeter WebAdmin interface. The top navigation bar includes links for Home, Content, **Server** (highlighted with a red box), Configuration, Diagnosis, Info, and Help. Below this, there is a sub-navigation bar with **Cluster** (highlighted with a red box) and User. The main content area is titled "Available Network Licenses at 'WIN-5HNVEGUCFFM'". It contains a table with columns: Product Code, Name, Feature Map, Licenses, and Status. The Status column is further divided into User Limit (Borrowed), No User Limit, Exclusive, Shared, and Free. Two licenses are listed: 4074 (MPManager) and 4378 (MPDg). Both have 5 licenses, 0 user limit, and 0 exclusive licenses. The Shared column shows 1 for both, and the Free column shows 4 for both. A red box highlights the Shared and Free columns. To the right of each license row is a "Details" button, also highlighted with a red box. Below the table, it says "Information last updated on Apr/15/2014 11:37:09".

Product Code	Name	Feature Map	Licenses	Status					
				User Limit (Borrowed)	No User Limit	Exclusive	Shared	Free	
5000370 Micropross									
4074	MPManager	-	5	0 (-)	0	0	1	4	Details
4378	MPDg	-	5	0 (-)	0	0	1	4	Details

Information last updated on Apr/15/2014 11:37:09

Tokens overview

Information about the consumed tokens (workstation, user) is available. The following screen enables the user to revoke particular tokens. After cancellation, the associated MP Manager instance will be closed after a grace period of 5min.

The screenshot shows the "License Details CmContainer 128-5302013" screen. It displays summary information: Entry 5000370 : 4074 (-), Free 4, and Total 5. Below this is a table with columns: ID, Client (User), Client Process ID, Application Information, Access Mode, First Access, Last Access, Expires, and Action. One entry is shown with ID 40, Client 127.0.0.1 (slaves), Client Process ID 2904, Application Information MPModel, Access Mode Station Share, First Access 2014-04-15 12:08:16, Last Access 2014-04-15 12:08:26, and Expires empty. A red box highlights the "Cancel" button in the Action column.

ID	Client (User)	Client Process ID	Application Information	Access Mode	First Access	Last Access	Expires	Action
40	127.0.0.1 (slaves)	2904	MPModel	Station Share	2014-04-15 12:08:16	2014-04-15 12:08:26		Cancel

Detailed information and token cancellation

HOW TO UPDATE MP MANAGER

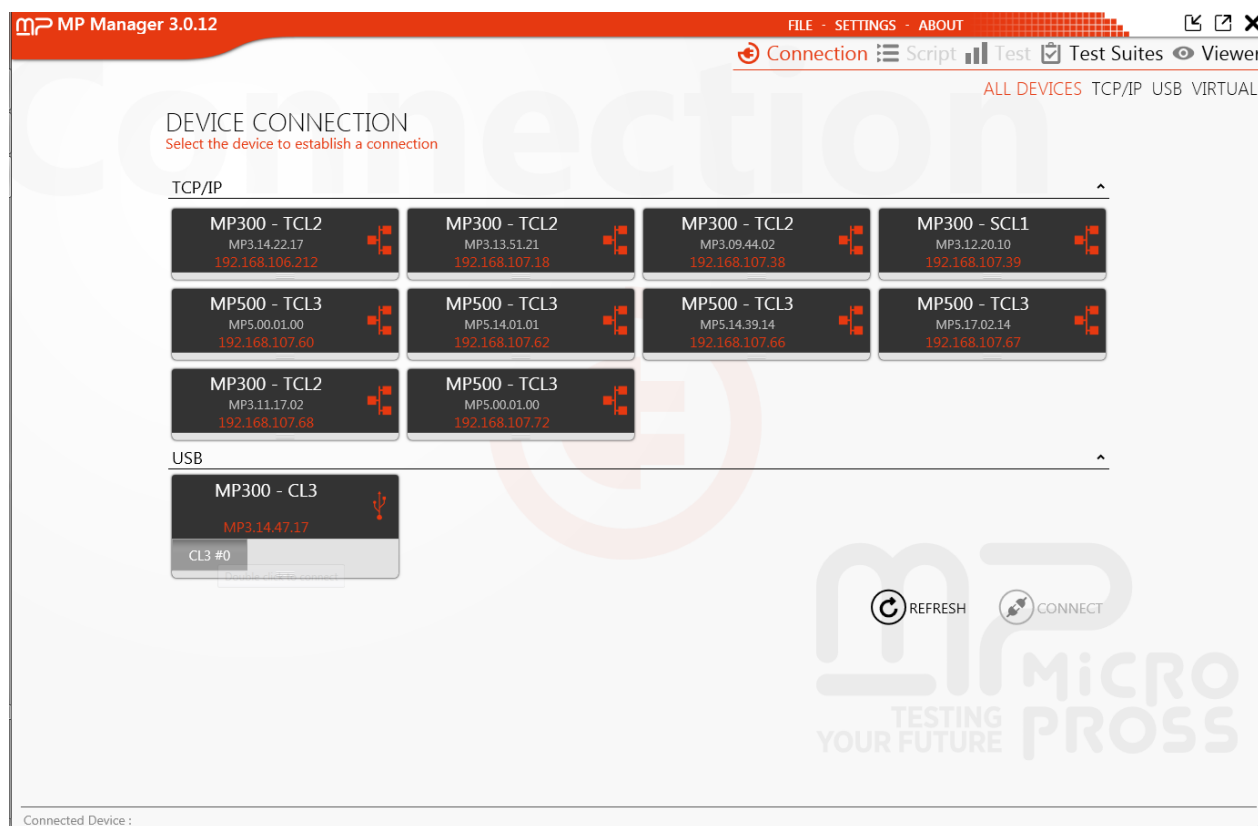
If the computer is connected to Internet (and the option activated in *settings > project* menu), a popup will rise whenever a new MPManager version is available on the Micropross download center.

Otherwise, please regularly check new versions by visiting the download center.

To access the download center and download MPManager, please refer to the document entitled *Micropross download center user's guide*.

DETAILED MPMANAGER FUNCTIONALITIES

When you launch MPManager, the default window is the Connection window:



This is where you can select the device to establish a connection (in TCP/IP or USB) or connect to a virtual device.

Once connected, The following panels are available:

configuration : Manages the signal generation parameters

spy : Configure, launch and stop the spy anytime.

Script : Write, run and analyze exchanges between the TCL3 and the device under test.

Spy & Play : Spy an exchange between a reader and a card, and replay it afterwards (not available using the TCL3).

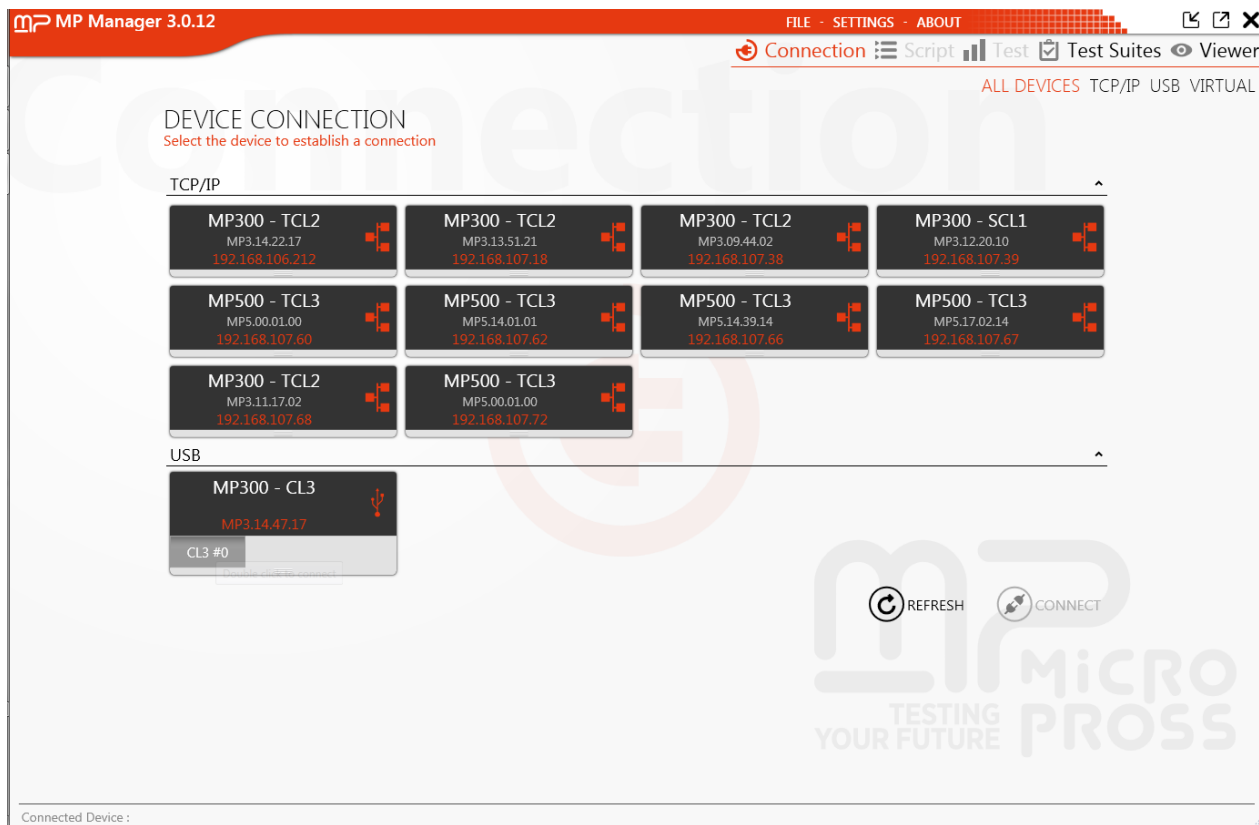
Test : Run parametric tests like Shmoo, antenna impedance measurement or card resonance frequency measurement

Viewer : Analyze the exchanges spied by the TCL3.

Configuration and spy can be accessed while navigating in the other windows, as well as “File”, “Settings” and “About” buttons.

Connection to a device

MPManager will automatically detect the devices connected to your computer or accessible through the network. In order to connect to your TCL3, just select it in the list and double click on the coupler number (*"TCL3 #0" on below screenshot*):



Another option is to select the coupler number, and click on "Connect" at the bottom right.

At the top right of the window, this is possible to filter on USB or TCP/IP devices, as well as connecting to a virtual device (in order to write a script even if you don't have a physical TCL3 available, for example).

Once connected, the window will change:

TCL3 INFORMATION
information about the connected device

USB

MP500
Serial number: MP5.14.39.14
Motherboard hardware id: 9072449A-00000010
Daughterboard hardware id: 9072424D-00000001

System: 1.02R03

Driver: 1.03R03
FPGA: 6.5
Up to date

Calibration date
2014-11-28
Up to date

Ethernet Configuration

IP: 192 . 168 . 107 . 66
MASK: 255 . 255 . 254 . 0
GATEWAY: 192 . 168 . 107 . 1

License

License	Description
Card Emulation	Allow the use of the Card Emulation mode
VHBR	Allow the use of VHBR protocol
Qi Channel	Allow the use of Qi channel

REPORT

SAVE **RELOAD**

GENERATE LICENSE CONTEXT FILE

DISCONNECT

In the device information, we will find the following:

- Connection type
- TCL3 hardware information (serial number, UC and Coupler identifiers) and firmware version, as well as the latest calibration date.
- Network settings (IP, Mask, Gateway) adjustment
- Additional embedded licenses (card emulation, VHBR...).

Eventually the “Report” button will generate a document with complete device status (hardware version, firmware version...).

Firmware update

To take advantage of new features and bug fixes, the user will probably need to update the firmware of the MP500 TCL3. Micropross provides these updates on the download center for all devices under maintenance contract.



Visit <http://support.micropross.com> for firmware updates.



The TCL3 information panel indicates the current firmware status of the device (Up to date or Outdated)

Before any firmware update, you shall start your MP500 in recovery mode as follows:

- Power off your device
- Press and hold the start button till the button lights orange
- Release the start button. The button blinks regularly
- Launch MPManager. Connect to your MP500.

Select the “Firmware update” panel in the Connection window to display the following window:



The left part of the screen displays detailed information about the current firmware of your MP500. To apply a firmware update released by Micropross, click on the “Browse” button and select a compliant update file (.mpfirm). The information relative to the update package, if available, is displayed under the “Target version” label as follows:

FIRMWARE UPDATE

CURRENT VERSION

BOOT	SYSTEM
1.0.0	1.02R03
OS	TCL3
1.1	DRIVER 1.03R03 FPGA 6.5

TARGET VERSION

SYSTEM	OS
1.02 <input type="checkbox"/>	1.1 <input checked="" type="checkbox"/>
TCL3	
DRIVER 1.03 <input checked="" type="checkbox"/>	
FPGA 6.5 <input type="checkbox"/>	


 NONE ☐ ALL ☒ UPDATE

Select all or part of the firmware package to update using the switch controllers and click on “update” to proceed with the firmware upgrade.



The operation may last several minutes. **Restart your MP500 after the firmware update for the changes to take effect.**



The MPManager 3 firmware update function is available for .mpfirm update packages only. Legacy .dat packages shall be used with MPUdate.

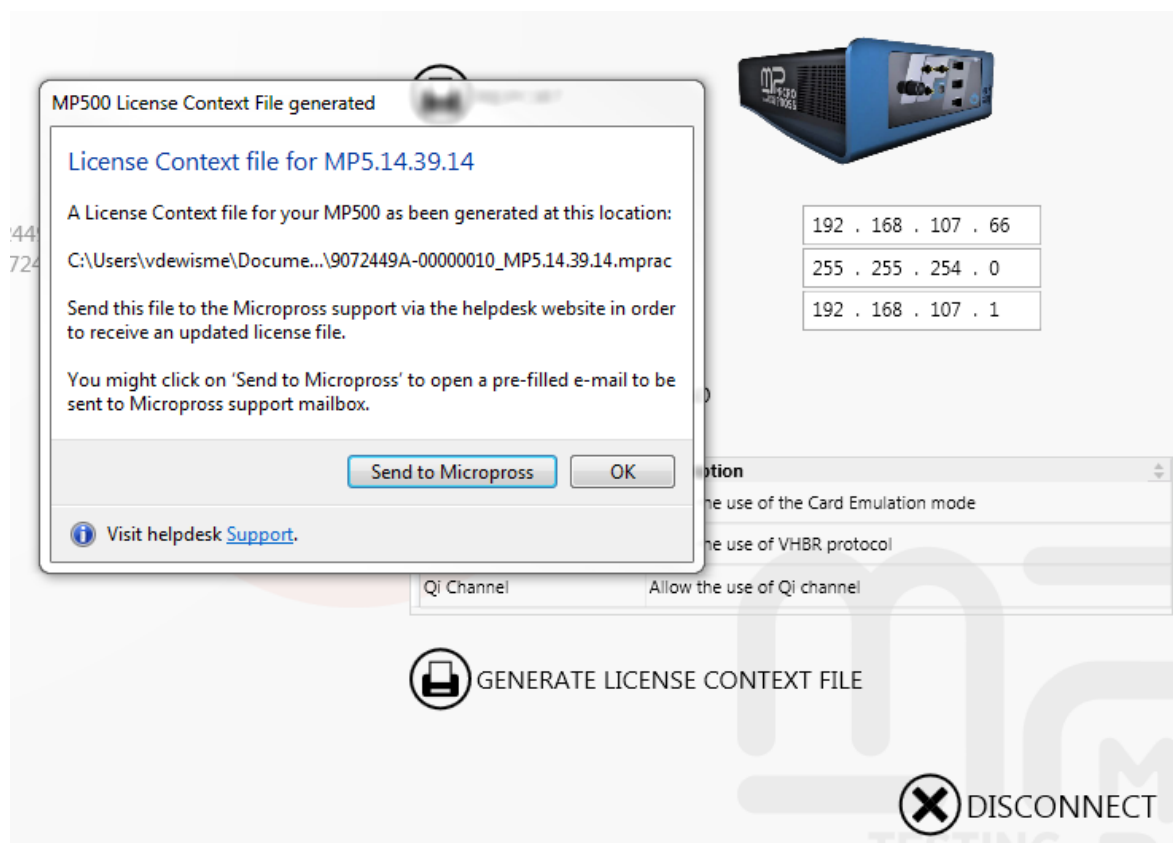
Embedded license management and update

Some features of the MP500TCL3 are subject to embedded licenses to be used:

- **Card Emulation license:** Unlock the PICC/Listener emulation features of the MP500 TCL3 (NFC, 13.56 MHz).
- **VHBR:** Unlock the higher datarates support of the TCL3 (datarates > 848 kb/s).
- **Qi Channel:** Unlock the Qi (Wireless charging) features of the MP500 TCL3 (Both low & medium power for power transmitters and receivers).

At any time, users can purchase additional licences and install them on their MP500 Hardware. To do so, they need to contact their Micropross sales representative and exchange license files with the Micropross support.

Generate an embedded context file



- Go to the information panel and click on *“Generate license context file”*
- A *.mprac* context file is generated on the Hard Drive
- Click on *“Send to Micropross”* to send a license request to the Micropross support using your default email client (The generated email will automatically create a ticket on your behalf on the Micropross Helpdesk) or visit the helpdesk at <http://support.micropross.com> to open a ticket with the context file.

Your request is then checked and handled by the Micropross support agent.

Upload embedded licenses

Once you received the *.mprau* file from your Micropross support contact, go to the firmware update page and click on *“Browse”* to open the file. Then, click on update to add the embedded license.

Restart your TCL3, and check again in the information page for the license presence.

Embedded applications

Embedded applications are installed in the non-volatile Memory of your device. Use *the embedded applications panel* to manage them:

MEMORY USAGE

Show the memory allocation in the flash memory

AutoStart	Name	Version	Date	Size	Delete
<input type="checkbox"/>	QiTestBaseStation	100	25/11/2014 09:00:00	160	✕
<input type="checkbox"/>	CONTACTLESS_TRANSACTION	150	15/10/2013 09:00:00	160	✕

 ADD APPLICATION

The overall memory usage of the device is indicated alongside with detailed information for each application:

- AutoStart status: Check / Uncheck the control to put an application in autostart mode. When setted in autostart mode, an application is launched once the MP500 has booted.
- Application name
- Application version
- Application date
- Click on the Delete control (✕) to erase an application from the MP500 internal memory

Click on “Add application” to store an application in the MP500 internal memory.

Script

This window is very useful as it allows you to build a scenario that will be played between the TCL3 and the DUT.

First, click on “New script” or “Open script” depending if you want to start from scratch or from an existing script (several samples are provided with the TCL3).



MPManager 3 is able to open MP Manager 2 script files (.mpscr) and convert on the fly into the new script file format (.mpscript). **Every unsupported command will be replaced by a comment in the converted script.**

Build and complete your script by adding some commands from the left panel. In order to help you build your script, the commands are regrouped under categories issued from the different standards:

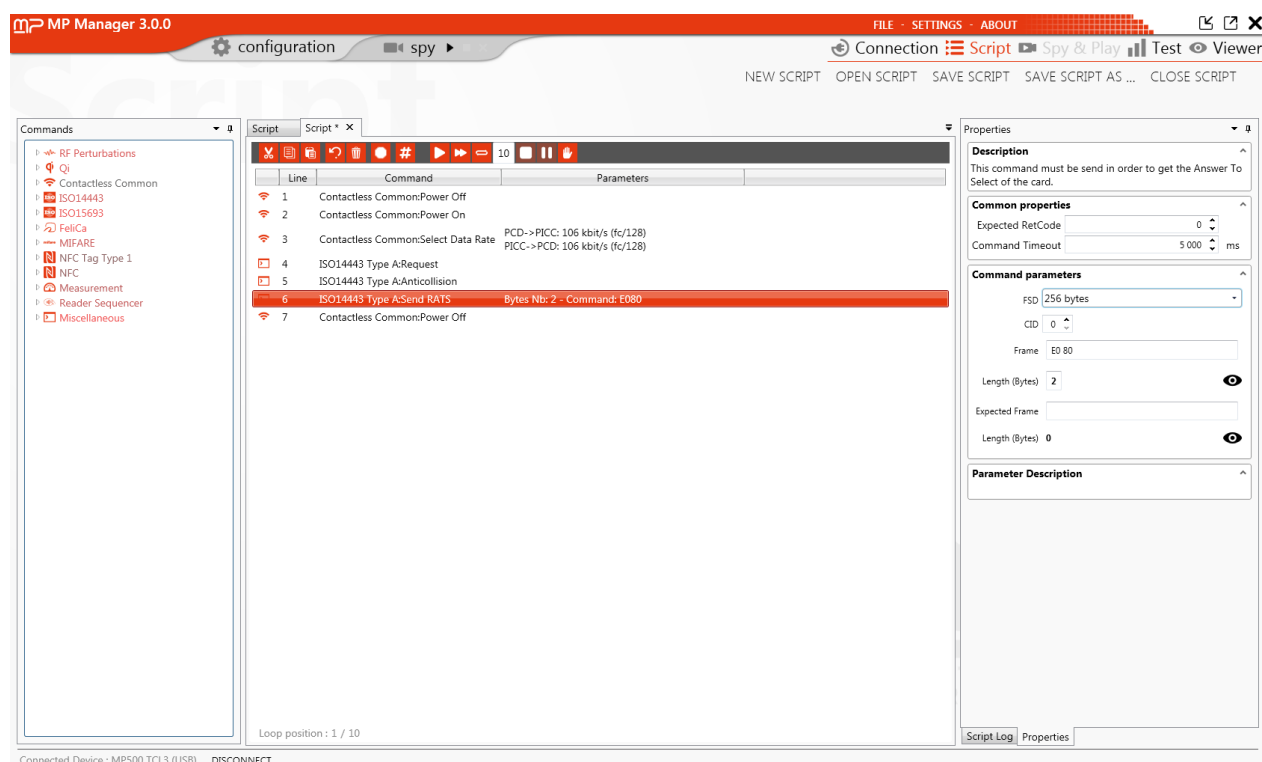
Contactless common

ISO 14443

Mifare

Measurement

Etc...



In order to add a command to the script, “drag and drop” it in the central panel (or double click on it). Shortly after adding a command, the “properties” window appears in which you’ll specify the command timeout and the Return Code (in case you plan to face an error with the command).

For some APIs, the Properties window is much more complete and enables you to fill the parameters of the command:

Properties

Description
This function allows exchanging APDU according to the half-duplex block transmission protocol. The APDU can be saved in libraries in order to be reused. This command will use the card type of the previous executed command.

Common properties
Expected RetCode: 0
Command Timeout: 5 000 ms

Command parameters
APDU Library
APDU Parameters
APDU: [dropdown]
Frame: 00000000
CLA: 00
INS: 00
P1: 00
P2: 00
Lc: 0 ☒ Includes Lc
Data In: [text]
Le: 0 ☐ Includes Le

Parameter Description

Script Log Properties

During script execution, the right panel will automatically switch to “Script log” window and display the exchanges between the TCL3 and the DUT (DUT answers are interpreted by MPManager decoders automatically).

NEW SCRIPT OPEN SCRIPT SAVE SCRIPT SAVE SCRIPT AS ... CLOSE SCRIPT

Commands

- RF Perturbations
- QI
- Contactless Common
 - Anti tearing
 - APDU
 - Exchange Command
 - Force Card Type
 - Frame Waiting Time
 - Power Off
 - Power On
 - Protocol Errors Management
 - Select Data Rate
- ISO14443
 - Type A
 - Configure
 - Anticollision
 - Deselect
 - Exchange Command
 - Halt
 - Parity Error
 - Request
 - S(PARAMETERS)
 - Send Frame Protocol
 - Send PPS
 - Send RATs
 - Wake Up
 - Type B
 - ISO15693
- FeliCa
- MIFARE
- NFC Tag Type 1
- NFC
- Measurement
- Reader Sequencer
- Miscellaneous

Script

Line	Command	Parameters
1	Contactless Common:Power On	
2	ISO14443 Type A:Request	
3	ISO14443 Type A:Anticollision	
4	ISO14443 Type A:Send RATs	Bytes Nb: 2 - Command: E0F0
5	Contactless Common:Power Off	

Loop position: 1 / 1

Script Log

#	From	Log
1	PC	Contactless Common:Power On
2	PC	ISO14443 Type A:Request
3	TCL3	ATQA: 0400
4	PC	ISO14443 Type A:Anticollision
5	TCL3	UID: 41087D78
6	TCL3	SAK: 20
7	PC	ISO14443 Type A:Send RATs Bytes Nb: 2
8	TCL3	ATS: 137880720280318066B1840C016E
9	PC	Contactless Common:Power Off
10	PC	Contactless Common:Power On
11	PC	ISO14443 Type A:Request
12	TCL3	ATQA: 0400
13	PC	ISO14443 Type A:Anticollision
14	TCL3	UID: 41087D78
15	TCL3	SAK: 20
16	PC	ISO14443 Type A:Send RATs Bytes Nb: 2
17	TCL3	ATS: 137880720280318066B1840C016E
18	PC	Contactless Common:Power Off
19	PC	Contactless Common:Power On
20	PC	ISO14443 Type A:Request
21	TCL3	ATQA: 0400
22	PC	ISO14443 Type A:Anticollision
23	TCL3	UID: 41087D78
24	TCL3	SAK: 20
25	PC	ISO14443 Type A:Send RATs Bytes Nb: 2
26	TCL3	ATS: 137880720280318066B1840C016E
27	PC	Contactless Common:Power Off

Script Log Properties

Connected Device: MP500 TCL3 (USB) DISCONNECT Configuration correctly applied













A tool bar is also available to help you building and running your script:






: Cut



: Stop (loop mode only)

- | | |
|---|---|
|  : Copy |  : Pause (loop mode only) |
|  : Paste |  : Stop on script command when an error occurs |
|  : Undo |  : Skip script command when an error occurs. |
|
 | |
|  : Delete | |
|  : Breakpoint | |
|  : Comment / Uncomment | |
|  : Execute step | |
|  : Execute script from current position | |
|  : Execute script in loop from the beginning | |
| 1 : Loop number | |

As well as some options for “Script log”:

-  : Copy to clipboard
-  : Export log
-  : Clear log

Eventually, save the script and/or close it by using top right buttons:

NEW SCRIPT OPEN SCRIPT SAVE SCRIPT SAVE SCRIPT AS ... CLOSE SCRIPT

Script commands

They are specific to the smartcard technologies supported by the device.

Miscellaneous commands

Comment

Add a free comment to document your scripts. All comments will appear in green in the script listing and won't interfere during the script execution.

Delay

Add a waiting command, in ms, to the script.

Execute script

Execute another script in the current script in one step. Browse for the script file to run in the properties.

External Call

Call an external method from a C# assembly.

The screenshot shows a 'Properties' dialog box with three sections:

- Description:** Call an external DLL
- Common properties:**
 - Expected RetCode: 0 (with up/down arrows)
 - Command Timeout: 5 000 (with up/down arrows) ms
- Command parameters:**
 - External Library: [text box] (with a browse icon)
 - Step: 0 (with up/down arrows)
 - Namespace: [text box]
 - ClassName: [text box]

Specify the assembly name and path, Namespace and class name. Choose the value of the step parameter described below.

Each "External call" will consist in two successive C# method calls. Methods prototypes shall not be changed.

External library sample code:

```
namespace ExternalLibrarySample
{
    public static class MPManagerExternalCallSample
    {
        public static string GetNextCommand(string previousAnswer, byte step)
        {
        }

        public static bool IsAnswerInvalid(string answer, byte step)
        {
        }
    }
}
....
```

- A first call is made to GetNextCommand() containing the last answer from the MP300, and a step from the command parameters window. Change the step to your match your assembly's code.
- Another call is made to isAnswerInvalid() containing the command answer to the GextNextCommand() method and a step number. Use this method to test the previous result and returns true or false to highlight in green or red the whole "Execute call" in the execution log.



Please refer to the External library software sample provided with MP Manager 3 for your tests.

Load config

Load a config file saved in the configuration plugin and applies the parameters included in the file to the hardware.

Remote command

Enter a remote command to send to the device. Please refer to the device API's reference for a description of all the remote commands of the devices.

Trigger Out

Drive the different output triggers of the device. The user is able to define triggering conditions, signal and delay in the following window.

Properties ▼ ⌵

Description ^

Used to switch logic signals to a trigger out SMB connector located at the front of the tool.

Common properties ^

Expected RetCode ▲ ▼

Command Timeout ▲ ▼ ms

Command parameters ^

Trigger Out ID ☒ Trigger out 1 ☐ Trigger out 2 ☐ Trigger out 3

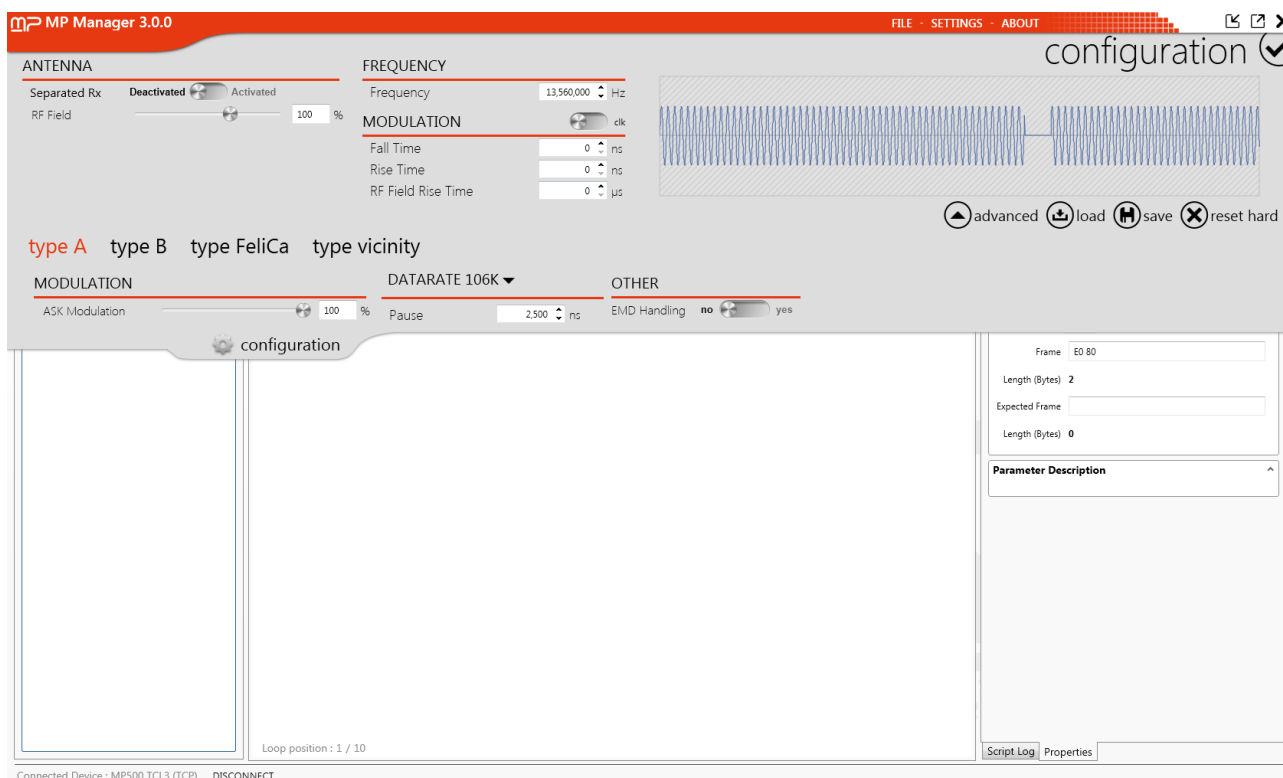
Configuration ▼

Logic Signal ☒ Off ☐ On

Delay After Tx ▲ ▼ ns

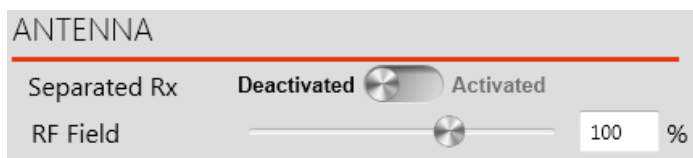
Parameter Description ^

Configuration



The configuration window can be accessed while navigating in another window at the same time. This is where the TCL3 generated signal parameters are handled.

Antenna



The “Separated Rx” option must be activated when the user plan to use 2 different antennas: one to generate the field and send the signal to the card, and another one to pick the card’s answer.

This configuration must be used if the signal is going from the TCL3 through an amplifier to the emitting antenna: in that case, a reception antenna is mandatory.

Frequency




The “Frequency” modifies the carrier frequency of the signal generated by the TCL3.

Modulation

The “RF Field” configures the field level emitted by the TCL3. 100 % corresponds to 9.7 V_{pp} on a 50 Ω resistor.

FREQUENCY	
Frequency	13,560,000 Hz

MODULATION	
	<input checked="" type="checkbox"/> clk
Fall Time	0 ns
Rise Time	0 ns
RF Field Rise Time	0 μs

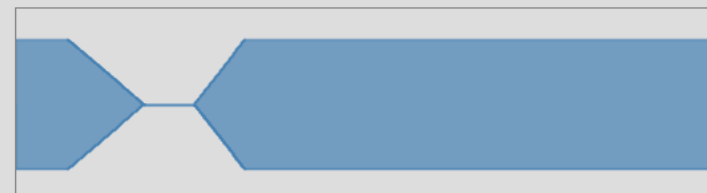


The “Modulation” option allows configuring the reader modulation of the TCL3.

By changing the fall time, rise time, and the Field rise time, you will see the influence on generated signals:

FREQUENCY	
Frequency	13,560,000 Hz

MODULATION	
	<input checked="" type="checkbox"/> clk
Fall Time	1,500 ns
Rise Time	1,000 ns
RF Field Rise Time	500 μs



This setting can also be configured in clock cycles:

MODULATION	
	<input checked="" type="checkbox"/> clk
Fall Time	20 clk
Rise Time	14 clk
RF Field Rise Time	6 757 clk

Advanced

By clicking on “Advanced” button, the panel will be extended, which gives you access to more options specific to card type.

Type A

type A		type B		type feliCa		type vicinity	
MODULATION				DATARATE 106K ▼		OTHER	
ASK Modulation	<input checked="" type="checkbox"/> 100 %	Pause	2 500 ns	EMD Handling	<input checked="" type="checkbox"/> no	<input type="checkbox"/> yes	

The adjustable type A parameters are (for each data rate):

- The Modulation index (from 0 to 100 %),
- The Pause time (as defined in ISO standard) from 100 ns to 4,500 ns,
- The EMD handling (please refer to MP500 TCL3 API Reference: *CPP_ANTI_EMD*).

Type Btype A **type B** type feliCa type vicinity

MODULATION		DATARATE 106K ▼		OTHER	
ASK Modulation	<input type="range" value="10"/> 10 %	SOF Low	1 280 clk	Bit 4	128 clk
		SOF high	256 clk	Bit 5	128 clk
		Start Bit	128 clk	Bit 6	128 clk
		Bit 0	128 clk	Bit 7	128 clk
		Bit 1	128 clk	Stop Bit	128 clk
		Bit 2	128 clk	EGT	128 clk
		Bit 3	128 clk	EOF	1 280 clk
				EMD Handling	<input type="radio"/> no <input type="radio"/> yes

The type B parameters you can configure are (for each data rate):

- The Modulation index (from 0 to 100 %),
- The timings (SOF, Start bit, bit 0... bit 7, stop bit, EGT, EOF),
- The EMD handling (please refer to MP500 TCL3 API Reference: *CPP_ANTI_EMD*).

Type FeliCatype A type B **type feliCa** type vicinity

MODULATION	
ASK Modulation	<input type="range" value="12"/> 12 %

In feliCa type, the only adjustable parameter is the Modulation index (from 0 to 100 %).

Type Vicinitytype A type B type feliCa **type vicinity**

MODULATION		PAUSE DURATION	
ASK Modulation	<input type="range" value="10"/> 10 %	VicinityPause	9 440 ns

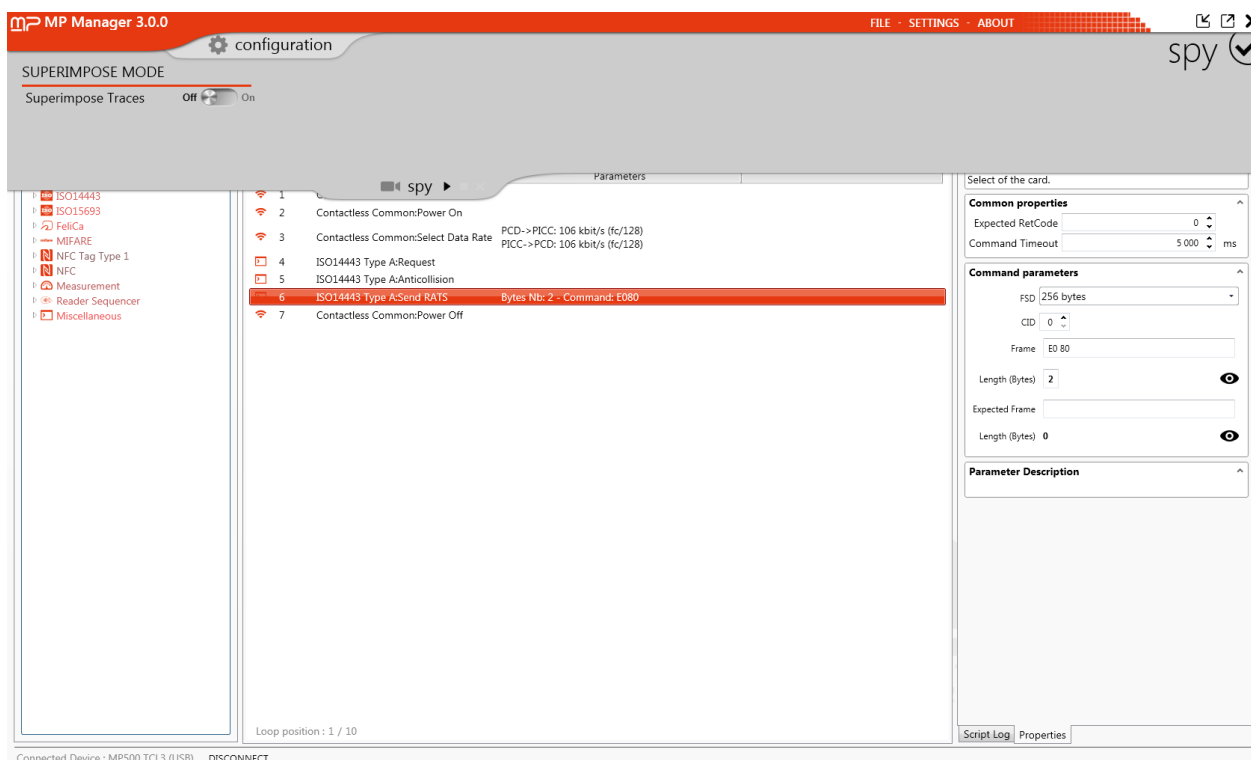
In vicinity type, two parameters are adjustable:

- The Modulation index (from 0 to 100 %),
- The Pause Duration (as defined in ISO standard) from 500 ns to 9,440 ns.



Eventually, the configuration can be saved in a .cfg file that you will be able to load for a future testing session. The “Reset hard” button will reinitialize the default configuration.

Spy



Just like configuration panel, the spy window can be accessed while navigating in another window at the same time. This is where the spying option is managed.

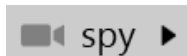


The superimpose mode is used to synchronize two MP500 devices in order to spy contactless and contact transaction at the same time.



Please refer to the MP500 Synchronization procedure

In order to launch the spy, you just have to click on “start”:



Then, execute your script and stop the spy (or cancel it):



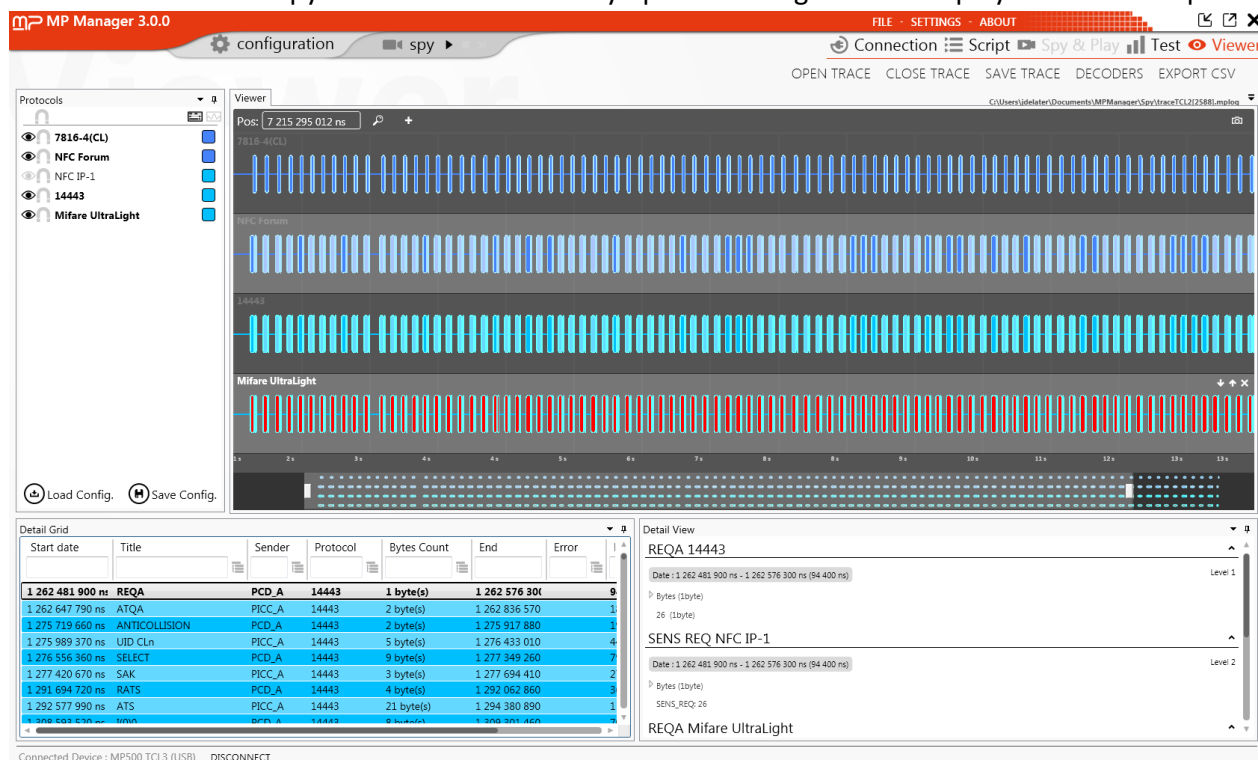
The spied exchange is automatically saved in default directory:

C:\Users\XXX\Documents\MPManager\Spy (this directory can be modified in *Settings > Spy*)

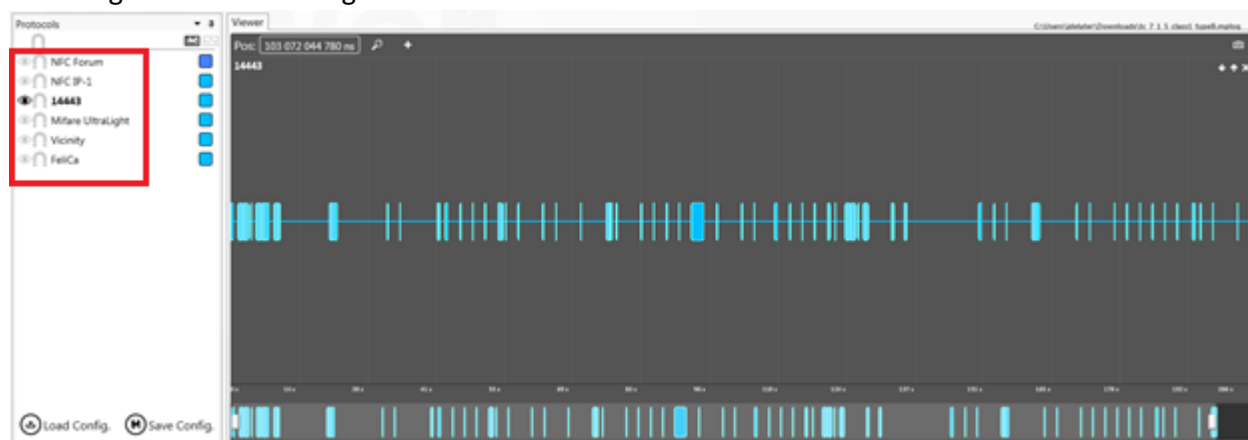
In order to analyze it, you will have to open the viewer window.

Viewer

The trace from latest spy session is automatically opened during the first display of the viewer panel.



On the left, several protocols that were automatically decoded are listed. Enable or disable the decoding with the following buttons:




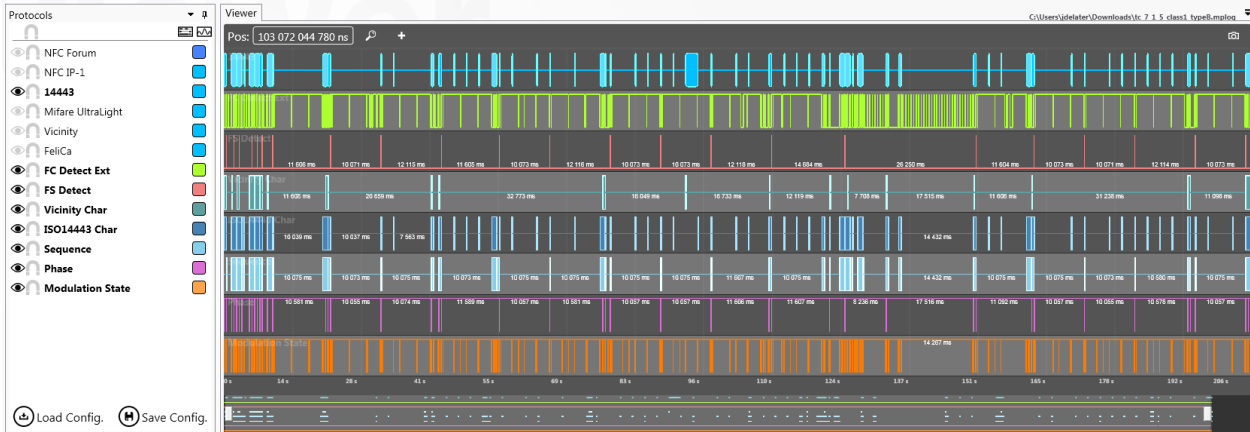
: Enable decoder

: Disable decoder

It is also possible to load a specific decoder using the “decoders” button at the top right of the window.

Viewer

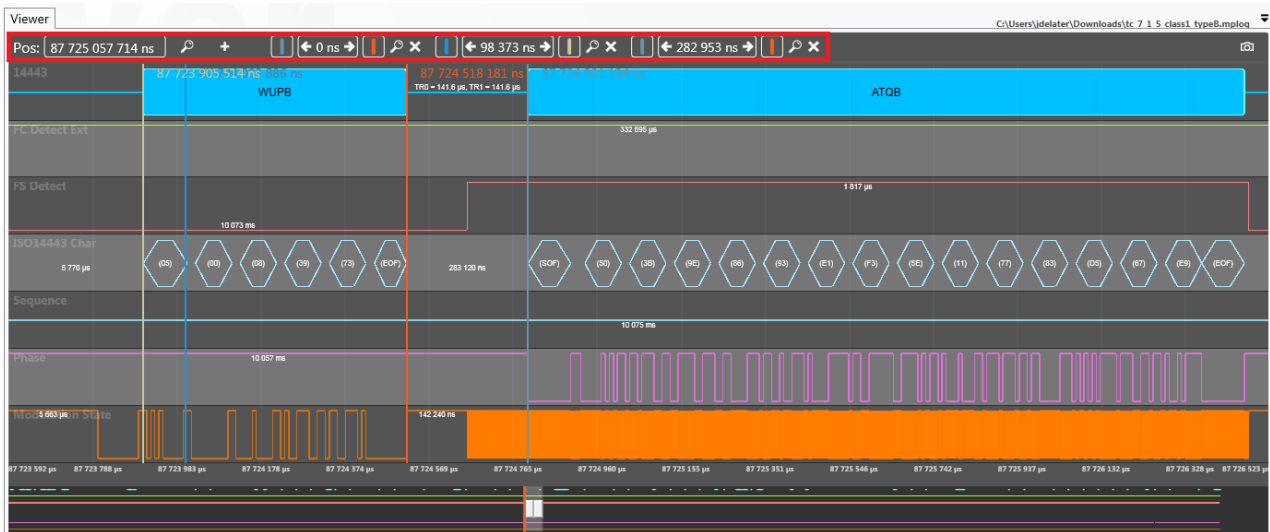
To see the low-level information (modulations, field strength detection, Sequence...) click on the "Show/Hide low level protocols" button: 



The mouse shall be used to browse the trace:

- Scroll up: zoom in
- Scroll down: zoom out
- Right click and move: move to the left / right
- Left click and drag: select a zone to zoom in

Here is a view after zoom-in:



Several options are available in low-level view:



Enable/Add cursors



Reach a specific position



Zoom fit



Show/Hide cursor, time difference information



Disable cursors



Take a screenshot of viewer window



Enable or disable magnetic cursors mode



Change protocol color



Load Config. :

Load protocol configuration



Save Config. :

Save protocol configuration



Zoom minimap

Detail Grid and Detail View

The detail grid provides some useful details regarding protocol level:

Start date	Title	Sender	Protocol	Bytes Count	End	Error
292 793 520 ns	WUPB	PCD_B	14443	5 byte(s)	293 405 800 n	6
800 546 420 ns	REQA	PCD_A	14443	1 byte(s)	800 640 820 n	9
806 392 160 ns	WUPB	PCD_B	14443	5 byte(s)	807 004 420 n	6
807 287 540 ns	ATQB	PICC_B	14443	14 byte(s)	808 953 580 n	1
1 829 792 460 ns	REQA	PCD_A	14443	1 byte(s)	1 829 886 860	9
1 835 638 000 ns	WUPB	PCD_B	14443	5 byte(s)	1 836 250 200	6
2 341 804 980 ns	REQA	PCD_A	14443	1 byte(s)	2 341 899 380	9
2 347 651 040 ns	WUPB	PCD_B	14443	5 byte(s)	2 348 263 600	6
2 348 546 260 ns	ATQB	PICC_B	14443	14 byte(s)	2 350 212 320	1
2 855 456 900 ns	REQA	PCD_A	14443	1 byte(s)	2 855 551 300	9
2 861 302 820 ns	WUPB	PCD_B	14443	5 byte(s)	2 861 914 660	6
3 369 067 900 ns	REQA	PCD_A	14443	1 byte(s)	3 369 162 300	9
3 374 914 980 ns	WUPB	PCD_B	14443	5 byte(s)	3 375 526 880	6
3 375 810 280 ns	ATQB	PICC_B	14443	14 byte(s)	3 377 476 340	1
3 882 648 420 ns	REQA	PCD_A	14443	1 byte(s)	3 882 742 820	9

Commands can be organized and filtered by Start date, Sender (PCD/PICC), Command, Protocol...

Start date	Title	Sender	Protocol	Bytes Count	End	Error
		PCD_A				
▼ 14443 (68 Messages)						
125 625 007 540	REQA	PCD_A	14443	1 byte(s)	125 625 101 9	9
126 137 712 980	REQA	PCD_A	14443	1 byte(s)	126 137 807 3	9
124 598 352 540	REQA	PCD_A	14443	1 byte(s)	124 598 446 9	9
125 110 239 100	REQA	PCD_A	14443	1 byte(s)	125 110 333 5	9
128 186 679 260	REQA	PCD_A	14443	1 byte(s)	128 186 773 6	9
132 819 933 420	REQA	PCD_A	14443	1 byte(s)	132 820 027 8	9

When you select a command line in the detail grid, the detail view will provide even more information regarding protocol decoding:

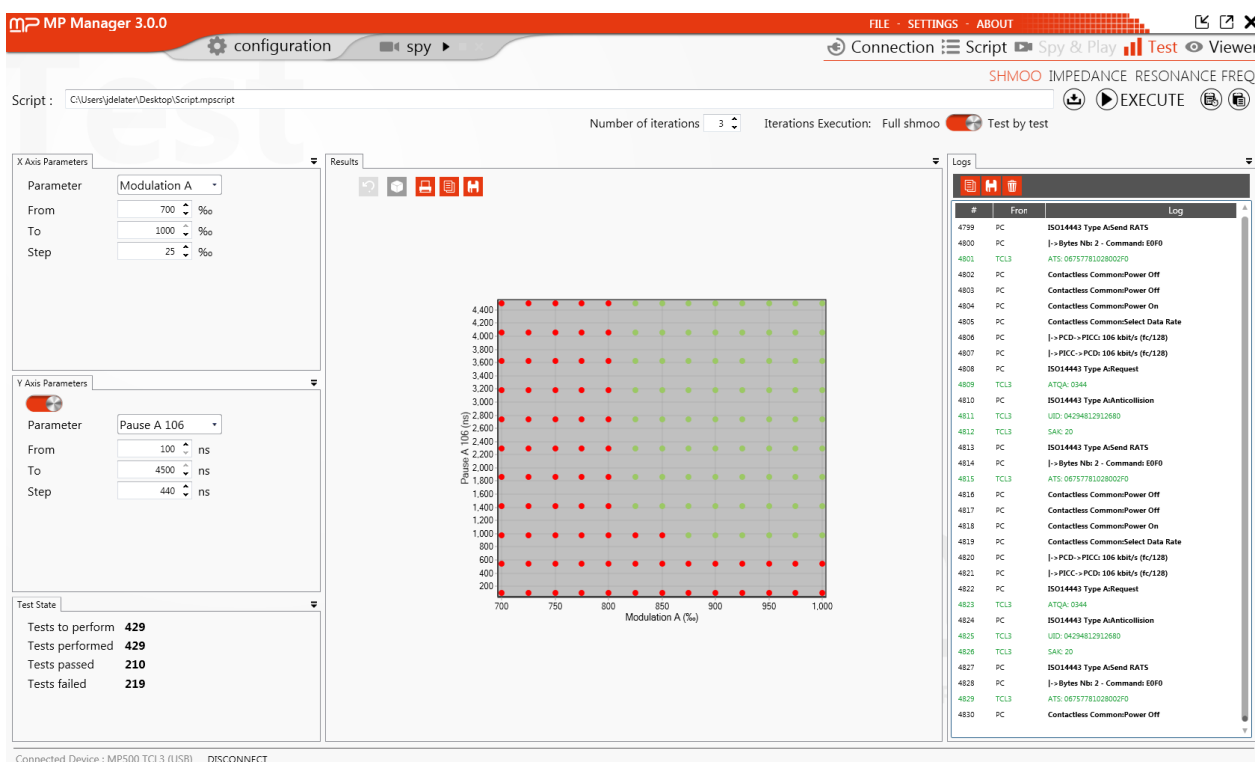
Detail View
WUPB 14443
Date : 806 392 160 ns - 807 004 420 ns (612 260 ns)
Level 1
<ul style="list-style-type: none"> Bytes (5 bytes) <ul style="list-style-type: none"> 05 00 08 39 73 (5 bytes) APR 05 (1byte) <ul style="list-style-type: none"> AFI = 00 (All families and sub-families) (1byte) Param: 08 (1byte) <ul style="list-style-type: none"> Extended ATQB not supported Nb of slots: 1 CRC B: OK (2 bytes) <ul style="list-style-type: none"> 39 73 (2 bytes) Timings <ul style="list-style-type: none"> EGT PCD = 9.5 µs EGT PCD = 9.4 µs EGT PCD = 9.4 µs EGT PCD = 9.4 µs

The Detail Grid data can be exported to a CSV file using "Export CSV" button at the top right of the window.

Test

The TCL3 embeds several “parametric tests” functionalities, such as Impedance measurement and Resonance Frequency measurement. MPManager also provides a functionality called “Shmoo” where the same script is ran several times when adjusting analog parameters between each execution.

Shmoo



The shmoo adapt two analog parameters of the TCL3 when executing a script. The aim is to characterize your card regarding interoperability with readers.

In order to run a shmoo test, you first have to load a script

Script : C:\Users\jdelater\Desktop\Script.mpscript



Then, select the X and Y axis parameters (Y is optional), and configure them.

X Axis Parameters

Parameter

Modulation A

From

700

‰

To

1000

‰

Step

25

‰

Y Axis Parameters

Parameter

Pause A 106

From

100

ns

To

4500

ns

Step

440

ns

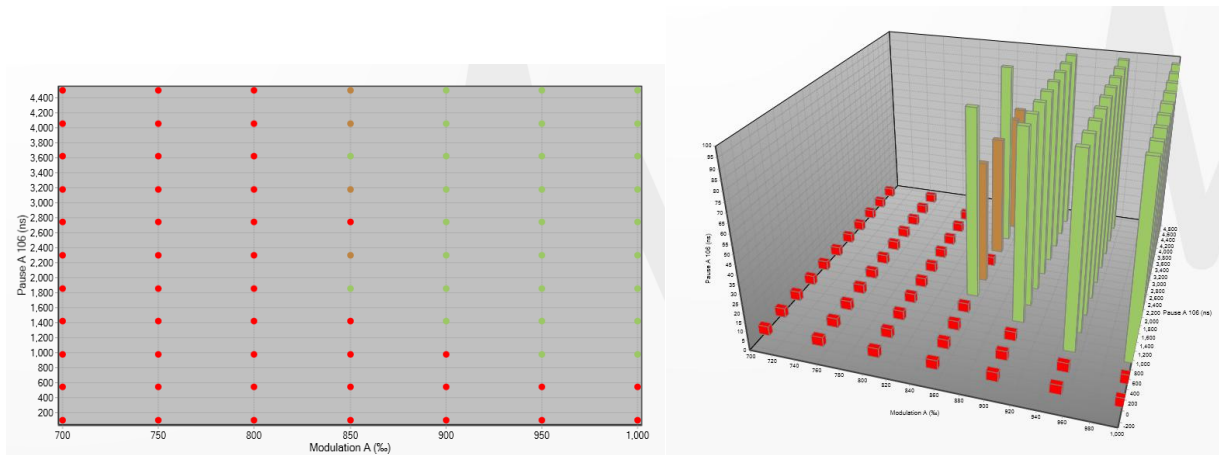
The different parameters are: Rise time, Fall Time, Frequency, Field Rise Time, Modulation A, Modulation B, Modulation FeliCa, Modulation Vicinity, Pause A 212, Pause A 424, Pause A 848, Pause Vicinity, Field Strength.

For each parameter, minimum and maximum value, as well as the step, can be configured.

Once the parameters are configured, click on execute button:



During execution, the graph will show real-time results, and provide a complete status at the end:



Just below the parameters, the “test state” provides a result summary. Each plotted test result is clickable in the graph. The applied parameters for a specific graph position are recalled in the log.

Test State	
Tests to perform	429
Tests performed	429
Tests passed	210
Tests failed	219

Logs		
#	From	Log
4785	PC	Test 143
4786	PC	AskModulationA=1000 %
4787	PC	Pause106TypeA=4500 ns
4788	PC	Success: 100 %
4789	PC	Contactless Common:Power Off
4790	PC	Contactless Common:Power On
4791	PC	Contactless Common:Select Data Rate
4792	PC	->PCD->PICC: 106 kbit/s (fc/128)
4793	PC	->PICC->PCD: 106 kbit/s (fc/128)
4794	PC	ISO14443 Type A:Request
4795	TCL3	ATQA: 0344
4796	PC	ISO14443 Type A:Anticollision
4797	TCL3	UID: 04294812912680
4798	TCL3	SAK: 20
4799	PC	ISO14443 Type A:Send RAT5
4800	PC	->Bytes Nb: 2 - Command: E0F0
4801	TCL3	ATS: 06757781028002F0
4802	PC	Contactless Common:Power Off
4803	PC	Contactless Common:Power Off
4804	PC	Contactless Common:Power On
4805	PC	Contactless Common:Select Data Rate
4806	PC	->PCD->PICC: 106 kbit/s (fc/128)
4807	PC	->PICC->PCD: 106 kbit/s (fc/128)
4808	PC	ISO14443 Type A:Request
4809	TCL3	ATQA: 0344
4810	PC	ISO14443 Type A:Anticollision
4811	TCL3	UID: 04294812912680
4812	TCL3	SAK: 20
4813	PC	ISO14443 Type A:Send RAT5
4814	PC	->Bytes Nb: 2 - Command: E0F0
4815	TCL3	ATS: 06757781028002F0
4816	PC	Contactless Common:Power Off
4817	PC	Contactless Common:Power Off

Eventually, a report can be generated in .xml or .csv format:



: Generate report



: Open report

Several options are available in this shmoo test. The first one is the possibility to execute each test several times, adding a third “dimension” to the test:

Number of iterations Iterations Execution: Full shmoo ☒ Test by test

Full shmoo: execute the full shmoo for each number of iterations.

Test by test: execute each test for each number of iterations, before moving to the next test.



: Switch between fixed and rotative mode (3D mode only)



: Switch between 3D and normal mode



: Print the graph



: Copy the graph to clipboard (as a screenshot)



: Export to file (as a screenshot)

Some options are also available for the execution log :



: Copy to clipboard



: Export to file (in .txt)



: Clear the log

Impedance measurement



Cable/Head compensation must be performed before any impedance measurement.

The TCL3 is able to measure the impedance of an antenna or module connected to the Tx/Rx front connector through a RF cable (which must be compensated). In order to do so, set the voltage level to 50 %, select Impedance measurement at the end of the cable and then click on “Start Measure”. The results will appear on the right.

Enable the repeat switch to perform a continuous impedance measurement.



Cable/Head compensation

The cable compensation procedure is used to compensate the offset induced by the cable connected to the Tx/Rx front connector. It must be performed prior to any antenna impedance measurement.

The head compensation procedure is used in production environment to compensate the offset induced by a test head connected to a RF cable. It should be performed after a cable compensation and before any measurement with a test head.

Use the calibration kit provided with your TCL3 to perform the cable/head compensation.



Calibration kit

The cable compensation consists in the following steps:

- Open circuit impedance measurement
- 50Ohm resistor measurement

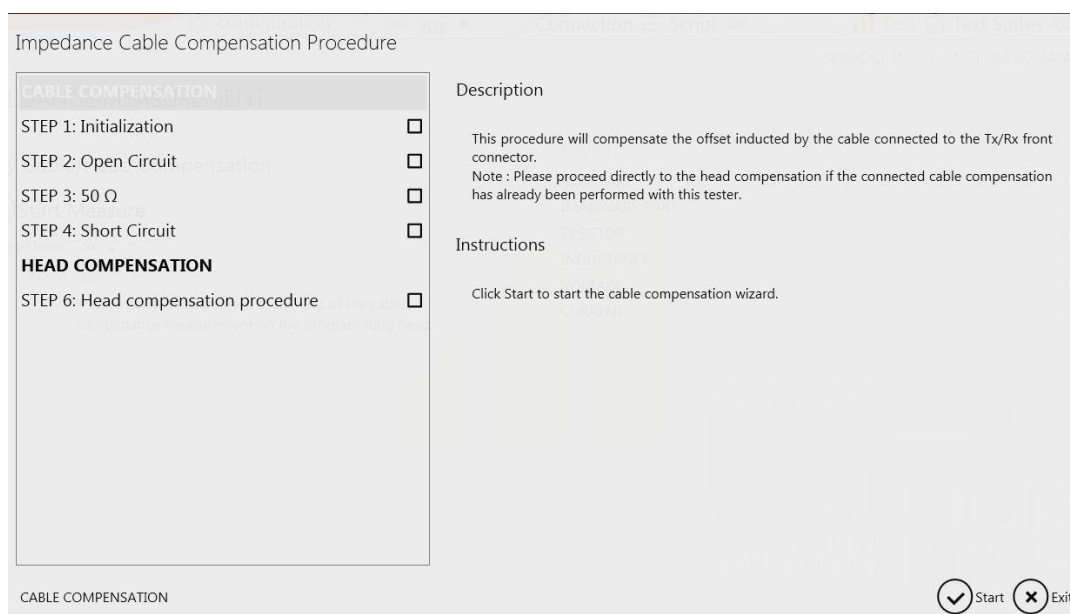
- Impedance measurement in short circuit

The head compensation consists in the following steps:

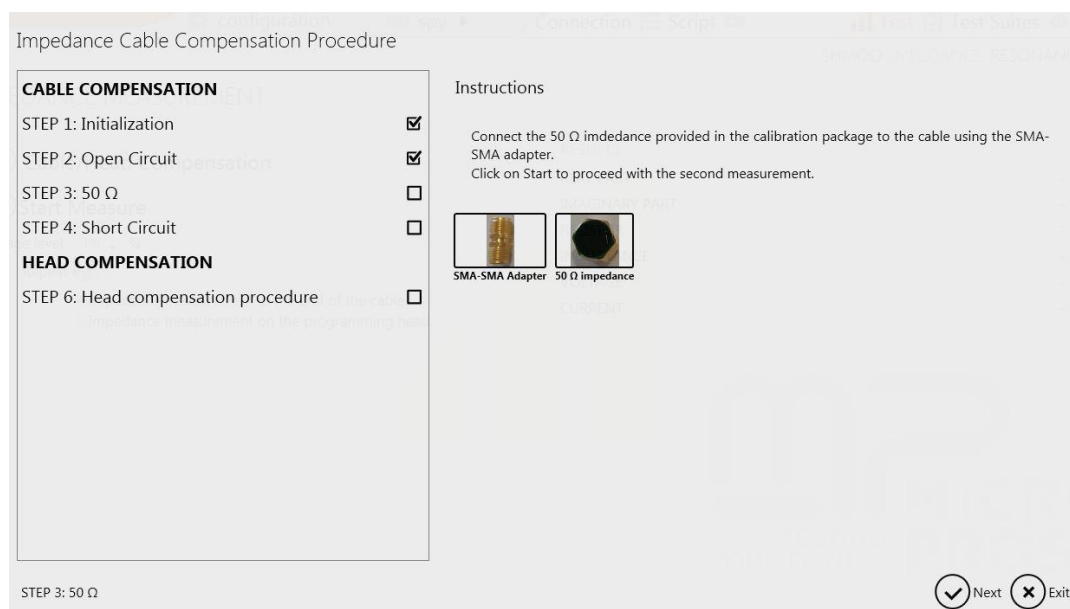
- Impedance measurement with test head connected

All the results are stored in the device non-volatile memory to be reused after restart.

- 1) Launch the cable/head compensation wizard by clicking on the cable/head compensation label.



- 2) Follow the instructions detailed in the compensation wizard. Step are performed successively



- 3) If you're proceeding to the end of the test head compensation, measurement results are displayed in the last information page.

Impedance Cable Compensation Procedure

CABLE COMPENSATION

STEP 1: Initialization ☒

STEP 2: Open Circuit ☒

STEP 3: 50 Ω ☒

STEP 4: Short Circuit ☒

HEAD COMPENSATION

STEP 6: Head compensation procedure ☒

Instructions

Connect the programming head to the cable and click Start to compensate the test head and store the results in the coupler's non volatile memory.

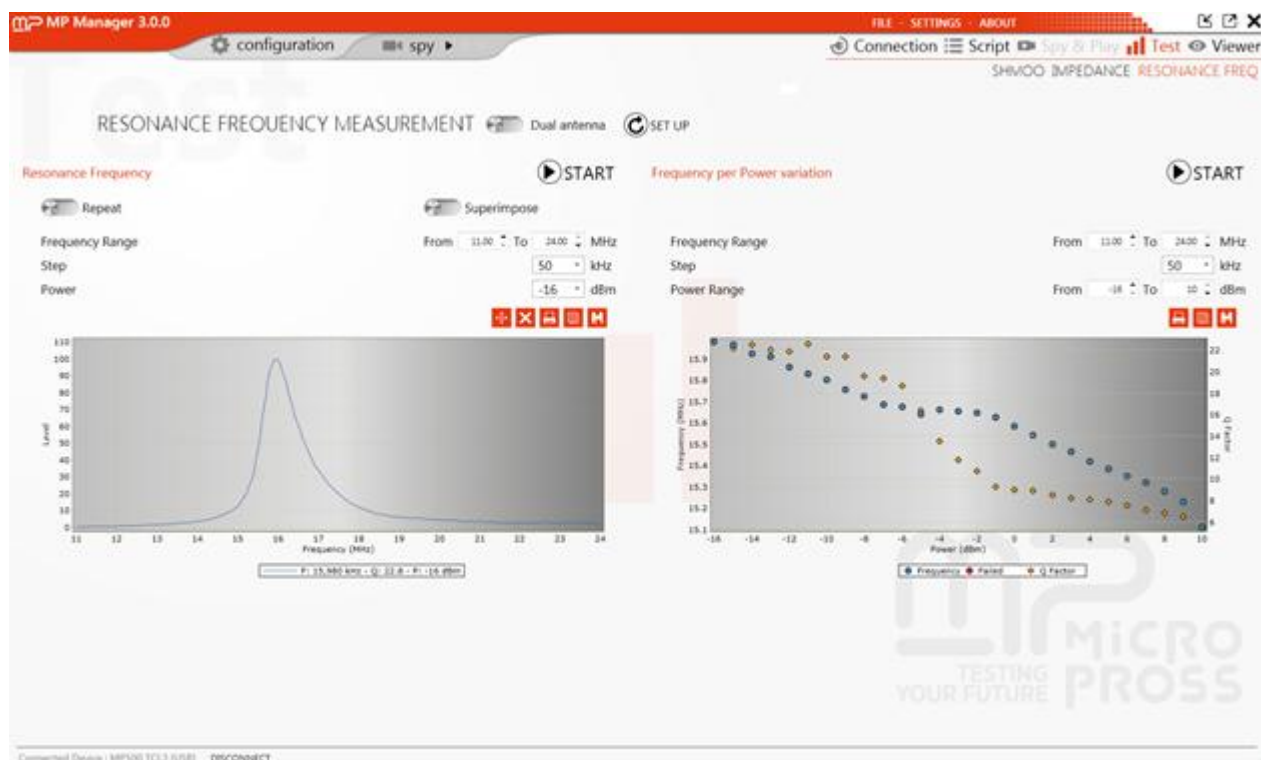
Resistor: 417.30 Ω
 Capacitor: 9.90 pF
 Real Part: 371.10 Ω
 Imaginary Part: -130.80 Ω
 Voltage: 149.00 mV
 Current: 0.00 mA

STEP 6: Head compensation procedure Exit

Resonance Frequency measurement



The resonance frequency measurement must be executed using the provided cable and Calibration Coil 1 antenna



The resonance frequency measurement window is articulated in 3 parts: the setup, the resonance frequency measurement for a fixed power, and the frequency per power variation.

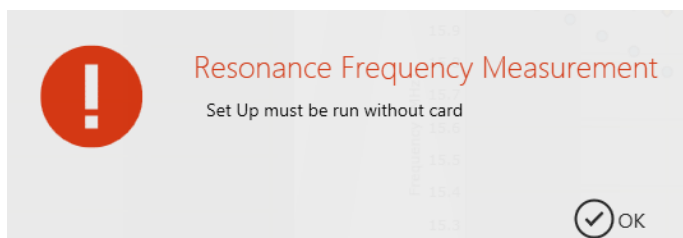
Setup

RESONANCE FREQUENCY MEASUREMENT ☐ Dual antenna SET UP



The “Dual antenna” option is only used with a dual communication/resonance frequency measurement antenna. It does not concern MP500 TCL3.

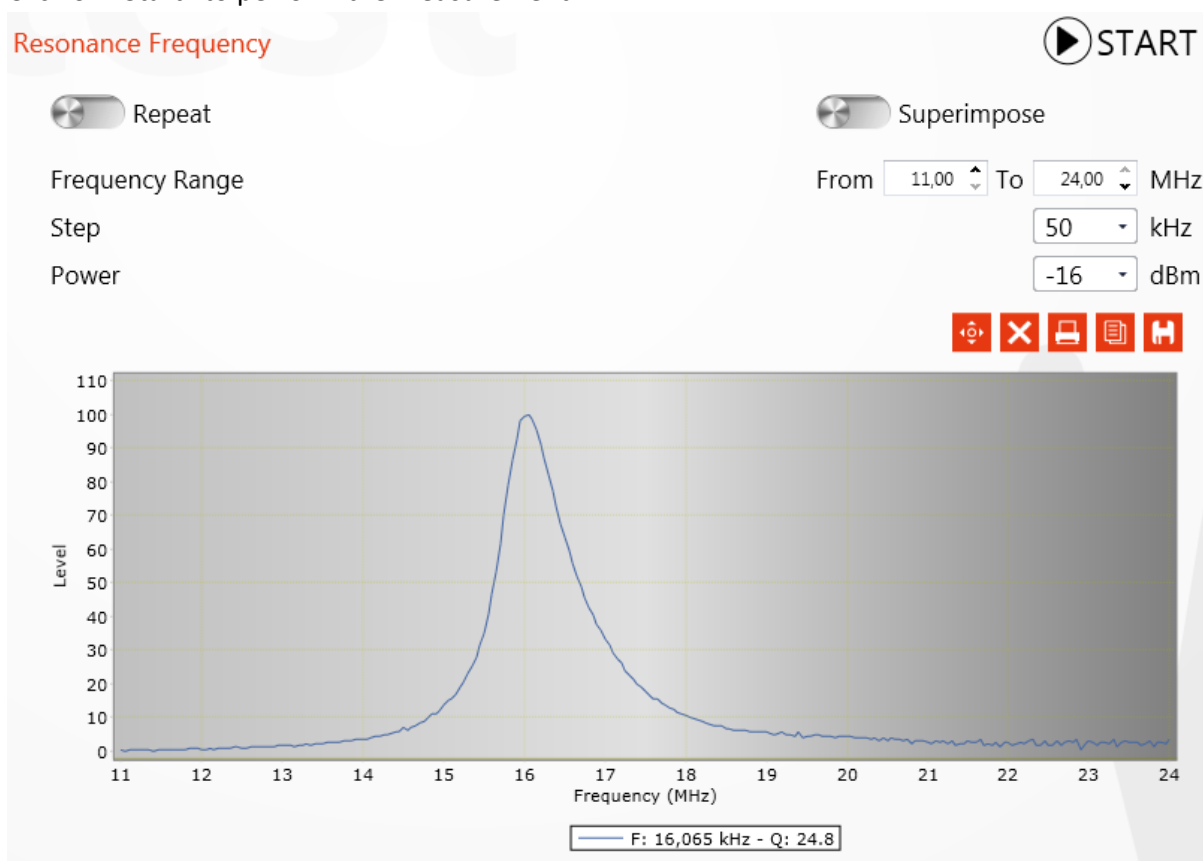
- Connect the 907-2475 (Calibration Coil 1) antenna to the TCL3 “RF/Q” connector
- Run the setup. A warning appears to make sure that there is no card positioned close to the antenna:



Resonance Frequency

In order to realize a correct Resonance Frequency measurement, the card must be placed one centimeter over the Calibration Coil 1 antenna using an adequate spacer.

Click on “Start” to perform the measurement:



The function will return the Resonance Frequency as well as the antenna Q factor.

Several options are available before running the test:

- Repeat: the measurement will be repeated every second,
- Superimpose: every measurement result is kept on the graph (useful to compare several cards),
- Frequency range: define the minimum and maximum measurement limit,
- Step: define the sampling value,
- Power: level of the signal emitted by the TCL3 to realize the measurement.



: Change the graphical view



: Clear the graph



: Print the graph



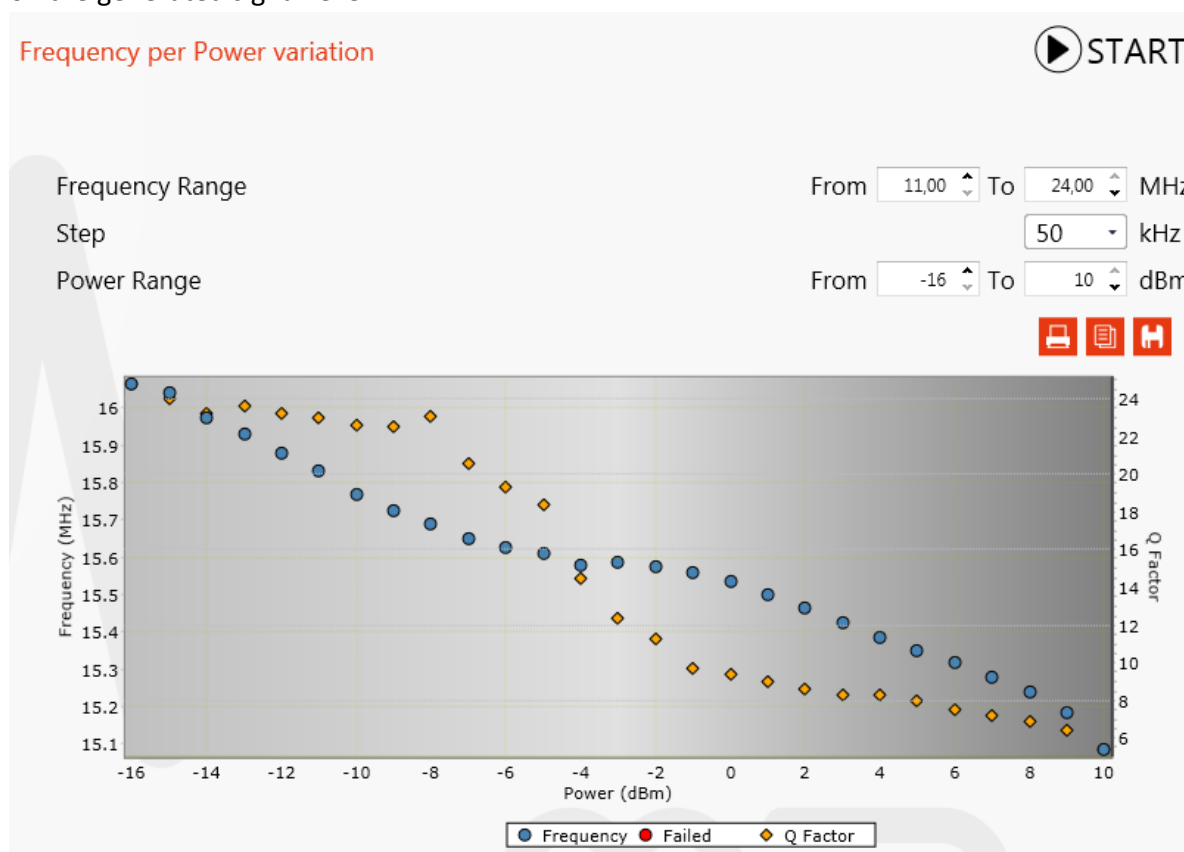
: Copy the graph (as an image)






: Export the data to a .xml file

Frequency per Power variation

This functionality is useful to characterize your card resonance frequency and quality factor depending on the generated signal level.



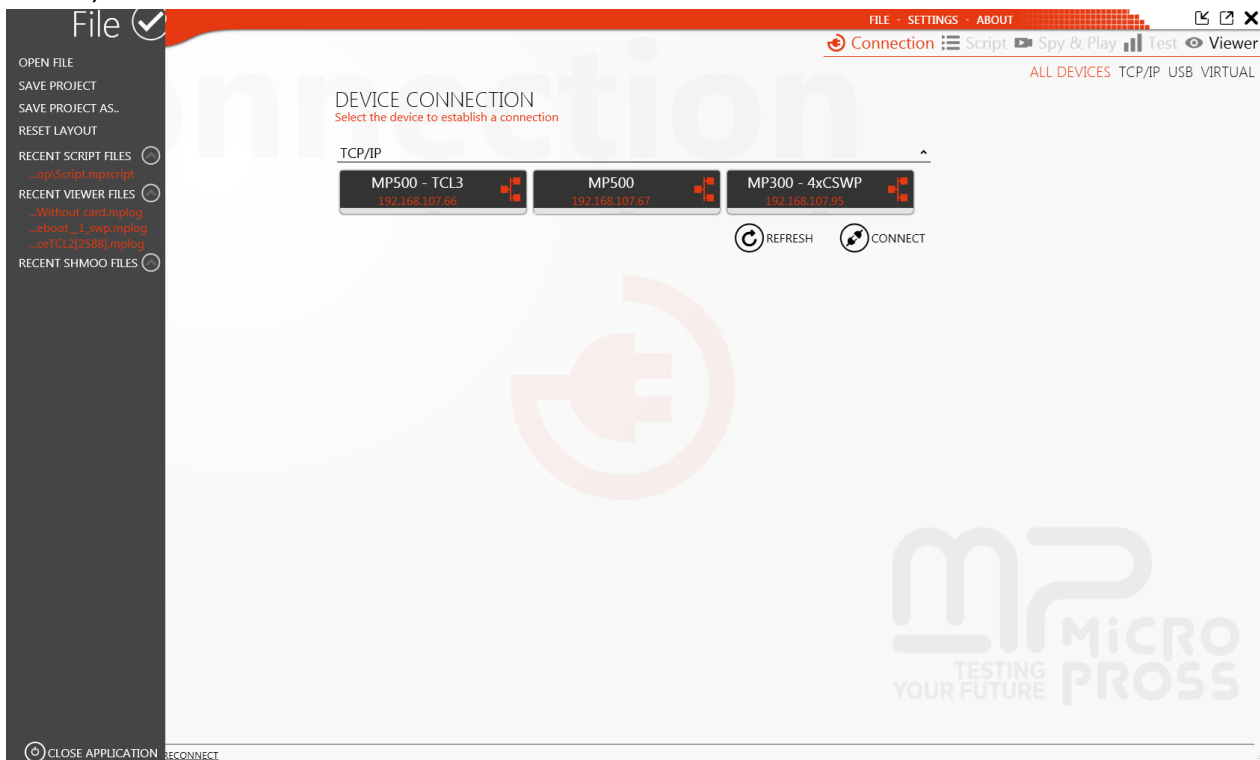
Several options are available before running the test:

- Frequency range: define the minimum and maximum measurement limit,
- Step: define the sampling value,
- Power range: level of the signal emitted by the TCL3 to realize the measurement.
- : Print the graph
- : Copy the graph (as an image)
- : Export the data to a .xml file

Menus

File

The file menu is used to open a file, create and save a project, or open a recent file (script, viewer, shmoo).

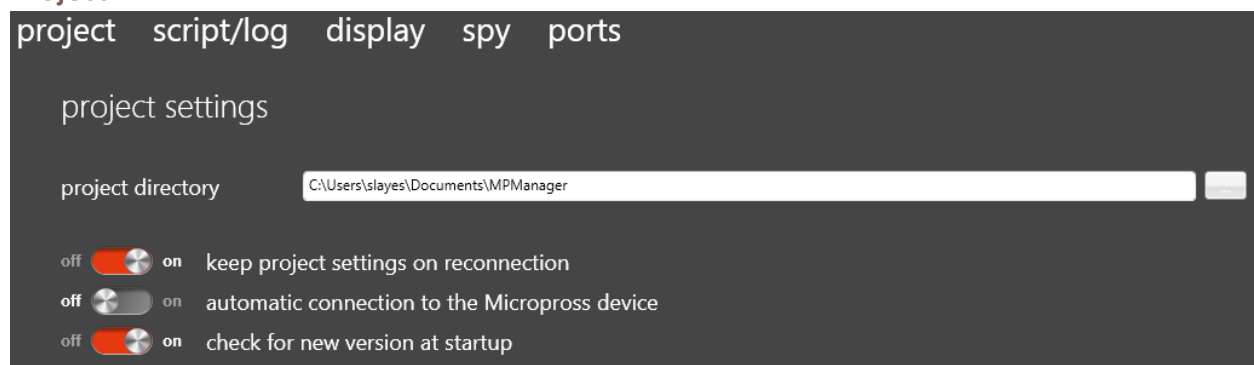


The « reset layout » button can be useful to reset default positioning for all the windows.

Settings

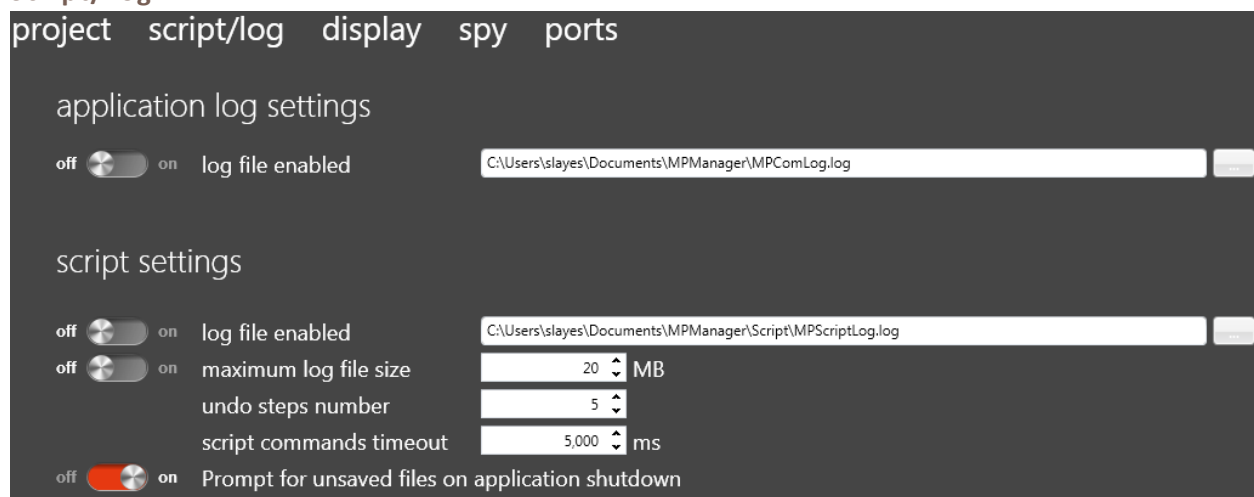
The settings menu is divided in 4 parts: project, script/log, display, and spy.

Project



- Project directory: Modify the project file directory
- Automatic connection to the Micropross device: If this option is set to “on”, MPManager will automatically reconnect to the Micropross device linked to your current project.
- Check for new version at startup: If this option is set to “on”, MPManager will automatically check if a new version is available at startup.

Script/Log



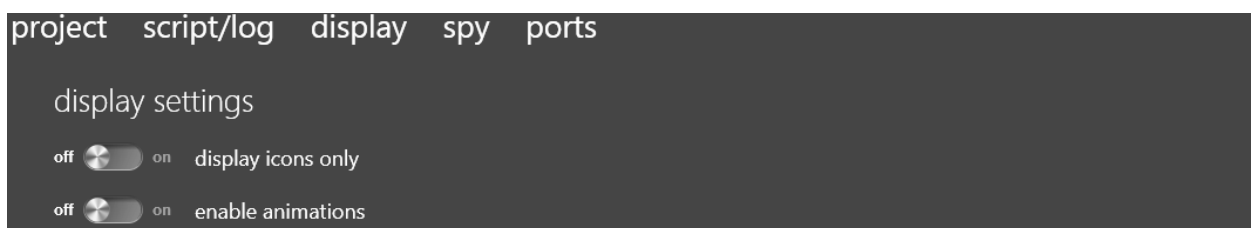
Application log settings

- Log file enabled: If this option is set to “on”, a log file will save all the remote commands exchanged between MPManager and the TCL3.

Script settings

- Log file enabled: If this option is set to “on”, the scripts execution log will be also saved in a log file directly.
- Maximum file size : The log file can be configured with a maximum log file size.
- Undo steps number: Maximum number of “Undo” iterations.
- Script command timeout: Default timeout for the script commands.
- Prompt for unsaved files on application shutdown: Will ask the user to save (or not) any unsaved file before closing the application.

Display



- Display Icons Only: Enable or disable « icons only » mode.
 - Enabled:



- Disabled :

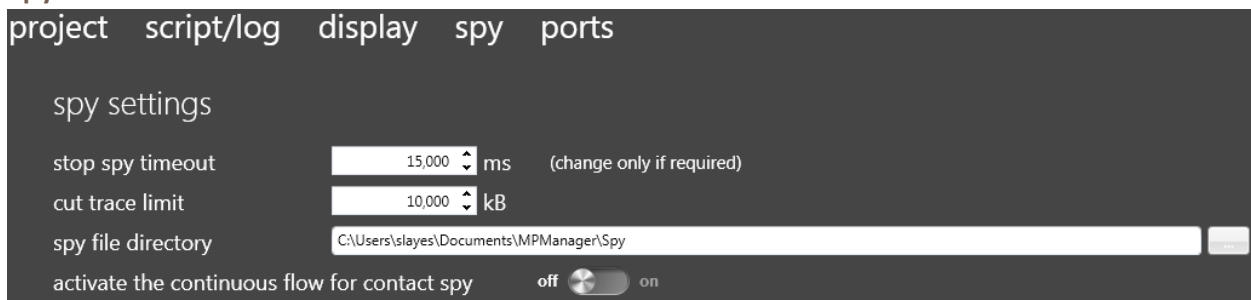


- Enable animations: Enable or disable the animations during navigation.



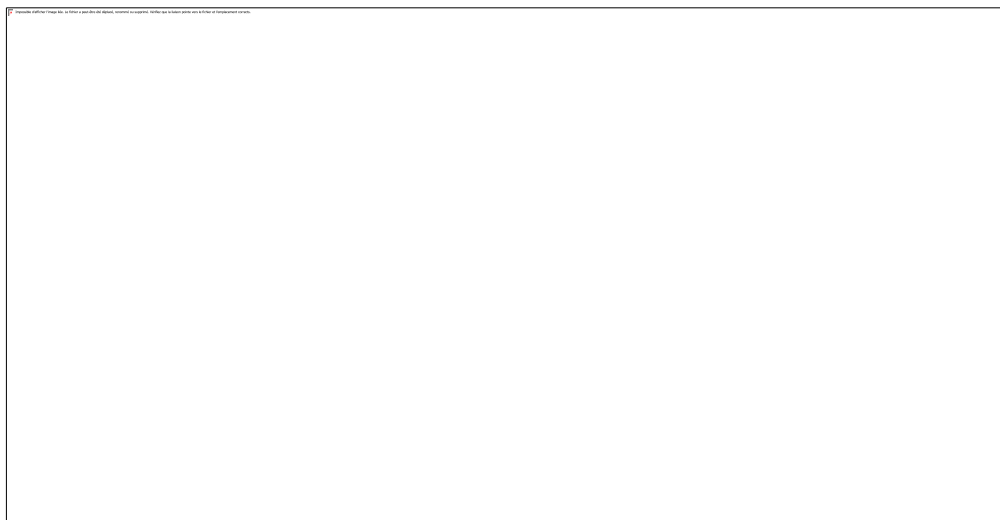
Disable animations can increase MPManager performance on low-performance PCs.

Spy



- Stop spy timeout: This timeout is used to stop the spy automatically if “stop spy” button is not able to stop it normally.
- Cut trace limit: If the trace exceed this size, a popup will propose to cut the trace when opened in the viewer.
- Spy file directory: Change the default spy file directory.
- Activate the continuous flow for contact spy (not used with TCL3): This option, only available with contact spying devices, will activate continuous flow in viewer window.

Ports



Adjust these parameters to adapt MP Manager to your local TCP/IP network policy.

- TCP Ports
 - Local TCP Port range : Specify a local TCP port range used by MP Manager to establish a communication with the device. Automatically chosen by default.
 - Remote TCP Port : TCP port to connect to to establish a communication to the device.
 - Spy TCP Port range : TCP port range used by MP Manager to download events form the device during a spy session. Automatically chosen by default.
- UDP Ports
 - Device discovery UDP Port : TCP port used by MP Manager for the device discovery broadcasting service (used to auto-detect devices on the connection page).

SUPPORT, MAINTENANCE & SAFETY

HARDWARE WARRANTY

Your MP500 TCL3 comes with a 2-year hardware warranty.

MICROPROSS SUPPORT

Don't hesitate to visit our interactive helpdesk at www.micropross.com/customer_area. You'll be able to:

- Get all the answers to your questions with the online helpdesk (*3 months of software support are free of charge from the delivery date*). Our engineers accompany you during your projects development to ease our tools integration.
- Download the latest software and resources available in the download center.

MAINTENANCE AGREEMENT

To get benefit from a full technical support of your products, feel free to request a quotation at smartcards@micropross.com

PREVENTIVE MAINTENANCE

Cable/Head compensation procedures

Cable and Head compensation procedures are essential to guarantee the accuracy and the validity of the measurement performed by the coupler. Please observe the following rules:



Cable compensation **must be performed** when the cable from the tester to the test head is replaced, or at least once per year.



Head compensation **must be performed** when the production machine starts or the test head evolves.



Resonance frequency setup **must be performed** when a cable is replaced, and at least once per month.

All setups results are stored in the non-volatile memory of the coupler.

Cleaning and preventive maintenance

Preventive maintenance consists of periodic cleaning and inspection. It should be performed as often as the operating environment dictates. If the product has been subjected to abnormally dirty conditions, interior cleaning and inspection by service operators may be needed. Exterior cleaning may be performed by the operator. Dust the exterior surfaces with a dry, lint-free cloth or a soft bristle brush. Do not use abrasive compounds on any part of the rack.



Any maintenance operation, including cleaning, must be performed with power cord disconnected. To prevent water from getting inside the rack, do not use water or chemical agents.

SAFETY NOTES

The general safety information in this summary is for operating and servicing personnel. Specific warnings and caution can be found throughout the manual where they apply and may not appear in this summary.

TERMS AS MARKED ON THE EQUIPMENT

CAUTION indicates a hazard to property, including the equipment itself, and could cause minor personal injury.

WARNING indicates solely a personal injury hazard not immediately accessible as you read the marking

DANGER indicates a personal injury hazard immediately accessible as you read the marking.

SYMBOLS AS MARKED ON EQUIPMENT



DANGER – High voltage



Protective ground (earth) terminal



ATTENTION – REFER TO MANUAL

GROUNDING THE PRODUCT

This product is intended to operate from a power source that does not apply more than 250 V_{RMS} between the supply conductors or between supply conductor and ground.

WARNING: This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts can render an electric shock.

POWER DISCONNECT

The main power disconnect is by means of the power cord or, if provided, an AC power switch.

USE THE PROPER POWER SUPPLY

If your product requires an AC/DC adapter, use only the adapter specified for your product.

WARNING: The AC/DC adapter provided insures correct grounding of the product. To avoid electrical shock, your product must be grounded.

USE THE PROPER POWER CORD

Use only the power cord and connector specified for your product. Use only a power cord that is in good condition.

USE THE PROPER FUSE

To avoid fire hazard use only a fuse of the correct type, voltage rating and current rating. Disconnect power cord before any intervention.

USE THE PROPER VOLTAGE SETTING

Make sure the line selector is in the proper position for the power source being used.

REMOVE LOOSE OBJECTS.

During disassembly or installation procedures, screws or other small objects may fall to the bottom of the mainframe. To avoid shorting out the power supply, do not power up the instrument until such objects have been removed.

DO NOT OPERATE WITHOUT COVERS

To avoid personal injury, remove jewelry such as rings, watches and other metallic objects before removing the cover. Do not touch exposed connections and components within the product while the power cord is connected. Always remove the power cord before removing the cover.

REMOVE FROM OPERATION

If you have reason to believe that the instrument has suffered a component failure, do not operate the instrument until the cause of failure has been determined and corrected.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERE

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove instrument covers. Components replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power

cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering aid and resuscitation, is present.

SOFTWARE LICENSES

This product contains the following open-source libraries.

Package	Version	License
buildroot	2013.02-svn26283-dirty	GPLv2+
busybox	1.21.0	GPLv2
gnupg	1.4.7	GPLv3+
libassuan	2.0.3	LGPLv2.1+
libconfig	1.4.8	LGPLv2.1+
libgpg-error	1.1	LGPLv2.1+
libgpgme	1.3.2	LGPLv2.1+
lzo	2.06	GPLv2+
ncurses	5.9	MIT with advertising clause
openssl	1.0.1e	OpenSSL or SSLeay
uboot-tools	2013.01.01	GPLv2+
zlib	1.2.7	zlib license
linux	3.0.35-Q7_IMX6-14.03.01	GPLv2
fakeroot	1.14.4	GPLv2
module-init-tools	3.15	GPLv2+
autoconf	2.68	GPLv3+ with exceptions
automake	1.11.6	GPLv2+

These libraries source code is available on demand.